

**CURRICULUM VITAE****NAME** Joe E. Brummer**ADDRESS** Colorado State University  
Department of Soil and Crop Sciences  
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Fort Collins, CO 80523-1170**PHONE** (970) 491-4988**EMAIL** Joe.Brummer@colostate.edu**EDUCATION**

1994	Ph.D. in Agronomy, Major-Range Management, University of Nebraska
1986	M.S. in Agronomy, Major-Range Management, Oklahoma State University
1984	B.S. in Range Science, Major-Range Ecology, Colorado State University

**ACADEMIC POSITIONS**

2005-present	Associate Professor/Forage Specialist, Colorado State University
2003-2005	Research Scientist/Scholar III, Forage Production, Colorado State University
2002-2003	Research Scientist/Scholar III/Superintendent, Forage Production, Colorado State University
1994-2002	Research Scientist/Superintendent, Forage Production, Colorado State University

**OTHER POSITIONS**

1987-94	Range Research Coordinator, University of Nebraska, North Platte, Nebraska
1986-87	Research Associate, Colorado State University, Fort Collins, Colorado
1984-86	Graduate Research Assistant, Oklahoma State University, Stillwater, Oklahoma
1983-84	Student Research Technician, Economic Research Service-USDA, Fort Collins, Colorado
1981	Research Assistant, Colorado State University, Springfield, Colorado
1980	Research Assistant, Colorado State University, Springfield, Colorado
1979	Range Aide, United States Forest Service, Laramie, Wyoming

**CURRENT JOB DESCRIPTION**

20 % Teaching 45 % Research/Creative Activity 35 % Service/Outreach \_\_\_\_\_ % Admin

Administrative oversight of the Mountain Meadow Research Center ended in 2003 with the closing of the center.

**PUBLISHED WORKS****Refereed Journal Articles:**

- Shanahan, J.O., J.E. Brummer, W.C. Leininger, and M.W. Paschke. 2007. Manganese and zinc toxicity thresholds for mountain and Geyer willow. *Int. J. Phytoremed.* 9:437-452.
- Bourret, M.M., J.E. Brummer, W.C. Leininger, and D.M. Heil. 2005. Effect of water table on willows grown in amended mine tailing. *J. Environ. Qual.* 34:782-792.
- Reece, P.E., J.E. Brummer, B.K. Northup, A.E. Koehler, and L.E. Moser. 2004. Interactions among western ragweed and other Sandhills species after drought. *J. Range Manage.* 57:583-589.
- White, S.K., J.E. Brummer, W.C. Leininger, G.W. Frasier, R.M. Waskom, and T.A. Bauder. 2003. Irrigated mountain meadow fertilizer application timing effects on overland flow water quality. *J. Environ. Qual.* 32:1802-1808.

- Fisher, K.T., J.E. Brummer, W.C. Leininger, and D.M. Heil. 2000. Interactive effects of soil amendments and depth of incorporation on Geyer willow. *J. Environ. Qual.* 29:1786-1793.
- Miller-Goodman, M.S., L.E. Moser, S.S. Waller, J.E. Brummer, and P.E. Reece. 1999. Canopy analysis as a technique to characterize defoliation intensity on Sandhills range. *J. Range Manage.* 52:357-362.
- Engel, R.K., J.T. Nichols, J.L. Dodd, and J.E. Brummer. 1998. Root and shoot responses of sand bluestem to defoliation. *J. Range Manage.* 51:42-46.
- Reece, P.E., J.T. Nichols, J.E. Brummer, and R.K. Engel. 1997. Field measurement of etiolated growth of rhizomatous grasses. *J. Range Manage.* 50:175-177.
- Reece, P.E., J.E. Brummer, R.K. Engel, B.K. Northup, and J.T. Nichols. 1996. Grazing dates and frequency effects on prairie sandreed and sand bluestem. *J. Range Manage.* 49:112-116.
- Brummer, J.E., J.T. Nichols, R.K. Engel, and K.M. Eskridge. 1994. Efficiency of different quadrat sizes and shapes for sampling standing crop. *J. Range Manage.* 47:84-89.
- McCullum, F.T., R.L. Gillen, and J.E. Brummer. 1994. Cattle diet quality under short duration grazing on tallgrass prairie. *J. Range Manage.* 47:489-493.
- Reece, P.E., J.T. Nichols, J.E. Brummer, R.K. Engel, and K.M. Eskridge. 1994. Harvest date and fertilizer effects on native and interseeded wetland meadows. *J. Range Manage.* 47:178-183.
- Engel, R.K., J.T. Nichols, and J.E. Brummer. 1993. A containerized technique for studying root systems. *J. Range Manage.* 46:459-461.
- Gillen, R.L., F.T. McCullum, M.E. Hodges, J.E. Brummer, and K.W. Tate. 1991. Plant community responses to short duration grazing in tallgrass prairie. *J. Range Manage.* 44:124-128.
- Gillen, R.L., F.T. McCullum, and J.E. Brummer. 1990. Tiller defoliation patterns under short duration grazing in tallgrass prairie. *J. Range Manage.* 43:95-99.
- Brummer, J.E., R.L. Gillen, and F.T. McCullum. 1988. Herbage dynamics of tallgrass prairie under short duration grazing. *J. Range Manage.* 41:264-266.

#### **Non-Refereed Proceedings/Transactions:**

- Bourret, M.M., J.E. Brummer, and W.C. Leininger. 2006. Foliar heavy metal concentrations of 2 willow species growing in a contaminated riparian zone, p. 204-212. *In: W.R. Keammerer (ed.), Proc. High Altitude Reveg. Workshop No. 17, Colorado Water Resources Research Institute, Information Series No. 101, Colorado State University, Fort Collins, Colo.*
- Boyster, M.J., J.E. Brummer, and W.C. Leininger. 2006. Comparison of Geyer and mountain willow grown in topsoil versus lime and biosolids amended mine tailings, p. 190-203. *In: W.R. Keammerer (ed.), Proc. High Altitude Reveg. Workshop No. 17, Colorado Water Resources Research Institute, Information Series No. 101, Colorado State University, Fort Collins, Colo.*
- Putnam, D., M. Ottman, T. Griggs, D. Drake, D. McWilliams, J. Brummer, and W. Riggs. 2006. Emerging issues with forages in the Southwest, p. 9-20. *In: Proc. 2006 Western Alfalfa and Forage Conf., December 11-13, 2006, Reno, Nev. Univ. Calif. Coop. Ext., Agron. Res. and Ext. Center, Plant Sci. Dept., Univ. Calif., Davis.*
- Shanahan, J.O., J.E. Brummer, W.C. Leininger, and M.W. Paschke. 2006. Manganese and zinc toxicity thresholds for mountain and Geyer willow, p. 247-262. *In: W.R. Keammerer (ed.), Proc. High Altitude Reveg. Workshop No. 17, Colorado Water Resources Research Institute, Information Series No. 101, Colorado State University, Fort Collins, Colo.*
- Brummer, J.E. and C.H. Pearson (Compiled and Edited). 2002. Proceedings of the Intermountain Forage Symposium. *Colo. State Univ. Tech. Bull. LTB 02-1.*
- Brummer, J.E. 2002. Haying alternatives - What are your options?, p. 123-136. *In: J.E. Brummer and C.H. Pearson (eds.), Proc. Intermountain Forage Symp. Colo. State Univ. Tech. Bull. LTB 02-1.*
- White, S., J. Brummer, W. Leininger, G. Fraser, R. Waskom, and T. Bauder. 2002. Mountain meadow fertilizer application timing as it affects overland flow water quality, p. 61-66. *In: Proc. AWRA 2002 Summer Specialty Conference: Ground Water/Surface Water Interactions, July 1-3, 2002. Keystone, Colo.*
- Putnam, Dan, Joe Brummer, Dennis Cash, Alan Gray, Tom Griggs, Mike Ottman, Ian Ray, Willie Riggs, Mark Smith, Glenn Shewmaker, and Rodney Todd. 2000. The importance of western alfalfa production, p. 1-9. *In: Proc. 29<sup>th</sup> Nat. Alfalfa Symp., December 11-12, 2000. Las Vegas, Nev.*

- Brummer, J.E. 1999. Fertility management of mountain meadows, p. 40-45. *In: A.W. Cooley, C.H. Pearson, and J.E. Brummer (eds.), Intermountain Grass and Legume Forage Production Manual, Colorado State Univ. Coop. Ext., Ft. Collins, Colo.*
- Brummer, J.E. 1999. Introduction to mountain meadows, p. 1-2. *In: A.W. Cooley, C.H. Pearson, and J.E. Brummer (eds.), Intermountain Grass and Legume Forage Production Manual, Colorado State Univ. Coop. Ext., Ft. Collins, Colo.*
- Brummer, J.E. 1998. Improving grazing management: Getting the most from your small acreage. *In: Choice and Problems for Small Acreage Managers, Proc. Colorado State Univ. Coop. Ext. In-Service Training for Small Acreages, February 10-11, 1998, Ft. Collins, Colo. 6 p.*
- Parker, K.S., J.E. Brummer, W.C. Leininger, and D.H. Smith. 1997. Responses of three important riparian species to four water table depths, p. 42-57. *In: Managing Colorado Watersheds for Riparian and Wetland Values, Proc. Colorado Riparian Assoc. 9<sup>th</sup> Annual Conf., October 14-16, 1997, Montrose, Colo.*
- Brummer, J.E. and N.D. Rill. 1996. Effect of aeration and nitrogen fertilization on yield and quality of mountain meadow hay, p. 13-15. *In: Poster Summaries, Nutrient Cycling in Forage Systems Conf., March 7-8, 1996, Columbia, Mo.*

**Other (e.g. lab texts, book reviews, technical reports, in-house reports):**

**Manuals:**

- Cooley, A.W., C.H. Pearson, and J.E. Brummer (eds.). 1999. Intermountain Grass and Legume Forage Production Manual. Colorado State Univ. Coop. Ext., Fort Collins, Colo.

