

FIRE MANAGEMENT EFFORTS IN ONTARIO'S PROTECTED AREAS: A SYNOPSIS

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Abstract

Like many jurisdictions, Ontario has implemented increasingly effective fire suppression since the 1920s. Natural fire regimes are increasingly recognized as essential in maintaining the health of many terrestrial ecosystems, and as an intrinsic process fundamental to ecological integrity. Resource stewards and the public are more aware that fire is under-represented in many protected areas in Ontario. Unregulated fire is not possible in most protected areas because of values at risk. Sound fire management planning is essential if fire is to be restored as an ecosystem process safely and effectively. OMNR is currently researching the natural role of fire in several protected areas, and developing policy and planning tools to support the safe and effective reintroduction of fire in provincial parks and conservation reserves. This paper provides an overview of these efforts.

Introduction

Ontario has implemented increasingly effective fire suppression since the 1920s. Many ecosystems within Ontario's provincial parks and conservation reserves require disturbance by fire for renewal and ecological health. In some cases, lack of fire disturbance over this period has led to ecosystem conditions that do not represent the forest, savannah, or grassland conditions before modern intervention. Shifts in species composition, accumulations of biomass, insect infestations, poor regeneration, and degradation of wildlife habitat are examples of changes that have been documented. Protected areas in which fire dependent ecosystems are present will not continue to represent the natural heritage they were designed to protect unless they are exposed to fire in the coming decades.

Long-term fire suppression has also resulted in significant accumulations of biomass that function as fuels. In addition to impacting ecosystem health, these hazardous fuel accumulations increase the risk of extremely large, intense fires that can threaten lives, property, neighbouring lands, and some natural and cultural features.

The Ontario Ministry of Natural Resources (OMNR) is currently researching the role of fire, and developing policy and planning tools to support the safe and effective reintroduction of fire in provincial parks and conservation reserves. This paper provides an overview of these efforts.

Increasing Awareness of the Ecological Role of Fire

Worldwide, fire is increasingly recognized as the primary natural agent of disturbance that maintains the health of terrestrial ecosystems, particularly in protected areas. With a heightened focus on sustaining ecosystems and ecological processes, the public is becoming more aware that fire is under-represented in many protected areas in Ontario.

Fire plays many roles in forest renewal. Fire disturbance reduces competition, creates seedbeds, releases nutrients, and triggers seed release or vegetative reproduction. In a natural fire regime, fire maintains a shifting mosaic of vegetation patches that are less susceptible to insects, disease, and blowdown. Many species of the boreal and Great Lakes - St. Lawrence forest have survival or regeneration capabilities suited to the local fire regime. For example, aspen (*Populus spp.*) and raspberry (*Rubus spp.*) sprout vigorously from underground roots after a fire passes. Wildlife species such as moose (*Alces alces*) feed on this new growth. Jack pine (*Pinus banksiana*) and black spruce (*Picea mariana*) depend on fire to melt their resin-sealed cones and release seeds.

In the past, characteristic fire regimes in the boreal forest would have included large, high intensity, stand-replacing fires that returned every 20 to 100 years on average. Several boreal wildlife species are adapted to these fire-dominated ecosystems where recently burned areas are surrounded by large undisturbed areas. In the Great Lakes - St. Lawrence forests of central Ontario, stands such as red and white pine (*Pinus resinosa* and *P. strobus*) would be visited by smaller, low intensity fires on more regular, 20- to 30-year intervals. These understory fires helped to perpetuate old growth red and white pine ecosystems by providing seedbeds for the pine to regenerate. Grassland and savannah ecosystems in some parts of Ontario depend on fire return intervals between 3 and 10 years to maintain their native biodiversity.

Long-term fire suppression in Ontario has nearly totally eliminated slow-spreading, low-intensity surface fires from the landscape. These fires often burned along the ground, flared up and ran through the understory, and dropped back to the ground in response to changes in weather, topography, and fuel. The resulting diverse vegetative mosaics are considered vital to the ecological integrity of many natural areas.

Forests are becoming more enclosed, favouring shade-tolerant species well beyond their historical levels in some areas. Tree species that partly depend on fire for renewal, such as red oak (*Quercus rubra*) and white pine, are now severely reduced in many landscapes. The open habitats favoured by many animals are becoming scarce. For example, Canada lynx (*Lynx canadensis*) uses mature conifers for cover but hunts in recently burned areas that support large populations of the snowshoe hare (*Lepus americanus*). Forests are closing in on natural grassland and savannah ecosystems that would have been perpetuated through frequent fires.

Research Efforts Underway

A joint Ontario Parks/Aviation and Forest Management Branch project called *Fire in*

Parks and Protected Areas: Toward a Goal of Ecological Integrity is now underway. The project includes several diverse efforts geared toward improving our understanding of the role of fire.

To date this project has included working with several provincial parks, including Sleeping Giant, Algonquin, and Rondeau. One objective is to investigate what sort of fire regimes might be appropriate to help restore more natural vegetative conditions. These ideas have been implemented differently in each case.

For Sleeping Giant Provincial Park, a report on presettlement vegetation conditions has been prepared based on historical air photos, land surveyors' notes, and timber harvesting records. Researchers are also conducting an analysis of fire regimes using a spatial landscape projection and disturbance model called LANDIS (Mladenoff *et al.*, 1996). Sources of information include satellite imagery, Forest Resources Inventory, soils, a digital elevation model, and expert opinion on tree silvics used in the modelling. Staff and students at Lakehead University in Thunder Bay are now continuing this landscape modelling.

