



A Landowner's Guide to  
Tallgrass Prairie  
and Savanna  
Management  
**in Ontario**

TALLGRASS ONTARIO

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## Chapter 1.

# This Guide and You

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### Who is this Guide For?

This guide is for Ontario landowners whose property contains native tallgrass prairie or savanna. Many landowners are unfamiliar with these rare and important grassland communities and less familiar with how to manage and restore them. This guide answers some basic questions about tallgrass, its management and uses. Restoration and management activities are powerful ways to learn more about the ecosystem and your relationship with it.

As an owner of a remnant tallgrass prairie or savanna, you are part of a small but important group helping to conserve a rare piece of Ontario's natural heritage. Tallgrass habitats are owned by a wide range of landowners including farmers, railroad corporations, municipalities, government agencies, clubs, rural non-farm residents, First Nation communities, golf courses and the Crown.

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### Why was this Guide Produced?

Tallgrass Ontario has prepared this guide to assist landowners with basic prairie and savanna management and restoration techniques. Without some management, these lands can convert to thickets and woodlands and the specialized prairie plants and animals that evolved over centuries will be gone forever.

The vast majority of native grassland has been lost; only 3% of the original tallgrass prairie and savanna in Ontario remains today. When the native tallgrass communities go, gone is the gene pool of plants that survive in our extreme climate. Gone too is the home of songbirds, insects and wild animals.

The natural disturbances that once maintained tallgrass habitats such as wildfires and grazing are mostly gone so we need to reintroduce these elements or mimic them as much as possible. Tallgrass sites now face threats from exotic invasive species and other human pressures, making it more critical that these special areas receive appropriate management.

Some tallgrass communities have experienced severe neglect (e.g. no management) for years, even decades. The longer the period of neglect, the greater the restoration effort required, but there is still hope.

Restoration is a young science as humans have only recently realized the need to preserve and restore natural landscapes and plant communities. Many prairie managers are still learning from their own experiences and the experiences of others. This guide describes several management and restoration techniques that landowners can experiment with themselves and share with others.

Where the issues are complex, this guide directs you to other places and people that can help. You decide what is practical for you given your time, experience and resources. This guide will not make you an expert in prairie management, but it will get you started and answer many of your questions.



Conservation of tallgrass habitats provides a legacy for future generations. *P. Allen Woodliffe.*

## Chapter 2. The Tallgrass Prairie & Savanna Ecosystem

### What is a Tallgrass Prairie? What is a Savanna?

Tallgrass prairie takes its name from the tall grasses that grow up to two metres high or more - taller than most people. These open grasslands support a great diversity of native grasses, wildflowers and animals. Savannas are a related ecosystem but the grasses and flowers are interrupted by scattered clumps of trees, mostly oaks.

Prairie is the French word used by early traders and explorers to describe the vast open country dominated by tall grasses that were encountered on their westward journeys. The word savanna is taken from the Carib Indian word referring to grassland with a scattering of open-grown trees.

Ecologists have not come to a consensus of exactly when a prairie becomes a savanna. A long-held definition is that a prairie has an average of less than 2.2 trees/ha (1 tree/acre). If the landscape has more than 2.2 trees/ha and up to 50% canopy cover, it is a savanna. If the landscape has more than 50% canopy cover, it is an oak woodland. However, these definitions are not precise, and many other factors play a role, such as species present, landscape, size, etc.



Mighty black oaks rein over the savanna in the Ojibway Nature Reserve in Windsor. *Paul Pratt*

Soil type is probably the main factor that determines whether an area will be a tallgrass prairie or savanna. Prairies can grow on a range of soils from sand to clay, but savannas tend to occur on sandy soils (e.g. sand

dunes, ridges). Vegetation tends to be less dense on these drier, sandy soils and so there is some open ground for acorns and tree seeds to germinate. On heavier or wetter soils, the grasses usually form dense mats, limiting the amount of open soil available for tree seeds to germinate.

The tallgrass prairie, also called the true prairie, is the easternmost prairie in North America. To the west is the mixed prairie and farther west, the shortgrass prairie that extends to the Rocky Mountains. In general, the height of prairie vegetation is a function of annual precipitation. Of all the grassland communities in North America, the tallgrass prairies in Ontario receive the most precipitation, accounting for their great height and diversity of species. All prairies are mostly treeless grasslands dependent on fire and tolerant of drought and grazing.

### Plant Characteristics

Most tallgrass prairie and savanna grasses and flowers are native warm season species. They mature later than the introduced cool season grasses that make up the majority of grasslands and pastures. Most are dormant by mid October. The range of prairie in North America roughly follows the corn belt.

Many prairie grasses and flowers have extensive and deep root systems, making them very drought tolerant. Most of the grasses spread by offshoots and are sod- or mat-forming. Because the plant's energy reserves are stored in the root system, they are able to survive through years of drought, neglect and abuse. They can even re-emerge from sites where they have not been seen for years once fire is re-established or mowing is stopped.

Chapter 3 describes more fully the common tallgrass prairie and savanna plant species.



Sixty-five percent of prairie plant biomass is underground in the extensive root system.

*Judie Shore*

Several tallgrass prairie and savanna species can be found growing in other non-forested, arid habitats including *sand dunes*, *alvars*, *rock barrens* and *sand barrens*.



### Meadows versus Prairies

Prairies are different from meadows. Prairies are old, climax communities; meadows are temporary and form as a result of a disturbance.

When a deciduous forest in southern Ontario is cleared or burned and then left alone, it will revert back to forest through the process of succession. The newly exposed soil is colonized by quick-growing, sun-loving plants such as goldenrod, teasel, giant ragweed and Queen Anne's lace. This is a meadow. These species are fairly coarse and not conducive to supporting fire. In time, shrubs and sun-loving trees will move in. Eventually, enough shade is created to allow forest trees such as maple and beech to germinate and a forest develops.

Meadow plants such as Canada goldenrod and Queen Anne's lace quickly colonize open ground.

*Cathy Quinlan*

A prairie, on the other hand, is a long-lived grassland ecosystem, dominated by native grasses that do foster fire. When a prairie is burned, it grows back to prairie as the roots remain protected below ground. However, human disturbance such as tillage or plowing, destroys the root system of the prairie plants and allows quick-growing meadow species to move in. This starts the chain of succession towards forest and the prairie is lost.

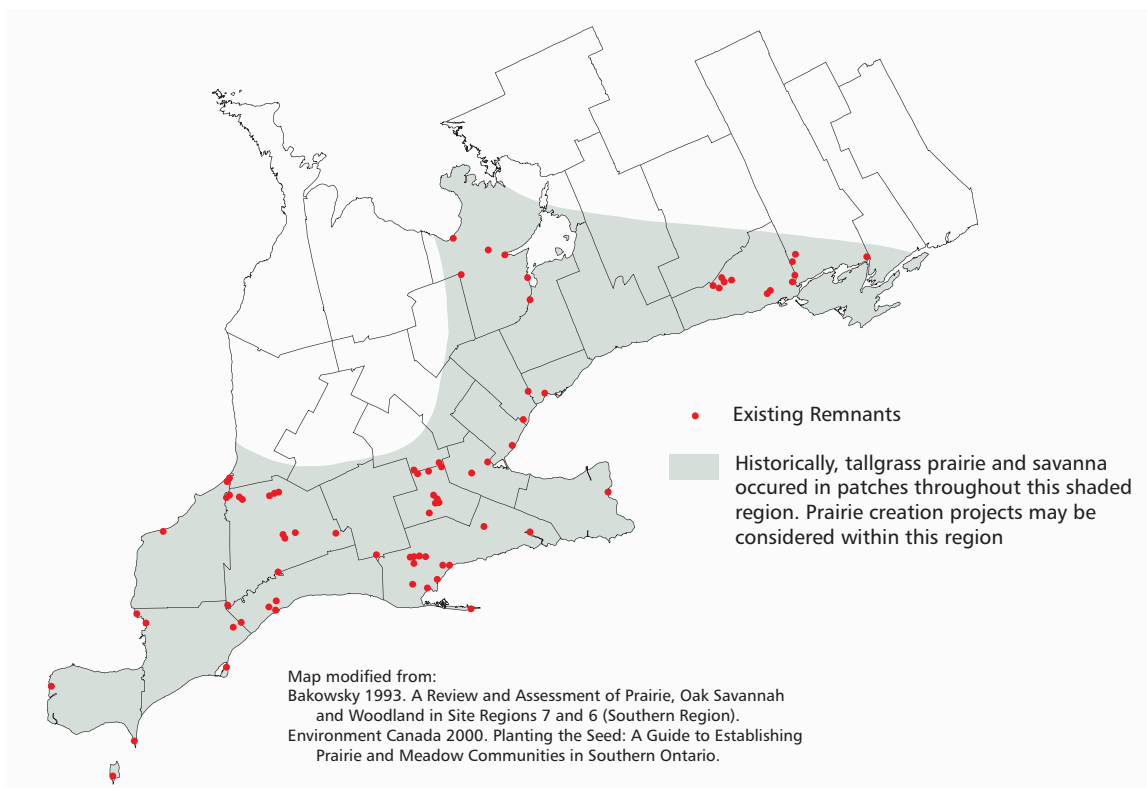


Figure 1. Range of Tallgrass Prairie and Savanna in Southern Ontario.

## Prairie and Savanna in Ontario

Tallgrass prairie once covered thousands of square kilometres of the eastern edge of the Great Plains and extended in restricted locations as far east as Pennsylvania and southern Ontario. The main range of tallgrass prairie in Canada is the 6,000 square kilometre plain centred in the Red River Valley in Manitoba.

Settlers were attracted to the tree-less landscape as this allowed them to till and plant quickly without years of tree cutting and removal. The prairie soil was also quite fertile. The accompanying urban development, especially in southwestern Ontario, resulted in further prairie loss. Settlers suppressed fire, reduced the numbers of large grazers and introduced exotic plants. Without fire and grazing, the disturbances needed to keep out woody plants, some prairies converted to woodlands.

Today, only small remnants of prairie and savanna remain scattered throughout Ontario. These small 'islands' of native grassland are increasingly threatened by surrounding landuses.

In Ontario, tallgrass prairie and savanna remnants occur in the counties and municipalities of Essex, Chatham-Kent, Lambton, Elgin, Middlesex, Oxford, Haldimand, Norfolk, Brant, Simcoe, Waterloo, Hamilton-Wentworth, Toronto, Northumberland and Peterborough (see Figure 1). Tallgrass prairie also occurs in northwestern Ontario near the Manitoba and Minnesota borders (e.g. Quetico Provincial Park).

### Why is it Important to Protect Tallgrass Remnants?

Tallgrass prairie and savanna are two of the most endangered ecosystems in Canada and are considered globally imperiled. Only 1% of the original tallgrass ecosystem in North America remains.

Tallgrass habitats are home to a great many species of plants and animals. Over 250 species of plants are found in Ontario's prairies and savannas including slender blazing-star, butterfly milkweed, pale purple coneflower, big bluestem and Indian grass. Almost 20% of Ontario's 681 rare plant species occur in these communities.

Birds such as bobolink, savanna sparrow and northern bobwhite (quail) shelter in the tall grasses and feed on the rich insect life. Butterflies, damselflies, ants, leafhoppers and lady beetles are just some of the insects found in large numbers in tallgrass sites. Badgers, meadow voles and fox snakes are also adapted to life among the dense grasses.

The prairie provides good winter cover for wildlife as the grasses stand up even under snow. Tallgrass provides excellent nesting, brood rearing, loafing, escape and roosting cover, especially for songbirds and game birds. Rabbit, dove, bobwhite quail, wild turkey, pheasant and numerous songbirds find native warm-season grasses suitable nesting cover. Native grasses concentrate insects, an important food source for birds and other wildlife. *Missouri Conservation Commission, 1993*

Prairies and savannas are part of Ontario's natural and cultural heritage. The need for preservation and restoration has only recently been recognized. Ontario still supports many small prairie and savanna remnants that can benefit from restoration and management. In time, through education and expansion, we may be able to restore tallgrass prairie and savanna as a viable plant community in Ontario and all the wildlife species that rely on it.



Henslow's sparrow is one of many rare birds that rely on tallgrass habitat for their survival.

*Parks Canada/J.R. Graham*

## Chapter 3. Getting to Know Prairie Plants

Ontario's tallgrass prairies and savannas contain a wide variety of colourful flowers, tall and slender grasses and majestic oaks. You are unlikely to encounter many of these plants outside a prairie or savanna, so it is not surprising that most people are unfamiliar with them. This chapter describes some of the plants you are likely to find in an Ontario prairie or savanna. A full list of plants and animals that rely to some extent on prairie/savanna habitats is included in the Appendix.

Learning some of the key indicator plants will increase your enjoyment and understanding of your site and help you manage it. A good field guide or two will help you identify the native and non-native species on your property. Several popular guides are listed in the Bibliography section.

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### Grasses

While grasses can be challenging to identify even for experienced botanists, once you become familiar with a few key species, you can feel confident in distinguishing them from other grasses.

There are five species of grasses that dominate prairies and savannas across southern Ontario. These grasses are illustrated in Figure 2. About 95% of the grass biomass at any particular site is made up of one or more of the following species:

**big bluestem** (*Andropogon gerardii*),  
**Indian grass** (*Sorghastrum nutans*),  
**little bluestem** (*Schizachyrium scoparium*),  
**switch grass** (*Panicum virgatum*), and  
**prairie cord grass** (*Spartina pectinata*).

Canada wild rye (*Elymus canadensis*) is also relatively common. There are about 30 other grass species that can be found in small numbers including Kalm's brome grass (*Bromus kalmii*) and Schrieber's panic grass (*Panicum oligosanthos*). There are also some very rare species such as arrow feather three-awn (*Eragrostis spectabilis*), June grass (*Koeleria macroantha*), and prairie dropseed (*Sporobolus heterolepis*).

Grasses have long, thin, needle-shaped leaves to minimize water loss through evaporation. They have hollow stems that are strengthened by nodes that allow the plant to bend in the wind without breaking.