**Technical/Progress Reports:**

- Berrada, A. and J.E. Brummer. 2004. Evaluation of spring cereals for dual use, p. 101-106. *In: J.E. Brummer and C.H. Pearson (eds.), Colorado Forage Research 2003: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Bull. TB04-01. Fort Collins, Colo.*
- Brummer, J.E. and C.H. Pearson. 2004. Colorado forage research 2003: Alfalfa, irrigated pastures, and mountain meadows. Colo. Agri. Exp. Sta. Tech. Bull. TB04-01. Fort Collins, Colo. 113 p.
- LaShell, B., D. Zalesky, D. Selzer, and J.E. Brummer. 2004. Quality comparison of windrow grazing versus traditional haying methods in mountain meadows, p. 111-113. *In: J.E. Brummer and C.H. Pearson (eds.), Colorado Forage Research 2003: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Bull. TB04-01. Fort Collins, Colo.*
- Pearson, C.H. and J.E. Brummer. 2004. Potential for selecting alfalfa varieties based on forage quality, p. 41-61. *In: J.E. Brummer and C.H. Pearson (eds.), Colorado Forage Research 2003: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Bull. TB04-01. Fort Collins, Colo.*
- Brummer, J.E., K.T. Fisher, and W.C. Leininger. 2001. Revegetation of fluvial tailing deposits on the upper Arkansas River near Leadville, Colorado. Mountain Meadow Res. Center Adv. Comm. Meeting, February 1, 2001, Gunnison, Colo., 7 p.
- Brummer, J.E. and N.D. Rill. 2001. Effect of initial harvest date and nitrogen fertilization on yield and quality of mountain meadow hay and regrowth. Mountain Meadow Res. Center Adv. Comm. Meeting, February 1, 2001, Gunnison, Colo., 7 p.
- Brummer, J.E. and N.D. Rill. 2001. Effect of planting method on establishment and growth of two willow species planted into amended mine tailings. Mountain Meadow Res. Center Adv. Comm. Meeting, February 1, 2001, Gunnison, Colo., 3 p.
- Brummer, J.E. and N.D. Rill. 2001. Renovation of upland pastures in the South Park Colorado area. Mountain Meadow Res. Center Adv. Comm. Meeting, February 1, 2001, Gunnison, Colo., 4 p.
- Brummer, J.E., N.D. Rill, and C.J. Mucklow. 2001. Dryland alfalfa variety trial. Mountain Meadow Res. Center Adv. Comm. Meeting, February 1, 2001, Gunnison, Colo., 3 p.
- Smith, D.H., J.E. Brummer, and D.G. Temple. 2001. Consumptive irrigation water use in the Upper Gunnison River Basin: Final project report. Report submitted to the Upper Gunnison Water Conservancy District, October 22, 2001, Gunnison, Colo.
- Brummer, J.E., C.H. Pearson, and J.J. Johnson (eds.). 2000. Colorado forage research 1999: Alfalfa, irrigated pastures, and mountain meadows. Colo. Agri. Exp. Sta. Tech. Rep. TR00-6. Fort Collins, Colo. 135 p.

- Brummer, J.E., K.T. Fisher, and W.C. Leininger. 2000. Revegetation of fluvial tailing deposits on the upper Arkansas River near Leadville, Colorado. Mountain Meadow Res. Center Adv. Comm. Meeting, March 2, 2000, Gunnison, Colo., 6 p.
- Brummer, J.E. and N.D. Rill. 2000. Effect of initial harvest date and nitrogen fertilization on yield and quality of mountain meadow hay and regrowth, p. 119-122. *In*: J.E. Brummer, C.H. Pearson, and J.J. Johnson (eds.), Colorado Forage Research 1999: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Rep. TR00-6. Fort Collins, Colo.
- Brummer, J.E. and N.D. Rill. 2000. Effect of initial harvest date and nitrogen fertilization on yield and quality of mountain meadow hay and regrowth. Mountain Meadow Res. Center Adv. Comm. Meeting, March 2, 2000, Gunnison, Colo., 4 p.
- Brummer, J.E. and N.D. Rill. 2000. Evaluation of varieties and methods of establishing birdsfoot trefoil into mountain meadows, p. 101-106. *In*: J.E. Brummer, C.H. Pearson, and J.J. Johnson (eds.), Colorado Forage Research 1999: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Rep. TR00-6. Fort Collins, Colo.
- Brummer, J.E., N.D. Rill, and D.G. Westfall. 2000. Effects of minimum tillage and nitrogen fertilization on yield and quality of mountain meadow hay, p.107-111. *In*: J.E. Brummer, C.H. Pearson, and J.J. Johnson (eds.), Colorado Forage Research 1999: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Rep. TR00-6. Fort Collins, Colo.
- Brummer, J.E., N.D. Rill, and D.G. Westfall. 2000. Residual effects of minimum tillage and nitrogen fertilization on hay yield and species composition of mountain meadows, p.113-118. *In*: J.E. Brummer, C.H. Pearson, and J.J. Johnson (eds.), Colorado Forage Research 1999: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Rep. TR00-6. Fort Collins, Colo.
- Pearson, C.H. and J.E. Brummer. 2000. Western Colorado alfalfa variety trial at Fruita, p. 6-9. *In*: Making Better Decisions: 2000 Colorado Alfalfa Performance Trials. Colo. Agri. Exp. Sta. and Coop. Ext. Tech. Rep. TR00-12. Ft. Collins, Colo.
- Temple, D.G., D.H. Smith, J.E. Brummer, and G.E. Cardon. 2000. Consumptive water use in mountain meadows, upper Gunnison River basin, CO, p. 127-135. *In*: J.E. Brummer, C.H. Pearson, and J.J. Johnson (eds.), Colorado Forage Research 1999: Alfalfa, Irrigated Pastures, and Mountain Meadows. Colo. Agri. Exp. Sta. Tech. Rep. TR00-6. Fort Collins, Colo.
- Brummer, J.E. 1999. Tips for renovation of forage stands using interseeding. Mountain Meadow Res. Center Adv. Comm. Meeting, February 5, 1999, Gunnison, Colo. 3 p.
- Brummer, J.E. and N.D. Rill. 1999. Effect of different methods of applying Roundup herbicide and seeding on establishment of alfalfa interseeded into a mountain meadow. Mountain Meadow Res. Center Adv. Comm. Meeting, February 5, 1999, Gunnison, Colo. 3 p.
- Brummer, J.E. and N.D. Rill. 1999. Effects of different birdsfoot trefoil varieties on yield and quality of mountain meadow hay following interseeding. Mountain Meadow Res. Center Adv. Comm. Meeting, February 5, 1999, Gunnison, Colo. 3 p.
- Brummer, J.E. and N.D. Rill. 1999. Effects of low rates of nitrogen fertilizer on yield and quality of mountain meadow hay. Mountain Meadow Res. Center Adv. Comm. Meeting, February 5, 1999, Gunnison, Colo. 4 p.
- Brummer, J.E., N.D. Rill, and D.G. Westfall. 1999. Residual effects of minimum tillage and nitrogen fertilization on hay yield and species composition of mountain meadows. Mountain Meadow Res. Center Adv. Comm. Meeting, February 5, 1999, Gunnison, Colo. 5 p.
- Brummer, J.E., A.P. Cullan, and N.D. Rill. 1998. Effect of drill type on interseeding success of legumes. Mountain Meadow Res. Center Adv. Comm. Meeting, February 17, 1998, Gunnison, Colo. 2 p.
- Brummer, J.E., A.P. Cullan, and N.D. Rill. 1998. Effect of drill type on interseeding success of legumes. Mountain Meadow Res. Center Field Day Rep., June 22, 1998, Gunnison, Colo. 2 p.
- Brummer, J.E., A.P. Cullan, and N.D. Rill. 1998. Establishment of birdsfoot trefoil using Roundup herbicide. Mountain Meadow Res. Center Adv. Comm. Meeting, February 17, 1998, Gunnison, Colo. 3 p.
- Brummer, J.E., A.P. Cullan, N.D. Rill, and A.W. Cooley. 1998. Establishment of birdsfoot trefoil using Roundup herbicide. Mountain Meadow Res. Center Field Day Rep., June 22, 1998, Gunnison, Colo. 3 p.
- Brummer, J.E., D.H. Smith, A.P. Cullan, and N.D. Rill. 1998. Effect of overstory removal date on interseeded legume establishment. Mountain Meadow Res. Center Adv. Comm. Meeting, February 17, 1998, Gunnison, Colo. 5 p.

