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Annotated Bibliography of Fire Literature Relative to Northern Grasslands in South-Central Canada and North-Central United States

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U.S. Fish and Wildlife Service
and
Cooperative Extension Service
South Dakota State University
U.S. Department of Agriculture

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Natural resource managers have greatly increased the use of fire to manage grassland habitats during the past two decades in the northern Great Plains region of the United States and Canada. In support of these efforts, we have compiled this annotated bibliography to provide a condensed reference of fire literature for those managers with an interest in fire ecology.

References are arranged alphabetically by author and year, numbered consecutively, and referenced by number in the author and subject indexes that follow the bibliography. The intent in compiling the bibliography and indexes is more to identify subject matter and to direct the reader to sources rather than to provide a digested interpretation of each manuscript.

We thank Mary Brashier, publications editor, Department of Agricultural Communications, SDSU, for editorial assistance and R.F. Gartner, W.D. Svedarsky, C.H. Halvorson, and K.L. Solberg for reviewing the manuscript.

This publication is the result of a cooperative effort by the U.S. Fish and Wildlife Service, the South Dakota Cooperative Fish and Wildlife Research Unit, and South Dakota State University.

1. Aaston, M. 1978. Fire——a tool for pasture improvement. Pages 39—41 in Proc Fire and Range Management Seminar, sponsored by the Land Use Service DREE—PFRA and Lands Branch, Saskatchewan Department of Agriculture, Regina.

#19334544

Describes a program of brush clearing in large community pastures in Manitoba and Saskatchewan from 1955 through 1975. Controlled burns were used after brush had been chained and sprayed. Weather conditions, fireguard width, and equipment are specified.

2. Aikman, J.M. 1955. Burning in the management of prairie in Iowa. Proc Iowa Acad Sci 62:53—62.

Discusses factors considered before burning one of two state—owned native prairie preserves in Iowa. Results of a trial burn in February presented.

3. Allen, L.S., L.H. Harbers, R.R. Schalles, C.E. Owensby, and E.F. Smith. 1976. Range burning and fertilizing related to nutritive value of bluestem grass. J Range Manage 29:306—308.

Effects of April burning, alone and in combination with 40 lb/acre urea fertilization, on the nutritional value of big and little bluestem.

4. Anderson, H.G., and A.W. Bailey. 1980. Effects of annual burning on grassland in the aspen parkland of east—central Alberta. Can J Bot 58:985—996.

Assesses vegetation changes on an 8100—ha area following 24 years of annual spring burning. Vegetative species composition, canopy cover, standing crop, nutrient status, blade length, and inflorescence production are examined. Fire effect on soil nutrient content is determined. Comprehensive literature review.

5. Anderson, M.A. 1978. Effect of fire on land management and range management. Pages 33—38 in Proc Fire and Range Management Seminar, sponsored by the Land Use Service DREE—PFRA and Lands Branch, Saskatchewan Department of Agriculture, Regina.

Spring and fall prescribed fire on tallgrass prairie components in Alberta. Temperatures of head fires and back fires are compared. Recommendations are given for post—burn management of rangeland.

6. Anderson, M.L., and A.W. Bailey. 1979. Effect of fire on a Symphoricarpos occidentalis shrub community in central Alberta. Can J Bot 57:2819—2823.

Plant species cover and frequency are assessed for three growing seasons after experimental May burning of buckbrush in central Alberta.

7. Anonymous. [W.T. Barker]. 1980. Range management. ND Farm Res Bul 38:18.

Brief summary of a 10—year study comparing the effects of burning and mowing on lowland meadow vegetation. No data presented.

8. Antos, J.A., B. McCune, and C. Bara. 1983. Effect of fire on an ungrazed western Montana grassland. Am Midl Nat 110:354—364.

Quantifies effects of a hot spring wildfire on vegetative cover, phenology, biomass, vigor, soil and air temperatures, and soil moisture during the first, second, and fourth growing seasons following a hot June wildfire. Data on lichen and bryophyte response included.

9. Apfelbaum, S.I., and A.W. Haney. 1984. Fire provides unusual opportunities for before—and—after study of bird populations (Minnesota). Restor and Manage Notes 2:30—31.

First—year impacts of wildfire on bird populations in a Minnesota pine—spruce forest. Species and guilds are compared by density, territory space, energy requirements, and importance values obtained before and after the fire.

10. Archibold, O.W., and M.R. Wilson. 1980. Natural vegetation of Saskatchewan prior to agricultural settlement. Can J Bot 58:2031—2042.

A reconstruction of preagricultural vegetation in southern Saskatchewan based on 2500 township plats from the 1880s. Mean grass cover was 65% and evidence of recent burning was uncommon. Results indicate southward expansion of aspen parkland. Includes a good review of literature on aspen invasion.

11. Arthur, G.W. 1975. Introduction to the ecology of early historic communal bison hunting among the Northern Plains Indians. Archaeol Surv of Can Pap 37. National Museum of Manitoba, Mercury Series, Ottawa. 136 pp.

Assesses historical accounts of bison hunting by Northern Plains Indians relative to current understanding of bison behavior in effort to correct misconceptions about presettlement Indian culture. Use of fire to hunt and direct movement of bison is treated extensively. Extensive bibliography.

12. Axelrod, A.N., and F.D. Irving. 1982. Effects of prescribed fire on American hazel at the Cedar Creek Natural Area in Minnesota. Restor and Manage Notes 1(2):14.

Annual burning effects on the distribution and stem density, weight, and height of American hazel in an oak savanna ecosystem.

13. Bailey, A.W. 1978. Burning prescriptions. Pages 9—13 in Proc Fire and Range Management Seminar, sponsored by the Land Use Service DREE—PFRA and Lands Branch, Saskatchewan Department of Agriculture, Regina.

Briefly discusses factors involved in prescribed burning, including when to burn, fuel factors, and weather conditions. Reasons for burning are discussed, and fire prescriptions for fescue grasslands, shrublands, and aspen forest are provided.

14. Bailey, A.W. 1978. Effects of fire on the mixed prairie vegetation. Proc Prairie Prescribed Burning Symposium and Workshop, sponsored by the U.S. Forest Service, Bureau of Land Management, and Fish and Wildlife Service, Jamestown, North Dakota. 5 pp.

Reviews literature dealing with the effects of prescribed and wild fire on the productivity and species composition of mixed grass prairie in the Northern Great Plains. The effect of precipitation on vegetative response to fire is emphasized.

15. Bailey, A.W. 1978. Fire impacts in diverse and complex multiple use environments. Pages 63—66 in Proc 1977 Rangeland Management and Fire Symposium, Casper, Wyoming. Printed by Montana Forest and Conservation Exp Sta, University of Montana School of Forestry, Missoula, 59812.

How fire or lack of fire influences the various resources within range ecosystems, with examples from the Canadian Aspen Parkland. Emphasizes need for planning to assure that burning objectives are met and that benefits outweigh costs.

16. Bailey, A.W. 1978. History of fire in the Canadian Plains. Pages 3–6 in Proc Fire and Range Management Seminar, sponsored by the Land Use Service DREE–PFRA and Lands Branch, Saskatchewan Department of Agriculture, Regina.

Uses historical literature to review lightning, Indians, and settlers as early sources of fire in the Canadian plains provinces. Effects of fire suppression on vegetation and soils are discussed.

17. Bailey, A.W. 1978. Prescribed burning as an important tool for Canadian rangelands. Pages 15–17 in Proc Fire and Range Management Seminar, sponsored by the Land Use Service DREE–PFRA and Lands Branch, Saskatchewan Department of Agriculture, Regina.

Wide ranging overview of prescribed fire in the Canadian plains. Reviews early literature relative to prairie fire ecology and summarizes experiments on post–fire forage production. Gives burn prescriptions for grassland, shrubland, and aspen parkland. Precautions are emphasized relative to weather, fuel load, temperature, time of day, fire breaks, burn objectives, and spot fires.

18. Bailey, A.W. 1978. Use of fire to manage grasslands of the Great Plains: Northern Great Plains and adjacent forests. Proc First Int Rangeland Congr, Soc for Range Manage, Denver, Colorado. 1:691–693.

Overview of vegetative response to prescribed fire in mixed, tallgrass, fescue, and aspen grasslands in the northern Great Plains. Provides general prescrip–tions for burning aspen parkland.

19. Bailey, A.W., and M.L. Anderson. 1978. Prescribed burning of a Festuca–Stipa grassland. J Range Manage 31:446–449.

Effects of spring and fall burning on species composition and productivity of a Festuca–Stipa grassland. Fire effects varied according to stage of growth and season of burn.

20. Barker, W.T. 1983. Manipulation of plant species composition, animal distribution, and herbage production by burning. Ecol Soc Amer Bul 84:110.

Abstract only. Describes use of fire to manipulate grazing in the sandhills of southeastern North Dakota. Lowland burning on a 3–year rotation increases lowland utilization, reduces lowland shrub densities, and decreases overgrazing of upland sites.

21. Becic, J.N., and T.B. Bragg. 1976. Grassland reestablishment in eastern Nebraska using burning and mowing management. Pages 120–124 in D.C. Glenn–Lewis and R.Q. Landers, Jr., eds. Proc 5th Midwest Prairie Conf, Ames, Iowa.

Compares effects of several combinations of burning and mowing over a 3–year period on vegetative species composition, canopy cover, and biomass in a newly restored tallgrass prairie. Sampling sites used in this study were stratified by topographic location.

22. Bennett, L.J. 1938. Blue–winged teal, its ecology and management. Collegiate Press, Ames, Iowa. 144 pp.

The ecology of blue–winged teal throughout its range, with emphasis on recruitment in Iowa, and management recommendations. Briefly mentions (p. 62) nest losses due to burning in May and June. Grazing, but not burning, is recommended for habitat management.

23. Berg, W.E. 1979. Wildland habitat development study. Minn Wildl Res Q 39:97–118.

Summarizes a 15–year project on the feasibility of developing sharp–tailed grouse habitat by prescribed burning in the aspen forests of northwest Minnesota. Vegetative structure and the relative abundances of white–tailed deer, snowshoe hares, ruffed grouse, and sharp–tailed grouse are compared on an unburned 5.2–ha control and a 5.2–ha experimental area that had been burned four times in 8 years. Includes a list of all birds seen in the two areas in spring and summer.

24. Bergstedt, B., and G.J. Niemi. 1974. Comparison of two breeding bird censuses following the Little Sioux forest fire. Loon 46:28–33.

Avian density estimates obtained in a burned portion of the Superior National Forest in northern Minnesota 2 years after a wildfire are contrasted with published densities reported from unburned regional forests.

