

Using Fire and Herbicides to Control Kentucky Bluegrass

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Many people are familiar with Kentucky bluegrass because it is one of the most common lawn grasses in the northern United States. However, on rangelands in North Dakota, it has rapidly increased in the last 30 years (Fig. 1). The invasion of Kentucky bluegrass onto rangelands is not just limited to North Dakota but has occurred throughout the northern Great Plains (Fig. 2).

The rapid spread of Kentucky bluegrass caught the eye of range scientists in North Dakota and they began to look for control strategies. The Northern Great Plains Research Laboratory, NDSU and the US Forest Service collaborated on research that evaluated combinations of fire and herbicides as potential control strategies on the Sheyenne National Grasslands.

Treatments included a fall burn (October 2005) or a spring fire (April 2006) (Fig. 3) and the application of either glyphosate (Roundup ©) or imazapic (Plateau ©) (Fig. 4). On sites that were burned in the fall, herbicide treatments were applied the following spring after the burn (May 2006). On spring burned sites, herbicide treatments were applied in the fall prior to the burn (October 2005). Besides the plots that were burned and sprayed with herbicide, there was also plots that the only treatment was a spring burn, plots that only had a fall burn and also untreated controls. Each treatment was applied to sites with either LOW, MODERATE or HIGH levels of Kentucky bluegrass abundance.

Figure 5 shows treatment results in both 2006 and 2007 for the site that had a high level of Kentucky bluegrass abundance. Prior to applying the treatments (summer 2005), Kentucky bluegrass made up 91% of the species composition on this site. However in 2006, the fall burn followed by a spring application of glyphosate (Fall + Glyph) treatment resulted in native grass increasing to over 50% of the species composition while introduced grasses (primarily Kentucky bluegrass) decreased to less than 20% of the species composition. While treatment effects diminished in 2007, native grasses still made up the majority of the species composition on this heavily invaded site.

There are increased concerns about how management can impact forb species which are critical for pollinators. There were no differences in forb abundance between any of the treatments, including the untreated control,

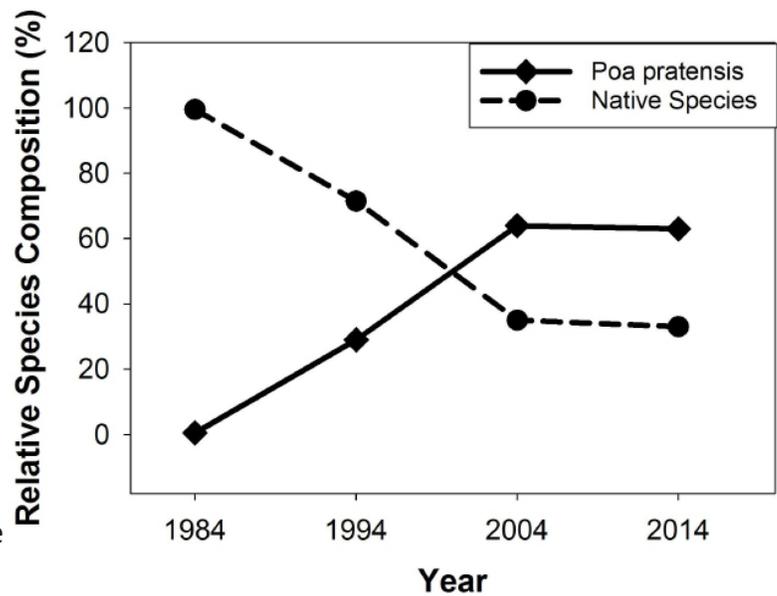


Figure 1. Change in percent Kentucky bluegrass (*Poa pratensis* L.) and native species in the relative species composition at a long-term (98 years) lightly grazed pasture at Mandan, North Dakota. Data modified from Printz and Hendrickson (2015).

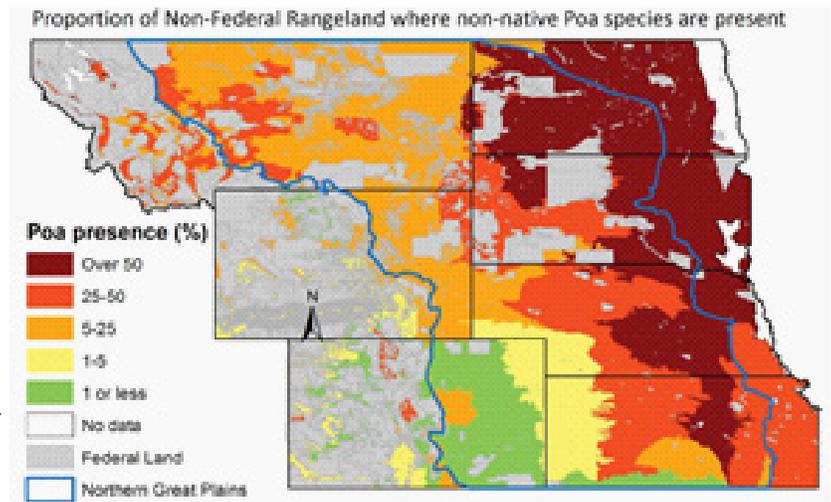


Figure 2. Proportion of rangeland with Kentucky bluegrass based on USDA-NRCS National Resources Inventory (NRI) data between 2003-2006. Percentages refer to percent of acres with Kentucky bluegrass present within a Major Land Use Area polygon. Figure from Toledo, et al. (2014)

on the high site. While there were some treatment differences on the moderate site, these disappeared after one year.

The information gained from this research indicates that burning plus herbicide can be a powerful tool for managing invasions on rangelands. However, the effects of these treatments are short-lived. Land managers need to look at changes in species composition caused by these treatments as opportunities for additional management. Grazing, burning, hay or additional herbicide application may be needed to continue the effectiveness of these treatments.

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Figure 3. U.S. Forest Service burn crew burning research plots on Sheyenne National Grasslands near Lisbon, ND.



Figure 4. NGPRL technician spraying research plots on Sheyenne National Grasslands near Lisbon, ND.

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Toledo, D., Sanderson, M., Spaeth, K., Hendrickson, J. and Printz, J., 2014. Extent of Kentucky bluegrass and its effect on native plant species diversity and ecosystem services in the northern Great Plains of the United States. *Invas. Plant Sci. Manage.* 7:543-552.