- Brummer, J.E., D.H. Smith, A.P. Cullan, and N.D. Rill. 1998. Evaluation of legume establishment following early haying. Mountain Meadow Res. Center Adv. Comm. Meeting, February 17, 1998, Gunnison, Colo. 2 p.
- Brummer, J.E., D.H. Smith, A.P. Cullan, N.D. Rill, and C.J. Mucklow. 1998. Effect of overstory removal date on interseeded legume establishment. Mountain Meadow Res. Center Field Day Rep., June 22, 1998, Gunnison, Colo. 5 p.
- Brummer, J.E., D.H. Smith, A.P. Cullan, N.D. Rill, and C.J. Mucklow. 1998. Evaluation of legume establishment following early haying. Mountain Meadow Res. Center Field Day Rep., June 22, 1998, Gunnison, Colo. 2 p.
- Brummer, J.E., and N.D. Rill. 1998. Effects of different birdsfoot trefoil varieties on yield and quality of mountain meadow hay following interseeding. Mountain Meadow Res. Center Adv. Comm. Meeting, February 17, 1998, Gunnison, Colo. 3 p.
- Brummer, J.E. and N.D. Rill. 1998. Evaluation of varieties and methods of establishing birdsfoot trefoil into mountain meadows. Mountain Meadow Res. Center Field Day Rep., June 22, 1998, Gunnison, Colo. 6 p.
- Brummer, J.E. 1996. Birdsfoot trefoil. Mountain Meadow Res. Center Field Day Rep., June 27, 1996, Gunnison, Colo. 2 p.
- Brummer, J.E., N.D. Rill, and A.W. Cooley. 1998. Effects of different birdsfoot trefoil varieties on yield and quality of mountain meadow hay following interseeding. Mountain Meadow Res. Center Field Day Rep., June 22, 1998, Gunnison, Colo. 3 p.
- Brummer, J.E., N.D. Rill, and C.J. Mucklow. 1998. Effects of low rates of nitrogen fertilizer on yield and quality of mountain meadow hay. Mountain Meadow Res. Center Adv. Comm. Meeting, February 17, 1998, Gunnison, Colo. 5 p.
- Brummer, J.E., N.D. Rill, and D.G. Westfall. 1998. Effects of aeration and nitrogen fertilization on yield and quality of mountain meadow hay. Mountain Meadow Res. Center Adv. Comm. Meeting, February 17, 1998, Gunnison, Colo. 5 p.
- Rill, N.D., J.E. Brummer, and D.G. Westfall. 1998. Effects of minimum tillage and nitrogen fertilization on yield and quality of mountain meadow hay. Mountain Meadow Res. Center Field Day Rep., June 22, 1998, Gunnison, Colo. 5 p.
- Brummer, J.E. 1996. Effect of wild caraway on production of associated meadow species: A preliminary evaluation. Mountain Meadow Res. Center Field Day Rep., June 27, 1996, Gunnison, Colo. 3 p.
- Brummer, J.E. 1996. Evaluation of varieties and methods of establishing birdsfoot trefoil into mountain meadows. Mountain Meadow Res. Center Field Day Rep., June 27, 1996, Gunnison, Colo. 5 p.
- Brummer, J.E. 1996. Potential management strategies for wild caraway. Mountain Meadow Res. Center Field Day Rep., June 27, 1996, Gunnison, Colo. 5 p.
- Brummer, J.E., D.G. Westfall, and N.D. Rill. 1996. Effects of aeration and nitrogen fertilization on yield and quality of mountain meadow hay. Mountain Meadow Res. Center Adv. Comm. Meeting, February 27, 1996, Gunnison, Colo. 7 p.
- Brummer, J.E. and N.D. Rill. 1996. Effect of wild caraway on production of associated meadow species: a preliminary evaluation. Mountain Meadow Res. Center Adv. Comm. Meeting, February 27, 1996, Gunnison, Colo. 4 p.
- Brummer, J.E. and N.D. Rill. 1996. Effects of aeration and nitrogen fertilization on yield and quality of mountain meadow hay. Mountain Meadow Res. Center Field Day Rep., June 27, 1996, Gunnison, Colo. 9 p.
- Brummer, J.E. and N.D. Rill. 1996. Effects of fall vs. spring aeration on yield of mountain meadow hay. Mountain Meadow Res. Center Adv. Comm. Meeting, February 27, 1996, Gunnison, Colo. 2 p.
- Brummer, J.E. and N.D. Rill. 1996. Evaluation of broadcasting as a method to establish various species of legumes in mountain meadows. Mountain Meadow Res. Center Adv. Comm. Meeting, February 27, 1996, Gunnison, Colo. 2 p.
- Brummer, J.E. and N.D. Rill. 1996. Evaluation of varieties and methods of establishing birdsfoot trefoil into irrigated mountain meadows. Lotus Newsletter, Vol. 27 @ <http://www.psu.missouri.edu/ln/>.
- Brummer, J.E. and N.D. Rill. 1996. Evaluation of varieties and methods of establishing birdsfoot trefoil into irrigated mountain meadows. Mountain Meadow Res. Center Adv. Comm. Meeting, February 27, 1996, Gunnison, Colo. 6 p.

- Brummer, J.E. and N.D. Rill. 1996. Evaluation of various species and varieties of legumes for interseeding into irrigated mountain meadows. Mountain Meadow Res. Center Adv. Comm. Meeting, February 27, 1996, Gunnison, Colo. 5 p.
- Parker, K.S., J.E. Brummer, W.C. Leininger, and D.H. Smith. 1996. Effects of water table depth on growth of 3 common meadow species. Mountain Meadow Res. Center Field Day Rep., June 27, 1996, Gunnison, Colo. 3 p.
- Brummer, J.E. 1995. Birdsfoot trefoil variety and establishment trial. Mountain Meadow Res. Center Adv. Comm. Meeting, February 22, 1995, Gunnison, Colo. 3 p.
- Brummer, J.E., J.T. Nichols, R.K. Engel, and P.E. Reece. 1994. Effect of carryover herbage on utilization of little bluestem, p. 46-47. Univ. of Nebraska, GSL Res. Rep. 1991-1994, WCC94-01. Lincoln, Neb.
- Engel, R.K., J.T. Nichols, and J.E. Brummer. 1994. The effect of time and frequency of defoliation on sand bluestem, p. 48-50. Univ. of Nebraska, GSL Res. Rep. 1991-1994, WCC94-01. Lincoln, Neb.
- Northup, B.K., J.E. Brummer, and J.T. Nichols. 1994. Plant species recorded on the Gudmundsen Sandhills Laboratory grazing study: 1989-1991, p. 37-39. Univ. of Nebraska, GSL Res. Rep. 1991-1994, WCC94-01. Lincoln, Neb.
- Brummer, J.E. and J.T. Nichols. 1991. Effect of standing dead herbage on utilization of little bluestem by yearling cattle, p. 35. Univ. of Nebraska, GSL Res. Rep. WCC91-01. Lincoln, Neb.
- Engel, R.K., J.T. Nichols, and J.E. Brummer. 1991. Tiller defoliation of sand bluestem by yearling cattle on Nebraska Sandhills range, p. 34. Univ. of Nebraska, GSL Res. Rep. WCC91-01. Lincoln, Neb.
- Miller, M.S., L.E. Moser, S.S. Waller, J.E. Brummer, J.T. Nichols, and P.E. Reece. 1991. Forage canopy density and structure and relation to organic matter decay in sandhills range exposed to different grazing regimes, p. 38. Univ. of Nebraska, GSL Res. Rep. WCC91-01. Lincoln, Neb.
- Brummer, J.E. 1989. Effect of standing dead herbage on utilization of little bluestem by yearling cattle, p. 63-64. Univ. of Nebraska Progress Rep. WCC89-1. Lincoln, Neb.
- Nichols, J.T., J.E. Brummer, R.K. Engel, and D.D. Myran. 1989. Effect of birdsfoot trefoil on production and forage quality of subirrigated meadow hay, p. 20-22. Univ. of Nebraska Progress Rep. WCC89-1. Lincoln, Neb.
- Nichols, J.T., J.E. Brummer, R.K. Engel, and D.D. Myran. 1989. Evaluation of birdsfoot trefoil varieties for subirrigated meadows, p. 23-28. Univ. of Nebraska Progress Rep. WCC89-1. Lincoln, Neb.
- Nichols, J.T., J.E. Brummer, R.K. Engel, and D.D. Myran. 1989. Methods of establishing birdsfoot trefoil, p. 29-33. Univ. of Nebraska Progress Rep. WCC89-1. Lincoln, Neb.
- Nichols, J.T., P.E. Reece, J.E. Brummer, and R.K. Engel. 1989. Effect of harvest date and fertilization on hay yield and forage quality of native meadow vegetation and interseeded Garrison creeping foxtail, p. 38-42. Univ. of Nebraska Progress Rep. WCC89-1. Lincoln, Neb.
- Nichols, J.T., P.E. Reece, J.E. Brummer, and R.K. Engel. 1989. Effect of harvest date and fertilization on hay yield and quality, p. 34-37. Univ. of Nebraska Progress Rep. WCC89-1. Lincoln, Neb.
- Reece, P.E., J.T. Nichols, J.E. Brummer, and R.K. Engel. 1989. Influence of grazing frequency and date on Nebraska Sandhills vegetation, p. 49-52. Univ. of Nebraska Progress Rep. WCC89-1. Lincoln, Neb.