25. Best, L.B. 1979. Effects of fire on a field sparrow population. Am Midl Nat 101:434–442.

Field sparrow nesting behavior in an Illinois shrub–grassland site during two seasons preceding and one season following an incomplete late–April prescribed burn. Data on territory establishment, habitat utilization, pair bonding, mate fidelity, site selection, and nest success.

26. Bird, R.D. 1930. Biotic communities of the aspen parkland of central Canada. Ecology 11:356–442.

Describes and quantifies the biotas and biotic relationships of four communities (prairie, willow, aspen edge, and mature aspen forest) within the aspen parkland in Manitoba. Community succession and the role of fire in the maintenance of prairie are briefly discussed.

27. Bird, R.D. 1961. Ecology of the aspen parklands of western Canada. Can Dep Agric Res Branch Publ 1066. 155 pp.

Ecology of the aspen parkland in detail from a historical viewpoint, including communities, community processes, and changes due to European settlement. Effects of fire and fire suppression are referenced throughout the text. Good bibliography.

28. Black, R.E. 1985. Horseshoe–Bar Ranch prairie fires. Nebraskaland 63(4):12–13,47.

Popular account of prairie fires in the Nebraska sandhills during the early 1900s, describing protective measures and fire fighting techniques used on the ranch. Effects of fire on vegetation are mentioned briefly.

29. Boardman, W.S. 1967. Wildlife and natural area preservation. Proc Tall Timbers Fire Ecol Conf 6:135–142.

A plea for sound fire policy in keeping with management objectives for natural areas. Results of fire and fire exclusion in several natural areas illustrate the thesis. Emphasis is placed on the need for better public education in fire ecology.

30. Bock, C.E., and J.H. Bock. 1983. Responses of birds and deer mice to prescribed burning in ponderosa pine. J Wildl Manage 47:836–840.

Quantifies differences in vegetative composition and the abundance of songbirds and deer mice in burned and unburned pine forest–pine savanna during the first two growing seasons following April and October burns at Wind Cave National Park, South Dakota.

31. Bock, J.H., and C.E. Bock. 1984. Effects of fire on woody vegetation in the pine–grassland ecotone of the southern Black Hills. Am Midl Nat 112:35–42.

Prescribed spring and fall surface burns are compared on two study plots in the ponderosa pine–grassland interface at Wind Cave National Park in South Dakota. Trees and shrubs are quantified 1 year pre– and 2 years post–burn on each plot, and results are compared with woody vegetation in a similar area subjected to a crown fire 5 years earlier. Surface fires significantly reduced density of smaller ponderosa pines but had little effect on the shrub community. In contrast, the crown fire killed pines of all sizes and most shrub species increased dramatically.

32. Bragg, T.B. 1978. Effects of burning, cattle grazing, and topography on vegetation of the Choppy Sands Range site in the Nebraska Sandhills prairie. Proc First Int Rangeland Congr, Soc for Range Mange, Denver, Colorado. 1:248–253.

Comparison of early and recent data on area vegetation reveals changes in species composition which may be related to sampling location, altered fire regimes, and/or grazing pressure. This study compares community composition, coverage, and biomass on different topographical aspects of undisturbed, grazed, burned, and grazed and burned study plots.

33. Bragg, T.B. 1982. Seasonal variations in fuel and fuel consumption by fires in a bluestem prairie. Ecology 63:7–11.

Small (1 sq m) plots in an ungrazed, tallgrass prairie in Nebraska were burned at 3–week intervals to assess the probability and effects of a grassland fire occurring throughout the growing season. Results are discussed relative to presettlement lightning fires.

34. Britton, C.M. 1979. Fire on the range. Western Wildlands 5:32–33.

General discussion of prescribed burning for brush control, with emphasis on sagebrush–bunchgrass rangeland. Briefly outlines fire responses of various major shrubs and grasses and discusses fire effects on soil.

35. Buell, M.F., and H.F. Buell. 1959. Aspen invasion of prairie. Torrey Bot Club Bul 86:264–265.

Aspen propagative roots extend over 20m into prairie haylands. The authors calculate age and growth rate of the roots and suggest that recurrent fire formerly prevented aspen invasion into grasslands.

36. Buell, M.F., and V. Facey. 1960. Forest–prairie transition west of Itasca Park, Minnesota. Torrey Bot Club Bul 87:46–58.

Present vegetation along a transect in the forest–prairie transition in northwest Minnesota described. Transect data are contrasted with presettlement vegetation described in interviews with early settlers. Describes the probable role of fire in maintenance of the prairie prior to settlement by whites.

37. Cancelado, R. and T.R. Yonke. 1970. Effect of prairie burning on insect populations. J Kans Entom Soc 43:274–281.

Numbers and composition of Homoptera and Hemiptera captured by daily trapping and weekly sweep netting throughout the entire first growing season following an early spring burn in tallgrass prairie in Missouri.

38. Cartwright, B.W. 1942. Regulated burning as a marsh management technique. Trans N Am Wildl Conf 7:257–263.

A program to reduce waterfowl losses to wildfire, agricultural burning, and haying in the Netley Marsh system near Winnipeg, Manitoba. Includes data on losses to fire and haying.

39. Clark, S.E., E.W. Tisdale, and N.A. Skogland. 1943. Effects of climate and grazing practices on shortgrass prairie vegetation. Publ 747, Tech Bul 46. Dominion Exp Sta, Swift Current, Saskatchewan. 53 pp.

Results of the first 12 years of research at the Dominion Range Experiment Station in southeast Alberta. Drought occurred during 11 of the 12 years. Effects of fire on condition of shortgrass rangeland are briefly discussed; fire had a negative impact on forage yield, with 3 to 5 years required for complete recovery under moderate grazing.

40. Coupland, R.T. 1973. Producers: I. Dynamics of above–ground standing crop. Matador Proj, Can Int Biol Program Tech Rep 27. Saskatoon, Saskatchewan. 159 pp.

Species composition and biomass of green shoots, dead shoots, and litter throughout the growing season for 3 to 5 years on one burned (August wildfire) and two unburned study sites in Saskatchewan. Effects of irrigation and fertilization on biomass are also evaluated. Data are included on other sites (undisturbed, burned, cultivated, reseeded) that received less intensive and less systematic monitoring.

41. Coupland, R.T., E.A. Ripley, and P.C. Robins. 1973. Description of site: I. Floristic composition and canopy architecture of the vegetative cover. Matador Proj, Can Int Biol Program Tech Rep 11. Saskatoon, Saskatchewan. 54 pp.

Vegetative species composition and various canopy parameters are reported for the IBP Matador grassland ecosystem study site in mixed prairie in Saskatchewan. Includes a brief summary of the effects of summer and fall burning on site vegetation for two growing seasons.

42. Currier, P.J. 1984. Response of prairie fringed orchid to fire and reduction in grazing (Nebraska). Restor and Manage Notes 2:28.

Flowering prairie white fringed orchids were discovered in Hall County, Nebraska. Reduced grazing, stimulation by a prescribed spring burn, and abundant summer rainfall may have triggered flowering for the first time in 50 years.

43. Curtis, J.T. and M.L. Partch. 1948. Effect of fire on the competition between blue grass and certain prairie plants. Am Midl Nat 39:437–443.

Quantifies response to annual and biennial burning in spring and fall by prairie plants that had been artificially introduced into a field of bluegrass. Results are from a 6–year study at the University of Wisconsin Arboretum.

44. Curtis, J.T. and M.L. Partch. 1950. Some factors affecting flower production in Andropogon gerardi. Ecology 31:488–489.

Summarizes results of a small–plot arboretum trial to determine whether fire–induced flowering in big bluestem was a response to litter removal, nutrient release from ashes, or direct exposure of meristematic tissue to heat.

45. Cushwa, C.T. 1968. Fire: a summary of literature in the United States from the mid–1920s to 1966. U.S. For Serv, Southeastern For Exp Sta, Asheville, North Carolina. 117 pp.

Unannotated bibliography of fire use and effects in the U.S., with emphasis on work from 1938 through 1968. Entries are grouped by subject (bibliographies; prescribed burning; ecological succession; economics; forestry; herbaceous and shrub plants; history; insects, disease and genetics; nutrition; physical principles and thermal properties; range fires; soil; techniques and research; watershed and weather; wildfire; wildlife).

46. Day, G.M. 1953. Indian as an ecological factor in the northeastern forest. Ecology 34:329–346.

Impacts of presettlement Indians in New England forests. Village clearing, firewood cutting, and agriculture demanded significant acreage. Purposeful burning was the primary land clearing technique. Forests were also burned annually or at frequent intervals to facilitate travel and hunting in many areas. Extensive bibliography.

47. Diiro, B.W. 1982. Effects of burning and mowing on seasonal whitetop ponds in southern Manitoba. MS thesis. Iowa State Univ, Ames. 48 pp.

Effects of mowing, spring burning, and fall burning on selected physical and biological parameters in whitetop–dominated wetlands in south–central Manitoba. Water depth, water and substrate temperatures and nutrient levels, invertebrate abundance and community composition, vegetative cover and production, waterfowl use, and simulated waterfowl nest success are examined under different treatment regimes.

48. Dix, R.L. 1960. Effects of burning on the mulch structure and species composition of grasslands in western North Dakota. Ecology 41:49–56.

Results of a preliminary quantitative study of the mulch structure and vegetative composition on grasslands in western North Dakota. Three burned areas and their paired control grasslands were sampled one, three, and four growing seasons after burning. Species composition tended to be similar in the paired treatment and control plots. Complete recovery of the mulch structure occurred within 4 years.

49. Dokken, D.A., and L.C. Hulbert. 1976. Effect of standing dead plants on stem density in bluestem prairie. Pages 78–81 in D.C. Glenn–Lewis and R.Q. Landers, Jr., eds. Proc 5th Midwest Prairie Conf, Ames, Iowa.

Compares density of live stems of grasses, sedges, and forbs on two soil types 0, 1, and 3 years after prescribed burning in Kansas and correlates live stem density with depth and weight of standing dead vegetation.

50. Donoghue, L.R., and V.S. Johnson. 1975. Prescribed burning in the north–central states. U.S. For Serv, N Cent For Exp Sta Rep FSRF–NC–11. 8 pp.

Reviews history of prescribed burning in Michigan, Minnesota, Wisconsin, Illinois, and Ohio and reports results of a 5–year survey study of prescribed burning in the area. Survey topics are numbers and acreages of burns per year; timing and objectives of burn; fuel type; weather (temperature, wind, humidity, days since last rain, and use of fire weather forecasts); time of day; burn duration; ignition tool and firing techniques; cost per acre; and success or failure in meeting objectives.

51. Drake, L.D. 1983. Snowplowing offers advantages in creating prairie firebreaks (Iowa). Restor and Manage Notes 1(4):20.

