

# Prairie Burning Practices as a Factor in the Demise of the Prairie-Chicken

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A 2011 through 2013 Greater Prairie-Chicken study supported by Kansas State University and the Kansas Department of Wildlife, Parks and Tourism was released in late 2014. The impact of two very different tallgrass prairie land-management systems on this species in decline was the focus of the report.

One management strategy was Patch Burn Grazing (PBG). This is a program in which an alternating third of a pasture is burned each year. Cattle will always prefer the growth that follows the most recent fire. Thus each year the cattle concentrate their grazing on the burned third, while one-third is getting the first year of a two-year rest, and the final third is getting the second year of a two-year rest. This presents a mosaic with areas of very short vegetation and of taller, denser forage conditions. Generally, these pastures are grazed from mid-April to mid-October. The usual stocking rate is one yearling per four acres.

The other strategy is labeled Intensive Early Stocking with annual Burning (IESB). With this system, the entire pasture is burned every year, and the pasture is grazed from mid-April through mid-July. The usual stocking rate is one yearling per two acres.

PBG is the newer regime. It is utilized on a handful of ranches and on the Tallgrass Preserve at Strong City. IESB has been around for thirty years or so. It was first advocated by range-management professionals at K-State. Uneven grazing of a pasture is always a concern for ranchers hoping to maximize their use of the range. Various pressures drive cattle to dine with considerable discrimination. These include preferences for certain plants and aversion to others (think *Sericea lespedeza* and Old World Bluestem) but also choices of location. Cattle enjoy a breeze in summer's heat, so they drift south into the prevailing wind or just hang out on the breezier hilltops. They appreciate shade and the nearby water of a stream or pond. They seek the most succulent plants that grow in the deeper riparian soils. Finally, in a pasture that is unburned in a given year, the cattle will graze only the locations that were eaten down in the prior year, preferring the exposed new growth to sticking their noses into last year's stale forage and coming up

with mouths full of mostly dead grass. Thus, these areas are grazed continuously, and through the years they transition to the least-desirable plant communities while other areas are seldom utilized.

Tracking collar on hen ©Wichita Eagle





The older K-State strategy to counteract these tendencies is first to create a level playing field by burning the whole pasture each spring. When this is followed by very heavy stocking known as “double stocking,” the cattle eat everywhere. To get enough to eat, they have to. And often by mid-July, the forage is about exhausted. Everything in the cattle business is driven by weight gains, and they are maximized by this system. In spring and early summer, tallgrass prairie plants are at their most nutritious, highest in protein, and yearlings may gain two to three pounds per day. By mid-July as the forage matures, these gains drop off precipitously until the yearlings are gaining little or even just maintaining their weight. Cattle owners love that quick gain and the landowner, if a separate entity, gets in on the bonanza by pasturing more cattle for more money.

Unfortunately the wide acceptance of IESB has coincided with a continuing decline in Greater Prairie-Chicken numbers. The 2011-2013 study was undertaken to determine if this was cause and effect, and if patch-burn grazing was a potential solution.

Before getting into the study results, I am compelled to describe the appearance of the prairie under these strategies. In Intensive Early Stocking with annual Burning, forage plants appear stunted, and looking down into these IESB prairies there is considerable bare ground. Forbs that cattle graze will be nearly absent. Ironweed, an unpalatable forb, will be ascendant.

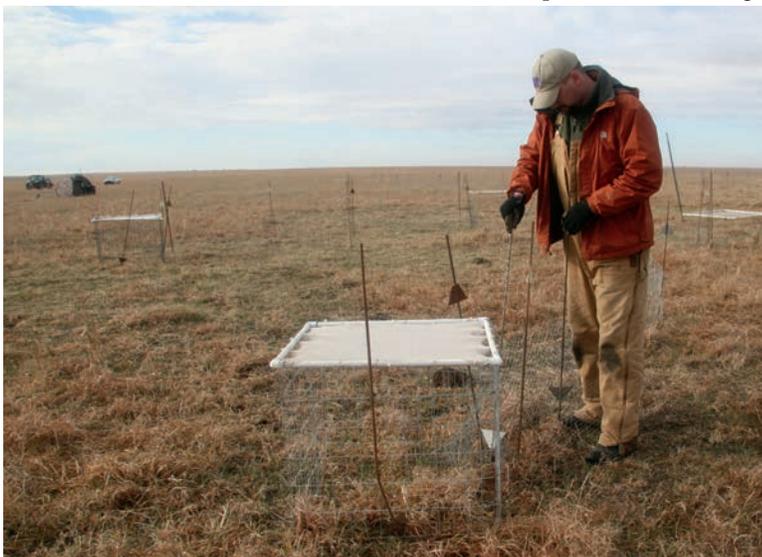
Patch-burned areas by contrast and by design are very heterogeneous and comprised of some short vegetation but mostly taller grasses and forbs. Catclaw Sensitive Briar, Butterfly Milkweed and even the delectable Compass Plant will be much more common in these areas. Like the original native tallgrass prairies, patch-burned prairies present a stunning array of beautiful wildflowers.