### **Published Abstracts:**

- Sokolow, S.K., J.E. Brummer, W.C. Leininger, and D.G. Milchunas. 2005. Effect of fall precipitation and surface soil manipulations on cheatgrass germination, production, and establishment. Abstr. Soc. Range Manage. 58<sup>th</sup> Annu. Meeting, Fort Worth, Tex.
- Scott, J.M., J.E. Brummer, and L. Santana. 2004. Sagebrush manipulation for sagegrouse. Abstr. Soc. Range Manage. 57<sup>th</sup> Annu. Meeting, Salt Lake City, Ut. No. 324.
- Bourret, M.M., J.E. Brummer, and W.C. Leininger. 2003. Growth of willow cuttings on amended fluvial mine tailing. Abstr. Soc. Range Manage. 56<sup>th</sup> Annu. Meeting, Casper, Wyo. No. 24.
- Brummer, J.E., M.M. Bourret, K.T. Fisher, W.C. Leininger, and D.M. Heil. 2003. Establishment of willows on fluvially deposited mine tailings in the upper Arkansas River basin. Abstr. ASA-CSSA-SSSA 95<sup>th</sup> Annu. Meeting, Denver, Colo.
- Brummer, J.E. and N.D. Rill. 2003. Management of mountain meadows to increase fall regrowth for grazing. Abstr. ASA-CSSA-SSSA 95<sup>th</sup> Annu. Meeting, Denver, Colo.

- Brummer, J.E., K.T. Fisher, and W.C. Leininger. 2001. Revegetation of fluvial mine tailing deposits on the upper Arkansas River near Leadville, Colorado. Abstr. Soc. Range Manage. 54<sup>th</sup> Annu. Meeting, Kona, Hawaii, No. 51.
- White, Shawn, Joe Brummer, Wayne Leininger, Reagan Waskom, and Gary Frasier. 2001. Fertilizer application timing as it affects water quality of a flood irrigated mountain meadow in the Gunnison Basin of Colorado. Student Water Symp., Colo. State Univ., Fort Collins, Colo.
- Brummer, J.E. and N.D. Rill. 1999. Evaluation of varieties and methods of interseeding birdsfoot trefoil into mountain meadows, p. 9. Abstr. Soc. Range Manage. 52<sup>nd</sup> Annu. Meeting, Omaha, Neb.
- Rill, N.D., J.E. Brummer, and D.G. Westfall. 1999. Effects of minimum tillage and nitrogen fertilization on basal cover and species composition of mountain meadow vegetation, p. 67. Abstr. Soc. Range Manage. 52<sup>nd</sup> Annu. Meeting, Omaha, Neb.
- Rill, N.D., J.E. Brummer, and D.G. Westfall. 1998. Effects of tillage and nitrogen fertilization on yield and quality of mountain meadow hay. Abstr. ASA-CSSA-SSSA 90<sup>th</sup> Annu. Meeting, Baltimore, Md.
- Parker, K.S., W.C. Leininger, J.E. Brummer, and D.H. Smith. 1997. Responses of *Carex rostrata*, *Juncus balticus*, and *Deschampsia cespitose* to four water table depths, p. 58. Abstr. Soc. Range Manage. 50<sup>th</sup> Annu. Meeting, Rapid City, S.D.
- Brummer, J.E., P.E. Reece, J.T. Nichols, and R.K. Engel. 1994. Western ragweed response to date and frequency of grazing Sandhills vegetation, p. 63. Abstr. Soc. Range Manage. 47<sup>th</sup> Annu. Meeting, Colorado Springs, Colo.
- Reece, P.E., J.E. Brummer, J.T. Nichols, and L.E. Moser. 1994. Competition between western ragweed and associated vegetation, p. 82. Abstr. Soc. Range Manage. 47<sup>th</sup> Annu. Meeting, Colorado Springs, Colo.
- Brummer, J.E., J.T. Nichols, R.K. Engel, and P.E. Reece. 1993. Effect of standing dead herbage on utilization of little bluestem under different grazing strategies in the Nebraska Sandhills. Abstr. Soc. Range Manage. 46<sup>th</sup> Annu. Meeting, Albuquerque, N.M., No. 020.
- Brummer, J.E., R.K. Engel, B.K. Northup, and J.T. Nichols. 1993. Evaluation of distance based density techniques to estimate production of sparse species. Abstr. Soc. Range Manage. 46<sup>th</sup> Annu. Meeting, Albuquerque, N.M., No. 261.
- Engel, R.K., J.T. Nichols, J.E. Brummer, and J.L. Dodd. 1993. Root and shoot responses of defoliated sand bluestem. Abstr. Soc. Range Manage. 46<sup>th</sup> Annu. Meeting, Albuquerque, N.M., No. 079.
- Reece, P.E., J.E. Brummer, R.K. Engel, and B.K. Northup. 1993. Total organic reserves in prairie sandreed and sand bluestem after four years of grazing treatments. Abstr. Soc. Range Manage. 46<sup>th</sup> Annu. Meeting, Albuquerque, N.M., No. 245.
- Brummer, J.E., J.T. Nichols, R.K. Engel, and P.E. Reece. 1992. Reproductive culm dynamics of little bluestem under different grazing strategies in the Nebraska Sandhills. Abstr. Soc. Range Manage. 45<sup>th</sup> Annu. Meeting, Spokane, Wash., No. 084.
- Engel, R.K., J.T. Nichols, and J.E. Brummer. 1992. A containerized technique to study individual range plants in their natural environment. Abstr. Soc. Range Manage. 45<sup>th</sup> Annu. Meeting, Spokane, Wash., No. P031.
- Miller, M.S., L.E. Moser, S.S. Waller, J.E. Brummer, J.T. Nichols, and P.E. Reece. 1992. Canopy evaluation of sandhills vegetation exposed to different grazing regimes. Abstr. Soc. Range Manage. 45<sup>th</sup> Annu. Meeting, Spokane, Wash., No. P030.
- Engel, R.K., J.T. Nichols, and J.E. Brummer. 1991. Tiller defoliation of sand bluestem by yearling cattle on Nebraska Sandhills range. Abstr. Soc. Range Manage. 44<sup>th</sup> Annu. Meeting, Washington, D.C., No. 55.
- Nichols, J.T., J.E. Brummer, R.K. Engel, and P.E. Reece. 1991. Effect of date of harvest and fertilization on yield and quality of subirrigated meadow hay in the Nebraska Sandhills. Abstr. Soc. Range Manage. 44<sup>th</sup> Annu. Meeting, Washington, D.C., No. 39.
- Brummer, J.E., J.T. Nichols, R.K. Engel, and P.E. Reece. 1990. Effect of fertilization practices and harvest dates on hay quality as influenced by leaf-stem ratios. Abstr. Soc. Range Manage. 43<sup>rd</sup> Annu. Meeting, Reno, Nev., No. 353.
- Nichols, J.T., D.D. Myran, J.E. Brummer, and R.K. Engel. 1990. Effect of birdsfoot trefoil on meadow hay yield and quality. Abstr. Soc. Range Manage. 43<sup>rd</sup> Annu. Meeting, Reno, Nev., No. 69.
- Nichols, J.T., J.E. Brummer, D.D. Myran, and R.K. Engel. 1990. Varieties and methods of establishment for birdsfoot trefoil. Abstr. Soc. Range Manage. 43<sup>rd</sup> Annu. Meeting, Reno, Nev., No. 328.

- Reece, P.E., J.T. Nichols, J.E. Brummer, and R.K. Engel. 1990. Yield and quality of garrison creeping foxtail vs. native species for subirrigated meadow hay production. *Abstr. Soc. Range Manage.* 43rd Annu. Meeting, Reno, Nev., No. 350.
- Brummer, J.E., J.T. Nichols, R.K. Engel, and P.E. Reece. 1989. The optimum quadrat for sampling production of native Sandhills vegetation. *Abstr. Soc. Range Manage.* 42nd Annu. Meeting, Billings, Mont., No. 232.
- Brummer, J.E., R.L. Gillen, and F.T. McCollum. 1986. Vegetation dynamics of the tallgrass prairie under short duration grazing. *Abstr. Soc. Range Manage.* 39th Annu. Meeting, Kissimmee, Fla., No. 027.

