Patch Burn Grazing
An Annotated Bibliography
(ok, incompletely annotated)

Patch Burn Grazing: Primary and/or Peer-reviewed Literature
The following represent research conducted with a primary or secondary purpose of describing the effects of patch burn grazing management strategies in the United States. Includes both articles published in peer-reviewed journals as well theses and dissertations.

  • Oklahoma
  • Bison and domestic cattle
  • Effects on animal distribution, effects on forage quality and quantity

  • Oklahoma
  • Bison and domestic cattle
  • Effects on animal distribution


  • Oklahoma
  • Domestic cattle
  • Effects on N availability; effects on microbial biomass

  • Oklahoma
  • Domestic cattle
  • Effects on N availability

  • Oklahoma
  • Domestic cattle
  • Effects on the abundance of milkweed, a butterfly host plant (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction but were instead focused on the effect of recent summer fires).
  • Effects on the abundance of butterfly eggs and larvae (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction but were instead focused on the effect of recent summer fires).

- Nebraska, Oklahoma
- Bison
- Effects on animal distribution

- Oklahoma
- Texas longhorn, bison, black-tailed prairie dogs
- Effects on prairie dog colony expansion; effects on bison and cattle distribution; effects on vegetation structure, composition and biomass

- Oklahoma
- Domestic cattle
- Effects on dickcissel nest predation; nest parasitism, reproductive success


- Oklahoma
- Bison
- Effects on vegetation biomass and composition

- Oklahoma
- Bison
- Effects on diet selectivity and composition

- Oklahoma
- Domestic cattle
- Effects on vegetation composition and structure; effects on breeding bird abundance

- Oklahoma
- Bison
- Effects on bison distribution
• Oklahoma
• Domestic cattle
• Effects on sericea lespedeza cover; effects on vegetation composition


• Oklahoma
• Domestic cattle
• Effects on breeding bird density, nest success, diet, and levels of stress hormones; effects on invertebrate abundance and diversity

• Oklahoma
• Domestic cattle
• Effects on invertebrate diversity and abundance

• Louisiana
• Domestic cattle
• Effects on forage production and utilization; effects on animal productivity
• The first known instance where the effects of patch burn grazing were quantified

• Oklahoma
• Domestic cattle
• Effects on invertebrate biomass and abundance; effects on vegetation cover

• Oklahoma
• Domestic cattle
• Effects on vegetation structure and composition; effects on animal performance
• Presents a conceptual model for the fire-grazing interaction illustrating the interaction of herbaceous fuels, fire occurrence, grazing animal distribution and vegetation structure and composition

• Oklahoma
• Domestic cattle
• Effects on breeding bird abundance; effects on vegetation structure and composition
- Oklahoma
- Domestic cattle
- Effects on small mammal abundance and community composition; effects on vegetation composition and structure

- Nebraska
- Domestic cattle and bison
- Effects on breeding bird abundance; effects on vegetation structure


- Nebraska
- Domestic cattle
- Effects on grazing selectivity of a suite of prairie forbs

- Iowa
- Domestic cattle
- Effects on grasshopper sparrow nest survival and survival after they have left the nest.


- Iowa
- Domestic cattle
- Effects on grasshopper sparrow chicks after they have left the nest

- Iowa
- Domestic cattle
- Effects on grasshopper sparrow nest survival


- Oklahoma
- Bison and domestic cattle
- Effects on animal behavior

- Oklahoma
- Domestic cattle
- Effects on animal productivity

- Iowa
- Domestic cattle
- Effects on tall fescue defoliation and abundance, vegetation structure, and animal performance

- Iowa
- Domestic cattle
- Effects on vegetation spatial heterogeneity and functional group composition.