A snowplow was used during the winter to construct a firebreak in a prairie marsh in Iowa. Blade angle and other details of the technique are described, and advantages over summer mowing are discussed.

52. Dube, D. 1978. Considerations in the use of prescribed burning. Pages 29–31 in Proc Fire and Range Management Seminar, sponsored by the Land Use Service DREE–PFRA and Lands Branch, Saskatchewan Department of Agriculture, Regina.

Preburn planning involves a burning plan, including size of the burn unit, placement of fire lines, fuel type and load, topographic variability, weather, and crew placement and communication.

53. Dziadyk, B., and G.K. Clambey. 1980. Floristic composition of plant communities in a western Minnesota tallgrass prairie. Pages 45–54 in C.L. Kucera, ed. Proc 7th N Am Prairie Conf, Springfield, Missouri.

Primarily an assessment of vegetation at Bluestem Prairie, but also documents changes in species composition and coverage caused by a fall wildfire that occurred between the first and second year of the 2–year study.

54. Dziadyk, B., and G.K. Clambey. 1980. Vegetation studies in the prairie–forest transition region. IV. Effects of burning on net production of a western Minnesota tallgrass prairie. Proc N Dakota Acad Sci 34:21.

Effects of a fall wildfire on basal cover, above–ground biomass, and root mass in six herbaceous plant communities of tallgrass prairie. Net production was reduced during the first postburn growing season, and this was attributed to a cool, wet spring coupled with fire damage to crowns of bunch grasses.

55. Ehrenreich, J.H. 1957. Management practices for maintenance of native prairie in Iowa. PhD thesis, Iowa State Univ., Ames. 159 pp.

Effects of burning, grazing, and mowing on species composition, productivity, and flowering of tallgrass prairie. Results of fire and mowing on various vegetative parameters are discussed relative to ecology, physiology, and anatomy of the grasses, to timing of the treatments, and to treatment effects on soil temperature, nutrients, and water content. Extensive bibliography on early results of prescribed burning.

56. Ehrenreich, J.H. 1959. Effect of burning and clipping on growth of native prairie in Iowa. J Range Manage 12:133–137.

Reports growth rates and periods, flower stalk production, and yields of dominant grasses in bluestem prairie plots burned zero, one, two, and three times during a 3–year period. Effect of clipping frequency (fall only vs. four times per growing season) on yield was determined for each burning treatment. Soil temperatures were monitored throughout the growing season.

57. Ehrenreich, J.H., and J.M. Aikman. 1957. Effect of burning on seedstalk production of native prairie grasses. Iowa Acad Sci 64:205–212.

Compares number, weight, and height of seed stalks; length, weight, and surface area of leaves; length and weight of sheaths; and number, percentage purity, and percentage germination of seeds of five dominant

grasses collected on burned and unburned bluestem prairie in Iowa.

58. Ehrenreich, J.H. and J.M. Aikman. 1963. Ecological study of the effect of certain management practices on native prairie in Iowa. Ecol Monog 33:113–130.

Effects of 1, 2, and 3 years of late winter and spring burning on: 1) soil temperature, moisture, structure, and nutrients; 2) plant growth rates and productivity; and 3) seed stalk production. Burning is contrasted with clipping. Good literature review on effects of various prairie management practices.

59. Eichhorn, L.C., and C.R. Watts. 1984. Plant succession on burns in the river breaks of central Montana. Proc Mont Acad Sci 43:21–34.

Results of a 10–year study documenting changes in canopy cover of grasses, forbs, and shrubs following wildfires that occurred up to 28 years earlier in two forest and three grassland plant associations in central Montana.

60. Engle, D.M., and P.M. Bultsma. 1981. Spring burning mixed prairies (South Dakota). Restor and Manage Notes 1(1):11–12.

Vegetative species composition, production, and vigor are examined on upland and lowland mixed prairie in north–central South Dakota during the first growing season after early and late spring prescribed burning.

61. Engle, D.M., and P.M. Bultsma. 1984. Burning of northern mixed prairie during drought. J Range Manage 37:398–401.

Evaluates standing crop of current year's growth and response of key management grasses following prescribed burns in mid–May and mid–June during 2 dry years. Burns were a test of fire to control Kentucky bluegrass. Mid–May burns produced desirable results on overflow range sites but reduced production of desirable grasses on silty range sites. Mid–June burning is not recommended on either range site during drought.

62. Erwin, W.J., and R.H. Stasiak. 1979. Vertebrate mortality during the burning of a reestablished prairie in Nebraska. Am Midl Nat 101:247–249.

Descriptive assessment of direct fire mortality among small mammals, ground–nesting birds, and reptiles during 3 years of prescribed spring burns on a small prairie preserve in eastern Nebraska.

63. Ewing, J. 1924. Plant succession of the brush prairie in northwestern Minnesota. J Ecol 12:238–266.

Vegetative composition and succession in various communities within the brush–prairie, or prairie–deciduous forest ecotone, on the White Earth Indian Reservation in northwest Minnesota. The frequency of fire and its impact on succession are discussed.

64. Forde, J.D., N.F. Sloan, and D.A. Shown. 1984. Grassland habitat management using prescribed burning in Wind Cave National Park, South Dakota. Prairie Nat 16:97–110.

A 4–year experimental study of vegetation, avian, mammalian, and insect response to a prescribed April burn in cool–season mixed grass prairie.

65. Fraser, H.M. 1977. Extremes of weather and climate: a meterologist's view of the problem. Pages 70–76 in Proc 1977 Rangeland Management and Fire Symposium, Casper, Wyoming. Printed by Montana Forest and Conservation Exp Sta, University of Montana School of Forestry, Missoula, 59812.

Discusses relationship between meteorology and fire management in terms of daily, seasonal, and climatological time scales. Examples are drawn from the Canadian Great Plains. Need for direct, precise communication between meteorologists and fire managers is emphasized.

66. Fritzell, E.K. 1975. Effects of agricultural burning on nesting waterfowl. Can Field–Nat 89:21–27.

Results of a 2–year study in an intensively farmed region in southern Manitoba's pothole district. Extent and chronology of burning, timing of nest initiation by mallards and blue–winged teal, preferences for burned and unburned nest sites, and nest destruction by fire are documented. Attitudes of farmers and effect of fire on small mammal populations are also discussed.

67. Furniss, D.C. 1938. The 1937 waterfowl season in the Prince Albert District, central Saskatchewan. Wilson Bul 50:17–27.

Waterfowl abundance, nest success, and brood success in 1934–1936 (good water conditions) versus 1937 (drought). Briefly compares effects of burning, grazing, and haying on waterfowl nest cover in aspen parkland.

68. Gartner, F.R. 1978. Resources of the North American Prairie. Pages 6–12 in Proc 1977 Rangeland Management and Fire Symposium, Casper, Wyoming. Printed by Montana Forest and Conservation Exp Sta, University of Montana School of Forestry, Missoula, 59812.

Nature and extent of prairie and of specific prairie associations in North America, the value of grass–lands for grazing, and the pressures for alternate use of prairie are discussed to illustrate the need for better management of dwindling rangeland. Use and misuse of prescribed burning as a management tool are discussed for a number of range types and range problems in the U.S. and Canada.

69. Gartner, F.R., R.I. Butterfield, W.W. Thompson, and L.R. Roath. 1978. Prescribed burning of range ecosystems in South Dakota. Proc First Int Rangeland Congr, Soc for Range Manage, Denver, Colorado. 1:687–690.

A 2–year study evaluated prescribed burning to control Japanese brome in mixed prairie. Effects of winter and spring burns were evaluated for two, and fall burns for one, growing season. Grazing confounded results, but burning generally reduced both yield and density of Japanese brome in favor of western wheatgrass.

70. Gartner, F.R., L.R. Roath, and E.M. White. 1976. Advantages and disadvantages of prescribed burning. Pages 11–15 in Symposium: Use of Prescribed Burning in Western Woodland and Range Ecosystems. March 1976. Utah Agric Exp Sta, Utah State Univ, Logan. 90 pp.

Briefly discusses fire ecology in the Black Hills of South Dakota. Negative impacts of present–day wildfire are summarized and contrasted with results of prescribed burns to reduce forest and grassland fuel loads, to control pine encroachment, and to control exotic grasses in native prairie. Other uses of prescribed fire are postulated.

71. Gartner, F.R., and W.W. Thompson. 1973. Fire in the Black Hills forest–grass ecotone. Proc Tall Timbers Fire Ecol Conf 12:37–68.

Historical frequency and effect of wildfire in the Black Hills of South Dakota. Results suggest that post—settlement fire suppression is largely responsible for pine encroachment on grasslands in the foothills area. Provides an overview of efforts to alleviate encroachment with prescribed burns.

72. Gartner, F.R., and E.M. White. 1974. Use of fire in vegetation management. 1974 Ann Meet For Comm, Great Plains Agric Counc, Sioux Falls, South Dakota. June 20, 1974. 7 pp.

Fire prescriptions and effects of burning to control ponderosa pine and Japanese brome encroachment on grasslands in the Black Hills, South Dakota. Known and potential impacts of long—term fire suppression in this habitat are briefly discussed.

73. Gartner, F.R., and E.M. White. 1983. Historical role of fire in the northern Great Plains and its use in management. Ecol Soc Am Bul 64:110.

Abstract only. Argues that prescribed burning can improve rangeland, but that response to fire is not known for all northern plains vegetation types. Cautions that control of grazing pressure is especially important when fire is incorporated in management plans.

74. Gartner, F.R., and E.M. White. 1986. Fire in the Northern Great Plains and its use in management. Pages 13—21 in Prescribed Fire and Smoke Management Symposium Proc, Feb 13, 1986, Kissiminee, Florida. Soc Range Manage, Denver, Colorado.

General discussion and literature review of fire in mixed prairie, with emphasis on the Black Hills region of South Dakota. Topics include fire history, results of fire suppression, physical nature of grassland fires, fire effects on mulch and soil moisture, vegetation response to fire, and smoke management.

75. George, R.R., A.L. Farris, C.C. Schwartz, D.D. Humburg, and J.M. Kienzler. 1978. Effects of controlled burning on selected upland habitat in southern Iowa. Iowa Wildl Res Bul 25. 39 pp.

Assesses the effects of burning season and postburn interval on vegetation at four sites on the Rathbun Wildlife area. Percent coverage and stem densities were determined for herbaceous and woody species respectively during one preburn year, two consecutive burning years, and two postburn years per treatment (February, April, June or September burn). Nesting and brood cover were assessed subjectively for bobwhite quail, cottontail rabbits, and ring—necked pheasants throughout the study.

76. Gersib, D. 1984. From out of the ashes. Nebraskaland 62(7):24—29.

Popular article emphasizing the role of fire in the maintenance of the prairie ecosystem.