They are also able to straighten back up even after trampling.

Tallgrass prairie grasses are different from many other field and pasture grasses. Most tallgrass prairie grasses:

- start to grow later in the spring,
- develop their seeds in August and September,
- grow to 2 meters or more in height,
- turn a distinctive reddish or golden colour in fall, and
- stand tall though the winter and snow.

There are a couple of exceptions. For example, June grass and Canada wild rye develop seed heads in June or July and little bluestem rarely reaches 1 metre in height.



Most prairie grasses and wildflowers remain tall throughout the fall and winter. *Cathy Quinlan*



**Figure 2. Five Common Ontario Tallgrass Prairie Grasses.**



**Big Bluestem** (*Andropogon gerardii*) is also called turkey foot because the seed head has three or more branches. *Cathy Quinlan*



**Little Bluestem** (*Schizachyrium scoparium*) grows in bunches and is rarely taller than 1m. *Cathy Quinlan*



**Indian Grass** (*Sorghastrum nutans*) is an attractive grass with a distinctive golden, plume-like seed head. *Cathy Quinlan*



**Prairie Cordgrass** (*Spartina pectinata*) grows up to 3m and is found in wet prairies. *Cathy Quinlan*



**Switchgrass** (*Panicum virgatum*) can be identified by its open seed head and a V-shaped tuft of hair at the base of the leaf. *Cathy Quinlan*



**Canada Wild Rye** (*Elymus canadensis*) has a distinctive curved seed head on 1m tall stalks. *Brenda Gallagher*



## Wildflowers

Many prairie wildflowers have showy, colourful flowers to attract pollinating insects. About a third to a half of the plants in a tallgrass prairie are flowers. Every week from May to October, new species come into bloom with the biggest floral show in mid July to mid August. From the bright yellow sunflowers to the purple blazing-stars to the orange butterfly milkweeds, the tallgrass prairie is ablaze with colour.

Some plants will be familiar to you as many common garden plants have been bred from native wildflowers. Wild lupine, gray-headed coneflower, prairie smoke, wild bergamot (bee balm), butterfly milkweed, blazing stars, asters, mints, goldenrods and sunflowers are just some of the colourful wildflowers of the tallgrass prairie. A few, like some sunflowers, can grow over 2 metres tall. Elegant orchids such as small white lady's slipper and eastern prairie white fringed orchid grow in sites with organic soils.



Ojibway Prairie in Windsor has an excellent prairie wildflower show in late summer. *Paul Pratt*

Figure 3 illustrates six common prairie flowers including round-head bush-clover, butterfly milkweed, showy tick-trefoil, wild bergamot, black-eyed Susan and smooth aster. Other common flowers include smooth beardtongue (*Penstemon digitalis*), pale-spike lobelia (*Lobelia spicata*) and prairie cinquefoil (*Potentilla arguta*).

## Trees

Within savannas, trees grow in scattered clumps or groves, giving it a park-like appearance. In a healthy savanna, the trees are usually large and open-grown, meaning they have large branches much lower on the trunk than trees growing in a forest. Also there is very little woody undergrowth due to the frequency of fire.

Figure 4 illustrates some of the trees associated with savannas. Black oak is the quintessential savanna tree in Ontario while Chinquapin, white and bur oak are also typical. Squirrels and other animals scatter their acorns throughout. Other, more rare oaks, are also associated with savannas including the northern pin oak that hybridizes with black oak.

Trees other than oaks that can also be found in savannas include shagbark hickory, trembling aspen, and red ash. Big shellbark hickory, sweet pignut hickory and honey locust are quite rare in Ontario as they are at the northern edge of their ranges.

## Shrubs

A handful of shrub species are also part of the prairie and savanna flora. Figure 4 illustrates some of these. The majority are fire and drought tolerant and prefer full sunlight. Like the trees, they grow in scattered clumps and, in a healthy community, do not dominate or shade out the grasses and flowers. Some of the more common shrubs include low shadbush (serviceberry), New Jersey tea, sand cherry and fragrant sumac.

Other shrub species associated with savannas include winged sumac and prairie rose, but these are rare and found only in restricted areas of the province.

**Figure 3. Five Common Ontario Tallgrass Prairie Wildflowers**



**Round-head Bush-clover** (*Lespedeza capitata*) has creamy-white flowers with purple spots that bloom in summer or fall. *P. Allen Woodliffe*



**Butterfly Milkweed** (*Asclepias tuberosa*) has brilliant orange flowers arranged in a flat-topped cluster at the top of a rough, hairy stem. *Cathy Quinlan*



**Showy Tick-trefoil** (*Desmodium canadense*) reaches 1.8 m and the seed pods are very sticky/clingy when mature. *Brenda Gallagher*



**Wild Bergamot** (*Monarda fistulosa*) has pale lilac flowers and the leaves smell of mint when crushed. *Brenda Gallagher*



**Black-eyed Susan** (*Rudbeckia hirta*) has yellow daisy-like rays and a chocolate-coloured centre disk. *Cathy Quinlan*



**Smooth Aster** (*Aster laevis*) has pale purple blooms and a smooth, hairless stem. *P. Allen Woodliffe*



### Figure 4. Some Trees and Shrubs of Ontario's Savanna



**Black Oak** (*Quercus velutina*) leaves are 15cm long with 5-7 lobes that end in sharp bristles. The lobes are separated by deep u-shaped notches. *Judie Shore*



**Sand Cherry** (*Prunus pumila*) is a low or trailing shrub with narrow, leathery leaves and a deep purple cherry that is edible but bitter. *P. Allen Woodliffe*



**Big Shellbark Hickory** (*Carya laciniosa*) is a medium to large tree, 18 to 27 m in height and the leaves have 7-9 leaflets and the terminal leaflet is larger than the others. *John Enright*



**Fragrant Sumac** (*Rhus aromatica*) is a low, thicket-forming shrub whose leaves resemble poison ivy but are aromatic when bruised. *Janes Bowles*



**New Jersey Tea** (*Ceanothus americanus* or *herbaceus*) is a low shrub with tiny five-petaled white flowers that bloom in summer. An excellent tea can be made from the dried leaves. *P. Allen Woodliffe*



**Shadbush** (*Amelanchier sanguinea*) is a straggling or erect shrub, 1-3 m tall, with red branchlets and dark purple berries. *Cathy Quinlan*

## Getting Help with an Inventory

There are many people who can help you inventory the plants on your site. Below is a list of agencies and organizations that may be able to help.

- Tallgrass Ontario
- Naturalist Clubs
- Conservation Authorities
- District offices of the Ministry of Natural Resources
- Stewardship Councils
- Botany Departments at Universities
- Environmental Consultants

Some of the organizations have staff and/or knowledgeable members who may be able to conduct an inventory or refer you to someone who can. Fees may or may not be charged. For contact information, see Helpful Organizations at the back of this guide.

It is helpful to inventory your site every 5 to 10 years to ensure the prairie plants are thriving and the weedy plants are decreasing.

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## Assessing Site Health through FQI

Landowners with a good understanding of botany or those who get the assistance of an experienced botanist can go an extra step beyond inventory and evaluate the quality and health of the site using a floristic quality index (FQI).

In the FQI, each plant species is given a score according to how specialized or faithful it is to the prairie/savanna habitat. Sites that contain many prairie/savanna specialists and few weedy generalist species score highly, indicating the site is of good quality. Conversely, sites that contain only a few specialized prairie species but many generalist species score low and indicate poorer quality.

Managers can re-inventory and re-score their site every few years to see if management techniques are working. It should be noted, however, that the FQI is only useful for the presence of species and does not take into account the abundance of those species.

For more information on FQI, refer to Packard and Mutel (1997), Oldham, Bakowsky and Sutherland (1995) and Herman *et al* (2001).



Participants at the Tallgrass Forum in 2001 learn about prairie plants on Walpole Island during an organized field trip. *Cathy Quinlan*

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## Sites to Visit

There are approximately 25 publicly-owned tallgrass prairie and savanna sites throughout southern Ontario that you can visit and learn from. Several occur in provincial parks including Rondeau, Pinery, and Turkey Point. Others are municipally owned including Ojibway (Windsor), Howard Watson Nature Trail (Sarnia), City of Brantford Greenway and High Park (Toronto).

Tallgrass Ontario's factsheet *Get up, get out and see some tallgrass* describes these public sites and their locations. Call Tallgrass Ontario for a copy or go to the website (see back of this guide for contact information).

## Chapter 4. Management Techniques

### The Need for Management

Historically, grasslands were shaped by fire, drought and grazing by a large number of mammals and insects. Today, prairies and savannas exist as small remnant patches within urban and farm landscapes where fire is suppressed and wild grazing animals are gone. Sites are often too far apart to allow native seeds and animals to disperse between them. Without fire, shrubs and trees invade. Roads dissect sites and allow alien plants to spread. In time, these remnant prairies may be lost. Fortunately, there are many techniques that can be undertaken to restore the prairie/savanna to good health.

The restoration of natural plant communities is a relatively new science and practice. Prairie managers from Canada and the United States are still experimenting with management techniques and learning what works best and at what cost. Should you wait until the science of restoration is better established before you take action? Consider this quote from Stephen Packard (Packard and Mutel, 1997):

*... the decision to withhold restoration "until we have better information," perhaps for decades, although it seems "conservative," is in fact a dangerous decision that will very likely do harm. Many of these patients are dying and desperately need treatment. "First, do no harm" does not mean "do nothing until the patient dies."*

The pages that follow describe several management techniques that are being used by land managers to recreate historic conditions in order to recover the health of prairies and savannas. The techniques include:

- fire and prescribed burning
- livestock grazing
- mowing and haying
- controlling invasive species
- interseeding and planting
- restoration of natural drainage

The goal of all these techniques is to encourage the growth of native prairie/savanna species while controlling or reducing woody and exotic plants that threaten to take over. Most managers use several or all of the techniques as circumstances and resources permit.

### Planning Ahead

Once you've read this guide and feel you are able to carry out some of the management techniques outlined, draw up a management plan for your site. A plan can be simple or elaborate, depending on your ability or if you're able to get assistance from others.

You can use the various sections in this guide as a framework for your plan. For example, a plan can consist of:

- a map of your property showing the tallgrass habitat and the other buildings and features within it,
- photos of the habitat in different seasons,
- a list of goals (e.g. improve vigour of native plants, reduce weedy species, enlarge area),
- a list of species currently present (if known) and notes on the location of special or rare species,
- plans for burns,
- plans for mowing and haying,
- notes on weedy patches and plans to control them
- plans for removing planted trees, etc.

This kind of advance planning will enable you to examine your long-term vision for the site and understand the costs, time commitment and land impacts.

Keep a journal to record the management techniques you've used, when you used them, how the prairie responded, who helped out, etc. This will help you evaluate the effectiveness of your actions. Share your experiences with others, especially those working in ecological restoration.

## Fire and Prescribed Burns

Most prairie managers use fire as a regular part of prairie management. Some believe a prairie or savanna remnant cannot be restored fully if fire is not used. The following section describes why fire is so important and how you can initiate a prescribed burn.

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### Fire and the Prairie

Fire plays a major role in the survival of many vegetation types around the world, including the Jack pine forests of Canada's boreal region and the prairies of the arid Great Plains in the USA. The extensive tracts of tallgrass prairie and oak savanna that existed in southern Ontario in pre-European times also owed their survival to fire.

It is thought that fires set intentionally or accidentally by Aboriginal people were, in fact, more common than fires caused by lightning. In the humid lower Great Lakes region, the types of convection storms where lightning occurs usually take place from June to August, a time when the prairie vegetation is usually too green to burn well. Also, most convection storms bring rain so fire isn't likely to last for very long.

Aboriginal people would start fires to drive game, remove brush to facilitate travel, increase yields of seeds and berries, clear land for agriculture or village establishment, and as a method of offense or defence in battle. Native peoples also used relatively large amounts of wood for cooking and heating and this woodland clearing created conditions favourable for the growth of fire-dependent grasses and flowers. Rather than huge wildfires, grass fires were likely small, burning for less than a day. Usually fires burned in a patchy way, leaving some areas untouched. Rivers and swamps acted as barriers to fire.

The growing points (meristems) of many prairie grasses and flowers are below ground and this feature protects them from both drought and fire. The previous year's stems and leaves provide fuel for the fire, while the growing point remains cool underground.



Large oaks are able to withstand a fast grass fire.  
*City of Toronto Urban Forestry*

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### How does Fire help Prairie?

A fast-moving grass fire helps the prairie in many ways. Firstly, it kills plants that are not specifically adapted to tolerate burning and usually have their growing tips above ground. Shrub and tree seedlings and other non-prairie weeds are controlled by regular burns.

Secondly, burns eliminate standing dead plant material so that sunlight and wind can warm and dry the soil surface more readily. The black ash absorbs the sun's energy during the day and insulates the soil against heat loss at night. This warmed soil speeds up the development of underground shoots. The new above-ground shoots receive full sunlight, providing them the energy for photosynthesis.

Thirdly, moisture may be more available to prairie plants after a fire. Dead standing material intercepts and absorbs a great deal of moisture. Most of that moisture will evaporate once the sun comes out. By burning off the material, water from a slow, gentle rain is more likely to be delivered to the ground where the shoots need it.

Finally, the burning of plant material releases nitrogen into the atmosphere. Since prairie species are adapted to low nitrogen levels, this gives them an advantage over weedy species that require more nitrogen. Other nutrients are also released including calcium, magnesium, potassium and phosphorus, making them available as fertilizer to boost plant growth.



Ontario Ministry of Natural Resources fire crew members conduct a prescribed burn to maintain the Dutton-Dunwich Railroad Prairie. *Bill Mackie*

### Prescribed Burns

Due to land clearing and settlement, wild grass fires are a thing of the past in southern Ontario. To restore fire to tallgrass prairies and savannas, prescribed burns are now used. A prescribed burn or PB is a planned and controlled fire deliberately set by humans on a specific plot of land.

