What is the best time of year to use prescribed fire to control invasive shrubs? A case study from the Upper Midwest[1]

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Abstract: The control of invasive woody species presents one of the greatest challenges for restoration and revegetation of fire-dependent ecosystems. While the vast majority of prescribed burning occurs in the early spring, there is evidence that burning during other times of the year can offer more effective control of undesirable species. This project investigated how seasonality, fire temperature, and fire residence time interact to influence stem damage and resprouting of invasive woody shrub species that are often targeted by prescribed fire treatments in in the Upper Midwest. Common buckthorn (*Rhamnus cathartica*) and honeysuckle (*Lonicera* spp.) are exotic invasive species that frequently degrade revegetated mine land, forest understories, edges, and grasslands in the Upper Midwest. Prescribed fire was simulated using a propane torch system designed for treating invasive plants. Invasive plant stems were burned for either short (15-second) or long (30-second) durations and hot (>246° C) or moderate (125-175° C) temperatures over four different seasons (spring, early growing season, late growing season, and fall). Each treatment regime and a control were randomly assigned to 20 invasive plants (for a total n = 340) in a prairie restoration on the campus of the University of Wisconsin-Platteville. These fire residence times and temperatures were derived from temperature profiles of prescribed fires conducted in the spring of 2016 in southern Wisconsin. Top-kill and resprouting were subsequently determined for each plant one-month following treatment. Initial results show that late-growing season burns (late-October through early November) are best for controlling invasive shrubs compared to burning at other times of the year. Season of burn predicted more top-kill than temperature or residence time. Based on these results, practitioners who want to control invasive shrubs in the Upper Midwest should focus their efforts on fall prescribed burns.

Additional Key Words: season of burn, revegetation.

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