### **Extension Publications:**

- Brummer, J.E. 2004. Mountain meadow management: Potential impacts to surface water quality. *Colorado Water* 21(3):9-10.
- Brummer, J.E. 2003. Hay outlook. *In: Weathering Tough Times Together*, Colorado Agri. Outlook Forum. February 20, 2003. Denver, Colo.
- Brummer, J.E. 2002. Hay outlook. *In: Colorado-Mexico Connection Agricultural Trade, Labor and More*, Colorado Agri. Outlook Forum. February 19, 2002. Denver, Colo.
- Brummer, J.E. 2002. Managing mountain meadows during water short years. Handout distributed at Mountain Meadow Research Center Advisory Committee Meeting, February 12, 2002.
- Brummer, J.E. 2001. Hay outlook. *In: Capitalize on Changing Technology and Policy*, Colorado Agri. Outlook Forum. February 13, 2001. Denver, Colo.
- Brummer, J.E. 2000. Big round bale silage. *Agronomy News From the Ground Up* 20(4):7-9.
- Temple, D.G., D.H. Smith, J.E. Brummer, and G.E. Cardon. 2000. Water use in mountain meadows. *Agronomy News From the Ground Up* 20(4):10-13.
- Brummer, J.E. 1999. Where does birdsfoot trefoil fit in Colorado? *Agronomy News From the Ground Up* 19(4):1-3.
- Brummer, J.E. 1998. Renovating forage stands: Tips for interseeding. *Agronomy News From the Ground Up* 18(4):1-3.
- Brummer, J.E. 1997. Creeping foxtail. Handout distributed at the Southern Rocky Mountain Forage and Livestock Conf., November 19-21, 1997, Monte Vista, Colo. 2 p.
- Brummer, J.E. and M. Haugen. 1997. Windrow grazing at high elevations. Handout distributed at the Southern Rocky Mountain Forage and Livestock Conf., November 19-21, 1997, Monte Vista, Colo. 4 p.
- Brummer, J.E. 1996. Birdsfoot trefoil. Handout distributed at the Tri-River Area Forage Field Day, June 11, 1996, Ridgway, Colo. 5 p.
- Brummer, J.E. 1996. Creeping foxtail. Handout distributed at the Tri-River Area Forage Field Day, June 11, 1996, Ridgway, Colo. 2 p.
- Mortvedt, J.J., D.H. Smith, and J.E. Brummer. 1996. Fertilizing mountain meadows. Colorado State Univ. Coop. Ext. Fact Sheet No. 0.535. Ft. Collins, Colo.
- Brummer, J.E. 1995. Basics of grass hay and pasture management. Handout distributed at the Fourth Annual Colorado River Basin Hay and Pasture Day, Fruita, Colo. 2 p.
- Brummer, J.E. 1995. Potential management strategies for wild caraway. Handout distributed at the Second Annual Gunnison Basin Hay Day, Gunnison, Colo.

### **Manuscripts in Preparation/Revision:**

- Boyster, M.J., J.E. Brummer, and W.C. Leininger. Comparison of Geyer and mountain willow grown in topsoil versus lime and composted biosolids amended mine tailings. (Submitted to *Journal of Environmental Quality* - Rejected, paper lacked novelty and appeal to broad audience. Revised and submitted to *Science of the Total Environment* - Declined because journal is not accepting papers dealing with mine tailings and heavy metals at this time. Plan to revise and submit to *Environmental Pollution*).
- Bouret, M.M., J.E. Brummer, and W.C. Leininger. Establishment and Growth of 2 Willow Species in a Riparian Zone Impacted by Mine Tailings. (Submitted to *Restoration Ecology* - Rejected, information too specific to Colorado and western US (range of Geyer and mountain willow), limited application for international readers. Plan to revise and submit to another journal).

White, S.K., J.E. Brummer, R.M. Waskom, and W.C. Leininger. Mountain meadow management as it affects surface water quality in western Colorado. Colo. State Univ. Tech. Bull. (Needs revision following departmental review).

Brummer, J.E., J.M. Scott, and G. Peterson. Improving sagebrush habitat for the Gunnison sage grouse in combination with managed livestock grazing. (In preparation as a Colo. State Univ. Tech. Bulletin).

White, S.K., J.E. Brummer, R.M. Waskom, and W.C. Leininger. Phosphorus and fecal coliform loading from three flood irrigated mountain meadows. (Originally submitted to the Journal of the American Water Resources Association, but could not satisfy reviewer concerns. Plan to revise and submit to the Journal of Soil and Water Conservation.)

## **CONTRACTS & GRANTS**

### **Funded Projects as PI**

- 2007-10 Establishment and Management of Perennial Forages for Grazing in Colorado Using Organic Farming Methods, Aurora Organic Dairy, \$67,451.
- 2006-08 No-Till Crop Production Using a Kura Clover Living Mulch System, CoPIs-Neil Hansen, Calvin Pearson, Wayne Cooley, Bruce Bosley, and John Murray, USDA-NRCS Conservation Innovation Grant, \$74,811.
- 2006 Conservation Tillage in Corn Using a Kura Clover Living Mulch System, CoPIs-Calvin Pearson, Neil Hansen, and Wayne Cooley, CSU Water Quality Mini Grant, \$800.
- 2006 Development of a Sagebrush Habitat Improvement Guide for the Gunnison Sage-grouse, Gunnison County, \$17,344.
- 2006 Sage Grouse Restoration Project, Utah State University, \$15,082.
- 2006 Gunnison Sage Grouse Habitat Guide, Colorado Division of Wildlife, \$17,344
- 2005-07 Renovation of Range Sites in the South Park Colorado Area that have been Impacted by Increases in Fringed Sage, Colorado Division of Wildlife Habitat Partnership Program, \$9,000.
- 2001-02 Factors Affecting Growth of Willows Established on Amended Fluvial Mine Tailing Deposits, CoPI-Wayne Leininger, ASARCO Mining Company, \$6,870.
- 2001-05 Biology of Cheatgrass Invasion in the Gunnison Basin, CoPI-Wayne Leininger, AES Invasive Species Grant, \$20,000.
- 1998-99 Evaluation of Methods to Revegetate Fluvial Mine Tailings in the Arkansas River Drainage near Leadville, Colorado, CoPI-Wayne Leininger, ASARCO Mining Company, \$2,500.
- 1997-98 Improvement of Mountain Meadows with Legumes, CoPIs-Dan Smith, Wayne Cooley, and C.J. Mucklow, Cooperative Extension/Agricultural Experiment Station Initiative Grant, \$25,000.
- 1996-97 Competitive Effects of Wild Caraway on Associated Mountain Meadow Vegetation, CoPIs-Chad Bouchard and John Sowell, Thornton Biology Research Grant (WSC), \$600.
- 1995 Evaluation of Plant Materials for Use at High Elevations, CoPI-Justin Niccoli, Renewable Resources Extension Act, \$1,000.

## **Funded Projects as CoPI**

- 2006-09 Developing a Model to Sustain Irrigated Agriculture While Meeting Increasing Urban Water Demand in Colorado, CoPIs-Tom Holtzer, Neil Hansen, James Pritchett, + 11 others, Parker Water and Sanitation District, \$853,842.
- 2006-08 Colorado Sustainable Pasture and Land Management Project, CoPIs-Ernie Marx, Pat McCarty, Ed Page, Fred Petersen, and Roy Roath, Cooperative Extension Venture Capital Fund, \$14,701.
- 2006-09 Sustainable Cropping Systems for Transition from Full Irrigation to Limited Irrigation and Dryland, CoPIs-Neil Hansen, James Pritchett, Dwayne Westfall, Troy Bauder, Joel Schneekloth, and Reagan Waskom, USDA-NRCS Conservation Innovation Grant, \$216,765.
- 2005-08 Developing Economically Sustainable Cropping Strategies for Small and Medium Sized Farms in an Increasingly Scarce Water Environment, CoPIs-James Pritchett, Neil Hansen, Dwayne Westfall, Joel Schneekloth, Reagan Waskom, Troy Bauder, James Ascough, Gerald Buchleiter, Craig Bond, Eric Schuck, Louis Swanson, and Dana Hoag, National Research Initiative, \$499,117.
- 2001-03 Consumptive Water Use in Mountain Meadows of the Upper Gunnison River Basin, CoPI-Dan Smith, Upper Gunnison River Water Conservancy District, \$30,000.
- 2001-05 Evaluation of Methods to Improve Habitat for the Gunnison Sage Grouse, CoPIs-Gunnison Soil Conservation District and John Scott, USFWS Partners for Wildlife, \$36,000.
- 1999-00 Consumptive Water Use and Irrigation Efficiencies in Mountain Meadows of the Upper Gunnison River Basin, CoPIs-Dan Smith and Grant Cardon, Upper Gunnison River Water Conservancy District, \$2,500.