Undertaking a PB requires expertise, training and planning as well as a good working relationship with neighbours and the local fire department. Safety is the prime consideration. In some municipalities, burning is not allowed, while in others, a permit from the local fire department is needed.

Some of the larger and more significant tallgrass sites in Ontario (e.g. provincial parks, nature reserves) are burned routinely by the Fire Service of the Ministry of Natural Resources (MNR) or by experienced land managers and/or consultants. Some landowners or clubs hire fire consultants to plan and complete the burn for them. Local fire departments are often willing to come out and help.

Prescribed burns have taken place for many years in Ontario, demonstrating that burns can be carried out safely, even in cities such as Toronto. Explaining the procedures and environmental benefits to neighbours, eases concerns and often produces advocates.

The actual steps in a PB and PB plan are too detailed to be covered in this guide. Long before you burn your site, a lot of discussion and education are needed. Here are some steps:

- Contact your local fire department to see if a fire permit is needed and if they are willing to help you on the day of the burn.

- Contact the Fire Management Program of the Ontario Ministry of Natural Resources for advice and to find out if there are fire training courses offered in your area. You can also request a copy of their CD-ROM called *Tallgrass Prairie and Savanna Prescribed Fire Decision Support System* (see bibliography). The system assists land managers with the assessment of the need for prescribed fire and assists in the planning and execution of prescribed burns on prairies and savannas.
- Call a fire consultant for a quote (see Helpful Organizations at the back).
- Gain first hand experience by helping out on a PB in your area. Contact Tallgrass Ontario for a list of planned burn sites in your area.
- Obtain a copy of *How to Manage Small Prairie Fires* by Pauly (1982).

With experience and training, landowners can become the experts in conducting burns on their own land. However, even with proper training, certification and permits, burning should never be undertaken by an individual alone without a backup team. Safety first!



A volunteer firefighter wets down an area not to be burned prior to ignition. *Cathy Quinlan*



## Burning Frequency

There are no hard and fast rules about how often to burn. Each site is different but there are a few indicators that will tell you when a burn is needed.

Healthy tallgrass prairies with small numbers of invading shrubs and exotic weeds will benefit from a burn once every 3-10 years. Healthy savannas will benefit from a burn once every 10-15 years.

Here are few indicators that a tallgrass prairie or savanna is stagnating and in need of a burn:

- there are fewer flowering plants and more grasses than there were in the past,
- there is very little open ground due to the buildup of litter (dead stems and leaves), and
- the plants are so thick that it is difficult to walk through the stand.

Sites on poorer, drier soil tend to need less frequent burning as the plants do not grow as vigorously and there is not the resulting build-up of leaf litter.

Tallgrass prairies and savannas that have not been burned in decades and have many invading shrubs and exotic weeds should be burned every year for two or three years until the non-prairie plants are under control. Additional weed control measures (e.g. herbicides) may be needed to knock back the non-prairie plants to favour the grasses and wildflowers. These sites may not burn well initially if there are not a lot of grasses. Straw can be added to act as a fuel source.

Prairies that have not burned for several years will have an accumulation of fuel and can be very hot and less controllable. Prairies that burn every 2-3 years have less fuel build-up and burn 'cooler', and are less likely to kill desirable trees. In addition, prairies that burn more frequently promote wildflowers while those that burn less frequently promote grasses.

On larger sites, burns can be rotated, such that different parts of the prairie or savanna get burned every year. For example, you may burn the western part of your site the first year, the central section the next year, and the eastern section the third year. Then, the rotation begins again. This system keeps some un-burned grass for wildlife and keeps the size of the burn plots manageable. In fact, it is important not to burn 100% of the site. Patchy burns are critical for the survival of insects.

## Time of Year to Burn

For practical and ecological reasons, most prescribed burns occur in early spring (late-March to mid-April). Since most prairie plants are warm-season perennials, they remain dormant at this time while the cool-season competing weeds are far enough advanced to get hit hard by the fire.

A good rule of thumb is to burn when the newly growing prairie grasses reach about an inch high. Most grassland birds have not yet begun to nest at this time and so will not be destroyed by the fire. It is not recommended to burn later than April 15th as prairie reptile and amphibian species (e.g. fox snake) begin to emerge at this time and may not be able to escape the fire.

Burns can also be carried out in the summer to favour grasses over wildflowers but it is only feasible to burn in very dry years when the plants have gone dormant. Woody plants that are stressed by a drought, may be more easily killed by fire at this time.

A burn in fall will clear off the plant material and provide open conditions for next spring's growth. However, winter wildlife cover will be lost and the exposed ground may be more susceptible to erosion. It is best to burn only half the prairie or savanna at this time.



Grass fires move quickly across open terrain.

*Scott Laver*



## Livestock Grazing

### Historical Grazing

Most grasslands evolved under alternating periods of grazing and rest as herds of herbivores moved in and out of vast ranges. The continual movement of animals provided native grasslands with fertilizer (manure), a method of seed dispersal and seasonal periods of rest to recover and replenish their food supplies. Animals grazed at different intensities and frequencies, creating patches of heavily to lightly grazed prairie. This patchiness provided different habitats for various plant and animal species. Each site was probably only grazed for a short period of time before the animals moved on.

Grazing animals alter the vegetation height and density, consume saplings and weeds, and reduce excess buildup of litter. Grazers actually help perpetuate grasses because nipping off the fresh new growth stimulates other shoots at or below ground level to begin growing. Intensive grazing pressure would negate this process. Flowers, however, are diminished by grazing as their growing points are at the tallest point of the plant.

Rabbits, ground birds and various rodents often use cow paths as runways. Many grassland birds select sites adjacent to cow paths for nesting.

### Grazing Ontario Prairies Today

Because there are so few tallgrass prairies and savannas left in Ontario and many are small or are situated in urban areas, grazing is not a common practice. Fencing cattle in and out of small plots is also prohibitive for many farmers. As a result, there is very little information on how much grazing a remnant tallgrass prairie in Ontario can sustain.

Grazing of tallgrass prairie grasses is a more common activity in Manitoba and the U.S. Midwest where much larger tracts still exist. Even in these areas, much of the experience is with planted monocultures of switchgrass or big bluestem instead of natural prairies. (See the Bibliography for references on growing warm season pastures.) Some useful information can be extracted from these experiences, however, and is presented here.

If you are interested in experimenting with grazing, it is best to start with an extremely low grazing intensity to see if the prairie/savanna plants survive and regrow with vigour the next year. For example, you might start with 10 head of cattle on a 10 acre

plot, one or two days a season. If the outcome is positive, you may increase the herd size or number of days grazed slightly. If the prairie plants do not grow back well or weeds are introduced, stop grazing or cut back the herd size significantly. Share your findings with others (e.g. Tallgrass Ontario, Ontario Ministry of Agriculture and Food, Cattlemen Associations).

The best time to graze is before the seed stalks develop on the prairie grasses, around the middle of July in Ontario. At this time, forage quality is high and palatability is good. A general rule of thumb is to let the grasses get 24 inches (60 cm) tall prior to grazing and to stop grazing when the stubble reaches an average of 10-12 inches tall. Cattle should be removed by the 1st of August or 60 days before frost to allow the plants to regrow an additional 8 inches before winter.

Cattle grazing in a tallgrass prairie or savanna should not have their diet supplemented with hay as this will introduce undesirable seeds through their droppings. Cattle can also graze the prairie in winter or during the dormant season to break up dense and tall plant cover. Missouri wildlife managers utilize this practice to make the prairie more attractive to spring nesting birds.



Light grazing by cattle can be beneficial to a prairie or savanna. *Scott Laver*

### Cow and Goat Grazing in Manitoba

In Manitoba, the Nature Conservancy of Canada routinely graze cattle on their mixed grass prairies. They stock 25 cows on 160 acres (the sites are drier and less productive than many Ontario prairies). The prairies are divided into three parcels with portable electric fencing. The cattle graze by

rotation such that each parcel is grazed for about 15 days in early summer and another 15 days in late summer. The goal is to defoliate about 55% of the stand each year.

The NCC is also experimenting with goat grazing to control leafy spurge, St. John's wort and woody plants. The goats can be stocked at 1 goat per acre. They are less destructive to the prairie soil than cattle due to their small size. Goat herders are employed to keep the goats from escaping through the fencing and to move them to weedy areas.



Goats consume many weedy plants including thistles. *Janel Sauder*

## Mowing and Haying

Mowing and haying are used as prairie management techniques on sites where fire or grazing are not feasible. Mowing and haying may be more labour-intensive than burning, but they can be effective in controlling some weeds and shrubs.

Mowing entails cutting plants relatively close to the ground. Haying involves collecting and removing the cut plants (thatch) from the site.

It is important to remove the clippings relatively quickly as the thick thatch can smother and kill the plants underneath. To more closely simulate a burn, some managers take the thatch, burn it in a container, and reapply the ash to the prairie. The thatch or straw can also be used as feed or bedding for animals.

Flat, open sites are ideal for this technique. Wet ground, steep or uneven topography, rocky areas, and shrub-infested sites would make mowing/haying extremely difficult.

Several cutting tools can be used. For small sites

with few woody plants, a rotary mower such as a hand held bush mower or a riding lawn mower can be used. It is wise to check with the manufacturer or owner's manual to see if your machinery is suitable for the job. Scythes or garden shears can also be used. For larger sites, a sickle bar cutter or forage harvester can be used. A forage harvester is ideal as it cuts and removes in one pass.

## How Often and How Much to Mow

A general rule of thumb is to mow/hay the prairie once every few years, similar to a prescribed burn schedule. Some plant and animal species may be lost under a yearly haying schedule as their life cycles make them relatively vulnerable at haying time.

It is not necessary to mow the entire site each time. Weedy areas may need to be mowed more frequently than the rest of the site. You can mow different sections of the tallgrass prairie or savanna in different years and monitor the results. This mowing/haying rotation also mimics grazing and leaves refuges for insects and other wildlife.

If there are rare plants on your property and you know where they area, flag them before mowing to avoid cutting.



A hand held weed whipper can be used to cut weeds or thick patches of grass. *Cathy Quinlan*



## When to Mow

The season in which a prairie is mowed/hayed depends on the needs of the site and the landowner's goals. If ground-nesting birds are present, mow after the nestlings have fledged.

### *Spring*

Mow and hay in the spring (April to mid-May) if your goal is to reduce early growing non-native or non-prairie plants. In Ontario, many cool-season grasses and flowers are several inches tall by mid-May, while most prairie plants remain dormant. Set the mowing blade 3 to 4 inches (7-10 cm) from the ground to remove as much of the weeds as possible. Like a spring burn, a spring mowing and haying opens up the prairie to greater sunlight, giving the soon-to-emerge prairie plants a chance to grow tall before the weeds catch up and shade them out.

Prairies can also be mowed just before a spring burn to reduce flame height. Mowing should be done in early afternoon when the vegetation is dry since the thatch will not dry laying on the ground. Set the mowing blade to 30 cm.

### *Late Spring*

The prairie can be mowed again in late May or early June to further knock back the spring weeds that have re-grown. As most prairie plants (especially grasses) grow from the base instead of the tip, they will not be harmed by a mowing this early in the season. Set the blade no lower than 10 cm from the ground.

### *Early Summer*

Early summer (June) is a good time to mow if sweet white clover is a problem. It is imperative to mow it when it is in flower and before any seed develops. This species is a biennial, and mowing in two or more successive years when it is in flower will gradually remove it from your prairie. Other problem plants can also be knocked back by cutting when they are in flower (e.g. grey dogwood).

### *Mid-Summer*

Mow and hay in the summer (mid to late July) if your goal is to reduce later blooming problem plants such as Canada goldenrod or Canada thistle. Again it is important to mow these plants when they are in flower and before any seed is set. The hay/thatch has a high protein content at this time of year, so it can be fed to livestock. Haying in mid-summer mimics the effect of animal grazing.



Hedge shears can be used to cut small patches of unwanted plants. *Cathy Quinlan*

### *Fall*

Mow and hay in the late fall (late October to November) if your goal is to reduce the fire intensity of next spring's burn. Mow down to 30 cm and remove the thatch. The straw can be used for animal bedding. A fall mow is not ideal, however, as it removes the standing plants that provide winter habitat for wildlife.

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## Controlling Problem Plants

Healthy prairies and savannas contain a wide variety of native grasses, flowers and woody plants. However, the spread of non-native and non-prairie plants has degraded many significant sites. Invasive or aggressive plants can squeeze out tallgrass species through competition and shading. This section describes some of the plants that are invading Ontario's tallgrass communities and the methods that can be used to control them.

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### Invasive Plants

Most of the plants that pose a threat to tallgrass prairies or savannas are non-native. Non-native plants are species that were not present in Ontario before European settlement. They were brought over from other parts of the world (usually Asia or Europe) by humans, accidentally or deliberately. Over 500 exotic species of weeds have been introduced to North America over the last 240 years. Fortunately, only a handful of them are invasive to the point of posing a serious threat to natural areas.

A few native plants also invade tallgrass sites. Plants such as Canada goldenrod are native to Ontario but harmful to prairies as they can spread very rapidly. Canada goldenrod is a common plant of meadows.

Invasive plants employ many strategies that allow them to outcompete other plants. Some flowering weeds produce hundreds of thousands of seeds per plant. Problem shrubs such as buckthorn produce numerous berries that are eaten and distributed widely by birds. Many invasive plants get a head-start by starting their growth early in the spring while native plants are still dormant. Non-native plants have no natural predators such as insects in their new land to keep them in check. Finally, most invasive plants tolerate disturbed sites with full sunlight (e.g. building sites, fallow farm fields).

