

Hydro-Axe and Chemicals Prior to Planting Natives

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Conversion of non-native invasive brush land into native warm-season grass/oak savanna using mechanical removal, herbicide, and the Rough Rider Rangeland Drill: research case study of integrated vegetation management from the upper Midwest.

Non-native invasive plant species are problematic for natural resource managers since they cause ecological damage and are costly to control. A program has been initiated within the Department of Forestry and Natural Resources at Purdue University to investigate invasive plant control and native warm-season grass (NWSG) establishment through the use of integrated vegetation management (IVM) techniques. These IVM techniques were used as the first step in restoring a grassland savanna that was dominated by invasive woody plants (90.4 percent of the woody plants inventoried were invasive). The objectives for this study were to construct an IVM process that efficiently controlled the invasive woody plants, preserved the oak overstory, and established native grasses within two growing seasons (18 months).

The objectives were successfully met through the use of general-use forestry herbicides to provide invasive woody plant control. The restoration process was made more manageable by using flail mowers to reduce the biomass of the woody plants and a Truax Rough Rider Range Land Drill to plant the uneven terrain, which was characterized by stumps, logs, and woody debris. Imazapic herbicide was used at the time of planting to facilitate NWSG establishment. The average number of NWSG's established within the plots testing various woody plant herbicides varied between 4.9 and 7.1 grass stems/m²; differences in establishment rates can be attributed to different experimental seeding rates of 7.5 and 15 kg/ha of pure live seed (6.7 lb/A and 13.2 lb/A) and, to a greater extent, highly variable site conditions throughout the area at time of planting. No non-target oak mortality was observed (n=66) one year after herbicide application.

The site was sampled for densities of native grasses one year after woody plant herbicide application and at the end of the first growing season after the NWSG's were planted. The ecological function of this experimentally established savanna and long-term species diversity of the plant community are currently unknown. However, through IVM that combined restoration techniques and invasive plant control, we have successfully established much of the structure and foundation needed for a functional savanna ecosystem.

Keywords:

Invasive woody plants, non-native, herbicide, integrated vegetation management, Midwest, native warm-season grass, savanna, Rough Rider Rangeland Drill.