## **AGRICULTURAL EXPERIMENT STATION PROJECTS**

Project No.: COLO 212

Title: Economic, Environmental, Genetic, and Nutritional Aspects of Grass-fed Beef

Duration Dates: 2007-2009

Project No.: COLO 608

Title: Management of Forages in Colorado for Improved Yield and Quality

Duration Dates: 2005 - 2010

Project No.: COLO 650

Title: Disturbance, Invasion, Restoration, and Rangeland Health

Duration Dates: 2003 - 2008

Project No.: COLO 651

Title: Sustainability of Matching Cow Nutrient Requirements with Nutrient Content of Grazed Forages

Duration Dates: 2001 - 2007

Project No.: COLO 165

Title: Biology of Cheatgrass Invasion in the Gunnison Basin

Duration Dates: 2002 - 2004 (Extended to 2005)

## **PROFESSIONAL AFFILIATIONS AND ACTIVITIES**

### **Memberships in professional societies**

Society for Range Management (1984-present)

### **Office in professional societies**

Board of Directors (07-08), Colorado Section Society for Range Management  
Board of Directors (99-00), Colorado Section Society for Range Management

### **Review/editorial boards**

Associate Editor (99-02), Journal of Range Management

### **Manuscript Refereeing**

Restoration Ecology

1 paper - 2007

Science of the Total Environment

1 paper - 2005

Ecological Applications

1 paper - 2003

USDA-ARS Poisonous Plant Laboratory

1 paper - 2003 (external review)

Journal of Range Management

5 papers - 2003

1 paper - 1998

2 papers - 1996

2 papers - 1995

2 papers - 1994

Journal of Environmental Quality

1 paper - 2001

University of Nebraska

1 paper - 1996 (external review)

Colorado State University Cooperative Extension (in-house review)

1 bulletin - 2001

1 manual - 1998

1 bulletin - 1997

1 bulletin - 1996

### **Society for Range Management**

Member of the Wildlife Habitat Committee (1999-2004)

Moderated Riparian/Hydrology Technical Session at the Society for Range Management Annual Meeting, Omaha, Nebraska (1999).

Judged three graduate student presentations at the Society for Range Management Annual Meeting, Omaha, Nebraska (1999), Boise, Idaho (2000), Kona, Hawaii (2001), Kansas City, Missouri (2002).

Served on the committee that planned and organized the tour for the Summer Meeting of the Society for Range Management, Crested Butte, Colorado (1998).

Moderated Technical Session at the Society for Range Management Annual Meeting, Wichita, Kansas (1996).

### **HONORS AND AWARDS**

2004 Valued Friendship Award, Gunnison County Stockgrowers, Gunnison, Colo.

2002 Certificate of Recognition for 4 years of service to the Society for Range Management as Associate Editor of the Journal of Range Management.

2000 Certificate of Appreciation for 2 years of service as a member of the Board of Directors, Colorado Section Society for Range Management.

**PAPERS PRESENTED/SYMPOSIA/INVITED LECTURES/PROFESSIONAL MEETINGS/WORKSHOPS****Professional Meeting Presentations****2003**

Mountain Meadows: The Challenge of Growing Forage at High Elevations, Forage Breakfast Meeting at the ASA-CSSA-SSSA 95<sup>th</sup> Annu. Meeting, Denver, Colo. (Invited).

Establishment of Willows on Fluvially Deposited Mine Tailings in the Upper Arkansas River Basin, ASA-CSSA-SSSA 95<sup>th</sup> Annu. Meeting, Denver, Colo. (Invited).

Management of Mountain Meadows to Increase Fall Regrowth for Grazing, ASA-CSSA-SSSA 95<sup>th</sup> Annu. Meeting, Denver, Colo. (Invited).

**2001**

Revegetation of Fluvial Mine Tailing Deposits on the Upper Arkansas River near Leadville, Colorado, Society for Range Management, Kona, Hawaii.

**1999**

Evaluation of Varieties and Methods of Interseeding Birdsfoot Trefoil into Mountain Meadows, Society for Range Management, Omaha, Nebraska.

**Workshops (Organized and presented)****2000**

Managing Mountain Meadows, CSU Mountain Meadow Research Center and the Natural Resource Conservation Service, Co-organizer, Steamboat Springs and Montrose, Colorado.

**1998**

Ranching in the New Millennium, CSU Mountain Meadow Research Center and Cooperative Extension, Co-organizer, Gunnison, Colorado.

**1997**

Private Grazing Lands Workshop, Utah State University, Invited Member of the Beef Working Group, Logan, Utah.

Winter Feeding Workshop, CSU Mountain Meadow Research Center, CSU Cooperative Extension, and Gunnison Basin Weed Commission, Co-organizer, Gunnison, Colorado.

**1996**

Third Annual Gunnison Basin Hay Day, CSU Mountain Meadow Research Center, CSU Cooperative Extension, Gunnison Basin Weed Commission, and Natural Resource Conservation Service, Co-organizer, Gunnison, Colorado.

**1995**

Second Annual Gunnison Basin Hay Day, CSU Mountain Meadow Research Center, CSU Cooperative Extension, Gunnison Basin Weed Commission, and Natural Resource Conservation Service, Co-organizer, Gunnison, Colorado.

**1994**

First Annual Gunnison Basin Hay Day, CSU Mountain Meadow Research Center, CSU Cooperative Extension, Gunnison Basin Weed Commission, and Natural Resource Conservation Service, Co-organizer, Gunnison, Colorado.

**Advisory Committee Meetings**

Organized and hosted annual advisory committee meetings for the Mountain Meadow Research Center, Gunnison, Colorado. Presented information on the following topics at the respective meetings:

**February 18, 2003**

Consumptive Water Use in Mountain Meadows.

Managing Mountain Meadows during Water Short Years.

**February 12, 2002**

Biology of Cheatgrass Invasion in the Gunnison Basin.

Managing Meadow Regrowth for Fall Grazing.

Managing Mountain Meadows during Water Short Years.

**February 1, 2001**

Effect of initial harvest date and nitrogen fertilization on yield and quality of mountain meadow hay and regrowth.

Renovation of upland pastures in the South Park Colorado area.

Dryland alfalfa variety trial.

Baleage Feeding Trial.

**March 2, 2000**

Revegetation of fluvial tailing deposits on the upper Arkansas River near Leadville, Colorado.

Effect of initial harvest date and nitrogen fertilization on yield and quality of mountain meadow hay and regrowth.

**February 5, 1999**

Effect of different methods of applying Roundup herbicide and seeding on establishment of alfalfa interseeded into a mountain meadow.

Effects of different birdsfoot trefoil varieties on yield and quality of mountain meadow hay following interseeding.

Effects of low rates of nitrogen fertilizer on yield and quality of mountain meadow hay.

Residual effects of minimum tillage and nitrogen fertilization on hay yield and species composition of mountain meadows.

**February 17, 1998**

Effect of drill type on interseeding success of legumes.

Establishment of birdsfoot trefoil using Roundup herbicide.

Effect of overstory removal date on interseeded legume establishment.

Evaluation of legume establishment following early haying.

Effects of different birdsfoot trefoil varieties on yield and quality of mountain meadow hay following interseeding.

Effects of low rates of nitrogen fertilizer on yield and quality of mountain meadow hay.

Effects of aeration and nitrogen fertilization on yield and quality of mountain meadow hay.

**February 27, 1997**

Depth to water table effects on three meadow species.

Effects of aeration and nitrogen fertilization on yield and quality of mountain meadow hay.

Effects of low rates of nitrogen fertilizer on yield and quality of mountain meadow hay.

Evaluation of varieties and methods of establishing birdsfoot trefoil into irrigated mountain meadows.

Competitive effects of wild caraway on associated vegetation.

### **February 27, 1996**

Effect of wild caraway on production of associated meadow species: a preliminary evaluation.

Effects of fall vs. spring aeration on yield of mountain meadow hay.

Evaluation of broadcasting as a method to establish various species of legumes in mountain meadows.

Evaluation of varieties and methods of establishing birdsfoot trefoil into irrigated mountain meadows.

Evaluation of various species and varieties of legumes for interseeding into irrigated mountain meadows.

Effects of aeration and nitrogen fertilization on yield and quality of mountain meadow hay.

### **February 22, 1995**

Birdsfoot trefoil variety and establishment trial.

### **Tours/Field Days**

#### **2007**

Presented information on control of fringed sage and reseeded of upland pastures in the South Park area at a field tour hosted by the Soil and Water Conservation Society and the Colorado Section Society for Range Management, Jefferson, Colorado.

#### **2006**

Presented information on control of fringed sage at a field tour hosted by the Habitat Partnership Program Committee, Fairplay, Colorado.

Presented information on how to sample sagebrush communities to assess habitat quality for the Gunnison sage grouse at a field tour hosted by the Gunnison Basin Strategic Committee for Sage Grouse, Gunnison, Colorado.

Presented information on practices to improve habitat for the Gunnison sage grouse at a field tour for USFWS personnel and Colorado congressional liaisons, Gunnison, Colorado.

Presented information on practices to improve habitat for the Gunnison sage grouse at a field tour hosted by the Gunnison-Dolores Watershed Districts, Gunnison, Colorado.

