

How much to burn

Because of the subtle patchiness of the prairie landscape, fires do not burn evenly or completely. This is a good thing as unburned areas become refuges for species which, in turn, help re-populate the burnt areas. This is especially important for insects. For this reason, some managers burn only half of the site each time on a rotating basis.

Alternatives to burning

Where burning is not an option, mowing can be a partial substitute for fire. Mowing should take place late in the fall after the prairie plants have set seed and the birds have finished nesting. This can be done with the same frequency as burning. It is best to mow only half the site on a rotating basis to leave winter cover for wildlife. The clippings (thatch) should be removed so they don't blanket the ground and prevent sunlight from penetrating. As well, the clippings can be burned in a container and the ash returned to the prairie.



A healthy prairie maintained by fire. Lindsay Rodger

Recommended Reading

Madson, J. 1982. *Where the sky began: Land of the tallgrass prairie*. Boston, MA: Houghton Mifflin.

Pauly, Wayne R. 1988. *How to manage small prairie fires*. Madison, WI: Dane County Park Commission, 4318 Robertson Road, Madison, WI, 53714.

Pyne, S.J. 1982. *Fire in America: cultural history of wildland and rural fire*. Princeton University Press, Princeton, New Jersey.

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This factsheet is one in a series about Ontario's tallgrass prairie and savanna communities. Some of these include:

- #1 Get up, get out and see some tallgrass
- #2 Fire and the prairie
- #3 Identifying tallgrass prairie species
- #4 An owner's guide to managing tallgrass prairie and savanna
- #5 Looking for help?

Illustrations by Judie Shore.



Burnie the Badger

TALLGRASS

FACTSHEET 2

O N T A R I O

Ontario Tallgrass Prairie and Savanna Association

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 (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.

Today there are only small remnants of tallgrass prairie and savanna remaining in southern and northwestern Ontario, but regular burns are still required to maintain these endangered plant communities.

This factsheet outlines the reasons fire is required for tallgrass survival, the historic occurrences of fire, the ecological effects, and some considerations for how and when to burn.

The Source of Fire

While lightning is thought to have been a major source of historical prairie fires in parts of the arid US and western Canada, it probably wasn't the major fire source 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 in the Great Lakes region is too green to burn well. Most convection storms bring rain



Fire is a natural and important part of prairie ecology. P. Allen Woodliffe

so fire isn't likely to persist for very long.

The most likely source of fire on southern Ontario's pre-settlement landscape was Native people. They 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.

Aboriginal 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.

The Impacts of Land Clearing and Fire Suppression

Ontario's prairies and savannas were some of the first lands to be used for agriculture by European settlers because of the lack of trees and good soil fertility. By the 20th century, most of the grasslands in southern Ontario were converted to farmland or covered by towns and cities. In addition, fire ceased to be a normal occurrence on the landscape either through the fragmentation of the land that prevented fire from sweeping through the fire-dependent habitat or direct suppression of fire by humans for safety reasons.

Without fire, many of the tallgrass prairies and savannas that were not converted to other uses eventually changed to shrub thicket and dense forests of oak, ash, maple and elm. Fire is needed to restore and maintain most of these rare communities.

The remnant population of wild lupine (*Lupinus perennis*) in High Park has flourished since the reintroduction of fire. Gera Dillon



How do prairie plants survive a 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. During a fast-moving grass fire, the soil surface can reach 680°C, while only 1 cm below, no temperature changes are detected.

Unlike prairies and savannas, meadows are not fire-dependent and do not benefit from burns. Meadows of Queen Anne's lace, giant ragweed, Canada thistle and common milkweed grow where the soil has recently been disturbed or tilled.

How does fire help prairie?

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



The black ash that remains after a burn warms the soil, speeding up the development of underground shoots. Cathy Quinlan

The burning and elimination of the standing dead plant material is another important factor. Once it is gone, 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.

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 rainfall 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.

How do wildlife species survive a fire?

Most animals have adaptive behaviours that help them escape from fire. Mammals, for example, can easily out-run small ground fires or retreat to burrows or previously burned areas. Reptiles and amphibians may remain in the soil, retreat beneath logs and damp leaves, enter burrows, or escape to water. Adult birds can fly away but fires may destroy nests, eggs and fledglings.

Insects can be the hardest hit from grassland fires, especially those in the larval stage.

However, most tallgrass prescribed burns in southern Ontario are carried out in very early spring, a time when most reptiles and amphibians have not yet emerged from hibernation and few birds have begun to nest. Overall, most animals benefit from the new growth that follows a fire and the open type of habitat it maintains. Some animals such as quail, turkey, coyote and birds of prey will move to recently burned areas looking for food.



Prescribed Burns

Today, we cannot rely on wildfires to maintain tallgrass prairie and savanna. To conserve and restore these rare habitats, deliberately set and carefully controlled fires are used – this is called prescribed burning.

Undertaking a prescribed burn requires expertise, training and planning. 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 are burned routinely by the Fire Service of the Ministry of Natural Resources (MNR) or by experienced land managers. Some property owners hire fire consultants to plan and complete the burn for them. Local fire departments are often willing to come out and help with a controlled burn.

Prescribed burns have taken place for many years across Ontario, demonstrating that burns can be carried



Ontario Ministry of Natural Resources fire crew members conduct a prescribed burn to maintain the oak savanna habitat at Ojibway Prairie. P. Allen Woodliffe

out safely, even in cities such as Toronto. Explaining the procedures and environmental benefits to neighbours, eases concerns and often produces advocates.

For more information on prescribed burning and consultants working in your area, consult the Tallgrass Ontario website listed on the back of this factsheet.

Burn Frequency and Time of Year

Although there are no hard and fast rules about how often to burn, there are a few generally accepted practices. Newly created prairies can be burned every year initially, then every two to three years after the vegetation is well established. Healthy remnant or intact prairies will benefit from burns every three to five years. Savannas need to be burned less frequently, every 10-15 years. The encroachment of woody or non-prairie vegetation is the determining factor.

For practical and ecological reasons, most prescribed burns are carried out in early spring. In southwestern Ontario, that is mid-March to late April and in more northerly areas, late April to mid-May. 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.

Some tallgrass managers vary the timing of the burn to benefit specific species. For example, summer burns decrease prairie grasses and shrub invasion and favour wildflowers. Consult an expert if you would like help fine-tuning the timing of the burn to manage certain plants.