Some of the more invasive weeds encountered in Ontario prairies and savannas include the following, all of which are non-native except for Canada goldenrod:

#### Flowers and Grasses:

Spotted knapweed, *Centaurea maculosa*  
 Knapweeds, *Centaurea sp.*  
 Canada thistle, *Cirsium arvense*  
 Crown vetch, *Coronilla varia*  
 Wild carrot / Queen Anne's lace, *Daucus carota*  
 Leafy spurge, *Euphorbia esula*  
 Sweet white clover, *Melilotus alba*  
 Yellow sweet clover, *Melilotus officinalis*  
 Phragmites / common reed, *Phragmites communis*  
 Canada goldenrod, *Solidago canadensis*

#### Vines, Shrubs and Trees:

Oriental bittersweet, *Celastrus orbiculatus*  
 Tartarian honeysuckle, *Lonicera tatarica*  
 Scotch pine / Scots pine, *Pinus sylvestris*  
 European buckthorn, *Rhamnus cathartica*  
 Glossy buckthorn, *Rhamnus frangula*  
 Black locust, *Robinia pseudoacacia*  
 Dog-strangling vine, *Vincetoxicum rossicum*

The field guides listed in the Bibliography describe and illustrate non-native plants as well as native plants and so are a great resource in helping you identify weeds on your property. The Ontario Ministry of Agriculture and Food (OMAF) produces many factsheets and brochures on weed identification and eradication. The information is also available at [www.gov.on.ca/OMAFRA/english/crops/facts/ontweeds/weedgal.htm](http://www.gov.on.ca/OMAFRA/english/crops/facts/ontweeds/weedgal.htm). The Nature Conservancy hosts a website with photos and descriptions of invasive plants. Go to <http://tncweeds.ucdavis.edu/>

There are usually only a few species of problem weeds on any given site, but they may be extremely abundant. You can flag and keep a patch of weeds to help with identification. Use garden markers to identify the weeds as they go through their life cycle.

Figure 5 illustrates some common problem plants of Ontario prairies and savannas.



**Figure 5. Some common problem plants of Ontario prairies and savannas.**



**Canada Goldenrod** (*Solidago canadensis*) is a very common wildflower of roadsides, thickets and clearings that blooms in late summer and early fall. *Brenda Gallagher*



**Spotted Knapweed** (*Centaurea maculosa*) has rough, pale green leaves and pink to light purple flowers. *Province of British Columbia*



**Canada Thistle** (*Cirsium arvense*) is easily identified by its dark green prickly leaves and rose-purple flowers that appear from July through October. *Province of British Columbia*



**Queen Anne's lace** (*Daucus carota*) is a common plant with an umbel of white flowers in late summer. The leaves smell of carrot when crushed. *Brenda Gallagher*



**Black Locust** (*Robinia pseudoacacia*) is a large tree with compound leaves composed of an odd number of small, oval leaflets. The fruit resembles a pea pod and the flowers are similar to pea flowers. *Cathy Quinlan*



**Common Buckthorn** (*Rhamnus cathartica*) is a shrub or small tree with purple-black berries and smooth leaves that remain dark green into late fall. *Cathy Quinlan*

## Control Methods

Over the years, land managers, gardeners and farmers have discovered numerous ways to control undesirable plants. Tables 1 and 2 outline several techniques for controlling woody and herbaceous plants in tallgrass prairie and savanna remnants. What control measures you use depends on the size and condition of your site, characteristics of the problem species, and available resources. A combination usually works best.

Herbicides should be used sparingly or as a last resort as there is always the risk of killing rare prairie plants along with the weeds. However, for some invasive plants such as leafy spurge and buckthorn, herbicide application is the only known effective control. Other plants can be controlled through mechanical means (pulling, cutting, burning, grazing).

Most of the information contained in Tables 1 and 2 was taken from *The Prairie Handbook*, by Packard and Mutel (1997). It provides a great deal of additional, practical information. Other groups with useful information include the Ontario Ministry of Agriculture and Food, the Ontario Society for Ecological Restoration, The Nature Conservancy (<http://tncweeds.ucdavis.edu/products/handbook.html>) and your local pesticide dealer.



A car mitten soaked in Roundup is wicked on problem plants. This spot technique is safer than spraying and uses less chemical. *City of Toronto Urban Forestry*

## Licenses

Most glyphosphate herbicides (e.g. Round-up) that can be purchased in small quantities at retail stores such as Canadian Tire or your local Co-op can be applied without a license. Closely follow the directions listed on the bottle.

Some scheduled herbicides require the applicator to hold a valid Ontario Pesticide Licence. Most of these chemicals (e.g. Garlon) are sold at specialized dealers or farm chemical supply stores. For information on pesticide licensing and training, contact:

Ontario Pesticide Training Certificate  
Ridgetown College, University of Guelph  
Ridgetown, ON N0P 2C0  
Ph: 1-888-620-9999 or (519) 674-1575  
Fx: (519) 674-1585

When using heavy equipment such as chain-saws, training is recommended. Many landowners prefer to hire a trained and certified contractor to do dangerous cutting or spraying. Check your yellow pages for a listing of these contractors.



Small buckthorn stems are cut down with a brush cutter and the stumps later treated with chemical to prevent re-sprouting. *City of Toronto Urban Forestry*

## Removing Planted or Encroaching Trees

Decades ago, many land managers and landowners planted trees in savannas, with the mistaken belief these open woodlands were ailing and needed the input of more trees. In some cases, they were planted to control eroding soil. White pine was often the tree of choice as it grows well on sunny, well drained sites.

Today, many savannas are in a very degraded condition as these planted trees tower over the site, shading the sun-loving plants. Cutting down these non-savanna trees is the best option for restoring a site.

In many savannas where fire has been suppressed for years, native trees have become established. Trees such as red maple, sugar maple, black cherry and white ash can invade savannas and, in time, convert them to woodlands. These trees should be removed before this happens.

Inform your local drainage superintendent about the danger of spreading phragmites and request the ditching equipment be cleaned before it is allowed near your site.



Phragmites stands over 6 feet tall with a distinctive plume-shaped seed head, commonly found in ditches. *Paul O'Hara*

## Phragmites - A Special Concern

Phragmites (*Phragmites communis*), also called common reed or elephant grass, is advancing at an alarming rate onto moist prairie/savanna sites in southwestern Ontario including Walpole Island, Ojibway Nature Reserve and Rondeau Provincial Park. This European plant has the ability to devastate many of Ontario's prairies and wetlands.

In most cases, the source of the spread is from roadside ditch cleanouts. Digging equipment is often contaminated with seed and rhizome fragments which then gets carried from ditch to ditch. Phragmites only needs a wet spot to get established and from there it can invade drier habitats.

Prescribed burns only encourage the spread of phragmites as it is also a warm-season grass. There are methods to control it, however. For small infestations, smother the plants by laying scrap metal or plywood sheets over top and weigh down with rocks. Leave for a year. Black geo-textile fabric does not work as the phragmites shoots can spear through it.

For large infestations:

- map the stands of Phragmites in early spring,
- visit the stands in mid July and cut down the phragmites with a handheld trimmer or weed eater (this exhausts the root reserves),
- re-visit the stands a month later in mid August to spray the resprouts with Roundup, and
- follow up one year later to spot-spray any weak survivors.



**Table 1. Methods to Control Invasive Woody Plants**

Technique	Description	Pro's	Con's
<b>Fire / Prescribed Burn</b>	<ul style="list-style-type: none"> <li>regular prescribed burns every 3 - 15 years can kill saplings and some older trees and shrubs</li> </ul>	<ul style="list-style-type: none"> <li>quick and relatively inexpensive</li> </ul>	<ul style="list-style-type: none"> <li>some municipalities do not allow burns</li> <li>experience and training required</li> <li>expensive if hiring a consultant</li> </ul>
<b>Mowing and Haying</b>	<ul style="list-style-type: none"> <li>mowing and haying every 3 - 5 years can be effective at killing young saplings</li> </ul>	<ul style="list-style-type: none"> <li>relatively inexpensive if equipment available</li> </ul>	<ul style="list-style-type: none"> <li>not possible on larger woody plants</li> <li>may stimulate suckering of some woody species</li> </ul>
<b>Girdling</b>	<ul style="list-style-type: none"> <li>use an ax or saw to make two parallel cuts 3 to 6 inches apart into the bark of the tree</li> <li>the cuts should be a bit deeper than the cambium layer just inside the phloem (inner bark); leave the xylem (sapwood) intact</li> <li>whack the bark between the cuts with the back of your ax; the outer bark and phloem tend to pop off in one piece</li> <li>girdle near the ground to minimize suckering</li> </ul>	<ul style="list-style-type: none"> <li>relatively quick</li> <li>inexpensive</li> <li>no herbicides or heavy equipment needed</li> <li>standing dead trees provide wildlife habitat</li> </ul>	<ul style="list-style-type: none"> <li>don't always get 100% kill</li> <li>takes a year or more to kill tree</li> <li>large standing dead trees may pose a safety risk from tree fall</li> </ul>
<b>Stem Cutting</b>	<ul style="list-style-type: none"> <li>cut shrubs and trees off at or near ground level</li> <li>use lopper or hand saw for small stems; chain-saw or gas-powered brushcutter for large stems or areas; wear protective gear</li> <li>cut resprouts (suckers) until food reserves are depleted; may take years</li> </ul>	<ul style="list-style-type: none"> <li>effective for woody species that don't sucker</li> <li>relatively quick and inexpensive</li> </ul>	<ul style="list-style-type: none"> <li>may trigger some species to sucker profusely</li> <li>may take many cuts of re-sprouts to kill plant</li> <li>may be expensive if contractors involved</li> </ul>
<b>Cut Stump Treatment</b>	<ul style="list-style-type: none"> <li>cut down shrubs or trees as above, then apply a broadleaf herbicide (e.g. Garlon) on the stump according to label directions</li> <li>best done in late summer but also effective in dormant season</li> <li>apply chemical immediately after cutting</li> </ul>	<ul style="list-style-type: none"> <li>best treatment for invasive shrubs (honeysuckle, buckthorn)</li> <li>relatively inexpensive</li> </ul>	<ul style="list-style-type: none"> <li>pesticide licence may be needed</li> <li>may be expensive if contractors involved</li> </ul>
<b>Frilling</b>	<ul style="list-style-type: none"> <li>mix a solution of a broadleaf herbicide (e.g. Garlon 4) with diesel or mineral oil for adhesion according to directions on label</li> <li>make a gash in the tree with an ax or chain-saw, making a sharp stroke at a downward 45° angle</li> <li>apply chemical into the pocket in the bark (sparingly so it doesn't drip)</li> <li>one can also use specialized injection equipment (e.g. EZ JECT) that cuts into the tree and injects an herbicide all in one procedure</li> </ul>	<ul style="list-style-type: none"> <li>relatively quick</li> <li>light labour</li> <li>effective on many aggressive shrubs</li> <li>little risk of chemical spread</li> <li>can be done in late summer or winter</li> </ul>	<ul style="list-style-type: none"> <li>pesticide licence may be needed</li> <li>chemical can be expensive</li> <li>dripping chemical may kill desirable plants</li> </ul>
<b>Basal Bark Treatment</b>	<ul style="list-style-type: none"> <li>mix a solution of herbicide and oil as above</li> <li>spray or paint chemical directly onto bark, going all the way around in a 12" band</li> <li>chemical can penetrate the bark of some trees</li> <li>can be done in the dormant season using Garlon 4 herbicide on small stems/trunks (&lt;6" diameter).</li> </ul>	<ul style="list-style-type: none"> <li>as above</li> </ul>	<ul style="list-style-type: none"> <li>as above</li> <li>not as effective on larger trees</li> </ul>
<b>Spot-Burning</b>	<ul style="list-style-type: none"> <li>use a propane torch to burn seedlings and suckers</li> <li>burn buckthorn seedlings early in the first growing season after adult removal</li> <li>repeat burn treatments are necessary to kill resprouts</li> </ul>	<ul style="list-style-type: none"> <li>relatively inexpensive</li> <li>light labour</li> <li>targets problem areas</li> </ul>	<ul style="list-style-type: none"> <li>can only be carried out when the vegetation is green and non-flammable</li> <li>need to cut large trees, shrubs first</li> </ul>



**Table 2. Methods to Control Invasive Herbaceous**

Technique	Description	Pro's	Con's
<b>Fire / Prescribed Burn</b>	<ul style="list-style-type: none"> <li>regular prescribed burns every 3 - 10 years can control some early growing weeds and cool season grasses</li> </ul>	<ul style="list-style-type: none"> <li>quick and relatively inexpensive</li> </ul>	<ul style="list-style-type: none"> <li>some municipalities do not allow burns</li> <li>experience and training required</li> <li>expensive if hiring a consultant</li> </ul>
<b>Mowing and Haying</b>	<ul style="list-style-type: none"> <li>mowing and haying every 3 - 5 years can be effective at killing some undesirable plants</li> <li>mow and hay when problem weeds are actively growing or in flower</li> <li>can mow repeatedly over problem/weedy areas in the same year</li> </ul>	<ul style="list-style-type: none"> <li>relatively inexpensive if equipment available</li> </ul>	<ul style="list-style-type: none"> <li>can set back native prairie plants if mown repeatedly</li> <li>will not control all aggressive plants</li> </ul>
<b>Pulling</b>	<ul style="list-style-type: none"> <li>hand pull weeds throughout the growing season</li> <li>regular pulling weakens the plant's root reserves</li> <li>easiest to pull weeds after a rain</li> </ul>	<ul style="list-style-type: none"> <li>inexpensive, only garden gloves require</li> </ul>	<ul style="list-style-type: none"> <li>labour intensive</li> <li>hard to pull from dry ground</li> </ul>
<b>Cutting or Snipping</b>	<ul style="list-style-type: none"> <li>stems of broadleaf plants (non-grasses) can be cut near ground level at or near the time of flowering but before seed develops</li> <li>use hedge trimming shears or loppers</li> <li>repeat to gradually weaken plant</li> </ul>	<ul style="list-style-type: none"> <li>inexpensive</li> <li>weeds are more easily identified when flowering</li> <li>no license needed</li> </ul>	<ul style="list-style-type: none"> <li>time consuming and labour intensive for large sites</li> <li>will need to repeat if new shoots come up</li> </ul>
<b>Blanketing or Insolation</b>	<ul style="list-style-type: none"> <li>smother weeds by laying down a sheet of black plastic (e.g. pond liner), newspaper, sheet metal or plywood over a weed patch; if the weeds are tall, mow or cut first</li> <li>the heat build-up under the plastic kills the plants, their roots and some seeds in the surface layer</li> <li>anchor the plastic with rocks, bricks or stakes and leave it in place for one full growing season</li> <li>next spring, seed or plant native species into the bare area</li> </ul>	<ul style="list-style-type: none"> <li>inexpensive</li> <li>light labour</li> </ul>	<ul style="list-style-type: none"> <li>suitable for small patches of weeds only</li> <li>will kill desirable plants mixed in with weeds</li> <li>takes most of the growing season</li> </ul>
<b>Spot Herbicide Application</b>	<ul style="list-style-type: none"> <li>spray individual weeds or small patches of weeds using a glyphosphate-based chemical (e.g. Round-up)</li> <li>apply using a spray bottle, a back-pack sprayer, or wick applicator</li> <li>best to apply early in season on the green leaves of weeds before prairie plants come up</li> </ul>	<ul style="list-style-type: none"> <li>inexpensive if small amounts used</li> <li>quick results</li> <li>kills roots, usually</li> <li>can be done carefully throughout growing season</li> </ul>	<ul style="list-style-type: none"> <li>pesticide license required if applying large amounts</li> <li>pesticide can drift and kill desirable plants</li> <li>expensive if large amounts needed</li> </ul>
<b>Spot-Burning</b>	<ul style="list-style-type: none"> <li>spot-burn weeds using a propane torch</li> <li>use only when the vegetation is green to prevent any fire from spreading</li> <li>target individual weeds or patches of weeds</li> <li>repeat if re-growth occurs</li> </ul>	<ul style="list-style-type: none"> <li>relatively inexpensive</li> <li>quick, light labour</li> </ul>	<ul style="list-style-type: none"> <li>can only be carried out when the vegetation is green and non-flammable to avoid wildfires</li> </ul>