77. Grier, B. 1981. Burning with a purpose. Nebraskaland 59(3):38—42.

Popularized discussion of prescribed burning to control forest encroachment and improve wildlife habitat in Nebraska. The use of snow cover to provide natural firebreaks during late winter—early spring burning is illustrated.

78. Hadley, E.B. 1970. Net productivity and burning responses of native eastern North Dakota prairie communities. Am Midl Nat 84:121—135.

Herbage production and efficiency of energy use in three upland and three lowland community types on the Oakville Prairie in east—central North Dakota. Spring burning significantly stimulated herbage production and caloric content during the first summer in one upland type but did not affect, or slightly reduced, these parameters in one lowland type. An account of fire effects on each species in the study plots is included.

79. Hadley, E.B., and R.P. Buccos. 1967. Plant community composition and net primary production within a native eastern North Dakota prairie. Am Midl Nat 77:116—127.

Species composition and productivity of six plant communities within a native tallgrass prairie in the Red River Valley. Some communities were studied both on unburned sites and on sites that had been burned the previous year.

80. Hadley, E.B., and B.J. Kieckhefer. 1963. Productivity of two prairie grasses in relation to fire frequency. Ecology 44:389—395.

Reports the effects of fire frequency (one, two, three, and four spring burns in 10 years) on the production of flower stalks and the caloric content and biomass of litter and living shoots and roots in big bluestem and Indiangrass in east—central Illinois.

81. Hanson, H.C. 1939. Fire in land use and management. Am Midl Nat 21:415—434.

Wide ranging early discussion of the pros and cons of fire as a management tool. Reviews literature on fire in forests, grasslands, peat bogs, and agriculture relative to: 1) destruction of cover and plant and animal life; 2) modification of atmospheric factors; 3) direct and indirect effects on soil, and 4) plant succession. Many examples are drawn from the Great Plains. Extensive bibliography.

82. Haupt, M.L. 1985. Prescribed burning of re—established grasslands on reclaimed mined land in western North Dakota. MS thesis, North Dakota State Univ, Fargo. 125 pp.

Burning date effects on the diversity, cover, and productivity of reestablished mixed grass prairie. Effects of May and June burning are reported for two growing seasons; August and October data are given only for one growing season. Soil temperature and moisture data for May and June burns. Burn conditions are specified. Treatments were replicated on north and south slopes at three sites.

83. Heitlinger, M.E. 1975. Burning a protected tallgrass prairie to suppress sweetclover, Melilotus alba Desr. Pages 123—130 in M.K. Wali, ed. Prairie: a multiple view. Univ of North Dakota Press, Grand Forks.

Effects of prescribed burning on volunteer white sweetclover in a tallgrass prairie remnant in south—central Minnesota. Fire in early May increased the number of first—year, but decreased the number of second—year, clover plants whereas a burn in early July decreased number of both first— and second—year plants.

84. Higgins, K.F. 1978. Fire bloopers. Proc Prairie Prescribed Burning Symposium and Workshop, sponsored by U.S. Forest Service, Bureau of Land Management, and Fish and Wildlife Service, Jamestown, North Dakota. 4 pp.

Briefly describes eleven prescribed fires in North Dakota and western Minnesota that escaped control or otherwise failed to give the desired results. Factors contributing to each blooper are identified.

85. Higgins, K.F. 1984. Lightning fires in North Dakota grasslands and in pine–savanna lands of South Dakota and Montana. J Range Manage 37:100–103.

Records of 294 lightning fires during 1940–1981 from four sites are examined to determine month of occurrence, size of burn, and frequency of lightning fires. The ecological role of lightning fires is discussed relative to interpretation of historical records and development of current management plans.

86. Higgins, K.F. 1986. Evidence of the historical occurence of woody plants in areas of North Dakota grasslands. Pages 115–117 in G.K. Clambey, W.C. Whitman, and R.H. Pemble, eds, Proc 9th N Am Prairie Conf, Moorhead, Minnesota.

Reviews historical literature relative to woody plant occurence in presettlement North Dakota and discusses mechanisms contributing to survival of woody plants in a fire climax community.

87. Higgins, K.F. 1986. Interpretation and compendium of historical fire accounts in the Northern Great Plains. U.S. Fish and Wildl Serv Resour Publ 161. 39 pp.

Compendium of pre–1900 historical accounts of natural and man–caused fire in the northern Great Plains, summarizing limitations associated with the interpretation of historical references, and interpreting the historic role of fires set by American Indians.

88. Hill, G.R., and W.J. Platt. 1975. Some effects of fire upon a tallgrass prairie plant community in northwestern Iowa. Pages 103–114 in M.K. Wali, ed, Prairie: a multiple view. Univ of North Dakota Press, Grand Forks.

Data on vegetative production and community structure (species richness, diversity, equitability, dominance, and species composition) throughout the first growing season after a spring burn. Community changes induced by fire are attributed to alteration of variables that favor C_3 species and depress C_4 species.

89. Hoefs, M.E.G., and J.M. Shay. 1981. Effects of shade on shoot growth of Vaccinium angustifolium Ait. after fire pruning in southeastern Manitoba. Can J Bot 59:166–174.

Examines growth rates of blueberries that had been fire pruned in spring and grown in 0, 25, 50, 75, and 100% shade. Results suggest shade, considered detrimental to blueberries in the Atlantic provinces, may be essential for optimal growth in Manitoba.

90. Hover, E.I., and T.B. Bragg. 1981. Effects of season of burning and mowing on an eastern Nebraska Stipa–Andropogon prairie. Am Midl Nat 105:13–18.

Compares effects of April burning, April mowing, and summer mowing on canopy cover and the density and height of grass flowering stems during the first growing season after treatment.

91. Huber, G.E., and A.A. Steuter. 1984. Vegetation profile and grassland bird response to spring burning. Prairie Nat 16:55–61.

Initial response of nongame birds to changes in the vegetation profile resulting from a prescribed spring burn in South Dakota. Individual bird species differed in their use of burned and unburned grassland, and use patterns changed as the habitat recovered. Results are compared with effects of grazing and mowing to provide greater flexibility for manipulation of prairie habitat.

92. Hulbert, L.C. 1969. Fire and litter effects in undisturbed bluestem prairie in Kansas. Ecology 50:874–877.

Compares response (growth rate, tiller density, and net productivity) of big bluestem to four treatments: burning, clipping and removal of litter, burning the clipped litter and returning the ash, and natural litter (control). Treatment effects on soil temperature and soil moisture are also considered.

93. Hulbert, L.C. 1976. Controlling experimental bluestem prairie fires. Pages 169–171 in D.C. Glenn–Lewis and R.Q. Landers, Jr., eds, Proc 5th Midwest Prairie Conf, Ames, Iowa.

Describes a partially mechanized method of burning firebreaks for prescribed burns in tallgrass prairie in Kansas. Construction and use of the equipment are discussed with emphasis on safety precautions.

94. Irving, F.D. 1981. Fire in savanna restoration: a 17–year record (Minnesota). Restor and Manage Notes 1(1):9.

Describes a data bank on prescribed burning compiled during an ongoing, long–term, oak savanna restoration project in Minnesota. Names and addresses of contact persons are provided.

95. Irving, F.D., and S.E. Aksamit. 1983. Tree mortality by fire in oak savanna restoration (Minnesota). Restor and Manage Notes 1(4):18–19.

Effect of prescribed fire frequency over an 18–year period on tree survival at the Cedar Creek Natural History Area in Minnesota.

96. James, S.W. 1985. An unexpected effect of autumn burning on tallgrass prairie. Am Midl Nat 114:400–403.

Compares productivity, soil temperature, and soil moisture on spring burned, fall burned, mulched, and control plots during two growing seasons in a Kansas tallgrass prairie. Contrary to expectations, productivity was nearly equal on fall and spring burned plots.

97. Job, H.K. 1902. Among the waterfowl. Doubleday, Page, and Co., New York. 224 pp.

Early observations on a wide variety of waterbirds, including ducks, in North Dakota and along the North Atlantic Coast. Briefly mentions prairie fires (pp 1,177,180) and reports (p 182) heavy loss of duck nests on a burned lowland area.

98. Johnson, D.H. 1976. Effects of grassland burning on breeding birds––preliminary report. Proc ND Acad Sci 30:24.

Abstract only. Population densities and species diversity of breeding birds on six grassland tracts in east–central North Dakota relative to various prescribed burning regimes and post–burn intervals. Extraneous factors confounded analysis, but the author concludes that prescribed burning alters bird communites.

99. Kantrud, H.A. 1986. Effects of vegetation manipulation on breeding waterfowl in prairie wetlands – a literature review. U.S. Fish and Wildl Tech Rept 3. 15 pp.

Literature review on wetland burning and grazing relative to needs of breeding waterfowl in the prairie pothole region. Identifies the need for experimental studies to quantify physical and biotic impacts of wetland burning and grazing. Extensive bibliography.

100. Kaufman, D.W., G.A. Kaufman, and E.J. Finck. 1983. Effects of fire on rodents in tallgrass prairie of the Flint Hills region of eastern Kansas. Prairie Nat 15:49–56.

Effects of fire frequency (annual vs. 4–year cycle) and time since burning (3–48 mo) on rodent populations in spring–burned tallgrass prairie. Vegetative conditions are specified for each treatment.

101. Keith, L.B., and D.C. Surrendi. 1971. Effects of fire on a snowshoe hare population. J Wildl Manage 35:16–26.

Distribution, direct mortality, movements, age and sex structures, and pregnancy rate of snowshoe hares relative to vegetation conditions for two growing seasons following a wildfire on a 640–acre snowshoe hare study area in Alberta.

*102. Kirby, R.E., and S.J. Lewis. 1983. Fire and wildlife in wetland ecosystems––a preliminary bibliography with abstracts. U.S. Fish and Wildl Serv, Div Refuge Manage, Washington, D.C. 17 pp.

Abstracts of 53 papers and books published through 1982 dealing with the use or effects of fire in North American wetland ecosystems.

103. Kirsch, L. 1978. Effects of fire upon wildlife habitat. Pages 47–51 in Proc Fire and Range Management Seminar, sponsored by the Land Use Service DREE–PFRA and Lands Branch, Saskatchewan Department of Agriculture, Regina.

Briefly summarizes effects of prescribed burning on mixed–grass prairie in central North Dakota. Fire response (percent cover and percent occurrence) of individual plant species is listed and wildlife use of burned vs. control areas is summarized. Author cautions that local site variables and/or different burning prescriptions control burning response.

104. Kirsch, L.M. 1983. Historic ecological records of Great Plains grasslands. Page 25 in Proc Management of Public Lands in the Northern Great Plains Workshop. ND Chapter Wildl Soc, Bismarck, North Dakota.