#### **2005**

Presented information on restoration of fluvial mine tailings with willows at a field tour hosted by the Upper Arkansas Watershed Association of Conservation Districts, Leadville, Colorado.

#### **2004**

Presented information on management of mountain meadows at a field day for teachers hosted by the Park County Soil Conservation District and the Eagle Rock Ranch, Jefferson, Colorado.

Presented information on management of mountain meadows at a field day hosted by the Lake County Soil Conservation District, Leadville, Colorado.

Presented information on sagebrush habitat improvement projects at a field tour hosted by the Gunnison Sagegrouse Working Group, Gunnison, Colorado.

### **2003**

Presented information on intensive grazing at a field day hosted by the San Juan Basin Research Center, Hesperus, Colorado.

### **2001**

Organized and hosted a field day to view research sites and discuss current findings related to management of mountain meadows, Gunnison, Colorado.

### **2000**

Presented information on revegetation of fluvial tailing deposits on the Upper Arkansas River at a field tour hosted by the Lake County Soil Conservation District, Leadville, Colorado.

Organized and hosted a field tour of consumptive water use and water quality research sites in conjunction with the Upper Gunnison Water Conservancy District, Gunnison, Colorado.

### **1999**

Presented information on meadow management at a field tour hosted by the Park County Soil Conservation District at the Eagle Rock Ranch, Jefferson, Colorado.

Presented information on reclamation studies at a field tour hosted by the Upper Arkansas Watershed Committee, Leadville, Colorado.

### **1998**

Hosted a tour and discussion of Aeration/Nitrogen Fertilization Plots for 9 Western State College biology students and their professor, Gunnison, Colorado.

Hosted John Maddock from Tasmania for a tour of research plots, Ridgway and Gunnison, Colorado.

Organized 4 field tours of mountain meadow research sites in conjunction with Cooperative Extension personnel, Gunnison, Ridgway, Hayden, and Clark, Colorado.

### **1997**

Hosted a tour and discussion of Wild Caraway Competition Plots for 10 Western State College biology students and their professor, Gunnison, Colorado.

### **1996**

Organized and hosted a forage field day with Wayne Cooley, Tri-River Area Agricultural Agent, Ridgway, Colorado.

Organized and hosted a high elevation forage production field day for the Mountain Meadow Research Center, Gunnison, Colorado.

## **Contributed Extension Presentations**

### **2007**

Colorado Forage Research Update, Western Education/Extension and Research Activity Committee (WERA 1002), Logan, Utah.

### **2006**

Roundup Ready Alfalfa Research Needs, ARDEC Forage Field Day, Fort Collins, Colorado.

Colorado Forage Research Update, Western Education/Extension and Research Activity Committee (WERA 1002), Salmon, Idaho.

**2004**

Selection of Grasses and Legumes for Seeding, Western Colorado Research Center Brown Bag Seminar, Hotchkiss, Colorado.

Renovating Pastures by Interseeding, Western Colorado Research Center Brown Bag Seminar, Hotchkiss, Colorado.

**2003**

Colorado Forage Research, Western Coordinating Committee Meeting (WCC-091), Salt Lake City, Utah.

Biology of Cheatgrass Invasion in the Gunnison Basin, Weed Management Workshop, Joint Area Weed Management Association, Gunnison, Colorado.

Potential Forage Projects for Western Colorado, Western Colorado Research Center Brown Bag Seminar, Hotchkiss, Colorado.

**2002**

Colorado Forages, Western Coordinating Committee Meeting (WCC-091), Las Vegas, Nevada.

**2000**

Fertilization of Mountain Meadows, Managing Mountain Meadows Workshops, Steamboat Springs and Montrose, Colorado.

Big Round Bale Silage, Managing Mountain Meadows Workshops, Steamboat Springs and Montrose, Colorado.

Interseeding of Mountain Meadows, Managing Mountain Meadows Workshops, Steamboat Springs and Montrose, Colorado.

**1998**

Windrow Grazing at High Elevations presented at the Ranching in the New Millennium Workshop, CSU Mountain Meadow Research Center and Cooperative Extension, Gunnison, Colorado.

**1995**

Control and Management of Wild Caraway, Second Annual Gunnison Basin Hay Day, Gunnison, Colorado.

**1994**

Fertilization of Mountain Meadows, First Annual Gunnison Basin Hay Day, Gunnison, Colorado.

Interseeding of Mountain Meadows, First Annual Gunnison Basin Hay Day, Gunnison, Colorado.

**Invited Extension Presentations**

**2007**

Hay Testing: What the Numbers Mean and How to Improve Them, North Park Hay Days, Walden, Colorado.  
Managing Sagebrush Rangeland to Improve Habitat for the Gunnison Sage-Grouse, Soil and Crop Sciences Departmental Seminar, Fort Collins, Colorado.

**2006**

Economics of Meadow Fertilization, Southern Rocky Mountain Forage and Livestock Conf., Monte Vista, Colorado.

**2005**

Large Bale Silage: Pros, Cons, and Management, Utah Hay and Forage Workshop, St. George, Utah.

Evaluation of Varieties and Methods of Interseeding Birdsfoot Trefoil into a Mountain Meadow, Soil and Crop Sciences Departmental Interview, Fort Collins, Colorado.

Establishment of Perennial Forages, Soil and Crop Sciences Departmental Interview, Fort Collins, Colorado.

Establishment of Willows on Fluvial Mine Tailing Deposits in the Upper Arkansas River Basin, FRWS Departmental Seminar, Fort Collins, Colorado.

Establishing and Renovating Pastures and Hay Fields, Tri River Area Small Acreage Workshop, Grand Junction, Colorado.

Selection of Grasses and Legumes for Seeding, Middle Park Hay Days Workshop and Field Demonstration, Kremmling, Colorado.

Economics of Meadow Fertilization, Middle Park Hay Days Workshop and Field Demonstration, Kremmling, Colorado.

#### **2004**

Mountain Meadow Research Center 1949-2003, Agricultural Experiment Station Annual Meeting, Fort Collins, Colorado.

#### **2003**

Managing Meadows During Drought Conditions: Grazing and Hay Production, Tri River Area Drought Management Workshop, Montrose, Colorado.

Management of Pastures and Meadows: Keeping Them Healthy, Southwest Forage Workshop, Durango, Colorado.

Interseeding of Mountain Meadows, Colorado Young Farmers, Ignacio, Colorado.

Meadow Renovation, Colorado Young Farmers, Ignacio, Colorado.

Interseeding of Mountain Meadows, Forage Extension Workshop, Westcliff, Colorado.

Irrigation and Fertility Management of Mountain Meadows, Forage Extension Workshop, Westcliff, Colorado.

Forage Species for Intensive Grazing, San Juan Basin Research Center Field Day, Hesperus, Colorado.

Managing Meadows Following Drought, Soil Conservation District Meeting, Glenwood, Springs, Colorado.

#### **2002**

Pasture Renovation, CSU Cooperative Extension Small Acreage Workshop, Fairplay, Colorado.

Forage Update: Mountain Meadow Research Center, Cooperative Extension In-Service, Fort Collins, Colorado.

Interseeding of Mountain Meadows, Forage Extension Workshop, Walden, Colorado.

Meadow Renovation, Forage Extension Workshop, Walden, Colorado.

Meadow Foxtail: Friend or Foe?, Forage Extension Workshop, Walden, Colorado.

Biology of Cheatgrass Invasion in the Gunnison Basin, Invasive Species Grant Meeting, Fort Collins, Colorado.

Managing Mountain Meadows during Drought Conditions: Grazing and Hay Production, Bureau of Land Management and U.S. Forest Service Drought Workshop, Gunnison, Colorado.

Managing Mountain Meadows during Drought Conditions: Grazing and Hay Production, Southern Rocky Mountain Forage and Livestock Conf., Monte Vista, Colorado.

Revegetation of Fluvial Mine Tailing Deposits on the Upper Arkansas River Near Leadville, Colorado, Departmental Seminar, Fort Collins, Colorado.

## **2001**

Pasture Management and Reseeding, CSU Cooperative Extension Small Acreage Workshop, Fairplay, Colorado.

Harvesting and Feeding Baleage and Other Alternatives, IRM Cattle Management School, Montrose, Colorado.

Pasture Maintenance, CSU Cooperative Extension Alfalfa and Irrigated Pasture Workshop, Durango, Colorado.

Interseeding of Mountain Meadows, Colorado Hay and Forage Association Meeting, Grand Junction, Colorado.

Current Research at the Mountain Meadow Research Center, CSU Cooperative Extension and AES Meeting, Orchard Mesa, Colorado.

Colorado Forage Program, AES Annual Meeting, Fort Collins, Colorado.

Management Practices to Develop High Quality Pastures for Fall Grazing, Soil and Crop Sciences Departmental Seminar, Fort Collins, Colorado.

Hay and Pasture Management, Colorado Cattleman's Association Beef Improvement Committee, Colorado Springs, Colorado.

## **2000**

Establishment Techniques for Perennial Forages, CSU Cooperative Extension Hay Seminar, Kiowa, Colorado.