## Interseeding and Planting

Because many tallgrass remnants are isolated from similar vegetation communities, the potential for natural seed exchange is limited or non-existent. In time, this could mean the death of a small prairie or savanna. However, by manually adding seeds and seedlings we can do what the wind, insects and birds cannot.

Planting and seeding native prairie plants can help to:

- re-introduce species historically found on a particular site,
- increase the population of dwindling species,
- increase the size of the gene pool,
- rejuvenate a degraded site,
- help control the spread of non-native species,
- make a site more burnable,
- fill in sparse or bare areas, or
- enlarge a remnant.

### Obtaining Native Stock

There are several native plant nurseries in Ontario that sell seed and plants derived from local stock. To find the nursery closest to you, contact the Ontario Society for Ecological Restoration and ask for their *Native Plant Resources Guide* (see Helpful Organizations).

Be careful of commercial nurseries that sell “native species” derived from far away areas. It is very important that local or regional seed be used instead of seed from the US or other distant locations. Local seed is best adapted to the climate and soil of a particular region, and thus best able to survive. It also maintains the genetic line. In time, your site may be a source of seed for these nurseries and used in restoration projects within your community.

If you are interested in collecting and propagating your own seed, obtain a copy of *Planting the Seed: A Guide to Establishing Prairie and Meadow Communities in Southern Ontario* (Environment Canada, 2000).



The companion guide *Planting the Seed* describes all of the steps involved in planning and planting a tallgrass prairie. *Cathy Quinlan*

### Interseeding

Interseeding, also called overseeding, is the sowing of seed directly into existing vegetation or turf as opposed to bare ground. The seeds of prairie and woodland species do best when spread among other established plants instead of on bare, plowed fields. You may need to add seed for two or more years since favourable conditions for seed-set, germination, and survival may not occur every year.

To get help in determining the best seed mix for your site, consult *Planting the Seed: A Guide to Establishing Prairie and Meadow* (Environment Canada, 2000) or contact a botanist or staff at a native plant nursery. Come armed with a current inventory and description or photos of your site. Choosing the right mix is dependent upon:

- native species present,
- site conditions (soil moisture and texture, slope aspect, amount of sun, existing vegetation),
- whether the site is a tallgrass prairie or savanna,
- grass-to-flower ratio desired, and
- budget.

Keep in mind some seeds are larger than others and therefore you get fewer per ounce, and some germinate more easily than others. Some remain dormant for a year or more. Some seeds must be cold stratified to mimic a winter and some need to be inoculated in order to germinate. Find out from the nursery whether any treatment is needed before sowing or if they have already undertaken it.

For large, diverse sites, you may need a different seed mix for each different micro-habitat (e.g. wetter areas, slopes).



Seed is mixed with white perlite so that it can be spread more evenly. *Eleanor Heagy*

### How and When to Interseed

There are a few technique you can use to ensure success in interseeding.

- For sites with sparse, open turf, no ground preparation is needed.
- If the vegetation is dense enough to put the ground into deep shade during any part of the growing season, the site needs fire or a low mowing and haying before seeding. The key is to get good seed to soil contact and enough sunlight to ensure germination.
- Don't waste expensive seed in areas that are brushy or thick with aggressive weeds. Control these problems before you seed.
- Seed can be sown in spring or fall or as soon as ripe.
- Mix seed with perlite, a white material of volcanic origin used in gardening, in order to see where seed has been broadcast. Perlite also keeps the seed separate from each other. Mix 1 cup seed (with heads broken up but chaff retained) with 1 cup perlite. If the seed is already cleaned (chaff removed), mix 1 cup seed with 2 to 3 cups perlite.
- One cup of seed mix (seed plus perlite) should cover a 3 m x 3 m area (10 ft x 10 ft). It can be broadcast by hand or by machine.
- For small patches, incorporate the seed into the soil by hand-raking with a long-handled garden rake, cultivator or other tool that breaks up the surface soil to a depth of up to 1 cm (1/2 inch). The soil should be dry enough to crumble. This greatly increases the seed's chances of survival as a seed lying on the surface is likely to be eaten by small animals, or it may sprout, desiccate and die if it does not have good soil contact.
- You can burn in the fall and broadcast seed soon after. The frost and rain will often churn up the bared ground sufficiently to make raking unnecessary. You can also burn in the fall and sow in March immediately after the snow and ice have melted. This is best done on flat ground as the spring rains may wash away seeds on sloping or steep ground.
- To fill in bare patches quickly, plant an aggressive prairie mix (e.g. Canada wild rye, Indian grass, big bluestem, black-eyed Susan, grey-headed coneflower). These species germinate relatively quickly and are better able to compete with weeds. Once these species are growing well, introduce more delicate or expensive seeds later on.
- You can use a cool season cover crop (e.g. annual oats) to help suppress weeds and retain moisture for the delicate new seedlings. Annual grains do not usually grow the second year so will not compete with the native species. The seeds can be sown at the same time as the native seeds.
- Newly seeded areas can be burned along with the established prairie the next year.



Seed is broadcast by hand over bare patches of a prairie, then lightly raked. *Eleanor Heagy*

### Planting Plugs and Potted Plants

Seeds are the most affordable way of adding plant diversity to your site. However, if your budget allows and the site is relatively small, you can plant plugs or potted prairie plants. This is especially effective for plants that are hard to grow from seed in the field or are rare and expensive. These plants can be purchased from a native plant nursery or grown at home from your own seed.

The plants can be planted in bare spots amongst the established prairie plants with a shovel or trowel as you would in your garden. The young plants will need to be watered for at least three weeks or until the roots are well established.



A wildflower plug is planted between established plants with a garden trowel. *Cathy Quinlan*

### Enlarging your Remnant

Small remnant prairies and savannas usually have fewer species and are more threatened by weeds and disturbances than large sites. Enlarging a remnant or creating a connection to another nearby remnant is an excellent way of ensuring the long term survival of this rare plant community.

Landowners can enlarge their remnant by retiring farmland or other land adjacent to or around the remnant and seeding or planting appropriate prairie/savanna plants into it. The companion guide, *Planting the Seed* (Environment Canada, 2000), describes all of the steps involved in creating a prairie from a bare field. It is your best resource for this type of work.

It is best to expand your remnant on land immediately adjacent to the prairie or savanna. In many cases, the adjacent fields were once prairie or savanna before they were converted. Native seeds and roots may still be in the soil. Old photographs, journals or documents from previous owners of the property may make reference to the original extent of the prairie/savanna.

If it is not possible to plant adjacent to your remnant, choose land that is similar in terms of soil, slope and drainage to that of the existing prairie/savanna. It may be most cost-effective to choose marginal land such as along watercourses, road allowances, utility easements, steep slopes, small and/or odd shaped areas too awkward for cultivation, etc.

Before planting or seeding onto farmland, it is a good idea to create shallow scrapings to provide a niche for wet prairie plants. Farm fields are often extremely flat after decades of tillage and some gentle

scrapings will recreate the original variation in the topography. Choose areas that are already a little low, where water pools during heavy rainfalls or select areas randomly. With a shovel or backhoe, create depressions of 10 - 20 cm deep and 1 - 2 metres across. Seed or plant these low areas with a separate seed mix containing wet prairie species such as dense blazing-star, ironweed, culver's-root, prairie cord-grass, sedges, etc.

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## Restoration of Natural Drainage

In some cases, farm drainage has been installed near or under a prairie/savanna remnant, especially wet prairies. Farm crops benefit from drainage but native plants and trees are harmed by the lowering of the water table. Naturally occurring damp areas promote a diversity of habitats for a wider variety of prairie species, both plant and animal.

To restore the prairie or to expand the site, drainage tiles need to be removed or plugged and disabled.

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### Removing Buried Tiles

If you are uncertain about the existence or location of buried tiles on your land, check with your local municipal office or drainage superintendent for the tile history of your land.

Hire a contractor to find the tile outlets and dig out at least 10 metres of the tile back from the outlet and fill the trench. A trencher is most useful as it minimizes soil disturbance. Simply blocking the outlet of an existing tile drain is inadequate as water pressure will build in the tile bed and blow out the plug, perhaps resulting in an erosion problem.

Once the artificial drainage is removed, wet areas will be created, especially at the end of tile runs that were not removed. The water table will also be raised throughout. Moisture-loving prairie plants such as dense blazing-star, culver's root, ironweeds and sedges may establish themselves or can be seeded or planted in.



A trencher can install and remove buried field tiles. *Brad Glasman*

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### Open Drains

Open drains drop the water table and allow phragmites and other invasive plants to spread. If an open drain passes through a wet prairie, it should be diverted into a large underground culvert (e.g. buried) and the land levelled off over it and re-seeded. This is a costly venture, however, and probably only feasible for very high profile sites.

## Chapter 5. Economic Ventures and Human Use Issues

Your prairie or savanna remnant can be a quiet place to unwind, admire the flowers, or listen to the birds and insects. It can also provide some economic return through hunting, seed collection and honey production. The choice is yours. This chapter outlines some of the economic ventures you may wish to enter into and other human use issues.

### Hunting

Responsible hunting is a sustainable activity in most natural areas. It can provide meat for the landowner or an income in the form of fees charged to hunters. All hunters must obtain a hunting permit from the Ontario Ministry of Natural Resources. Some landowners prefer to allow only bow hunting while others permit rifle or shotgun hunting as well. In wetland areas, non-lead shot should be used due to the risk of lead poisoning of waterfowl.

Hunting can also help control the population of overabundant animals (e.g. deer). In many parts of Ontario, especially the southwest, there are no large carnivores to keep the prey animals in balance.

The killing of predators such as coyotes is strongly discouraged. Coyotes, a native of prairie grasslands, are opportunistic feeders that consume a variety of foods including small mammals, carrion, fruits and vegetable matter. They may also prey on larger wildlife such as white-tailed deer. As top-level predators, coyotes play an important role in regulating the population of other species in the food chain.

### Selling Seed

The market for native tallgrass prairie seed is growing in Ontario. Many gardeners are choosing native plants for their beauty and hardiness. Tallgrass prairie plants are also in demand from landscapers and restorationists who use the plants in naturalizing utility corridors, marginal farm land, river buffers, parkland and other places. Contact your local native plant nursery to inquire about the feasibility of selling seed from your remnant. Care must be taken when collecting seed to ensure the prairie is not depleted of seed.



Seed collecting in late summer. *P. Allen Woodliffe*

### Honey Production

Prairie flowers can be used as a summer nectar source for honeybees. Some plants that serve well as nectar sources include prairie coreopsis, pale purple coneflower, blazing stars, and goldenrods. Contact your local apiary or honey producer to discuss the feasibility of renting your prairie or savanna as a summer nectar source.



Honey bees use prairie flowers as a summer nectar source. *Jeremy McNeil*

## ATV's and Trespass Issues

Trespassers are a concern for many property owners, especially owners of natural areas. One of the most common forms of trespassing is by ATV (All Terrain Vehicle). These machines can cause serious damage to the prairie/savanna. ATV's can create a destructive network of trails that dissect the habitat and allow weeds to invade, cause erosion, and disturb wildlife. Other trespassers may poach wildlife and rare plants, hold bush parties, cut trees, etc.

What can you do to limit the damage of trespassers?

- Post your property with “No trespassing” signs.
- Ensure fences are in good repair.
- Encourage neighbours or legal users of your property to report any unauthorized use of your property.
- Patrol your property during weekends and evenings when trespassers are most likely to be found.
- Report trespassers (license plates) to police and follow through with prosecutions to discourage others.
- Obtain a copy of *This Land is Whose Land? A legal guide to property protection rights* (Ministry of the Attorney General, 1987).



Posting your property if the first line of defence against trespassing. *Bill Mackie*



## Chapter 6. Protection & Conservation Options

Tallgrass habitats survive in this province because landowners choose to leave part or all of their property in a natural state. The landowner tradition of taking pride in the land ensures there is a legacy to leave for future generations.

Many landowners value the tallgrass prairie or savanna on their property and intend to conserve it for as long as they own the land. Some want to take steps to ensure the habitat is conserved for all time, while some prefer to leave the responsibility of habitat management to others.