Abstract only. Destruction of large ungulate herds without fire suppression in the Great Plains grassland favored species adapted to undisturbed stands of ecologically young grassland habitat. This habitat is rapidly being lost to agricultural development and fire suppression.

105. Kirsch, L.M. and K.F. Higgins. 1976. Upland sandpiper nesting and management in North Dakota. Wildl Soc Bul 4:16–22.

Highest nest density and productivity of upland sandpipers was in burned grassland. Prescribed burning in early May at 3–year intervals is recommended as a management technique.

106. Kirsch, L.M., and A.D. Kruse. 1973. Prairie fires and wildlife. Proc Tall Timbers Fire Ecol Conf 12:289–303.

Review of historical literature dealing with effects of fire and big–game grazing on prairie grouse and ducks. Under experimental conditions nest density and success of both ducks and sharp–tailed grouse were greater on burned, and less on grazed, fields compared with undisturbed midgrass prairie in east–central North Dakota. Plant response to burning is summarized.

107. Komarek, E.V. 1967. Fire – and the ecology of man. Proc Tall Timbers Fire Ecol Conf 6:143–170.

Academic discussion of the basic nature of fire, the natural laws which govern its physical, chemical, and biological behavior, and its role in the evolution of man and culture. Contains a number of references to plant and animal response to fire. Extensive bibliography.

108. Kozlowski, T.T. and C.E. Ahlgren, ed. 1974. Fire and ecosystems. Academic Press, New York. 542 pp.

In–depth summaries of the effects of fire on soils, soil organisms, wildlife, and vegetation, with emphasis on vegetation. One chapter is devoted to use of fire in land management.

109. Kramer, J.L. 1973. Vegetation and soil responses to burning, mowing, and fertilization in the Sheyenne National Grassland of North Dakota. MS thesis, North Dakota State Univ, Fargo. 119 pp.

Results of burning, mowing, and fertilization trials in tallgrass prairie in southeastern North Dakota. Lowland plots burned in mid spring were tested weekly for soil moisture and biweekly for nutrient (K,P,N) content during the first growing season; yield was determined at the end of the growing season. Extensive literature review.

110. Kruse, A.D., K.F. Higgins, and J.L. Piehl. 1983. Environmental factors that influence prescribed burning in the northern plains. Pages 31–32 in Proc Management of Public Lands in the Northern Great Plains Workshop. ND Chapter Wildl Soc, Bismarck, North Dakota.

Abstract only. Reviews prevailing environmental conditions during 192 prescribed grassland–shrubsteppe burns in the northern Great Plains. Identifies four basic sets of environmental conditions that 1) prohibit ignition or spread of fire, 2) produce partial burns, 3) produce complete burns, 4) produce high risk fires.

111. Kruse, A.D. and J.L. Piehl. 1986. Impact of prescribed burning on ground–nesting birds. Pages 153–156 in G.K. Clambey, W.C. Whitman, and R.H. Pemble, eds, Proc 9th N Am Prairie Conf, Moorhead, Minnesota.

Impact of prescribed burns on nest success of waterfowl and other ground nesting birds in north–central North Dakota. Depending on the time and severity of a burn, many clutches have time to hatch before and after the burn, and a considerable number may survive a fire. Reviews literature dealing with nest survival following fires.

112. Kucera, C.L., and M. Koelling. 1964. Influence of fire on composition of central Missouri prairie. Am Midl Nat 72:142–147.

Effects of burning frequency (annual and biennial) and time since burning (1, 2, 3, and 5 years) on vegetative cover and composition in tallgrass prairie in central Missouri.

113. Launchbaugh, J.L. 1964. Effects of early spring burning on yields of native vegetation. J Range Manage 17:5–6.

Productivity and species composition during the first three growing seasons after a hot, early spring wildfire in a Kansas shortgrass prairie.

114. Launchbaugh, J.L. 1973. Effects of fire on shortgrass and mixed prairie species. Proc Tall Timbers Fire Ecol Conf 12:9–22.

Reviews location and general characteristics of shortgrass and mixed prairie. Generalizes the effects of burning based on wildfires at various locations, and summarizes results of prescribed

burning, grazing, and mowing research in Kansas. Soil moisture relationships are stressed.

114A. Launchbaugh, J.L. and C.E. Owensby. 1978. Kansas rangelands, their management based on a half century of research. Kans Agric Exp Sta Bul 622. 56 pp.

Concise summaries of research on a variety of cattle and range management practices in Kansas. Prescribed burning is discussed relative to its effects on forage yield, forage and soil nutrients, beef gain, and vegetative community structure. Specific burning practices, precautions, and methods are recommended. Prescribed burning is also discussed in conjunction with shrub control, early stocking, and fertilization. Includes a section on prevention of wildfire and management of rangeland following wildfire.

115. Leedy, D.L. 1950. Ducks continue to nest after brush fire at Castalia, Ohio. Auk 67:234.

One mallard and one black duck continued to nest for at least 9 days after wildfire removed all herbaceous cover from a 100-acre area. Both nests contained scorched eggs and both were subsequently disrupted and destroyed.

116. Leslie, J. 1979. Prescribed burning. South Dakota Farm and Home Research 30(2):14–18.

Popular account discussing history, extent, and rationale of prescribed burning in South Dakota. Examples include burning in the Black Hills to reduce fuel load and control forest invasion, exotic grass control in eastern South Dakota tallgrass prairie, and fire enhancement of wildlife habitat. Strongly cautions against indiscriminant burning.

117. Lewis, F.J., E.S. Dowding, and E.H. Moss. 1928. Vegetation of Alberta. II. The swamp, moor, and bog forest vegetation of central Alberta. J Ecol 16:19–70.

Vegetation and successional stages in moors and wetlands within the Northern Forest, Cordilleran Forest, and Aspen Parkland associations of Alberta. Authors remark on the widespread evidence of fire within the study area and describe its effects on wetland structure and vegetation.

118. Lodge, R.W. 1960. Effects of burning, cultivation, and mowing on yield and consumption of crested wheatgrass. J Range Manage 13:318–321.

Compares effects of fall mowing, fall discing, spring burning, and fall burning on forage production, protein content, basal cover, floristic composition, and forage consumption in a deteriorated crested wheatgrass pasture in Saskatchewan. Spring burning was judged the least, and fall burning the most, beneficial treatment for range renovation.

119. Lovaas, A.L. 1976. Introduction of prescribed burning to Wind Cave National Park. Wildl Soc Bul 4:69–73.

Reviews history of fire policy in the national park system and discusses the roles of interagency cooperation and public relations in overcoming public opposition to prescribed burning at Wind Cave National Park, South Dakota.

120. Maini, J.S. 1960. Invasion of grasslands by Populus tremuloides in the Northern Great Plains. PhD thesis, Univ of Saskatchewan, Saskatoon. 231 pp.

Aspen reproductive biology, age structure and invasion rates of existing aspen groves, understory composition, suckering patterns and survival of suckers, and the age distribution of groves relative to settlement history are used to argue for limited aspen expansion following the cessation of prairie fires in southern Saskatchewan.

121. Mathews, E.E. 1984. Fire on Montana's rangelands: a successful pilot program. Western Wildl 10(3)16–19.

A pilot program of the State Forestry Division explored the feasibility of using prescribed burning to improve range condition on public and private lands in western Montana. Objectives, conduct, and results of the program are discussed. Cost data are presented for eight burns on private land.

122. McGee, J.M. 1982. Small mammal populations in an unburned and early fire successional sagebrush community. J Range Manage 35:177–180.

Species composition, abundance, and food habits of small mammals in an unburned Wyoming sagebrush community are compared with changes in these parameters following prescribed burns in early June (partial burn) and late August (complete burn). Data collection began one growing season before, and continued for two seasons after, the respective burn dates. Vegetation was monitored before and after burning.

123. Messinger, R.D. 1974. Effects of controlled burning on waterfowl nesting habitat in northwest Iowa. MS thesis, Iowa State Univ, Ames. 49 pp.

Quantifies changes in plant cover, species diversity, height, density, frequency of occurrence, biomass, and litter during the first growing season after an early spring burn. Compares waterfowl (largely blue-winged teal) nesting density and success on burned and unburned plots.

124. Millar, J.B. 1973. Vegetation changes in shallow marsh wetlands under improving moisture regime. Can J Bot 51:1443–1457.

Discusses changes in the density and occurrence of common shallow-water marsh plants in 71 wetlands under fluctuating water conditions during a 10-year period. Burning was observed; its effects on marsh vegetation are briefly summarized.

125. Moore, C.T. 1972. Man and fire in the central North American grasslands 1535–1890: a documentary historical geography. PhD dissertation, Univ of California, Los Angeles. 155 pp.

References to fire in historical documents from the entire Great Plains are reviewed. Examines timing and source of fire, reasons for burning by Indians and whites, and effects of fire on vegetation, native animals, livestock, and man. Results are discussed relative to current literature on prairie fires. Extensive bibliography of historical resource material.

126. Nagel, H.G. 1973. Effect of spring prairie burning on herbivorous and non-herbivorous arthropod populations. J Kansas Entomological Soc 46:485–496.

Compares numbers and biomass of insects captured in biweekly sweep net samples on burned and unburned native tallgrass prairie in Kansas during the latter half of the first growing season following a spring burn. Results are presented by taxon and trophic level (herbivore, carnivore, omnivore).

127. Nagel, H.G. 1980. Effect of spring burning date on mixed-prairie soil moisture, productivity, and plant species composition. Pages 259–263 in C.L. Kucera, ed, Proc 7th N Am Prairie Conf, Springfield, Missouri.

Mid-April and mid-May burns compared for primary productivity, soil moisture, plant basal cover, and

plant species composition. An objective was to control Kentucky bluegrass (Poa pratensis) with minimal adverse impact on mixed prairie productivity in south–central Nebraska.

128. Neckles, H.A., J.W. Nelson, and R.L. Pedersen. 1985. Management of whitetop (Scolochloa festucacea) marshes for livestock forage and wildlife. Delta Waterfowl Res Sta Tech Bul 1. Portage la Prairie, Manitoba. 12 pp.

Discusses salinization resulting from cultivation of seasonal wetlands, the importance of whitetop marshes to waterfowl, and the ecology, life history, and management of whitetop. Fall burning is recommended to increase yield and develop monodominant whitetop stands only if water levels can be manipulated to assure spring flooding. Specific haying and grazing regimes will maximize forage value while simultaneously enhancing waterfowl production.

129. Nelson, J.G., and R.E. England. 1971. Some comments on the cause and effects of fire in the northern grassland areas of Canada and the nearby United States, ca. 1750–1900. Can Geogr 15:295–306.