- Iowa
- Domestic cattle
- Effects of an exotic grass (tall fescue) on fire behavior (research was conducted in part within patch burn grazing pastures but results were not presented in the context of a fire-grazing interaction)

- Multiple sites in the United States
- Domestic cattle
- Effects on vegetation structural heterogeneity

- Multiple sites in the United States
- Domestic cattle
- Effects on vegetation structural heterogeneity


- Texas
- Domestic cattle, white-tailed deer
- Effects on deer distribution; effects on cattle distribution; effects on vegetation composition

- Missouri
- Domestic cattle
- Butterfly preference for nectar sources (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction)
- Effects on butterfly detectability (research was conducted in a patch burn grazing landscape but most results were not presented in the context of a fire-grazing interaction)
- Effects on abundance of a butterfly (Speyeria idalia) and its preferred nectar sources (research was conducted in a patch burn grazing landscape and results were presented in the context of a fire-grazing interaction)


- Iowa
- Domestic cattle
- Effects on bird density; effects on vegetation structure


doi.org/10.1890/ES1810-00154.00151

- Iowa
- Domestic cattle
- Effects on breeding bird abundance; effects on vegetation structure and composition

Polito, V. 2012. Effects of patch mosaic burning on tick burden on cattle, tick survival and tick abundance. MS Thesis. Department of Veterinary Biomedical Sciences, Oklahoma State University, Stillwater. 162 pp.


Rensink, C. B. 2009. Impacts of patch-burn grazing on livestock and vegetation in the tallgrass prairie. MS Thesis, Kansas State University, Manhattan, KS.

- Kansas
- Domestic cattle
- Effects on animal performance and forage utilization; effects on vegetation composition; effects on sericea lespedeza utilization by cattle and sericea lespedeza density


- Oklahoma
- Domestic cattle
- Effects on invertebrate biomass, abundance, and nutritional quality; effects on vegetation cover
- See Engle et al 2008 for published results
- Oklahoma and Iowa
- Domestic cattle
- Effects on horn fly abundance on cattle

- Oklahoma
- Bison
- Effects on animal distribution

- Missouri
- Domestic cattle
- Effects on breeding bird richness and density

- Texas
- Domestic cattle
- Effects on soil temperature, bulk density, penetration resistance, infiltration rate, aggregate stability, and soil carbon; effects on vegetation composition

- Texas
- Domestic cattle
- Effects on soil bulk density, penetration resistance, infiltration, and aggregate stability; effects on vegetation composition


- Oklahoma
- Domestic cattle
- Effects on vegetation structure and composition; effects on animal performance

- Oklahoma
- Domestic cattle
- Effects on forage utilization (research was conducted in a patch burn grazing landscape and results were presented in the context of a fire-grazing interaction)
- Effects on sand sagebrush carbohydrate reserves, survival, and growth (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction)
- Effects on grasshopper abundance (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction)


- Oklahoma
- Domestic cattle
- Effects on forage utilization


- Oklahoma
- Domestic cattle
- Effects on grasshopper abundance (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction)


- Oklahoma
- Domestic cattle
- Effects on soil movement, water content, and temperature


- Oklahoma
- Domestic cattle
- Effects on sagebrush density and structure (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction)
- Effects on vegetation structure and composition (research was conducted in a patch burn grazing landscape and results were presented in the context of a fire-grazing interaction)
- Interactive effects of fire, grazing, and topoedaphic variability on vegetation structure and composition; Interactive effects of fire, grazing, and topoedaphic variability on grazing distribution (research was conducted in a patch burn grazing landscape and results were presented in the context of a fire-grazing interaction)


- Oklahoma
- Domestic cattle
- Interactive effects of fire, grazing, and topoedaphic variability on vegetation structure and composition; Interactive effects of fire, grazing, and topoedaphic variability on grazing distribution (research was conducted in a patch burn grazing landscape and results were presented in the context of a fire-grazing interaction)
- Oklahoma
- Domestic cattle
- Effects on sagebrush density and structure (research was conducted in a patch burn grazing landscape but results were not presented in the context of a fire-grazing interaction)

- Oklahoma
- Domestic cattle
- Effects on vegetation structure and composition (research was conducted in a patch burn grazing landscape and results were presented in the context of a fire-grazing interaction)

- Oklahoma
- Bison
- Effects on measures of growth and reproduction of a perennial forb, *Arnoglossum plantagineum*.

**Patch Burn Grazing: Non-technical and/or Non-peer Reviewed Literature**

The following represent websites, review articles from peer-reviewed periodicals, extension publications, non-technical and non-peer reviewed periodicals, published presentations from conferences and symposia, and informational brochures.