There are many legal tools that can be used to protect your prairie or savanna for future generations and/or ease the financial burden of ownership. This chapter describes some of the options open to landowners of important habitats.



The Dutton Prairie is leased from the railroad company by the West Elgin Nature Club.

*Bill Mackie*

### Conservation Easements and Agreements

If you are looking for a more permanent type of protection for your natural area, conservation easements or agreements may be the best option. A conservation easement is a legal written agreement between a property owner and a conservation organization such as a land trust, that conserves the land by placing restrictions on its use. It assures the landowner that their property will remain in a natural state without giving up use and enjoyment of the

land. The agreement is registered on the title of the land for 999 years and is binding on future owners.

Conditions of the agreement are tailored to the particular property. Interests of the landowner and the conservation agency that holds the easement are agreed upon prior to a formal agreement. Both parties monitor the agreement to ensure the terms are maintained.

Granting an easement can also yield tax savings. If the conservation agreement is donated in perpetuity, Revenue Canada views it as a charitable gift. The grantor of a conservation agreement receives a tax benefit which may be used at the time of the donation or extended over five years.

Either the landowner or a conservation agency can initiate discussions about a conservation agreement. Agencies able to hold conservation agreements include:

- Nature Conservancy of Canada,
- Ontario Heritage Foundation,
- Municipalities,
- Ontario Land Trusts,
- Naturalist Clubs,
- Conservation Authorities, and
- Ducks Unlimited Canada.

### Leasing

Leasing the tallgrass portion of a property to a naturalist group or another conservation organization is a good option for landowners who do not want to deal with management issues, yet want to maintain ownership. Naturalist groups may be interested in maintaining the habitat through burns or mowing and, in return, are allowed to visit the area or collect small amounts of seed. They may even conduct inventories and provide the owner with a list of plants and animals present. Generally, the lease is for a nominal sum as the conservation group is providing many in-kind management services. Most groups carry liability insurance, but it is a good idea to explore personal liability ramifications in connection with leasing or permitting others to use your land.

## Sale

In exceptional cases, high quality sites are sometimes considered for purchase by conservation organizations such as the Nature Conservancy of Canada, local land trusts, or other environmental/stewardship groups. These groups may be prepared to raise funds to purchase the most significant properties at fair market value. Landowners interested in selling their properties to conservation organizations should contact Tallgrass Ontario or the Nature Conservancy of Canada for more information.

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## Donation

A landowner can voluntarily donate land to a conservation agency, either during his or her lifetime or after death in a will. Several organizations in Ontario accept land donations including those listed under Conservation Easements above.

Lands that qualify as ecologically sensitive are eligible under the federal government's Ecological Gifts Program. Under the program, individuals receive a federal tax credit for the value of the land donated and corporations receive a deduction. For more information, contact Environment Canada, Ecological Gifts Program (see Helpful Organizations at the back of the guide.)



**Great Spangled Fritillary on Wild Bergamot**  
*Rosemary Scott*

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## Helpful Organizations

### County Stewardship Councils

Provincial Coordinator: Tel: 705-755-3278  
[www.ontariostewardship.org](http://www.ontariostewardship.org)  
 Call your regional Ontario Ministry of Natural Resources office for contact information (see below).

### Environment Canada

Ecological Gifts Program  
 Canadian Wildlife Service  
 ECB-OR, CSD  
 4905 Dufferin St.  
 Downsview, ON M3H 5T4  
 Tel: (416) 739-5828 or 739-4286  
 Fax: (416) 739-5845  
 Website: [www.cws-scf.ec.gc.ca/ecogifts](http://www.cws-scf.ec.gc.ca/ecogifts)

### Lands and Forests Consulting and Fred Bruin

**Consulting** (Prescribed Burn Consultants)  
 136255 Grey Road #40  
 Box 10, Desboro, ON N0H 1K0  
 Tel: (519) 794-9992 Fax: (519) 794-9996  
 Email: [trees@bmts.com](mailto:trees@bmts.com)  
 Website: [www.landsandforests.com](http://www.landsandforests.com)

### North American Native Plant Society

P.O. Box 84, Station D.  
 Etobicoke, ON M9A 4X1  
 Website: [www.nanps.org](http://www.nanps.org)

### Ontario Ministry of Natural Resources

General Inquiry - Tel: 1-800-667-1940  
 Web Site: [www.mnr.gov.on.ca](http://www.mnr.gov.on.ca)

#### District Offices:

Bancroft: (613) 332-3940  
 Parry Sound: (705) 746-4201  
 Pembroke: (613) 732-3661  
 Aylmer: (519) 773-9241  
 Guelph: (519) 826-4955  
 Kemptville: (613) 258-8204  
 Aurora: (905) 713-7400  
 Peterborough: (705) 755-2001  
 Midhurst: (705) 725-7500

### Ontario Ministry of Natural Resources Fire

**Service:**  
<http://affm.mnr.gov.on.ca/spectrasites/internet/affm.fire.cfm>

### Ontario Nature (formerly Federation of Ontario Naturalists)

355 Lesmill Road, Toronto ON M3B 2W8  
 Tel: (416) 444-8419  
 Fax: (416) 444-9866 or 1-800-440-2366  
 Email: [info@ontarionature.org](mailto:info@ontarionature.org)  
 Website: [www.ontarionature.org](http://www.ontarionature.org)  
 Local member clubs:  
[www.ontarionature.org/network/allseasons.html](http://www.ontarionature.org/network/allseasons.html)

### Society for Ecological Restoration, Ontario Chapter

c/o Centre of Environmental Training  
 Niagara College, Glendale Campus  
 135 Taylor Road  
 R.R. 4, Niagara-on-the-Lake, ON L0S 1J0  
 Tel: (905) 641-2252 x 6494  
 Email: [info@serontario.org](mailto:info@serontario.org)  
 Website: [www.serontario.org](http://www.serontario.org)

### Tallgrass Ontario

*London Office:*  
 659 Exeter Road, London, Ontario N6E 1L3  
 Tel: (519) 873-4631 Fax: (519) 873-4645  
*Field Office:*  
 120 Main Street East, Ridgetown, ON N0P 2C0  
 Tel: (519) 674-1543  
 Web Site: [www.tallgrassontario.org](http://www.tallgrassontario.org)  
 Email: [info@tallgrassontario.org](mailto:info@tallgrassontario.org)

### Wetland Habitat Fund

c/o Wildlife Habitat Canada  
 1750 Courtwood Crescent, Suite 310  
 Ottawa, ON K2C 2B5  
 Tel: (613) 722-2090 x 252 Fax: (613) 722-3318  
 Email: [mstabb@wetlandfund.com](mailto:mstabb@wetlandfund.com)  
 Website: <http://www.wetlandfund.com/>



## Glossary of Terms

**Competition** - The process whereby plants contend for limited space, light, nutrients and water. Some species are more successful at competing for these resources than others. Less successful species eventually disappear from a site.

**Cool Season** - Describes a plant that achieves most of its growth early in the growing season, and then later in the cool fall season.

**Drainage** - the flow or retention of water in soil.

**Forb** - A specialized term for any non-grassy herbaceous plant. Used particularly for broad-leaved plants of prairies.

**Habitat** - The place where a plant or animal lives.

**Herbaceous** - Describes an annual, biennial or perennial plant that is not woody and dies back at the end of the growing season.

**Invasive plant** - A plant that reproduces so aggressively that it displaces other plant species in the area.

**Meadow** - An open, mostly treeless ecosystem dominated by wildflowers such as goldenrods and Queen Anne's lace. A successional or transitional community formed as a result of disturbance that will eventually succeed or mature into scrubland and forest

**Naturalization** - Any effort to convert managed landscapes such as lawns or farm fields to more natural and naturally evolving landscapes. The effort can entail active planting of native species and/or simply ceasing the management practices (e.g. stop lawn mowing and allow plants to move in on their own).

**Non-Native Species** - Species that do not naturally occur in an area, but have arrived directly or indirectly as a result of human efforts. Also known as alien species.

**Old Fields** - Former agricultural lands that are no longer pastured or cultivated and that are dominated by early successional wildflowers such as asters and goldenrod species (e.g. meadow species).

**Plug** - A seedling plant growing in a cylinder of soil, with roots fully formed and some top growth (unless dormant). Plugs are grown individually in separate cells in a tray. Trays vary in depth, size and number of cells.

**Prairies** - Open, mostly treeless ecosystems dominated by native grasses on deep or arid soils. A mature, climax community maintained by disturbance (e.g. fire, grazing).

**Prescribed Burn** - A carefully planned and authorized controlled fire.

**Remnant Prairie or Savanna** - A small patch of native grassland in an area dominated by non-native vegetation, cropland or urban development.

**Restoration** - The human process of rebuilding or reviving a native plant community where it has been degraded, altered or destroyed.

**Savanna** - Natural area dominated by prairie grasses and forbs (flowers) with scattered trees, mostly oak species.

**Sedge** - A grass-like herbaceous plant having stems that are triangular in cross-section; found mainly in damp and marshy habitats.

**Stewardship** - The process and attitude of taking responsibility for fostering a healthy environment and for passing such an environment on to future generations. Stewardship is an especially important aspect of landownership.

**Succession** - The natural process of change that occurs in an area over time as one community of living organisms replaces another. For example, a piece of bare ground succeeds into a meadow, then shrubland and eventually a climax or mature forest.

**Warm Season** - Describes a plant that starts its growth relatively late in the spring, after the soil has warmed up, and typically remains active even through dry periods of the summer.

**Weed** - A plant out of place or where it is not wanted.

**Wildlife** - Term for all wild living animals and plants.

**Woody Plant** - Includes shrubs, vines and trees that go dormant in the winter and regrow in the spring.

## Appendix



## List of some rare and characteristic species associated with tallgrass prairie and savanna in Ontario

(See end of table for definitions)

### Trees, Shrubs and Vines

Scientific Name	Common Name	Srank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<i>Amelanchier alnifolia</i> var. <i>humilis</i>	low shadbush	S4			1,3,5,Sa	P,S
<i>Carya laciniosa</i>	big shellbark hickory	S3			1,3,5-6,11,Sa,L,Si,C	S
<i>Carya ovalis</i>	sweet pignut hickory	S3			1,3,5-6,Sa	P,S
<i>Ceanothus americanus</i>	New Jersey tea	S4			1,3,5-6,8,Sa,L	P,S
<i>Ceanothus herbaceus</i>	Prairie Redroot	S4			1,3,5-6,8,Sa	P,S
<i>Celtis tenuifolia</i>	dwarf hackberry	S2	THR	THR	1,3,5-6,Sa	P,S
<i>Gleditsia triacanthos</i>	honey locust	S2			3?,5-6,11,Sa,L,Si,C	P
<i>Hypericum gentianoides</i>	orange-grass St. John's-wort	S1			1,3,5,Sa	P
<i>Hypericum prolificum</i>	shrubby St. John's-wort	S2			1,3,6,Sa	S
<i>Myrica pensylvanica</i>	bayberry	S1			1,3,5-6,11,Sa,Si?	S
<i>Prunus pumila</i>	Sand cherry	S4S5			1,3,5,Sa	P,S
<i>Prunus pumila</i> var. <i>besseyi</i>	Bessey's plum	S1			1,3,5,Sa	S
<i>Quercus ellipsoidalls</i>	northern pin oak	S3			1,3,5,Sa	P,S
<i>Quercus palustris</i>	pin oak	S3			1,3,5-6,11,Sa,L,Si,C	P,S
<i>Quercus prinoides</i>	dwarf chinquapin oak	S2			1,3,5,Sa	P,S
<i>Quercus velutina</i>	black oak	S4			1,3,5,Sa	S
<i>Rhus aromatica</i>	fragrant sumac	S5			1,3,5,Sa	P,S
<i>Rhus copallina</i>	winged sumac	S3S4			1,3,5,Sa	P,S
<i>Rosa setigera</i>	climbing prairie rose	S3	SC	SC	1,5,Sa,L,Si,C	P,S
<i>Smilax ecirrhata</i>	upright greenbrier	S3?			1,3,6,11?,Sa,L	S
<i>Smilax illinoensis</i>	Illinois greenbrier	S2?			1,3,6,11?,Sa,L	S



