

EMERGING THEMES IN REED CANARYGRASS MANAGEMENT

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INTRODUCTION

This paper presents an overview of some practical considerations in the management of reed canarygrass (*Phalaris arundinacea*) in the Pacific Northwest. This overview alludes to aspects of this species' biology as they pertain to the weed management of this species. Naglich (1994) provides a detailed summary of the biology of this species, as well as additional discussion of techniques used historically in managing this species as a weed.

MITIGATION SITE SELECTION

Potential mitigation sites should not be excluded from consideration solely because of a reed canarygrass infestation. Frequently, such sites are amenable to efficacious control treatments cost-effectively applied on large scales. For example, abandoned agricultural fields may experience succession toward pure stands of reed canarygrass. However, the flat topography and seasonal hydrology of many of these situations may allow fallow cultivation or multiple broadcast applications of herbicide that effectively eradicate those stands.

ANTICIPATING AND MANAGING INFESTATIONS OF REED CANARYGRASS

1. **Design all projects assuming they will eventually be subject to reed canarygrass infestation.** This weed is sufficiently abundant and widespread that wetland managers and restorationists should anticipate that their lands or projects may potentially host infestations of this weed in the future. Based on the current knowledge of reed canarygrass biology and ecology, and recent attempts in managing this species, several options are available to discourage potential infestations and reduce the risk of invasion by reed canarygrass, and/or manage existing infestations. These are described below.
2. Design coniferous forested wetland plant communities and wetland habitats that have perennial inundation greater than 1 foot for most of the year. **Design use of micro-topographic variation (hummocks and swales) may allow for increased inundation in project areas, as well as increased habitat diversity.** The trees are planted on the summits of the hummocks. Conifer forests are highly effective in eliminating reed canarygrass from a stand or habitat. The conifers need to be planted relatively densely in wide (rather than narrow) blocks in both the wetland system and in adjoining buffers. If the blocks in buffer or wetland habitats are too narrow, side-lighting (particularly during the early portion of the growing season) allows the reed canarygrass infestation to persist in the understory.

In some cases, a situation might call for "designed succession" in which faster more competitive plants [such as willow, red alder (*Alnus rubra*), and/or cottonwood (*Populus trichocarpa*)] are installed and allowed to grow. These early "colonizers" are selectively thinned several years later and underplanted with appropriate conifer species, which would be expected to establish in the weakened sward of reed canarygrass and in the less harsh environment provided by a thinned deciduous canopy.

3. **Attempt eradication for existing reed canarygrass infestations and seed stores on sites to be used for newly constructed wetland/riparian projects.** Numerous methods are available for controlling this species on a project site, including mowing, burning, flaming, cultivation, and herbicide applications, and various combinations thereof. Sufficient time should be allowed for repeat treatments to ensure eradication of existing stands. **Restorationists implementing graded projects should seriously consider using an extended period of fallow conditions and control techniques to ensure the eradication of reed canarygrass.** Extended fallow periods may also provide insights into the nature of a site's hydrology, which may be useful in fine-tuning hydrologic controls and/or planting design.
4. Also, when possible, attempt to deplete the reed canarygrass seed store in existing soils prior to restoration plantings. Seed store depletion is accomplished by combining fallow conditions with weed control techniques for at least one growing season. Multiple fallow growing seasons are preferable to one. Emerging seedlings are killed by repeated cultivation (disking or harrowing), flaming, and/or periodic herbicide applications. The goal of fallow cultivation is to prevent emerging seedlings or sprouts from tillering and flowering. Repeated cultivation continues to expose new seeds in the seed store. Herbicide applications alone only deplete the seed store in the upper elevations of the soil column.

If a project area is too large for eradication management, or if limited funds are available, localized mulching barriers or shading may be used to create planting spaces for trees and other desirable competitive vegetation.

5. If large-scale field-burning or broadcast herbicide applications are not possible for a project or in an area, consider the use of flaming. If large-scale field-burning or broadcast applications of herbicide are not possible, consider the use of flaming.* Flaming may not create the same level of air quality and safety hazards that prescribed burning may. In addition, flaming can be done at any time of the year and, in most case, without a burn permit from local jurisdictions. Numerous hand-held or implement-based flaming devices are available (for example, Flame Engineering, Inc., P.O. Box 577, West Highway 4, LaCross, Kansas 67548; 800-255-2469). Repeated burnings or flamings over a year or more may be needed to eradicate or weaken established stands of reed canarygrass. The dead culms and leaves from previous year's growth should be removed prior to starting a flaming regime to minimize the fire and smoke hazards and to create better flame access to emerging shoots.
6. **If seed store depletion is not possible, consider competitive exclusion as a means to discourage reed canarygrass seedling establishment on disturbed soils.** Seeding a site with competitive grass species such as tufted hairgrass (*Deschampsia cespitosa*), slough grass (*Beckmannia syzichachne*), spike bentgrass (*Agrostis exarata*), Canada reed (*Calamagrostis canadensis*), turf-forming varieties of red fescue (*Festuca rubra*), meadow barley (*Hordeum brachyanterum*), or sedges such as *Carex praticola*, *C. vulpinoidea*, or *C. amplifolia* may present a significant obstacle to reed canarygrass seedling establishment. Seedings should be heavy (25-50+ lbs/ac). If used, woody material should be planted prior to seeding.
7. **Seriously consider herbicide applications as a valuable tool in managing reed canarygrass.** Despite known and unknown, short- and long-term effects of the use of herbicides in aquatic systems, glyphosate shows significant utility in managing reed canarygrass, particularly when integrated with other management tools. Frequent knee-jerk reactions among the public and some professionals against the use of glyphosate in ecosystem restoration needs to be balanced by the consideration that the effects of herbicide applications in aquatic systems may be greatly exceeded in the long term by dramatic improvement in riparian and wetland habitats.

8. **Avoid excavation as means of eradicating existing** stands or seed store. Such activities waste potentially valuable topsoil and are generally expensive to accomplish. Excavation should be driven by project goals for altering hydrologic regimes, rather than as a direct weed management tool.
9. Be alert to the emergence of new “technologies” or approaches to managing reed canarygrass. For example, a promising new techniques involving planting circles and/or polewood plantings are showing good promise in the good fight. **Mitigation design should explicitly include experimental components, which are then specifically monitored, eventually evaluated, and then “cycled back” into mitigation design programs (adaptive management!).**

EPILOGUE

The magnitude and persistence of reed canarygrass infestations in aquatic and terrestrial systems presents restorationists, land managers, and local citizenry with a complex array of challenges. Chief among these is the need to view reed canarygrass infestation in the context of a broad landscape perspective, rather than on site-by-site bases. Another challenge asks us to re-discover the timeframes in which plant succession operates, and to possibly adjust our expectations of (and performance standards and contingency actions for) what we can achieve and when we can achieve it in conducting restoration activities. For WSDOT, this may require significant changes in protocols used for contracting, construction, and monitoring.

LITERATURE CITED

Naglich, Francis. 1994. Reed canarygrass (*Phalaris arundinacea* L.) in the Pacific Northwest: growth parameters, economic uses, and control. Essay, Master of Environmental Studies, Evergreen State College, Olympia, Washington.