

Management Recommendations for Invasive Species In Prairies



Cool-season grasses.

Remnant tallgrass prairies are dominated by characteristic tall, warm-season grasses. Native cool-season grasses and many wildflowers are abundant in addition to the warm-season grasses. Smooth brome and downy brome are introduced (non-native) invasive cool-season grasses. Smooth brome is perhaps the biggest vegetative threat to remnant prairies. One native species, reed canary grass, is a very aggressive rhizomatous grass that can become a problem in small moist prairies.



Bromus inermis, Smooth brome

Brome is a species introduced for cool-season grazers. It is often planted for horse pastures and is an inexpensive grass often planted to roadsides. This rhizomatous cool-season perennial grass spreads quickly while inhibiting the growth of other species. Once established, this grass will eventually dominate an entire prairie, severely reducing native habitat.

Early season burns are often prescribed to help inhibit this species. These burns are conducted in late April. The timing is critical so that it inhibits the root development of brome. Burning earlier will warm the ground and enhance conditions for brome to spread and burning after mid-May will suppress warm-season grasses, thereby allowing brome to out-compete them.

However, prescribed burns do have limitations. In large infestations, burning 2 or 3 years in a row is necessary for control. Further, it can be difficult to find the correct weather patterns and the needed assistance at just the right time to conduct a prescribed burn effectively and safely. Mowing or haying in June prior to brome seeding out is also helpful. This does not kill brome that is already established but will help prevent further spread. Another option is late fall or winter applications of herbicide after the warm-season species have gone dormant. Caution should be taken to treat only those areas necessary as desirable native cool-season species will also be affected by the herbicide. In addition, the effectiveness of some herbicides are temperature dependent, so make sure you follow label directions

Bromus japonicus, Japanese brome

Bromus tectorum, Downy brome (cheatgrass)

Downy brome and Japanese brome are annual species. As such, they are easier to control than the rhizomatous perennial grasses. Early spring burns have proven very effective in their demise as is mowing or haying before they produce seed. Again, these are early season species so they will be producing seed by early June. Spraying in the fall is NOT a good option for these species, as the plants die in midsummer after producing seed. The spring treatment you use will need to be repeated for several years until the seed bank is depleted to within tolerable limits. Reducing or eliminating disturbances such as digging, overgrazing or leaving hay bales in the field are the best way to keep annual bromes from becoming a problem.



Phalaris arundinacea, Reed canary grass



Reed canary grass thrives in moist habitats. There are also European varieties of this species which have interbred with natives and are nearly impossible to distinguish. In areas which are frequently flooded, reed canary grass can quickly become an infestation. While the seed bank below ground holds many water loving species, the heavy mat of canary grass rhizomes prevent seeds from germinating or from finding the sun. It is helpful to control this species before it overtakes entire plant communities. Heavy grazing with horses has been shown to reduce the cover of reed canary grass, however, it does not allow other species to recolonize. Fall treatment with herbicide is effective where infestations threaten habitat, and repeated treatment may be necessary.

Noxious Weeds



Carduus nutans, musk thistle

Musk thistle is a biennial species which can best be controlled by regular inspections through the prairie in late May to early June. Chop any rosettes just below the ground surface. Remove the heads of any blooming thistles and bag them in a black trash bag. Chop the remaining stems just below

the surface of the ground. Spring prescribed burns are another excellent way to control musk thistle.



Cirsium arvense, Canada thistle

Canada thistle is a rhizomatous perennial that can spread laterally 8 to 10 feet in a single season. It is best to treat these infestations twice per year. Spray or mow in the spring to prevent flowering and seed set. Keep it mowed low if possible. It is most important to spray it in the fall when it is most likely damage the root system and keep it from spreading.

Euphorbia esula, leafy spurge



Leafy spurge was introduced to the U.S. as a contaminant in grain. It produces flowers in late May and early June. Seed capsules explode and shoot seed up to 15 feet from the parent plant. It will take several years of treatment to eradicate a population. Chemical treatments should be made during flowering and again in the fall. Burning produces a flush of fresh growth which is

more tender, making herbicides more effective.