### Wildflowers and Herbaceous Plants

Scientific Name	Common Name	Srank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<i>Agalinis gattingeri</i>	round-stemmed purple false foxglove	S1	END		1,3,4,Sa	P
<i>Agalinis skinneriana</i>	pale purple false foxglove	S2	END		1,3,4,Sa	P,S?
<i>Agrimonia parviflora</i>	swamp agrimony	S3S4			1,3,5-6,Sa,Si?	P,S
<i>Aletris farinosa</i>	colic root	S2	THR	THR	1,3,5,Sa	P
<i>Allium cernuum</i>	nodding wild onion	S2			1,5,SA,L	P
<i>Amorpha canescens</i>	leadplant	SH			1,3?,5-6,8,Sa	P
<i>Anemone cylindrica</i>	thimbleweed	S4			1,3,5,Sa	P,S
<i>Anemonella thalictroides</i>	rue anemone	S3			1,6-7,Sa	S
<i>Arenaria stricta</i>	rock sandwort	S5			1,3,5,Sa	P,S
<i>Asclepias hirtella</i>	tall green milkweed	S1			1,3,5,Sa	P
<i>Asclepias purpurascens</i>	purple milkweed	S2			1,3,5,Sa	P,S
<i>Asclepias sullivantii</i>	prairie milkweed	S2			1,3,5,+ 11,Sa	P
<i>Asclepias tuberosa</i>	butterfly-weed	S4			1,3,5,Sa	P,S
<i>Asclepias verticillata</i>	whorled milkweed	S2			1,3,5-6,Sa,L	P,S
<i>Asclepias viridiflora</i>	green milkweed	S2			1,3,5,Sa	P,S
<i>Aster dumosus</i>	bushy aster	S2			1,3,5,11,Sa	P
<i>Aster laevis</i>	smooth aster	S5			1,3,5-6,Sa,L	P,S
<i>Aster oolentangiensis</i>	sky-blue aster	S4			1,3,5,Sa,L	P,S
<i>Aster praealtus</i>	willow aster	S2			1,3,5,Sa	P,S
<i>Aster shortii</i>	Short's aster	S2			1,3,5,Sa,L	P,S
<i>Aureolaria flava</i>	smooth yellow false foxglove	S3			1,3,6,9,Sa	S
<i>Aureolaria pedicularia</i>	fernleaf yellow false foxglove	S3			1,3,6,9,Sa	S
<i>Aureolaria virginica</i>	downy yellow false foxglove	S1			1,3,6,9,Sa	S
<i>Baptisia tinctoria</i>	yellow wild indigo	S2			1,3,5-6,Sa	P,S
<i>Blephilia ciliata</i>	downy woodmint	S1			1,3,5-6,Sa,L	P
<i>Bulbostylis capillaris</i>	hair-like bulbostylis	S3?			3,5,11,Sa	P
<i>Castilleja coccinea</i>	scarlet paint-brush	S5			1,5,9,11,Sa,L	P,S
<i>Chenopodium foggii</i>	Foggs' goosefoot	S2			3,5-6,Sa	S
<i>Cirsium discolor</i>	prairie thistle	S4			1,3,5-6,Sa	P,S
<i>Cirsium hillii</i>	prairie thistle	S3			1,3,5-6,Sa	S
<i>Comandra umbellata</i>	bastard toadflax	S5			1,3,5-6,Sa,L	P,S
<i>Coreopsis tripteris</i>	tall coreopsis	S2			1,3,5-6,Sa,L	P,S
<i>Cypripedium candidum</i>	small white lady's slipper	S1	END	END	1,4?,5,8,11,Sa,O	P
<i>Desmodium canadense</i>	showy tick trefoil	S4			1,3,5-6,Sa,L	P,S
<i>Desmodium canescens</i>	hoary tick-trefoil	S2			1,3,5-6,Sa	P,S
<i>Desmodium cuspidatum</i>	bracted tick-trefoil	S3			1,3,5-6,Sa,L	P,S
<i>Desmodium dillenil</i>	tick trefoil	S4			1,3,5,Sa	P
<i>Desmodium rotundifolium</i>	round-leaved tick-trefoil	S2			1,3,5-6,Sa	S
<i>Echinacea pallida</i>	pale purple coneflower	S1			1,3,5,Sa	P
<i>Erigeron pulchellus</i>	Robin's plantain	S5			1,3,5-6,Sa	P,S
<i>Eupatorium purpureum</i>	purple-jointed joe pye weed	S3			1,3,6,Sa	S
<i>Euphorbia corollata</i>	flowering spurge	S4			1,3,5,Sa,L	P,S
<i>Euthamia gymnospermoides</i>	Great Plains flat-topped goldenrod	S1			1,3,5-6,11,Sa	P
<i>Fimbristylis puberula</i>	hairy fimbriatylis	S1			1,3,5,11,Sa	P
<i>Frasera caroliniensis</i>	American columbo	S2	SC	SC	1,3,5-6,Sa	P,S
<i>Gallum pilosum</i>	hairy bedstraw	S3			1,3,6,Sa	S
<i>Gaura biennis</i>	biennial gaura	S2			1,3,5-6,Sa	P,S



## Wildflowers and Herbaceous Plants (continued)

Scientific Name	Common Name	Rank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<i>Gentiana alba</i>	white prairie gentian	S1	END	END	1,3,6,8,Sa	S
<i>Gentiana puberulenta</i>	downy gentian	SX			1,3,5,8,Sa	P,S
<i>Gentiana quinquefolia</i>	stiff gentian	S2			1,5,6,8,Sa,Si	P,S
<i>Geum triflorum</i>	prairie smoke	S4			1,3,5,Sa	P,S
<i>Helianthemum bicknellii</i>	Bicknell's rock-rose	S4			1,3,5,Sa	P,S
<i>Helianthemum canadense</i>	rock rose	S4			1,3,5,Sa	P,S
<i>Helianthus decapetalus</i>	thin-leaved sunflower	S5			1,3,6,Sa	S
<i>Helianthus divaricatus</i>	woodland sunflower	S5			1,3,5-6,Sa	P,S
<i>Helianthus strumosus</i>	pale-leaved wood sunflower	S5			1,3,5-6,Sa	P,S
<i>Hieracium venosum</i>	rattlesnake hawkweed	S2			1,3,6,Sa	S
<i>Houstonia longifolia</i>	bluets	S4?			1,3,5-6,Sa	P,S
<i>Hypericum gentianoides</i>	orange-grass St. John's-wort	S1			1,3,5,Sa	P
<i>Hypoxis hirsuta</i>	yellow star-grass?	S3			1,5-6,Sa	P,S
<i>Krigia biflora</i>	two-flowered cynthia	S2			1,3,5,Sa	S
<i>Lechea intermedia</i>	pinweed	S4			1,3,5,Sa	P,S
<i>Lechea pulchella</i>	pretty pinweed	S1			1,3,5,Sa	S
<i>Lechea villosa</i>	hairy pinweed	S3			1,3,5,Sa	S
<i>Lespedeza capitata</i>	round-headed bush-clover	S4			1,3,5,Sa	P,S
<i>Lespedeza hirta</i>	hairy bush-clover	S4			1,3,5,Sa,L	P,S
<i>Lespedeza intermedia</i>	wand-like bush-clover	S4			1,3,5,Sa	P,S
<i>Lespedeza virginica</i>	slender bush-clover	S1	END		1,3,5-6,Sa	S
<i>Liatris aspera</i>	rough blazing-star	S2			1,3,5-6,Sa	P,S
<i>Liatris cylindracea</i>	cylindrical blazing-star	S3			1,3,5-6,Sa	P,S
<i>Liatris spicata</i>	dense blazing-star	S2	THR	THR	1,3,5-6,Sa,L	P
<i>Linum sulcatum</i>	grooved yellow flax	S3			1,3,5,Sa	P,S
<i>Linum virginianum</i>	slender yellow flax	S2			1,3,5,Sa	S
<i>Liparis liliifolia</i>	purple twayblade	S2	END	END	1,3,5-6,Sa	S
<i>Lithospermum canescens</i>	hoary puccoon	S3?			1,3,5-6,Sa	P,S
<i>Lithospermum incisum</i>	fringed puccoon	S1			1,3,5,Sa	P
<i>Lobelia spicata</i>	pale-spike lobelia	S4			1,3,5,Sa	P,S
<i>Ludwigia alternifolia</i>	seedbox	S1			1,3,5,11,Sa	P
<i>Ludwigia polycarpa</i>	many-fruited false-loosestrife	S2			1,3,5,11,Sa,L	P
<i>Lupinus perennis</i>	wild lupine	S3			1,3,16,10,Sa	S
<i>Lycopus virginicus</i>	Virginia bugleweed	S2			1,3,6-7?,11,Sa?,L,Si,C?	P
<i>Lysimachia quadrifolia</i>	whorled loosestrife	S4			1,3,5-6,Sa	P,S
<i>Lysimachia quadriflora</i>	prairie loosestrife	S4			1,3,5,11,Sa	P,S
<i>Lythrum alatum</i>	winged loosestrife	S3			1,3,5,11,Sa	P
<i>Monarda fistulosa</i>	wild bergamot	S5			1,3,5-6,Sa,L	P,S
<i>Monarda punctata</i>	spotted bee-balm	S1			1,3,5,Sa	P,S
<i>Muhlenbergia richardsonis</i>	soft-leaf muhly	S2			1,3,5,11,Sa	P
<i>Oenothera clelandii</i>	sand evening-primrose	S1			1,3,5,Sa	P,S
<i>Oxypolis rigidior</i>	stiff cowbane	S2			1,6-7,11,Sa,L,Si,C	P,S
<i>Paspalum setaceum</i>	slender paspalum	S2			1,3,5,Sa	P,S
<i>Penstemon hirsutus</i>	hairy beardtongue	S4			1,3,5,Sa	P,S
<i>Phlox subulata</i>	moss phlox	S1?			1,3,5,Sa	S
<i>Platanthera leucophaea</i>	eastern prairie fringed orchid	S2	END	END	1,5,8,10,11,Sa,O	P
<i>Polygala incarnata</i>	pink milkwort	S1	END	END	1,3,5,11,Sa	P
<i>Polygala polygama</i>	racemed milkwort	S4			1,3,5-6,Sa	P,S
<i>Polygala senega</i>	seneca snakeroot	S4			1,3,6,Sa	P,S

## Wildflowers and Herbaceous Plants (continued)

Scientific Name	Common Name	Strank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<i>Polygala verticillata</i>	whorled milkwort	S4			1,3,5,Sa	P,S
<i>Polygonum tenue</i>	knotweed	S2			1,3,5,Sa	P,S
<i>Potentilla arguta</i>	prairie cinquefoil	S4			1,3,5,Sa,L	P,S
<i>Pteridium aquilinum</i>	bracken fern	S5				S
<i>Pycnanthemum tenuifolium</i>	slender mountain-mint	S3			1,3,5,Sa	S
<i>Pycnanthemum verticillatum</i> var. <i>pilosum</i>	hairy mountain-mint	S1			1,3,5,Sa	S
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint	S4			1,3,5-6,11,Sa,L,Si,C	P,S
<i>Ranunculus fascicularis</i>	early buttercup	S4			1,3,5-6,Sa	S
<i>Ranunculus hispidus</i> var. <i>hispidus</i>	bristly buttercup	S3			1,3,5-6,Sa	S
<i>Ranunculus rhomboideus</i>	prairie buttercup	S3			1,3,5-6,Sa	P,S
<i>Ratibida pinnata</i>	gray-headed coneflower	S2S3			1,3,5-6,Sa	P
<i>Rotala ramosior</i>	toothcup	S1			1,3,5,11,Sa	P
<i>Scutellaria parvula</i> var. <i>leonardii</i>	Leonard's small skullcap	S1			1,3,5,Sa	P
<i>Senecio plattensis</i>	prairie ragwort	S2S3			1,3,5-6,Sa	S
<i>Sliphium laciniatum</i>	compass plant	S1			1,3,5,Sa	P
<i>Silphium terebinthinaceum</i>	prairie dock	S1			1,3,5,11,Sa	P,S
<i>Sisyrinchium albidum</i>	white blue-eyed grass	S1			1,3,5,11,Sa	P,S
<i>Solidago ohioensis</i>	Ohio goldenrod	S4			1,3,5,11,Sa,L	P,S
<i>Solidago ptarmicoides</i>	upland white aster	S5			1,3,5,Sa	P,S
<i>Solidago riddellii</i>	Ridell's goldenrod	S3			1,3,5,11?,Sa,L	P
<i>Solidago rigida</i> ssp. <i>Rigida</i>	stiff goldenrod	S3			1,3,5,Sa,Li,L	P
<i>Solidago speciosa</i>	showy goldenrod	S1			1,3,5,Sa	P,S
<i>Spiranthes/lacera</i> var. <i>gracilis</i>	southern slender ladies' tresses	S1			1,3,5,8,11,Sa	P,S
<i>Spiranthes magnicamporum</i>	Great Plains ladies' tresses	S3			1,3,5,8,11,Sa	P,S
<i>Spiranthes ochroleuca</i>	yellow ladies' tresses	S2			1,3,5,8,11,Sa	S
<i>Spiranthese ovalis</i>	oval ladies' tresses	S1			1,3,5,8,11,Sa	P,S
<i>Strophostyles helvula</i>	trailing wild bean	S3			1,3,5,Sa	S
<i>Tephrosia virginiana</i>	Virginia goat's-rue	S1	END	END	1,3,5-6,Sa	S
<i>Thalictrum revolutum</i>	waxy meadow-rue	S2			1,3,5-6,11,Sa,L,Si,C	P,S
<i>Tradescantia ohioensis</i>	Ohio spiderwort	S2			1,3,5-6,11,Sa	P,S
<i>Trichostema dichotomum</i>	forked blue curis	S1			1,3,5-6,Sa	S
<i>Valeriana edulis</i>	hairy valerian	S1			1,3,5,Sa	P
<i>Vernonia missurica</i>	Missouri ironweed	S3			1,3,5-6,Sa,L,Si,C	P,S
<i>Veronicastrum virginicum</i>	culver's-root	S2			1,3,5-6,Sa,L	P,S
<i>Vicia caroliniana</i>	wood vetch	S2			1,3,6,Sa	S
<i>Viola palmata</i> var. <i>dilatata</i>	cleft violet	S2			1,3,6,Sa	S
<i>Viola pedata</i>	bird's-foot violet	S1	END	END	1,3,5,Sa	S
<i>Viola pedatifida</i>	prairie violet	S1			1,3,5,Sa	S
<i>Viola sagittata</i>	arrow-leaved violet	S4			1,3,5,Sa	P,S
<i>Vulpia octoflora</i>	slender eight-flowered fescue	S2			1,3,5,Sa	S
<i>Zigadenus glaucus</i>	death camass	S4			1,3,5,Sa	P,S