Oklahoma State University, Department of Natural Resource Ecology and Management website: http://fireecology.okstate.edu/patch-burning

Leopold Center for Sustainable Agriculture (Iowa State University patch-burn grazing research team) website: http://www.leopold.iastate.edu/patch-burn-grazing-research-team


  • Reviews evidence for the fire-grazing interaction
  • Compares and contrasts range management strategies that can make rangelands homogeneous or heterogeneous
  • Identifies patch burn grazing as a range management strategy that would have conservation benefits

  • Compares and contrasts the research framework that treats fire and grazing as independent effects with the research framework that treats fire and grazing as an interactive effect
  • Compares and contrasts conservation strategies that focus on the reintroduction of animals and their resultant ecosystem impacts with strategies that reintroduce animals along with fire, and the resultant interactive ecosystem impacts


Smart, S. undated. Managing for biodiversity and livestock: fire and grazing. South Dakota State University. 7 pp. Available at: http://grassland.unl.edu/c/document_library/get_file?uuid=588ad9e2-4112-4637-8929-2764e6621d0b&groupId=1980339&.pdf

- Nebraska
- Bison, pocket gophers
- Presents a conceptual model of the fire-grazing interaction
- Presents a conceptual model of the effect of scale on the interaction of disturbances (fire and grazing) with vegetation dynamics
- Describes a research framework for studying fire-grazing interactions in a conservation context


**Fire-Grazing Interaction: Primary and/or Peer-reviewed Literature**

The following represent peer-reviewed literature that, while not conducted within a framework for studying patch burn grazing, was conducted within landscapes characterized by a heterogeneous distribution of burned areas, resulting in a heterogeneous distribution of foraging animals.

While a vast body of knowledge about the effects of fire and grazing on tallgrass prairie has been generated from the Konza Long Term Ecological Research site (http://www.konza.ksu.edu/KNZ/pages/publications/knzpubs.aspx), most is not treated here for two reasons: 1) it's a vast body of knowledge beyond the scope of this bibliography and is best accessed from the link above; and 2) it typically represents research that is conducted within a conceptual framework whereby fire and grazing are treated as independent factors (see Fuhlendorf et al. 2009 for a discussion of this topic).


- *South Africa*
- *Wildebeest*
- *Effects on the development of grazing lawns/vegetation structure*

- *South Africa*
- *Multiple native herbivores*
- *Effects on animal distribution*

- *South Africa*
- *Multiple native herbivores*
- *Effects on vegetation structure and vegetation type*

- *Colorado*
- *Cattle and black-tailed prairie dogs*
- *Effects on prairie dog colony expansion*


- *Alaska*
- *Gray wolves*
- *Effects on wolf distribution*

- *California*
- *Mountain sheep*
- *Effects on animal distribution*


- *France*
- *Mouflon*
- *Effects on animal distribution; effects on forage quality; effects on vegetation composition*

- Australia
- Macropods (potoroos and wallabys)
- Effects on animal distribution and abundance

- South Dakota
- Black-tailed prairie dog, bison, antelope
- Effects on animal distribution

- Scotland
- Exotic deer and domestic sheep
- Effects on fuel loads
- Effects on fire behavior


- Zimbabwe
- Domestic cattle and goats
- Effects on fuel load (phytomass, litter)

- South Africa
- Zebra and multiple species of antelope
- Effects on animal distribution and grazing selection; effects on vegetation structure

- Wyoming
- Elk
- Effects on elk browsing of aspen

- Tanzania
- Multiple species of native herbivores
- Effects on dynamics of phytomass components (live leaf, live stem, flower/fruit, standing dead)
- Effects on consumption (forage removal); effects on vegetation bulk density and height


- Alberta
- Gray wolves
- Effects on wolf distribution


- Colorado
- Mountain sheep and mule deer
- Effects on diet quality


- Cameroon
- 11 species of ungulates
- Effects on ungulate community structure (body mass distribution, co-occurrence patterns, species richness, species density, guild dominance)