The methods and results of the K-State study were as follows: the chickens were trapped on their leks using elaborate chicken-wire funnels leading into cages. They were pulled from the cages by hand, taken into a tent, sexed, their age assessed by feather patterns, a blood sample obtained by clipping off the end of a toenail, and an 8-gram antenna radio transmitter and battery device affixed with an elastic necklace harness. Some of these birds must have unavoidably been trapped repeatedly, though recorded and processed only once.

Using handheld radio receivers, technicians tracked the hens daily from a distance until the hens spent much of their time at in one location-the nest, which was then visited by the researchers on foot. The eggs were counted and aged by floating them in lukewarm water. The nest was not revisited until the hen changed her general whereabouts, at which time the nest was checked to see if it was abandoned, destroyed by predators, or successfully pecked open from the inside, not smashed from the outside. Successful hatchlings along with their radio-collared mothers were flushed and counted at 14, 24, 34 and 60 days post-hatch. The investigators postulate that these maneuvers did not affect mortality, though it is reasonable to wonder to what degree human activity around and at the nest site might not attract the attention of terrestrial predators, like coyotes, skunks, and raccoons.

The study concluded that Greater Prairie-Chickens in this study area will die out, with patch-burning only retarding the rapidity of decline.

On the Intensive Early Stocking with annual Burning areas, declines were at 50% per year. Raptors and other predators caused significant damage in these areas of minimal concealment. Even winter mortality was high. In the patch-burned areas, the Traps used ©Wichita Eagle





**Bill Browning releasing trapped hen**  
©Wichita Eagle

conclusion was only slightly less grim. If more ranches were managed this way, the data suggested that the demise of the species would be drawn out over a longer time-frame. Winter mortality and mortality of hens on the nest were much reduced, and if the first nest failed, second nesting was more common.

The study attributes the differences in chicken fecundity under the two prairie-burning treatments to a measurement called Visual Obstruction Reading (VOR). This is a term that refers to how tall and dense the grasses and forbs are. Optimal height for nest concealment is 1-2 feet, maybe best around knee high. The density of the cover should reduce visibility to a few inches. In IESB, this level of VOR represented about 2% of the pasture while PBG had 16% of the required habitat at this level of coverage.

So what are my own conclusions? PBG is better for both flora and fauna. However, it seems to me that this study was flawed: conclusions about the species' demise ignore the possible mortality associated with being studied.<sup>1</sup> Moreover, the study was unexpectedly impacted by drought that severely affected its first two years. The drought not only had direct impact on prairie chicken populations, it greatly altered subsequent burning regimens, causing further drastic reductions in VOR. But the results, even considering these caveats, are sufficiently alarming concerning the future of this iconic tallgrass species.

Two revelations: I am very loyal to these chickens and have gone the distance to manage our place on their behalf, so I am not a disinterested reporter on the study's conclusions. But burning regimens represent only one challenge to the species. A study published in March, 2015, concluded that vegetation height, which is greatly influenced by fire and grazing processes, was positively associated with nest survival. Greater Prairie-Chickens chose nesting locations that maximized time post fire while minimizing tree cover and distance to leks. . . . [However,] even the best management practices may prove to be futile in the southern Great Plains if climate change continues to create unfavorable

nest survival conditions. Management that creates and maintains suitable nesting sites through the use of interacting fire and grazing should maximize the potential for high reproduction in years when local weather variables are favorable.<sup>2</sup>

<sup>1</sup> However, one other study indicated that while 75% of nest losses in the study population of 24 nests was due to predation, "controlled comparisons provided no evidence that video surveillance attracted predators to nests. Variation in nest attendance had a minimal effect on nest survival compared to height of vegetative cover at the nest site." See "Patterns of nest attendance by female Greater Prairie-Chickens (*Tympanuchus cupido*) in northcentral Kansas," by Virginia L. Winder, Mark R. Herse, Lyla Hunt, et al., *Journal of Ornithology*, 157 no. 3 (July 2016): 733- 745

<sup>2</sup> See "Weather Constrains the Influence of Fire and Grazing on Nesting Greater Prairie-Chickens" by Torre J. Hovick, R. Dwayne Elmore, Samuel D. Fuhlendorf, et al., in *Rangeland Ecology and Management*, 68, issue 2 (March 2015): 186-193. Three other articles confirming the conclusions concerning burning and grazing practices summarized here are "Alternative Rangeland Management Strategies and the Nesting Ecology of Greater Prairie-Chickens," by Lance B. McNew, Virginia L. Winder, James C. Pitman, et al. *Rangeland Ecology and Management*, 68, issue 3 (May 2015): 298-304; "Effects of grazing and prescribed fire on resource selection and nest survival of upland sandpipers in an experimental landscape," by Brett K. Sandercock, Matilde Alfaro-Barrios, Ashley E. Casey, et al., *Landscape Ecology*, 30, issue 2 (February 2015): 325-337; and "Effects of Wind Energy Development on Nesting Ecology of Greater Prairie-Chickens in Fragmented Grasslands," by Lance B. Mcnew, Lyla M. Hunt, Andrew J. Gregory, et al., in *Conservation Biology*, 28, issue 4 (August 2014): 1089-1099. See also the article by Jan Biles, "Burning, Grazing, and 'Human Activity' Threaten Birds' Future," in *The Topeka Capital Journal*, Sunday, July 06, 2008, interviewing Robert Robel, Professor of Biology at Kansas State University, and Jim Pitman, Small Game Coordinator for KDWP.