Harvest Management, CSU Cooperative Extension Hay Seminar, Kiowa, Colorado.

Renovation-Reseeding of Small Acreage Pastures, CSU Cooperative Extension Small Acreage Workshop, Cripple Creek, Colorado.

Management of Mountain Meadows: Fertility and Interseeding, San Juan Soil Conservation District, Pagosa Springs, Colorado.

Renovation-Reseeding of Small Acreage Pastures, CSU Cooperative Extension Small Acreage Workshop, Fairplay, Colorado.

Pasture Maintenance, CSU Cooperative Extension 2000 Management Intensive Grazing Seminar, Greeley, Colorado.

Wild Caraway: Your Next Troublesome Weed, Southern Rocky Mountain Forage and Livestock Conference, Monte Vista, Colorado.

Meadow Management: Keys to Quality Regrowth, Southern Rocky Mountain Forage and Livestock Conference, Monte Vista, Colorado.

Pasture Fertility and Irrigation Management, CSU Cooperative Extension Pasture Management School, Delta Colorado.

From Aeration to Reclamation: Happenings at Mountain Meadow Research Center, Soil and Crop Sciences Departmental Seminar, Fort Collins, Colorado.

**1999**

What's New with Interseeding? Southern Rocky Mountain Forage and Livestock Conference, Monte Vista, Colorado.

What's Happening at the Mountain Meadow Research Center? Gunnison Valley Cattlewomen's Association, Gunnison, Colorado.

Management of Mountain Meadows, CSU Cooperative Extension Small Acreage Workshop, Fairplay, Colorado.

Pasture and Meadow Renovation, CSU Cooperative Extension Small Acreage Workshop, Cripple Creek, Colorado.

**1998**

Improving Grazing Management: Getting the Most from Your Small Acreage, CSU Cooperative Extension Small Acreage Training, Ft. Collins, Colorado.

Use of Baleage at High Elevations, Southern Rocky Mountain Forage and Livestock Conference, Monte Vista, Colorado.

**1997**

Practical Considerations for Improving Mountain Meadow Hay Production and Quality, San Juan Soil Conservation District Meeting, Pagosa Springs, Colorado.

Creeping Foxtail: Friend or Foe? Southern Rocky Mountain Forage and Livestock Conference, Monte Vista, Colorado.

Windrow Grazing at High Elevations, Southern Rocky Mountain Forage and Livestock Conference, Monte Vista, Colorado.

**1996**

Non-bloating Legumes for Forage Production, Alfalfa and Perennial Forages Management Clinic, Ft. Collins, Colorado.

Practical Considerations for Improving Mountain Meadow Hay Production and Quality, Wyoming Pasture Management Workshop, Riverton, Wyoming.

Improving Mountain Meadow Production and Quality, San Luis Valley Forage and Livestock Conference, Monte Vista, Colorado.

**1995**

Current Research Efforts at the Mountain Meadow Research Center, Natural Resource Conservation Service, Glenwood Springs, Colorado.

Current Research Projects at the Mountain Meadow Research Center, Western State College science faculty, Gunnison, Colorado.

Mountain Meadow Management, CSU Cooperative Extension Forage Production Seminar, Alamosa, Colorado.

Mountain Meadow Management Practices, Fourth Annual Colorado River Basin Hay and Pasture Day, Fruita, Colorado.

**1994**

Meadow Improvement Using Interseeding, Tri-River Area Annual Hay Day, Paonia, Colorado.

Improvement Practices for Grass-Dominated Meadows, CSU Cooperative Extension Hay Production Seminar, Alamosa, Colorado.

## **Poster Presentations**

### **2006**

Foliar heavy metal concentrations of 2 willow species growing in a contaminated riparian zone, High Altitude Revegetation Workshop, Fort Collins, Colorado.

### **2000**

Fifty Years of Research at the Mountain Meadow Research Center and Colorado Forage Research, ARDEC Field Day, Fort Collins, Colorado.

### **1996**

Effect of Aeration and Nitrogen Fertilization on Yield and Quality of Mountain Meadow Hay, Nutrient Cycling in Forage Systems Conference, Columbia, Missouri.

## **COMMITTEES**

### **University Committees**

Search Committee Chair for the San Juan Basin Research Center Research Associate position (2006)

Water Outreach Executive Committee (1999-2000)

Search Committee for the San Juan Basin Research Center Research Scientist/Manager (1999)

Search Committee for the Soil & Crop Sciences Department Head (1998)

Search Committee for the Southeast Colorado Range/Forage Research and Extension Specialist (1997)

### **Regional Committees**

South Central Feedstocks Workshop held in Tulsa, Oklahoma in October 2007. Served as co-chair of the lignocellulosic workgroup committee, gave summary report at the meeting, and provided written summary for posting on the website. This was part of the Sun Grant Initiative for biofuels production.

Multistate Project (W-503), Economic, Environmental, Genetic, and Nutritional Aspects of Grass-Fed Beef (Member 2007)

High Altitude Revegetation Committee (Member 2006 to present, serve as editor for the proceedings)

Western Alfalfa and Forage Conference held in Reno, Nevada in December 2006. Represented Colorado as a member of the planning committee and moderated one of the technical sessions at the meeting.

Western Education/Extension and Research Activity Committee (WERA 1002), Managed Grazing Systems for the Intermountain West (Member 2002-2007, Chair 2007)

Western Coordinating Committee (WCC 091), Improving Stress Resistance of Forages in the Western United States (Member 2000-2004)

### **Departmental Committees**

Research Committee (1998-01)

### **Interdisciplinary Research/Extension Teams**

Extension Small Acreage Management Team (2006-present)

Center for Riparian Ecology and Management (CREAM) (1999-present)

## **STUDENT ADVISING/GRADUATE SUPERVISION/TEACHING**

### **GRADUATE STUDENTS:**

#### Current Graduate Advisees:

Matthew R. Booher, Soil and Crop Sciences, M.S.  
Natasha R. Davis, Forest, Rangeland, and Watershed Stewardship, M.S.

#### Current Graduate Committees:

Katherine C. Doesken, Soil and Crop Sciences, M.S.  
R. Bradley Lindenmayer, Soil and Crop Sciences, M.S.

#### Graduate Degrees Completed Under My Supervision

Jennifer R. Shanahan, Forest, Rangeland, and Watershed Stewardship, 2006, M.S.  
Molly J. Boyter, Forest, Rangeland, and Watershed Stewardship, 2006, M.S.  
Shannon K. Sokolow, Forest, Rangeland, and Watershed Stewardship, 2005, M.S.  
Melody M. Bourret, Forest, Rangeland, and Watershed Stewardship, 2004, M.S.  
Shawn K. White, Rangeland Ecosystem Science, 2002, M.S.  
Kimberly S. Parker, Graduate Degree Program in Ecology, 2000, M.S.  
Kevin T. Fisher, Graduate Degree Program in Ecology, 1999, M.S.

### **GUEST LECTURES:**

SOCR 320 - Forage and Range Management (4 lectures Spring '07)  
RS 400 - Range Improvements (2 lectures Fall '07)

## **OTHER ACTIVITIES/ACCOMPLISHMENTS**

### **Off-campus/non-credit courses**

Rangeland Ecology (Bio397) - a 3 credit hour course taught at Western State College during the spring 1997 Term.

### **Special service to the state/community related to professional expertise**

Worked with students from Odea Elementary School to review and provide input on the design of their science projects, Fort Collins, Colorado (2007).

Member of the Gunnison Resource and Environmental Education Network (GREEN), an informal group of professionals working together to provide information and education to the community about the natural and cultural resources in the Gunnison Basin (1994-2006).

Taught sixth grade science students about the digestive system of a cow. Identified various bacteria and protozoa that break down forages by observing rumen fluid from a cow using a projecting microscope (1996-02).

Water Workshop - Spent 6 hours in the classroom teaching fourth graders about the importance of water in the Gunnison Basin culminating with a field day in which I explained and demonstrated common irrigation practices and how to measure flowing water (1998-2006).

Mill Creek Youth Summit - A field day for seventh graders in which I manned a station that taught students about topographic maps and how to create them using several types of surveying equipment (2000-01).

Mill Creek Youth Summit - A field day for seventh graders in which I manned a station that taught the importance of water quality by using the abundance of macroinvertebrates in the stream as an indicator (1998).

Demonstrated a field sampling technique that uses tessellations to determine plant density to the sixth grade advanced math class (1996 & 2000).

Served on a panel for the Crested Butte School District in which uses of water in the Gunnison Valley were discussed (1996).

**Consulting Activities**

Reviewed and provided input on the Remedial Work Plan for California Gulch OU 11, Leadville, Lake County, Colorado for local landowners (Concerned Citizens for Conservation).

Reviewed and provided input on the Final Draft of the Restoration Alternatives Report for the Upper Arkansas River Basin for local landowners (Concerned Citizens for Conservation) concerned about potential impacts to private property (2005).

**Expert Testimony**

IRS Estate Tax Case for the Estate of Rosamond R. Zetterholm. Active vs. passive management of high elevation meadows and pastures (1999-00).