- Cameroon
- Multiple species of ungulates
- Effects on animal distribution
Kramer, K., T. A. Groen, and S. E. van Wieren. 2003. The interacting effects of ungulates and fire on forest
• The Netherlands
• Domestic livestock and exotic herbivores
• Effects on animal distribution; effects on vegetation cover; effects on fire behavior


• Australia
• Domestic cattle
• Effects on vegetation cover; effects on invertebrate abundance

• Australia
• Domestic sheep and native macropods (kangaroo, wallaby, wombat)
• Effects on fire behavior

• Australia
• Domestic sheep and cattle; native macropods (kangaroo, wombat, wallaby, pademelon)
• Effects on vegetation cover and height; effects on fuel load


• Nepal
• Multiple native herbivores
• Effects on axis deer distribution
- Nepal
- Multiple native herbivores
- Effects on forage composition and quality; effects on axis deer distribution

- Tanzania
- Domestic cattle and multiple species of native herbivore
- Effects on native herbivore distribution


- Australia
- Kangaroos
- Effects on kangaroo abundance; effects on forage nutrients and fecal nutrients

- Kansas
- Bison
- Effects on animal distribution

- Tanzania
- Multiple species of native herbivore
- Effects on birds and arthropods

- Israel
- Domestic cattle
- Effects on vegetation cover, height, richness, diversity and evenness

- Uganda
- Multiple species
- Effects on abundance of savanna hares; effects on abundance and behavior of predators

- Hungary
- Domestic sheep and wild rabbits
- Effects on vegetation composition; effects on fire behavior
- **South Africa**
- **Sable antelope**
- **Effects on animal distribution, foraging efficiency, and fecal nutrient content**

- **Wyoming**
- **Elk and bison**
- **Effects on animal distribution**


- **Australia**
- **Macropods (wallaroos and kangaroos)**
- **Effects on animal distribution and abundance**

- **Kenya**
- **Multiple species of large native herbivores**
- **Effects on small mammal communities**

- **India**
- **Domestic cattle and multiple species of native herbivore**
- **Effects on vegetation cover, species richness, diversity, and evenness**

- **Burkina Faso**
- **Domestic livestock**
- **Effects on fuel characteristics, fire behavior, and fire temperature**

- **British Columbia**
- **Stone sheep**
- **Effects on forage quality; effects on animal performance**
- Kenya
- Multiple native herbivores; small (hare) to large (elephant); hindgut fermenters and foregut fermenters
- Effects on forage quality; effects on animal distribution

- Oklahoma
- Bison, elk, white-tailed deer, longhorn cattle
- Effects on bison distribution

- Wyoming
- Elk
- Effects on forage quality; effects on animal distribution

- Utah
- Bighorn sheep
- Effects on animal distribution

- Australia
- Macropods (kangaroo and wallaby) and domestic cattle
- Effects on animal distribution; effects on vegetation biomass and greeness

- Australia
- Macropods (kangaroo, wallaby, wombat, pademelon)
- Effects on animal distribution; effects on vegetation composition

- South Africa
- Four species of native ungulate
- Effects on animal distribution

- Wyoming
- Elk and bison
- Effects on foraging dynamics and survival


- Montana
- Elk
- Effects on vegetation communities and forage quality; effects on animal distribution

- Montana
- Elk
- Effects on vegetation communities and forage quality; effects on animal distribution

- Montana
- Elk
- Effects on vegetation communities and forage quality; effects on animal distribution

- Norway
- Domestic sheep
- Effects on vegetation composition and diversity

- Kansas
- Bison
- Effects on vegetation communities; effects on animal distribution

- South Africa
- White rhino and multiple species of other native herbivores
- Effects on vegetation structure;effects on fire behavior; effects on abundance of grazers other than white rhino

- Oklahoma
- Bison
- Effects on forage quantity and quality; effects on animal distribution
- **Tanzania**
- **Multiple species of native ungulates**
- **Effects on animal distribution**

- **South Africa**
- **Multiple species of native herbivores**
- **Effects on vegetation structure; effects on small mammal communities**

- **Kenya**
- **Multiple species of native and domestic herbivore**
- **Effects on animal distribution and abundance**

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