## Grasses, Sedges and Rushes

Scientific Name	Common Name	Strank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<i>Andropogon gerardii</i>	big bluestem	S4			1,3,5,Sa,L	P,S
<i>Andropogon virginicus</i>	broom sedge	S4			1,3,5,Sa	P
<i>Aristida longespica</i> var. <i>geniculata</i>	three-awn grass	S2			1,3,5, + 11,Sa	P
<i>Aristida longespica</i> var. <i>longespica</i>	three-awn grass	S2			1,3,5, + 11,Sa	P?
<i>Arisidida purpurascens</i>	arrow feather three-awn grass	S1			1,3,5,Sa,	P
<i>Bouteloua curtipendula</i>	side-oats grama	S2			1,3,5,Sa,L	P,S
<i>Bromus kalmii</i>	Kalm's brome grass	S4			1,3,5,Sa	P,S
<i>Calamovilfa longifolia</i>	sand reed	S3			1,3,5,Sa	P,S
<i>Carex albicans</i> var. <i>albicans</i>	blunt-scaled oak sedge	S2			1,3,5-6,Sa,L	S
<i>Carex bicknellii</i>	Bicknell's sedge	S2			1,3,5,Sa,L	P
<i>Carex conoidea</i>	prairie gray sedge	S3			1,3,5,11,Sa	P
<i>Carex inops</i>	sun sedge	S1			1,3,5,Sa	S
<i>Carex meadii</i>	Mead's stiff sedge	S2			1,3,5,11,Sa,L	P
<i>Carex mesochorea</i>	midland bracted sedge	S1			1,3,5,Sa	P
<i>Carex nigromarginata</i>	black-edged sedge	S1			1,3,6?,Sa	S
<i>Carex richardsonii</i>	Richardson's sedge	S4?			1,3,5,Sa	P,S
<i>Carex sartwellii</i>	Sartwell's sedge	S4			1,3,5,11,Sa,L	P
<i>Carex siccata</i>	hay sedge	S5			1,3,5,Sa	P,S
<i>Carex suberecta</i>	wedge-fruited oval sedge	S2			1,3,5,11,Sa	P
<i>Carex swanii</i>	downy green sedge	S3			1,3,6,Sa	P
<i>Carex tetanica</i>	common stiff sedge	S3			1,3,5,11,Sa	P
<i>Cyperus flavescens</i>	yellow flat sedge	S2			1,3,5,11,Sa	P
<i>Cyperus lupulinus</i>	umbrella-sedge	S4			1,3,5,Sa	P,S
<i>Digitaria cognata</i>	fall witch grass	S1			1,3,5,Sa	P
<i>Elymus canadensis</i>	Canada wild-rye	S4S5			1,3,5,Sa,L	P,S
<i>Equisetum laevigatum</i>	smooth scouring-rush	S4			1,3,5,Sa	P,S
<i>Eragrostis capillaris</i>	lace grass	S1			1,3,5,Sa	S
<i>Eragrostis spectabilis</i>	purple love grass	S2			1,3,5,Sa	P,S
<i>Euthamia gymnospermoides</i>	Viscid bushy golden-rod	S1			1,3,5-6,11,Sa	P
<i>Fimbristylis puberula</i>	hairy fimbristylis	S1			1,3,5,11,Sa	P
<i>Juncus acuminatus</i>	sharp-fruit rush	S3			1,3,5,11?,Sa	S
<i>Juncus biflorus</i>	two-flowered rush	S1			1,3,5,Sa	P
<i>Juncus brachycarpus</i>	short-fruited rush	S1			1,3,5,11,Sa	P
<i>Juncus greenei</i>	Greene's rush	S3			1,3,5,Sa	P
<i>Juncus marginatus</i>	grass-leaved rush	S2			1,3,5,11,Sa	S
<i>Koeleria macrantha</i>	June grass	S2			1,3,5,Sa	P,S
<i>Muhlenbergia richardsonia</i>	soft-leaf muhly	S2				
<i>Panicum dichotomum</i>	forked panic grass	S2			1,3,6,Sa	S
<i>Panicum leibergii</i> var. <i>leibergii</i>	Leiberg's Panic Grass	S1			1,3,5,Sa	P
<i>Panicum meridionale</i>	mat panic grass	S1			1,3,5,Sa	S
<i>Panicum oligoanthes</i>	Scribner's panic grass	S4			1,3,5,Sa	P,S
<i>Panicum perlongum</i>	long-stalked panic grass	S1S2			1,3,5,Sa	S
<i>Panicum rigidulum</i>	redtop panic grass	S2S3			1,3,5,11,Sa	P
<i>Panicum sphaerocarpon</i> var. <i>sphaerocarpon</i>	round-fruited panic grass	S3			1,3,5,Sa	P,S
<i>Panicum villosissimum</i>	white-haired panic grass	S3			1,3,5,Sa	P,S

**Grasses, Sedges and Rushes** *(continued)*

Scientific Name	Common Name	Srank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<i>Panicum virgatum</i>	switchgrass	S4			1,3,5,Sa,L	P,S
<i>Paspalum setaceum</i>	slender paspalum	S2			1,3,5,Sa	P,S
<i>Schizachyrium scoparium</i>	little bluestem	S4			1,3,5,Sa,L	P,S
<i>Scirpus clintonii</i>	Clinton's bulrush	S2			1,5,Sa	P
<i>Scleria pauciflora</i>	few-flowered nut-rush	S1			1,3,5,11?,Sa	P
<i>Scleria triglomerata</i>	tall nut-rush	S1			1,3,5,11,Sa	P
<i>Scleria-verticillata</i>	low nut-rush	S3			1,3,5,11,Sa	P
<i>Sorghastrum nutans</i>	Indian grass	S4			1,3,5,Sa,L	P,S
<i>Spartina pectinata</i>	prairie slough grass	S4			1,3,5,11,Sa,L	P,S
<i>Sphenopholis obtusata</i>	prairie wedge grass	S1			1,3,5-6,11?,Sa	P
<i>Sporobolus asper</i>	rough dropseed	S1S2			1,3,5,Sa,L	P
<i>Sporobolus cryptandrus</i>	sand dropseed	S4			1,3,5,Sa	P,S
<i>Sporobolus heterolepis</i>	prairie dropseed	S2			1,3,5,Sa	P
<i>Stipa avenacea</i>	black oat-grass	SH			1,3,5,Sa	S
<i>Stipa spartea</i>	porcupine grass	S3			1,3,5,Sa	P,S



## Animals

Scientific Name	Common Name	Srank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<b>Reptiles</b>						
<i>Coluber constrictor foxi</i>	blue racer	S1	END	END	12, 13, 14	S
<i>Elaphe vulpina gloydi</i>	eastern fox snake	S3			12, 13, 14	P,S
<i>Heterodon platirhinos</i>	eastern hog-nosed snake	S3	THR	THR	9, 13,14	S
<i>Thamnophis butleri</i>	Butler's garter snake	S2			2	P
<i>Eumeces fasciatus</i>	five-lined skink	S3			2,14	P,S
<i>Sistrurus catenatus catenatus</i>	eastern Massasauga	S3	THR	THR	12, 13, 14	P
<b>Birds</b>						
<i>Ammodramus henslowii</i>	Henslow's sparrow	S1	END	END	2, 12, 13	P
<i>Chondestes grammacus</i>	Lark sparrow	SH			14	S
<i>Icteria virens</i>	yellow-breasted chat	S2S3	SC	SC	14	S
<i>Lanius ludovicianus migrans</i>	eastern loggerhead shrike	S2			9, 12, 14	P
<i>Parus bicolor</i>	tufted titmouse	S2				S
<i>Colinus virginianus</i>	northern bobwhite	S1S2	END	END	12, 14	P
<i>Tympanuchus cupido</i>	greater prairie chicken	SX	EXP			P
<i>Melanerpes erythrocephalus</i>	red-headed woodpecker	S3	SC	SC	13	S
<i>Thryomanes bewickii</i>	Bewick's wren	SH			14	S
<b>Mammals</b>						
<i>Taxidea taxus</i>	American badger	S2	END	END		P
<b>Grasshoppers, Crickets &amp; Katydid (Orthoptera)</b>						
<i>Atlantiscus testaceus</i>	short-legged shield-bearer	S1S3			2	S
<i>Dendrotettix quercus</i>	oak grasshopper	S1			2	S
<b>Beetles (Coleoptera)</b>						
<i>Cicindela lepida</i>	little white tiger beetle	S2			4	P, S
<i>Cicindela patruela</i>	a tiger beetle	S1			4	S
<b>Moths (Lepidoptera)</b>						
<i>Acronicta albarufa</i>	barrens daggermoth	S1			2,9	S
<i>Papaipema aweme</i>	aweme borer	SH				S
<i>Papaipema cerussta</i>	ironweed borer	S1?			9	P,S
<i>Papaipema sciata</i>	culver's root borer	S1?			9	P,S
<i>Schinia gloriosa</i>	glorious flower moth	S1			9	S
<b>Butterflies &amp; Skippers (Lepidoptera)</b>						
<i>Erynnis baptisiae</i>	wild indigo duskywing	S1			9	P,S
<i>Erynnis martialis</i>	mottled duskywing	S2			1,9	S
<i>Erynnis persius persius</i>	persius duskywing	SX			1,9	S
<i>Incisalia irus</i>	frosted elfin	SX		END	1	S
<i>Lycaeides melissa samuelis</i>	karnar blue	SX	EXP	END	1,9,10	S
<i>Mitoura grynea</i>	olive hairstreak	S2			9	S
<i>Speyeria idalia</i>	regal fritillary	SX				S

**Animals** *(continued)*

Scientific Name	Common Name	Srank	COS- EWIC	MNR	Ecology	Prairie or Savanna
<b>Wasps (hymenoptera)</b>						
<i>Tachysphex pechumani</i>	antennal waving wasp	S2S3			4,Sa	S
<b>Leafhoppers (homoptera)</b>						
<i>Aceratagallia nana</i>	a leaf hopper	S1			2,8	P
<i>Aflexia rubraneura</i>	red-tailed leafhopper	S1			2,8	P
<i>Chlorotettix fallax</i>	a leafhopper	S1			2,8	P,S
<i>Fitchiella robertsoni</i>	a planthopper	S1			2,8	P,S
<i>Graminella mohri</i>	a leafhopper	S1			2,8	P
<i>Graminella oquaka</i>	a leafhopper	S1			2,8	P,S
<i>Hecalus flavidus</i>	a leafhopper	S1			2,8	P,S
<i>Laevcephalus minimus</i>	a leafhopper	S1			2,8	P
<i>Laevcephalus peronatus</i>	a leafhopper	S1?			2,8	
<i>Mocuellus strictus</i>	a leafhopper	S1			2,8	P
<i>Paraphlepsius turpiculus</i>	a leafhopper	S1			2,8	P
<i>Polyamia compacta</i>	a leafhopper	S1			2,8	P
<i>Xerophloea peltata</i>	a leafhopper	S1			2,8	P,S

See definitions on next page.



### Notes on Table in Appendix

**Column 1: Scientific or Latin Name**

**Column 2: Common or English Name**

**Column 3: Provincial Rank (Srank)**

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre of the OMNR to set protection priorities for rare species and natural communities. These ranks are not legal designations. The most important factors considered in assigning provincial ranks are the total number of known, extant sites in Ontario and the degree to which they are potentially or actively threatened with destruction. Other criteria include the number of known populations considered to be securely protected, the size of the various populations and the ability of the taxon to persist at its known sites.

- S1 Extremely rare** in Ontario; usually five or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.
- S2 Very rare** in Ontario; usually between five and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.
- S3 Rare to uncommon** in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- S4 Common** and demonstrably secure in Ontario.
- S5 Very common** and demonstrably secure in Ontario.
- SH Historically** known from Ontario, but not verified recently (typically not recorded in the province in the last 20 years); however, suitable habitat is thought to be still present in the province and there is reasonable expectation that the species may be rediscovered.

**SX** Apparently **extirpated** from Ontario, with little likelihood of rediscovery. Typically not seen in the province for many decades, despite searches at known historic sites.

**?** Following a ranking indicates some degree of uncertainty.

A rank range, e.g. S2S3, indicates that the Ontario Rank is either S2 or S3, but that the information currently available is insufficient to determine which rank applies.

**Column 4: COSEWIC Status**

Status assigned by the Committee on the Status of Endangered Wildlife in Canada.

**EXP Extirpated.** Any indigenous species of fauna or flora no longer known to exist in the wild in Canada, but occurring elsewhere.

**END Endangered.** Any indigenous species of fauna or flora that is threatened with imminent extinction or extirpation throughout all or a significant portion of its Canadian range.

**THR Threatened.** Any indigenous species of fauna or flora that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed.

**SC Special Concern.** Any indigenous species of fauna or flora that is particularly at risk because of low or declining numbers, occurrence at the fringe of its range or in restricted areas, or from some other reason, but is not a threatened species.

**NAR Not at risk.**



**Column 5: MNR Status**

Status assigned by the Ontario Ministry of Natural Resources. Designations made by OMNR since January 1995 are based on recommendations of a ministry technical committee called Committee on the Status of Species at Risk in Ontario (COSSARO). Endangered species (END) are protected under the province's Endangered Species Act.

**END Endangered.** Any native species that, on the basis of the best available scientific evidence, is at risk of extinction or extirpation throughout all or a significant portion of its Ontario range if the limiting factors are not reversed.

**THR Threatened.** Any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a significant portion of its Ontario range if the limiting factors are not reversed.

**SC Special Concern.** Any native species that, on the basis of the best available scientific evidence, is a species of special concern in Ontario, but is not a threatened or endangered species.

**Column 6: Ecology**

This column lists information regarding species-specific ecological needs and preferences. Such information should be considered when developing tallgrass community management plans.

- 1 Fire-adapted (or tolerant)
- 2 Fire sensitive (or intolerant)
- 3 Benefits from or tolerates soil disturbance
- 4 Sensitive to soil disturbances
- 5 High light intensity species
- 6 Medium light intensity species
- 7 Low light intensity species
- 8 Micro-organism association
- 9 Host-plant or predator-prey association
- 10 Requires specific pollinator or dispersal agent
- 11 Requires moist or wet soil in spring
- 12 Need for large remnants to maintain viable populations
- 13 Other specific habitat needs
- 14 Specific threats or pressures

Soil types:      Sa      Sand  
                      L      Loam  
                      Si      Silt  
                      C      Clay  
                      O      Organic

**Column 7: Prairie or Savanna**

**P Prairie.** Species found in tallgrass prairie habitat.

**S Savanna.** Species found in savanna habitat.

**Sources:**

*Tallgrass Communities of Southern Ontario: A Recovery Plan* (Rodger, 1998) and Natural Heritage Information Centre website: [www.mnr.gov.on.ca/mnr/nhic/nhic.cfm](http://www.mnr.gov.on.ca/mnr/nhic/nhic.cfm). Refer to this website for up-to-date status information.







TALLGRASS ONTARIO