Review of prairie fires in Alberta, Saskatchewan, Manitoba, North Dakota, and Montana, 1750–1900. Topics include causes of fire (lightning and human); Indian use of fire; nature, seasonality, and frequency of fire; relationships between fire, animals, and vegetation; effect of fire on man; and impacts of climatic variation on prairie fire. This paper was reprinted in Proc Rangeland Management and Fire Symposium, Casper, Wyo. Nov. 1–3, 1977.

130. Niemi, G.J. 1978. Breeding birds of burned and unburned areas in northern Minnesota. Loon 50:73–83.

Commonness indexes of all birds observed during 3 years on a burn and an adjacent control area in the Superior National Forest. The study was initiated 3 years after a 15,000–acre fire in a 100–year–old jack pine and quaking aspen forest.

131. Ohr, K.M. and T.B. Bragg. 1985. Effects of fire on nutrient and energy concentration of five prairie grass species. Prairie Nat 17:113–126.

In a tallgrass, bluestem–dominated prairie, signifi–cant differences in plant nutrient concentrations were found between burned and unburned areas, between areas burned at different frequencies, and between recently and less recently burned areas. Biomass energy concentration increased with burning and with burning frequency. Soil nutrient data are provided.

132. Olson, W. W. 1975. A study of the effects of controlled burning on vegetation structure and seedling establishment. MS thesis, North Dakota State Univ, Fargo. 135 pp.

Vegetation composition, height, basal area, shoot density, canopy coverage, productivity, height density, and flowering response are reported at 20 sites in south–eastern North Dakota with different histories of land use, restoration effort, and burning. Burned sites were sampled one to five growing seasons after burning in early May to mid–June and sampled for 2 years. Some soil nutrient, soil pH, and soil water data are presented. Results are discussed relative to wildife management practices. Literature review on grassland fire response.

133. Owensby, C.E., and K.L. Anderson. 1967. Yield responses to time of burning in the Kansas Flint Hills. J Range Manage 20:12–16.

Early, mid–, and late spring burning effects are given for forage and weed yields of grazed tallgrass pasture during an 8–year period. Data are given for upland and limestone breaks range sites.

134. Owensby, C.E., and J.L. Launchbaugh. 1977. Controlling prairie threeawn (Aristida oligantha Michx.) in central and eastern Kansas with fall burning. J Range Manage 30:337–339.

Burn dates and methods, with and without subsequent seeding of native grasses, to control prairie threeawn at three former tallgrass prairie sites in Kansas are compared. Burning in early December removed mulch and reduced threeawn the next year. Duration of control was not assessed.

135. Owensby, C.E., and E.F. Smith. 1972. Burning true prairie. Pages 1–4 in L.C. Hulbert, ed, Proc 3rd Midwest Prairie Conf, Manhattan, Kansas.

Summarizes studies on prescribed burning of tallgrass prairie in Kansas, including studies on plots subjected to annual burning since 1927. Effects of burning date and burning with and without grazing are discussed relative to herbage production, vegetative composition, soil moisture, soil nutrients, and livestock production.

136. Owensby, C.E., and J.B. Wyrill III. 1973. Effects of range burning on Kansas Flint Hills soil. J Range Manage 26:185–188.

Effects of long–term, annual, winter and spring burning, with and without grazing, on grassland soil chemistry. Soil cores (surface to 1.22 m) were analyzed for pH, organic matter, Ca, Mg, N, P, and K. Bulk density of the upper 7.6 cm of soil was used to determine effects of fire on physical soil properties.

137. Papike, R.V. 1984. Experimental burns, reintroductions in savanna restoration project (Minnesota). Restor and Manage Notes 2:73.

Results of a prescribed burning program at Sherburne NWR, Minnesota, to discourage cool–season exotic grasses, stimulate warm–season native grasses and forbs, and suppress encroaching woody vegetation.

138. Peet, M., R. Anderson, and M.S. Adams. 1975. Effects of fire on big bluestem production. Am Midl Nat 94:15–26.

Photosynthetic rates and net productivity of big bluestem relative to microclimatic variables (leaf, air, and soil temperature, total and reflected radiation, relative humidity) in burned and unburned prairie. Study identifies mechanisms by which spring burning increases productivity of tallgrass prairie.

139. Raby, S. 1966. Prairie fires in the northwest. Saskatchewan Hist 19:81–99.

Prairie fires in Manitoba, Saskatchewan, and Alberta from about 1880 to 1920. Discusses ignition sources, fire effects, and fire legislation. Includes full text of an 1895 letter regarding potential fire impacts on vegetation, soils, and climate, written by a naturalist with the Geological Survey of Canada.

140. Rahn, P.H. 1978. Landsat–1 photointerpretation of forest fire hazards in the Black Hills. Proc SD Acad Sci 57:132–138.

Landsat images identify fire scars and determine direction of fire travel in the Black Hills of South Dakota. A firebreak and other measures suggested to reduce fire hazards to human habitation near Rapid City.

141. Rains, J.R., C.E. Owensby, and K.E. Kemp. 1975. Effects of nitrogen fertilization, burning, and grazing on reserve constituents of big bluestem. J Range Manage 28:358–362.

Effects of burning, grazing, and fertilization (0, 40, and 80 lb N/acre) on total nonstructural carbohydrate and nitrogen reserves of big bluestem in the Kansas Flint Hills. Grazed native tallgrass range was burned in spring 1971 and fertilized in 1972; analyses were conducted biweekly during the 1972 growing season and monthly during the 1973 dormant season.

142. Ralphs, M.H., and F.E. Busby. 1979. Prescribed burning: vegetative change, forage production, cost, and returns on six demonstration burns in Utah. J Range Manage 32:267–270.

Six demonstration burns were conducted to control sagebrush and juniper on Utah rangeland. Burn prescriptions, burning costs, and response of native and seeded forage are discussed.

143. Ralston, R.D., and R.L. Dix. 1966. Green herbage production of native grasslands in the Red River Valley. Proc 1965 ND Acad Sci 20:57–66.

Herbage production on 40 stands of remnant prairie in eastern North Dakota, southern Manitoba, and northwestern Minnesota were assessed. Most of the stands are on railroad shoulders and are therefore burned nearly every year. Comparatively high yields on the stands are attributed to above–average precipitation and frequent fire.

144. Redmann, R.E. 1978. Plant and soil water potentials following fire in a northern mixed grassland. J Range Manage 31:443–445.

Leaf water potential, osmotic potential, and soil moisture in mixed grassland were noted during the growing season following a fall wildfire in Saskatchewan. Increased water stress in the burned area was judged sufficient to account for the reductions in productivity which have been observed after fire.

145. Renwald, D. 1978. Effect of fire on woody plant selection by nesting nongame birds. J Range Manage 31:467–468.

Selection of nest trees and shrubs by nongame birds 0–6 years after burning in central Texas showed that certain species of woody plants should be protected by firebreaks to maintain nesting bird populations when range is burned for brush control.

146. Rice, L.A. 1932. Effect of fire on the prairie animal community. Ecology 13:392–401.

Effects of spring burning on soil invertebrates and surface arthropods in tallgrass prairie in Illinois. Soil pH, temperature, and moisture data are presented. Vertebrate abundance is treated briefly.

147. Rickard, W.H. 1970. Ground dwelling beetles in burned and unburned vegetation. J Range Manage 23:293–294.

Compares relative abundances of four species of beetles on burned and unburned shrub–steppe in southeast Washington.

148. Roach, D. 1974. Prescribed burning in the Black Hills. 1974 Ann Meet For Comm, Great Plains Agric Counc, Sioux Falls, Sout Dakota. June 20, 1974. 3 pp.

Rationale and objectives of a prescribed burning program for ponderosa pine forests in the South Dakota Black Hills. Discusses fire prescriptions to reduce flash fuels by 80% with less that 20% mortality in the residual stand. Stresses need for public education.

149. Rowe, J.S. 1969. Lightning fires in Saskatchewan grasslands. Can Field–Nat 83:317–324.

Documents 21 lightning–caused prairie fires in southwestern Saskatchewan in 1966 and 1967. Some general observations of the effect of fire on vegetation and the role of lightning fires in the maintenance of grassland communities are discussed.

150. Rutkosky, F.W. 1978. Bibliography on the effects of prescribed burning and mammal and waterfowl utilization of wetlands: annotated literature search with selected abstracts. U.S. Fish and Wildl Serv, Div Ecol Serv, Annapolis Field Off, Annapolis, Md. 45 pp.

Contains 176 indexed references, published 1931–1977, of which about 50% deal with wetland burning. Abstracts of 47 papers. Coverage is nationwide, with emphasis on coastal marshes.

151. Sando, R.W. 1969. Prescribed burning weather in Minnesota. U.S. For Serv, N Cent For Exp Sta Res Pap NC–28. 8 pp.

Synopsis of weather patterns related to prescribed burning, based on data from Minneapolis, International Falls, and Duluth. Variables affecting prescribed burning and the criteria for an acceptable burning day are discussed.

152. Schacht, W., and J. Stubbendieck. 1985. Prescribed burning in the Loess Hills mixed prairie of southern Nebraska. J Range Manage 38:47–51.

Spring burning and fall mowing compared on basal cover, species composition, and herbage yield in badly degraded mixed prairie. Vegetative parameters were measured one growing season before, and two growing seasons after, treatment. Soil moisture was monitored for two growing seasons post–treatment.

153. Schlichtemeier, G. 1967. Marsh burning for waterfowl. Proc Tall Timbers Fire Ecol Conf 6:40–46.

Describes an attempt to burn a 600–acre bulrush marsh in the Nebraska Sandhills to enhance waterfowl habitat. Winter burn conditions and post–burn vegetative cover are documented; no waterfowl response data are presented.

154. Schripsema, J.R. 1977. Ecological changes on pine–grassland burned in spring, late spring, and winter. MS thesis, South Dakota State Univ, Brookings. 99 pp.

Winter, spring, and late spring grassland burning effects on fuel load reduction; vegetation density, height, and yield; tree mortality; soil moisture and nutrient content; and animal usage in the Black Hills of South Dakota.

155. Sexton, D.A., and M.M. Gillespie. 1979. Effects of fire on the location of a sharp–tailed grouse arena. Can Field–Nat 93:74–76.

Male sharp–tailed grouse moved their arena 480 m from an undisturbed to a burned site 2 days after a fire in Manitoba. The move was attributed to reduced cover, which permitted displaying males to see and be seen.

156. Shilts, D.R., W. Klukus, B.L. Freet, and T. Oliverius. 1980. Fire management plan, Wind Cave National Park, Hot Springs, S.D. 67 pp.