Lespedeza cuneata, Sericea lespedeza

Sericea lespedeza was brought from Asia for stabilization of soil. It is a very tough plant to kill. Fire, grazing and most chemicals have proven ineffective. Cimarron Max is a chemical recommended by the Oklahoma extension service.



Sericea lespedeza should be sprayed in May or early June when the plants are actively growing. At other times of the year, it should be mowed low often to weaken it. It will take many years to kill plants and deplete the seed bank.

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Trees



Juniperus virginiana, Eastern Red Cedar

Eastern red cedar is a native species which has become invasive due to the fragmentation of the landscape and infrequent burns. It has both male and female trees (it will take a few years to see the berries characteristic of female tree). If you can control only a few trees each season, it is important to remove the female trees as soon as possible. Young trees are easily controlled by prescribed fire. Older trees quickly become hazards for prairie burns as they will flame high. Cutting below the lowest branch will kill cedars. They do not require herbicide application. Eastern red cedar is perhaps the easiest species to control so long as the prairie is cleared completely of new sprouts every 3 to 4 years by cutting or burning. Do not wait. Yearly haying at any time of year will also control eastern red cedars.

Ulmus pumila, Siberian elm



Siberian elm, native to northern Asia, was planted in the Midwest for windbreaks and timber. This weedy tree invades native prairies and can be treated by cutting and stump treating. A follow up with foliar spray on any suckers or new growth the following spring and or fall may be necessary.

Robinia pseudoacacia, Black locust



Black locust is identified by a double spine in the leaf axil. It has cascading white blooms and large compound leaves with rounded leaflets. It spreads by root suckering and has the ability to form dense colonies, making it difficult to eradicate. Cutting the trees at the base and applying herbicide, then recutting any resprouting stems and retreating is necessary to kill this species.

Non-native Clovers



Most non-native clovers are of European origin. Often planted for honeybees or as a nitrogen fixing legume for pastures, these perennial clovers are prolific and successful seeders. They are also allelopathic, meaning they release chemicals into the soil that prevent germination or proper growth of other plant species. They can all overtake native prairie habitat very quickly. There are plenty of native legume species as an alternative to planting clover, which can feed prairie soils and pro-

Melilotus officinalis, yellow sweet clover



Yellow sweet clover is a biennial. It forms a rosette for the first year then produces a flowering stalk in the second year. Often it will appear dominant in flowering years and less so in years when most plants are in the rosette stage. It reduces the growth potential of other plants in its path by exuding a

chemical called Coumarin, similar to the chemical originally used rat poison.

Sweet clover can be controlled in several ways. Mid to late October spraying of rosettes can be quite effective. Prescribed burns also suppress or kill rosettes before they have a chance to produce flowers. Mowing in the spring before flowers mature prevents the next crop of seed from being produced. Yellow sweet clover blooms in May so very early mowing is necessary in this case. Haying or mowing should be done in early June.

Other Species of Concern

Alliaria petiolata, Garlic mustard



Garlic mustard is a biennial which blooms in late April. It is a problem chiefly in woodlands. It has been shown to have allelopathic effects on both native plants and the soil microbiome, inhibiting the beneficial association of mycorrhiza with trees and other plants. Plants can be controlled with prescribed fire in early April. Hand pulling this plant is effective but very labor intensive. Plants should be pulled, bagged and removed from the site in the spring before seed set, starting at the outer edges of the infestations and working into

the middle. Each spring starting on the outer perimeter of the infestation will keep it from moving outward. Chemicals are also effective but will affect trees, so care should be taken to avoid vegetation.

Potentilla recta, Sulfur cinquefoil



Small populations can be hand pulled, however, spot spraying with herbicide in spring and fall provide the best control. Burning is not effective unless followed with herbicide treatment on rosettes.

