

Controlling Reed Canary Grass (*Phalaris arundinacea*) in Wetland Restorations

What is reed canary grass?

Reed canary grass is a sod-forming perennial grass that produces tall (2 to 8 ft) shoots, and reproduces by seed, underground spread, and from fragments (Figure 1). This plant forms thick creeping underground stems called rhizomes (Figure 2). Reed canary grass is considered native to the temperate regions of all five continents. This species was bred to be an important cultivated forage grass for nearly two centuries, and has also been planted to stabilize slopes and drainage ways. Although reed canary grass had conservation value in the past, it is now considered an invasive species. The invasive character of some *Phalaris* populations may be the result of agronomic breeding for vigorous growth and drought tolerance. Most often, you will find reed canary grass growing in moist habitats, like wetlands, streamsides, lakeshores, and road ditches, but reed canary grass also grows well in upland habitats.



Figure 2. Thick creeping underground stems, called rhizomes, contribute to reed canary grass persistence.

Be careful not to confuse reed canary grass with native bluejoint grass (*Calamagrostis canadensis*). Bluejoint grass and reed canary grass seedlings are particularly difficult to distinguish. Look for the prominent transparent ligule (collar-like flap where the leaf attaches to the stem) on reed canary grass to positively identify this species (Figure 3).

Why is reed canary grass a problem?

Wetland restoration projects in Minnesota (and across temperate North America) are often invaded by reed canary grass before native plants can establish. Reed canary grass also invades natural wetlands, forming vast monotypic stands and displacing native vegetation. Development and urbanization alter the landscape, creating habitat for which reed canary grass is especially suited; it thrives in high nutrient, fluctuating hydrology conditions that are typical of sites that receive stormwater inputs. Reed canary grass also spreads through underground connections, allowing it to move into otherwise unsuitable conditions. This species is a problem for wetlands across the northern United States. Washington state lists reed canary grass as a noxious weed



Figure 1. Reed canary grass in a wetland restoration in Minnesota.

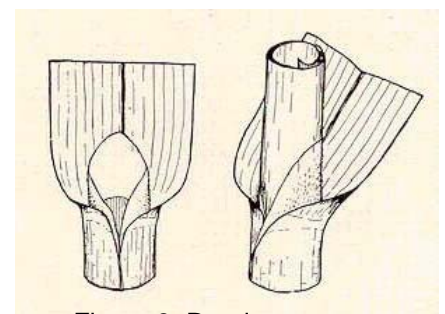


Figure 3. Reed canary grass has a prominent ligule.

Controlling reed canary grass: what works?

Herbicide treatments reduce reed canary grass when applied at the right time. Glyphosate-based herbicides are most commonly used to control reed canary grass because they are relatively non-toxic and they are known to be effective for this species. Because of glyphosate's mode of action, later season herbicide applications (late August or later in Minnesota) are more effective than spring herbicide applications (April and May in Minnesota) (Figure 4). Glyphosate moves with carbohydrates in the plant. A herbicide application in spring, when the plant uses carbohydrates to produce shoots, will kill the shoots of the plant but rhizomes will survive and resprout. But glyphosate herbicide applied in the later season, when the plant is storing carbohydrates in the rhizomes, will translocate directly to rhizomes, killing both the above and belowground parts of the plant.



Figure 4. This photo was taken one year after these plots had been treated with herbicide in Minnesota. The late August and late September applications were more effective than the spring herbicide application.



Figure 5. A dense cover of native species can really slow down reed canary grass invasion.

Reed canary grass is less likely to invade a site that has a dense cover of native plant species (Figure 5). If managers can quickly establish native plants, by seeding and planting, they will spend less effort controlling reed canary grass. While the native species are establishing, however, managers will probably need to selectively remove new reed canary grass juveniles, especially if it is easy for reed canary grass seed to get to the site from other nearby populations.

Controlling reed canary grass: what doesn't work?

Mechanical control (mowing, grazing, tilling) alone does not reduce established reed canary grass populations. Mowing and grazing removes top growth and stimulates more shoot production. Tilling splices rhizomes into pieces and triggers dormant buds to produce new shoots, producing a more dense reed canary grass stand than if nothing had been done in the first place.

Burning alone also doesn't work. In fact burning increases reed canary grass shoot density as new shoots



Figure 6. Reed canary grass resprouts from rhizomes 10 days after a spring burn.

