VEGETATION MANAGEMENT GUIDELINE: Canada Thistle (*Cirsium arvense* (L) Scop.)

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Canada thistle (*Cirsium arvense* (L.) Scop.), an alien species, is capable of crowding out and replacing native grasses and forbs. It is detrimental to natural areas, particularly nonforested communities, and it can alter the natural structure and species composition where it becomes well-established. Prairies, barrens, savannas, and glades that have been disturbed or are undergoing manipulative restoration management are susceptible to invasions. In addition, it can spread from adjacent disturbed sites into sedge meadows and wet prairies.

This dioecious, weedy perennial occurs in patches and thrives in disturbed areas such as overgrazed pastures, old fields, waste places, fencerows, and roadsides. Occasionally, it occurs in wet areas where water levels fluctuate, such as stream banks and ditches. This thistle is not usually a problem in undisturbed prairies, good to excellent pastures, or woodland. Plants are tall and the sparse flower cluster is lax on sites that are shaded most of the day.

Introduction of Canada thistle into new areas occurs mostly by windborn seed. Sometimes seeds are carried by run-off in ditches. Once introduced, the species spreads rapidly by rhizomes or root segments. Lateral roots 0.9 m or more deep spread from a fibrous taproot. Aerial shoots occur at 0.8- to 2.4-cm intervals. Basal leaves are produced the first year and flowering stems the next. Pollination is mostly by honeybees; wind pollination is limited. Most seeds germinate within one year. Some seeds immediately produce rosettes before winter and emerge to flower the next spring. Seeds remain viable in soil up to 20 years in some cases. Emergence typically occurs in May, and vertical growth follows in June. As frequency of Canada thistle increases at a site, species diversity decreases, possibly as a result of allelopathic substances produced by the thistle.

Prescribed fire is an effective and preferred treatment for controlling this species. Late spring burns, between May and June, are most detrimental to this noxious weed and should be used whenever possible. Burns should not be conducted early in the spring, as early spring fires can increase sprouting and reproduction of this species. During the first three years of control efforts, burns should be conducted annually.

Management practices that maintain and encourage the development of healthy stands of native species will help prevent establishment of Canada thistle or help shade and weaken plants on sites already infested.

Repeated and frequent pulling or handcutting of individual plants will eventually starve underground stems. Cutting or pulling should be done at least three times each season, in June, August, and September. This treatment is feasible for light and moderate infestations but may be relatively time consuming in heavy infestations. Grazing is not an effective control measure as prickles on the plant prevent livestock from grazing near Canada thistle.

Spot application of the amine formulation of 2,4-D used according to label instructions can control this plant. Individual plants of Canada thistle should be treated with a wick applicator or hand sprayer. The herbicide 2,4-D amine is selective for broadleaf plants. To reduce vapor drift, use an amine formulation of 2,4-D rather than an ester formulation. Precautions should be taken to avoid contacting nontarget plants with the solution. Do not spray so heavily that herbicide drips off the target species. Chemicals should be applied while backing away from the areas to avoid walking through the wet herbicide. By law, herbicides may be applied on public properties only according to label directions and by licensed herbicide applicators or operators.

On large disturbed or buffer sites (old fields, ditch banks, roadsides) with heavy infestations, Canada thistle should be mowed when in full bloom, and as close to the ground as possible. Cut flower heads should be removed to prevent scattering seeds on site. Repeated mowing may be needed for several years to obtain adequate control.

A foliar application of a 1–2% solution of Roundup (a formulation of glyphosate) applied in spring when plants are 15 to 25 cm tall is an effective herbicide treatment on disturbed sites. Individual plants should be spot-treated with a wick applicator. Roundup normally kills the entire plant, including the roots, when applied in this manner. Roundup is a nonselective herbicide and precautions should be taken to avoid contacting nontarget plants with the solution. Do not spray so heavily that herbicide drips off the target species. As with 2,4-D amine, Roundup should be applied while backing away from the areas to avoid walking through the wet herbicide. Roundup should not be used in high-quality natural areas during the growing season because of the possibility of harming nontarget plants.

On severely disturbed sites with heavy infestations, such as cropland or abandoned cropland, the site could be plowed and sowed to a cover crop (wheat, alfalfa, rye), if practical and desirable. The following May, the cover crop should be plowed under and desired native species should be seeded. Tillage disturbance of soil that is not followed by sowing a cover crop may provide favorable conditions for reinvasion and for introduction of other exotics.

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