Summarizes fire management objectives, prehistoric and historic fire records, effects of fire and fire suppression, and fire research at Wind Cave National Park, South Dakota. Develops clearly stated policies for suppression of wildfire and use of prescribed burning. Training, organization, priorities, equipment needs, and cooperation with other agencies and the public are specified. Sample burn prescriptions for specific objectives are included.

157. Sims, H.P., and C.H. Buckner. 1973. Effect of clear cutting and burning on Pinus banksiana forests on the populations of small mammals in southeastern Manitoba. Am Midl Nat 90:228–231.

Examines small mammal populations, using snaptraps, for 3 years after burning slash from jack pine in southeastern Manitoba. Peromyscus maniculatus populations built rapidly in the burned plots, though the species was infrequently trapped in adjacent, uncut control stands. Abundance of all other species was reduced in burned, relative to control, areas.

158. Smeins, F. E., and D. E. Olsen. 1970. Species composition and production of a native northwestern Minnesota tallgrass prairie. Am Midl Nat 84:398–410.

Species composition, productivity, and related physical–chemical properties of four community types on an undisturbed remnant of tallgrass prairie. Following a spring burn, vegetation was judged to have improved in height, density, and flowering. Kentucky bluegrass produced growth but did not flower during the first post–burn growing season.

159. Smith, A.G. 1969. Waterfowl–habitat relationships on the Lousana, Alberta, waterfowl study area. Pages 116–122 in Saskatoon Wetlands Seminar. Can Wildl Serv Rep Ser 6.

Overview of natural and human factors affecting waterfowl habitat and habitat use in Alberta. Briefly mentions impact of pothole burning relative to structure of wetland vegetation and physical loss of shallow wetlands.

160. Smith, A.L. 1973. Life cycle of the marsh grass Scolochloa festucacea. Can J Bot 51:1661–1667.

Primarily describes life cycle of whitetop, but includes data on phenological changes related to fall burning. Addresses effects of burning on water and soil temperatures, litter accumulation, growth rate and density of S. festucacea, and species composition of the emergent community.

161. Smith, A.L. 1973. Production and nutrient status of whitetop. J Range Manage 26:117–120.

Compares productivity and nutrient content (N, basic cations) of whitetop in undisturbed, fall burned, summer mowed, and grazed stands in North Dakota. Effects of season and water level are examined.

162. Smith, E.F., and C.E. Owensby. 1973. Effects of fire on true prairie grasslands. Proc Tall Timbers Fire Ecol Conf 12:9–22.

Review of research on burning tallgrass prairie in the Kansas Flint Hills, starting in 1918. History of burning and grazing in the area, response of dominant species to burning, and effects of fire on forage production and quality, soil temperature, fertility and moisture, and cattle gain. Results are often contradictory.

163. Smith, K.A. 1983. Prescribed burning on mid cool–season grassland of northwestern North Dakota to reduce Symphoricarpos occidentalis. Page 29 in Proc Management of Public Lands in the Northern Great Plains Workshop. ND Chapter Wildl Soc, Bismarck, North Dakota.

Abstract only. Five years of prescribed burning in north–central North Dakota decreased buckbrush height and canopy cover but increased the number of green shoots. Native grasses gradually increased with treatment.

164. Stelfox, J.G., and H.G. Vriend. 1977. Prairie fires and pronghorn use of cactus. Can Field–Nat 91:282–285.

Pronghorns fed on prickly pear cactus in a relatively undisturbed native prairie in southeastern Alberta after wildfire denuded the cactus of spines. The authors suggest that restricted fires in areas with abundant cactus might benefit pronghorns during drought years.

165. Steuter, A.A. 1983. Nonchemical control of leafy spurge and wormwood sage: study initiated (South Dakota). Restor and Manage Notes 1(4):30.

In limited trials summer burning using head fires of moderate intensity gave good control of wormwood sage but negatively impacted many species native to South Dakota prairie. Plans for spring burning efficacy tests are discussed.

166. Svedarsky, W.D. 1982. Use of a sod–cutter in transplanting prairie (Minnesota). Restor and Manage Notes 1(2):11.

Describes use of a sod cutter in conjunction with regular spring burning to establish native prairie grasses in Minnesota.

167. Svedarsky, W.D., and P.E. Buckley. 1975. Some interactions of fire, prairie, and aspen in northwest Minnesota. Pages 115–121 in M. K. Wali, ed, Prairie: a multiple view. Univ of North Dakota Press, Grand Forks.

In 3 years of annual and one cycle of biennial spring burning for aspen sucker control at the Red River Valley Natural History area, both burning schedules controlled aspen incursion and favored native warm–season grasses (big and little bluestem) over introduced Kentucky bluegrass. See also Svedarsky, Buckley, and Feiro 1986.

168. Svedarsky, W.D., P.E. Buckley, and T.A. Feiro. 1986. Effects of 13 years of annual burning on aspen–prairie ecotone in northwestern Minnesota. Pages 118–122 in G.K. Clambey, W.C. Whitman, and R.H. Pemble, eds, Proc 9th N Am Prairie Conf, Moorhead, Minnesota.

Update of reference #167. Based on a 13–year data base, the authors recommend burning biennially in late spring to control Kentucky bluegrass and trembling aspen.

169. Svedarsky, W.D., and R.W. Sando. 1977. General weather considerations for the prescribed burning of prairie in northwest Minnesota. Prairie Nat 9:25–30.

Fuel moisture content, precipitation, relative humidity, and wind are discussed relative to prescribed burning in the prairie–forest transition zone. Mean monthly rainfall data and daily rainfall probabilities are given for the region.

170. Tester, J.R. 1965. Effects of a controlled burn on small mammals in a Minnesota oak–savanna. Am Midl Nat 74:240–243.

Effects of fire on individual survival and populations of small mammals as determined by recapture methods in conjunction with a 20–acre

prescribed burn. Soil, litter, and air temperatures and fire effect on vegetation were recorded.

171. Tester, J.R., and W.H. Marshall. 1961. Study of certain plant and animal interrelations on a native prairie in northwestern Minnesota. Univ Minn Mus Nat Hist Occas Pap 8. 51 pp.

Spring burning, fall burning, grazing, and no treatment compared on selected vegetation parameters and populations of songbirds, small mammals, and insects in a tallgrass prairie. Community response was measured for two growing seasons after treatment. Almost all treatment effects on mammals, birds, and insects correlated most closely with variations in litter depth or cover. Tester and Marshall (1962) present additional data from this study.

172. Tester, J.R., and W.H. Marshall. 1962. Minnesota prairie management techniques and their wildlife implications. Trans N Am Wildl Conf 27:267–287.

Results of a 5–year study on effects of four treatments (spring burn, fall burn, mowing, and grazing) on native tallgrass prairie in northwestern Minnesota. Treatment effects on litter, upland grasses and forbs, shoreline vegetation, songbirds, small mammals, and insects summarized. Effects on willow and aspen invasion are treated in detail. Effects are related to known habitat requirements of ducks and prairie chickens in effort to develop a basic program for tallgrass prairie maintenance. See also Tester and Marshall, 1961.

173. Thomas, G. 1977. Fire and the fur trade: The Saskatchewan district: 1790–1840. The Beaver Aut 1977:32–39.

Popular article based on records of Hudson's Bay and other trading companies. Includes data on the frequency and origin of fires, Indian use of fire, early methods of fire control and prevention, and the effects of wildfire on bison, Indians, and regional development and economics.

174. Thomas, W.L. ed. 1956. Man's role in changing the face of the earth. Univ of Chicago Press. Chicago, Illinois. 1192 pp.

Contains several papers dealing exclusively or heavily with prehistoric man's use of fire and the influence of fire in the origin or maintenance of grasslands. Additional references to fire and fire ecology are scattered throughout the volume.

175. Thompson, D.J. 1982. Effects of fire on Phragmites australis (Cav.) Trin. ex Steudel and associated species at Delta Marsh, Manitoba. MS thesis, Univ of Manitoba, Winnipeg. 199 pp.

Spring, summer, and fall burning, and summer mowing effects on the productivity, density, flowering, shoot and rhizome morphology, and nutrient reserves of Phragmites. Treatment effects on substory species are assessed, as is the interaction between burning season and water level. Treatment effects on soil nutrients, soil temperature, humidity, and insulation are quantified.

176. Thompson, D.J. and J.M. Shay. 1985. Effects of fire on Phragmites australis in the Delta Marsh, Manitoba. Can J Bot 63:1864–1869.

Treatment differences were evaluated during the first growing season after burns in summer, fall, and spring for Phragmites management in south–central Manitoba. Measured responses were 1) density, biomass, mean weight, basal diameter, and height of vegetative and flowering stalks; 2) leaf and inflorescence length; 3) below–ground biomass; 4) number of overwintering buds; and 5) nonstructural carbohydrate content of rhizomes. Timing of burn appears critical for Phragmites management.

177. Towne, G., and C. Owensby. 1984. Long–term effects of annual burning at different dates in ungrazed Kansas tallgrass prairie. J Range Manage 37:392–397.

Effects of burning season (winter and early, mid, and late spring) on forage production, species composition, and basal cover in a tallgrass plot after 56 years of annual burning. Though confounded by procedural changes over time, results indicate that time of burning dictates vegetative response to fire.

178. Troester, H.G. 1970. Managed prairie burning for wildlife. ND Outdoors 32(11):7–9.

Popular article explaining the rational for prescribed burning to enhance wildlife habitat. Contains several "before–and–after" photographs of burned prairie.

179. Umoh, J.E., L.H. Harbers, and E.F. Smith. 1982. Effect of burning on mineral contents of Flint Hill range forages. J Range Manage 35:231–234.

Compares mineral (Ca, P, Mg, K, Na, Fe, Mn, Zn, Cu) content of grass from burned and unburned tallgrass prairie in Kansas. Samples were collected monthly throughout the year; all grass species were pooled for analysis.

180. Vacanti, P.L., and K.N. Geluso. 1985. Recolonization of a burned prairie by meadow voles (Microtus pennsylvanicus). Prairie Nat 17:15–22.

In a reestablished Nebraska tallgrass prairie, time required for meadow voles to achieve preburn densities was determined. Population buildup was related to the return of canopy cover, litter, and food on a 0.6–ha experimental plot. Population trends of deer mice and harvest mice are also briefly discussed.

181. Vogl, R.J. 1965. Effects of spring burning on yields of brush prairie savanna. J Range Manage 18:202–205.

Productivity, litter accumulation, and forage water content examined during the first and second growing seasons after spring burning in a Wisconsin tallgrass–brush savanna. Test plots had been burned one to five times during the 10 years preceeding the study.

182. Vogl, R.J. 1974. Effects of fire on grasslands. Pages 139–194 in T.T. Kozlowski and C.E. Ahlgren, eds, Fire and ecosystems. Academic Press, New York.