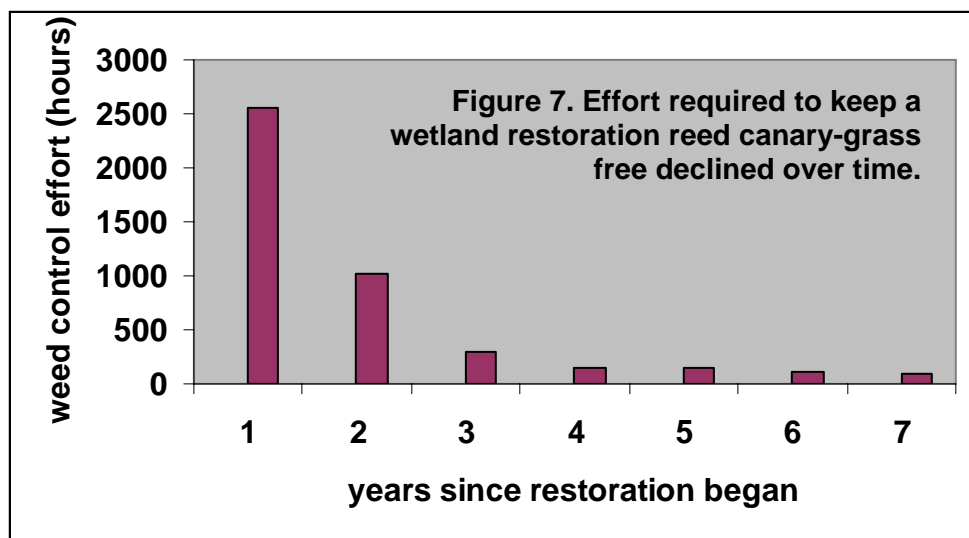
sprout from rhizomes rapidly following a burn (Figure 6). And implementing a controlled burn prior to a glyphosate herbicide application does not increase the effectiveness of the herbicide. Just partial contact with live tissue is enough for absorption of glyphosate herbicide, it isn't necessary to burn to get a flush of new green shoots.

Although mechanical removal methods are not successful for established stands of reed canary grass, if other hardy native species are mixed with the reed canary grass, burns or mechanical removal may be more effective. If reed canary grass can be set back, the area might be readily occupied by species that could potentially outcompete reed canary grass.

Is one year of control enough?

Following control, reed canary grass can rapidly recolonize, possibly from rhizomes, from seeds on site, or from dispersal of seeds to the site. If reed canary grass has dominated a site for many years, managers will definitely need to control reed canary grass for more than

one year, and maybe more than 2 years. Although the effort required to keep reed canary grass out of the site diminishes over time, hand weeding might be necessary indefinitely. At the Spring Peeper Meadow wetland restoration demonstration at the University of Minnesota Landscape Arboretum, effort to keep the wetland reed canary grass-free was substantial at first, but declined over time (Figure 7).



The devil is in the seed bank

For sites that have had reed canary grass for more than 20 years, many reed canary grass seeds (Figure 8) are stored in the soil, forming a reed canary grass seed bank. After clearing away the existing reed canary grass, seeds in the seed bank have enough light exposure to germinate and grow, and the site is recolonized with reed canary grass. How do you diminish the reed canary grass seed bank? There are several options:

1. Spray the reed canary grass, till the seed bank to encourage germination of a new generation of reed canary grass plants. Kill that generation of plants, and repeat.
2. Excavate and remove the top 4-6 inches of soil.
3. Turn and fill under the layer of soil containing reed canary grass.



Figure 8. Reed canary grass produces many seeds.

For more information:

- The Nature Conservancy Wildland Invasives Team <http://tncweeds.ucdavis.edu/esadocs/phalarun.html>
- Wisconsin Department of Natural Resources <http://www.dnr.state.wi.us/org/land/er/invasive/factsheets/reed.htm>

Recommendations are based on studies in the published literature and research performed at the University of Minnesota, in partnership with Minnesota DNR, Minnesota DOT, and Ramsey-Washington Metro Watershed District: C. H. Reinhardt and S. M. Galatowitsch. 2004. Best Management Practices for Reed canary grass: Final Technical Document for the Department of Transportation.