Trifolium pratense, Red clover

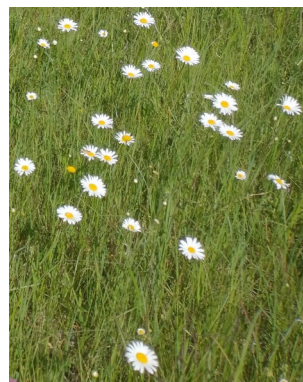
Trifolium repens, White clover



Trifolium species also exhibit allelopathy through other chemical means. As cool-season species these perennial clovers bloom early and produce seed quickly, then begin to regrow and reseed in the fall. They can be set back by early spring burns, but large infestations

benefit from chemical treatment for control. Spraying in late October or early November (Use when temperatures are warm enough as directed) will kill the clover without harming the native warm-season grasses. Spot spraying in late September through October is another option. Spraying in this way may cause a gap in warm-season species, so to prevent any other weedy species from establishing, overseed with seed from the same prairie. Spraying for cool-season invasives will also harm native cool-season plants. For this reason, it is important not to treat the entire prairie if it is not infested. Treat only where necessary.

Leucanthemum vulgare, Ox-eye daisy



Burning is not effective against this rhizomatous perennial and prolific seeder. Chemical applications on early spring rosettes, mowing before seed set, and summer herbicide applications are the necessary treatments for eradication of this species. When you mow and apply herbicide, it is best to mow then let the plant recover for a couple of weeks before applying the herbicide.

Hypericum perforatum, St. John's-wort



Fall herbicide applications when plants are storing reserves in the roots is the best treatment. Seed can remain in the soil for 50 years. Plants bloom in July. Haying in mid July to August will remove most flowers, keeping seed sources low. Long term management is required.

Treatment Chart for Problem Prairie Invaders

Problem Species	Type	R h i z o m e s	N a t i v e	March	late April or early May	Early to Mid June	July	August/ Sept	Late Oct	Nov-Jan	OTHER
Smooth brome	perennial cool-season	x		Apply herbicide	Prescribed burn	Hay or Mow			Apply herbicide		
Annual brome	annual cool-season			Apply herbicide	Prescribed burn	Hay or Mow					
Reed Canary Grass	perennial cool-season	x	x	Apply herbicide	Prescribed burn	Hay or Mow			Apply herbicide		heavy grazing by horses
Red clover	perennial cool-season	x		Apply herbicide	Prescribed burn				Apply herbicide		
White clover	perennial cool-season	x		Apply herbicide	Prescribed burn				Apply herbicide		
Yellow clover	biennial			Apply herbicide	Prescribed burn	Hay/mow early June			Apply herbicide		
Sericea lespedeza	Perennial warm-season	x			Apply herbicide	Apply herbicide	Mow low	Mow low	Mow low		
Musk Thistle	biennial					Remove heads Chop out			Apply herbicide rosettes		
Canada thistle	perennial	x			Apply herbicide	Mow low	Mow low	Mow low	Apply herbicide		
Eastern Red Cedar	Tree		x		Prescribed burn or cut	Burn or cut	Burn or cut	Burn or cut	Cut	Cut	
Siberian elm	Tree				Cut and treat	Cut and treat	Cut and treat	Cut and treat	Cut and treat	Cut and treat	
Black locust	Tree				Cut and treat stump	Cut and treat	Cut and treat	Cut and treat	Cut and treat.	Cut and treat.	
Garlic mustard	Biennial			Hand pulling	Hand pulling						
Leafy Spurge	Perennial, warm-season	x			Late May Apply herbicide				Apply herbicide		
St. John's wort	Perennial	x					Mow		Apply herbicide		
Sulfur cinquefoil	Perennial				Spot apply Herbicide				Spot apply Herbicide		
Ox-eye daisy	Perennial	x			Mow	Mow	Spot treat				