General review of fire in grasslands. Topics include the nature of grasslands, the role of fire in the origin and evolution of grasslands, ignition sources, features that increase fire risk in grasslands, physical characteristics of grassland fires, effects of fire on plant productivity, soils, nutrients, and species composition, succession in grasslands, inconsistencies in grassland fire research results, effects of fire suppression, and the uses of fires in range, wildlife, and natural area management. Extensive bibliography.

183. Vogl, R.J., and A.M. Beck. 1970. Response of white–tailed deer to a Wisconsin wildfire. Am Midl Nat 84:270–273.

Deer tracks were counted on roads in burned and unburned forest habitat 8 years after a severe wildfire. Higher counts in the burned area are

related to fire—induced changes in vegetative structure. Results are used to emphasize need to consider long—term effects of fire.

184. Ward, E. 1942. Phragmites management. Trans N Am Wild Conf 7:294—298.

Beneficial and negative aspects of Phragmites for waterfowl management. Recommends mowing and burning to control stands and to increase open edge. April burning produces temporary control; permanent eradication can be achieved by burning in August and September.

185. Ward, P. 1968. Fire in relation to waterfowl habitat of the Delta marshes. Proc Tall Timbers Fire Ecol Conf 8:254—267.

Gives fire history of Delta Marsh in Manitoba and results of a limited number of spring and summer burns designed to open and thin out extensive stands of Phragmites and whitetop.

186. Weaver, J.E., and N.W. Rowland. 1952. Effects of excessive natural mulch on development, yield, and structure of native grassland. Bot Gaz 114:1—19.

Vegetation, soil, and mulch conditions described for a segment of upland prairie in Nebraska after 15 years protection from burning, grazing, and mowing. Includes effects of accumulated mulch on soil nutrients, rainfall infiltration and evaporation, soil moisture and temperatures, and vegetative growth rates.

187. Wells, P.V. 1965. Scarp woodlands, transported grassland soils, and concept of grassland climate in the Great Plains region. Science 148:246—249.

Evidence for the theory that extensive, treeless grasslands may be a relatively recent development on the plains. Interaction of topography, wind, and fire, rather than a "grassland climate" may account for the observed distribution of vegetation. See also references #188, 189, 190.

188. Wells, P.V. 1970. Historical factors controlling vegetation patterns and floristic distributions in the Central Plains region of North America. Pages 211—221 in W. Dort and J.K. Jones, eds, Pleistocene and recent environments of the central Great Plains. Univ of Kansas Press, Lawrence.

Evidence from the distribution of grasslands in North America, the derivation of the central plains flora, and the topographic distribution of woodlands in the Great Plains is used to argue that fire and physiography are more important than climate in the establishment and maintenance of prairie grasslands. See also references #187, 189, 190.

189. Wells, P.V. 1970. Postglacial vegetational history of the Great Plains. Science 167:1574—1582.

Fossil and subfossil evidence that conifer stands occupied the xeric Laramie Basin floor throughout most of the recent postglacial period. Climate alone, therefore, cannot explain the absence of forests in the more mesic Great Plains. Based on past and present distribution of trees in the plains, the author concludes that physiography and fire are the primary factors responsible for grassland origin and maintenance. See also references #187, 188, 190.

190. Wells, P.V. 1970. Vegetational history of the Great Plains: a postglacial record of coniferous woodlands in southeastern Wyoming. Pages 185—202 in W. Dort and J. K. Jones, eds, Pleistocene and recent environments of the central Great Plains. Univ of Kansas Press, Lawrence.

A slightly modified version of reference #189; see also references #187 and 188.

191. Westemeier, R.L. 1973. Prescribed burning in grassland management for prairie chickens in Illinois. Proc Tall Timbers Fire Ecol Conf 12:317—338.

Discusses management of seeded redtop for prairie chickens in Illinois and documents the impact of 6 years of spring and late summer burning on nest density. Use of fire to develop or enhance booming grounds is described.

192. White, A.S. 1983. Effects of 13 years of annual prescribed burning on a Quercus ellipsoidalis community in Minnesota. Ecology 64:1081—1085.

Burned and unburned plots were compared after 13 years of spring burning designed to return the study area to oak savanna structure. Parameters included overstory density and basal area, shrub cover, and understory composition and richness. Data are included on individual species' response to burning. Results indicate a gradual return to savanna, but apparent fire tolerance of large trees may preclude complete restoration.

193. White, E.M., and F.R. Gartner. 1975. Immediate effects of prairie fire on the soil nitrate, ammonium, available phosphorus, and total N contents. Proc SD Acad Sci 54:188—193.

Soil samples from burned upland (dry) and lowland (wet) prairie plots in eastern South Dakota contained more NH_4—N, NO_3—N, available PO_4—P, total N, and organic matter compared with soil from unburned control plots. Results of laboratory studies to determine how burning enhanced nutrient content are included.

194. White, E.M., W.W. Thompson, and F.R. Gartner. 1973. Heat effects on nutrient release from soils under ponderosa pine. J Range Manage 26:22—24.

Nutrient (total N, water—soluable K and P) release from soils was studied in the laboratory using litter, O—horizon, and upper mineral soil collected from the forest—grassland ecotone of the Black Hills. Tested temperatures (25—500 C) spanned the range encountered in a controlled burn of dense second—growth pine near one of the sample sites.

195. White, R.S., and P.O. Currie. 1983. Prescribed burning in the Northern Great Plains: yield and cover responses of three forage species in the mixed grass prairie. J Range Manage 36:179—183.

Responses of western wheatgrass, blue grama, and threadleaf sedge to spring and fall burning in Montana. Clipping trials simulated grazing. Yield and cover responses were determined biweekly during the growing season. Response varied between species and sampling period.

196. White, R.S., and P.O. Currie. 1983. Effects of prescribed burning on silver sagebrush. J Range Manage 36:611—613.

Spring and fall burns were conducted for silver sagebrush control in south—central Montana. Good control, with substantial canopy reduction and at least 35% kill, was achieved with a fall burn. Conversely, spring burns could be used to encourage sprouting among palatable silver sagebrush ecotypes to improve grazing.

197. Wolfe, C.W. 1973. Effects of fire on a sandhills grassland environment. Proc Tall Timbers Fire Ecol Conf 12:241—255.

Lightning–fire effects on soil nutrients and vegetative cover and composition are reported for three soil–associated range sites in the Nebraska Sandhills. A portion of the burn area consisted of planted forest; data on use of burned and unburned forest and prairie by mule deer, white–tailed deer, and mourning doves are included.

198. Woolfolk, J.S., E.F. Smith, R.R. Schalles, B.E. Brent, L.H. Harbers, and C.E. Owensby. 1975. Effects of nitrogen fertilization and late–spring burning of bluestem range on diet and performance of steers. J Range Manage 28:190–193.

Burning and fertilization (40 lb N/acre), both alone and in combination, compared for cattle weight gain and nutrient value of forage consumed by free–feeding, fistulated steers in tallgrass range in Kansas during the first growing season following a late April prescribed burn.

199. Worcester, L.L. 1979. Effects of prescribed burning at different fuel moisture levels on vegetation and soils of grasslands in Wind Cave National Park. MS thesis, South Dakota State Univ, Brookings. 101 pp.

Small plot study examined the effects of fuel moisture on various vegetation and soil parameters during the first two growing seasons following late spring burning in three grassland communities in the Black Hills, South Dakota. Soil moisture and nutrient content, mulch layer, and vegetative growth rates, yield, and species composition are quantified. Fire behavior is described. Extensive bibliography and literature review.

200. Wright, H.A., and A.W. Bailey. 1978. Reconciling of fire technology to meet management objectives: prescribed burning. Pages 77–79 in Proc 1977 Rangeland Management and Fire Symposium, Casper, Wyoming. Printed by Montana Forest and Conservation Exp Sta, University of Montana School of Forestry, Missoula, 59812.

Summarizes optimal weather conditions for prescribed burning of rangeland and points out need for field training in burning.

201. Wright, H.A., and A.W. Bailey. 1980. Fire ecology and prescribed burning in the Great Plains – a research review. USDA For Serv Tech Rep INT–77. 60 pp.

Fire effects on vegetation by region (Southern, Central, and northern Great Plains) and community association (short, mixed, and tallgrass prairie, fescue grassland, grassland–forest). Fire prescriptions are given for each association by region. Fire response of each major species is listed in appendix form. Extensive bibliography.

202. Wright, H.A. and A.W. Bailey. 1982. Fire ecology: United States and southern Canada. John Wiley and Sons, New York. 501 pp.

Basic textbook summarizing fire behavior, fire prescriptions, and fire effects on wildlife, soils, and vegetation.

203. Yancey, R.K. 1964. Matches and marshes. Pages 619–626 in J.P. Linduska, ed, Waterfowl tomorrow. U.S. Government Printing Office, Washington, D.C.

Overview of prescribed burning in marshes (especially in southern states) for benefit of waterfowl. Covers history, objectives, types of fires, and factors that influence plant succession following prescribed burning.

204. Zedler, J., and O. L. Loucks. 1969. Differential burning response of Poa pratensis fields and Andropogon scoparius prairies in central Wisconsin. Am Midl Nat 81:341–352.

Response (productivity, stalk height, fruiting) of grasses to 2 years of April burning in the Buena Vista Marsh in central Wisconsin. Study sites were chosen to isolate effects of topography, soil type, and water table.

205. Zimmerman, G.M. 1981. Effects of fire upon selected plant communities in the Little Missouri Badlands. MS thesis, North Dakota State Univ, Fargo. 60 pp.

A 2–year study of standing crop, basal cover, and stem (culm) density on 18 transects to determine vegetation response to wildfire. Both grassland and wooded draw communities were sampled. Results were highly variable between and within communities, species, sampling periods, and years. Literature review of factors that dictate community response to fire and specific examples from the Great Plains.

206. Zimmerman, G.M., H. Goetz, and P.W. Mielke, Jr. 1985. Use of an improved statistical method for group comparisons to study effects of prairie fire. Ecology 66:606–611.

Basic concepts and use of "multi–response permutation procedures" (MRPP) for analysis of fire effects. Use of MRPP is recommended because it is flexible and requires few assumptions to be made. Utility of MRPP is demonstrated using phytomass data collected during the first and second growing seasons after a fall prairie wildfire in southwest North Dakota.

* During preparation of this bibliography for press, the following updated version of Entry 102 was published:

102A. Kirby, R.E., S.J. Lewis, and T.N. Sexson. 1988. Fire in North American wetland ecosystems and fire–wildlife relations: an annotated bibliography. USFWS Biol Rep 88(1), 146 pp.

AUTHOR INDEX
(Listed by paper number)

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