

# Lake States Fire Science Consortium

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## RESTORATION OF WETLANDS INVADED BY REED CANARYGRASS IN AN URBAN REGION OF THE UPPER MIDWEST

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Reed canarygrass (*Phalaris arundinacea*) is an invader in North American wetlands, forming large monotypes once established. In urban areas where storm runoff carries excess water, nutrients, and sediments into wetlands, reed canarygrass can be especially pervasive. At the University of Wisconsin-Madison Arboretum, researchers attempted to restore a seven acre wetland site with uncurtailed stormwater inflows and a monotype of reed canarygrass. Over five years, restoration tools used included various types of herbicide following prescribed fire, sowing of native wetland species, and clipping.

Seven 69-yd x 30-yd macroplots were delineated within the reed canarygrass monotype, with four plots designated as experimental and three as controls. All plots were burned in May of 2001 to remove litter. In August 2001 experimental plots were treated with 2% active ingredient (ai) glyphosate; this treatment was repeated a second time one year later, and experimental plots were once again burned the following fall. Seeds from 33 native wetland species were sown within experimental plots in either fall of 2002 or spring of 2003. In one of the experimental macroplots, two experiments were performed: seeding of native species and clipping of reed canarygrass. Treatments for the seeding experiment included no seeding, fall seeding, spring seeding, and both spring and fall seeding. The clipping experiment compared clipping of reed canarygrass with fall seeding, clipping with spring seeding, no clipping with fall seeding, and no clipping with spring seeding. In fall of 2004, the southern halves of three experimental macroplots were treated with 2.25% ai sethoxydim, a grass-specific herbicide. Plots were then



Photo Credit: Paul Charland, USFWS

### MANAGEMENT IMPLICATIONS

- 1) Herbicide following prescribed fire was the most effective treatment to reduce reed canarygrass (*Phalaris arundinacea*), but stormwater runoff aided reestablishment of the invasive.
- 2) Restoration efforts in wetlands dominated by reed canarygrass should be prioritized to locations where stormwater runoff can be curtailed.
- 3) Seeding (following treatments with fire and herbicide) is likely necessary to recolonize invaded wetlands with native plant communities.

### Want to learn more?

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## Research Brief for Resource Managers

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burned one month later to remove standing dead grasses. Sethoxydim treatments were repeated in June of 2005. Vegetation was sampled during summers of 2003 (year one), 2004 (year two), and 2005 (year three).

Reed canarygrass was in only 33% of experimental plots following treatment with fire and glyphosate in year one. However, by year two, reed canarygrass had more than doubled in height (85% the height of control plot plants), and in year three there was no significant difference between reed canarygrass cover in control versus experimental plots. Reed canarygrass was still abundant in plots that were seeded, but in year one these plots had higher native species richness, especially when seeded in the spring. Following the first year, native species richness and abundance declined and reed canarygrass regained dominance. Plots not treated with seeding had the fewest native species. The clipping experiment yielded no treatment responses in species richness, species cover, species height, or floristic quality. Reed canarygrass in experimental plots treated with sethoxydim in year three were shorter, had less percent cover and plots had greater native species richness and floristic quality. Surprisingly, native grasses were not negatively affected by the sethoxydim treatments. However, assessment of this treatment was not done in subsequent years.

After three years, restoration efforts did not result in a desired dense native plant community resistant to reed canarygrass. Treatments, though successful in initially increasing species richness, did not prevent reed canarygrass from regaining dominance in years two and three. Treatments of burning and applying glyphosate were successful at killing the canopy of reed canarygrass but the plant was thereafter able to reestablish via seeds and rhizomes. Use of a more selective herbicide, such as sethoxydim, yielded promising results, but efficacy with continued use of the herbicide is unknown. The results of this study suggest that reestablishment of native species would not be likely without seeding. Ultimately, researchers believe that the stormwater runoff aids the reestablishment of reed canarygrass by carrying in dissolved nutrients and sediments. Restoration efforts under these conditions promise to be difficult and potentially ineffective long-term. For sites where runoff can be curtailed, success is more likely and efforts should be prioritized in these locations.

#### Reference

Wilcox, J. C., M. T. Healy, and J. B. Zedler. 2007. Restoring native vegetation to an urban wet meadow dominated by reed canarygrass (*Phalaris arundinacea* L.) in Wisconsin. *Natural Areas Journal* 27:354-365