For Algonquin Provincial Park, background information for fire management planning is being compiled. This includes information on presettlement vegetation conditions and fire regimes, and the response of tree species to fire. Landscape modelling and analysis of fire regimes is also underway for all of ecodistricts 5E-9 and 5E-10 using the LANDIS model. This project is investigating whether current gap analysis methodologies for designing protected area systems in Ontario are likely to be robust through time (Crins *et al.*, 2004) and assessing landscape-level effects of various fire regimes.

Efforts for Rondeau Provincial Park are focussing on assessing changes in vegetation resulting from prescribed burning. Some sampling data had been collected before and after prescribed burns conducted in tallgrass prairie and oak savannah communities in 2001. To more rigorously assess the impacts of future prescribed burns, we arranged a fee-for-service contract to design ecological monitoring protocols. These protocols are designed to gauge progress toward specific objectives regarding the restoration of oak savannah and woodland communities, and reducing invasive species. Staff at Rondeau sampled 12 transects in 2002 using these new protocols. Six of these transects were burned in a prescribed burn operation in April 2003 and will be resampled this summer.

We are also actively working with professors and graduate students engaged in complementary research at several Ontario universities, including York, Waterloo, and Lakehead, and welcome further collaboration.

Prescribed Burning Programs

Fire managers are currently working with protected area managers and other partners to use prescribed burning to restore and maintain threatened tallgrass prairie and oak savannah ecosystems in southern Ontario. These areas, which include Ojibway Prairie, Pinery, Turkey Point, and Rondeau Provincial Parks, provide important habitat for over 30 species at risk. The use of prescribed burns is critical in maintaining these threatened

ecosystems and reducing invasive species. Initial public opposition has been largely replaced by widespread support following the success of these programs.

Existing Fire Management Plans

Several resource stewardship plans that deal with fire are being successfully implemented in Ontario. These include the following:

The *Pinery Provincial Park Resource Management Strategy* (OMNR, 1988) includes the use of thinning and prescribed burning to help return areas of red pine plantation to oak savannah ecosystems. Pinery has had an active prescribed burn program for several years. The *Quetico Provincial Park Fire Management Plan* (OMNR, 1997) establishes a Prescribed Natural Fire Zone in which ecological fires are allowed to burn to meet management objectives, and guides the use of prescribed burning. To date, two successful prescribed burn operations have helped to reduce the hazards associated with large areas of blowdown in Quetico Provincial Park, and several lightning-caused fires have received a monitored response.

The *Rondeau Provincial Park Vegetation Management Plan* (OMNR, 2001) aims to protect, restore and perpetuate the biodiversity of the park's Carolinian ecosystems through programs such as deer herd reduction and prescribed burning. MNR has conducted prescribed burns at Rondeau in 2001 and 2003.

New Forest Fire Management Strategy for Ontario

The *Forest Fire Management Strategy for Ontario (Fire Strategy)* is a contract between land managers and the fire management program for all parts of Ontario. The Fire Strategy provides direction to the MNR's fire management program about how it should protect values and forests while supporting ecologically sound resource management.

During 2001 and 2002, MNR's fire program developed a new Fire Strategy to reflect changes in program direction. The new strategy was developed with extensive consultation from MNR staff, partners, and the public. Among the recurring public comments listed in the *Background to the Development of Ontario's Forest Fire Management Strategy* (OMNR, 2002) are the following:

- increase the use of fire for ecological and forest renewal purposes – i.e., 'reintroduce fire in a planned way;
- invest in planning and analysis prior to developing vegetation and fire management plans in parks and protected areas;
- excellent opportunity to use prescribed fire in areas such as the Aulneau and Black Bay Peninsulas, Michipicoten Island, and the wilderness portion of Algonquin Park;
- advance the use of prescribed fire in protected areas;
- fire is a major agent of ecosystem renewal in parks and protected areas;

- fire on the landscape is a natural occurrence and is not a major tourism concern; and,
- increase public education on the role and benefits of fire in the ecosystem.

The new Fire Strategy divides Ontario into six new fire management zones: Southern Ontario, Great Lakes-St. Lawrence, Boreal, Northern Boreal, Hudson Bay and Parks. Each has common land-use, resource management and fire management objectives.

The Parks Zone was created in recognition that fire is under-represented within many protected areas, and their future ecological integrity requires a progressive and responsible fire management effort. The Parks Zone includes approximately 60% of the 9.5 million ha within parks and conservation reserves in Ontario. This includes ten provincial parks (Algonquin, Kesagami, Killarney, Lady Evelyn-Smoothwater, Lake Superior, Opasquia, Polar Bear, Quetico, Wabakimi, and Woodland Caribou) as well as Pukaskwa National Park. All other protected areas are included in their surrounding fire management zones.

The new Fire Strategy directs the Fire Program to use “light on the land” techniques whenever feasible to reduce human impact during fire response in protected areas, and anywhere natural or culturally sensitive values have been identified. Examples of light on the land techniques may include reducing the use of heavy mechanical equipment, foam, and cutting of trees.

Need for Policy and Planning

Unregulated fire is not possible for most protected areas. The safety of visitors, and values such as capital assets, settlements or timber supplies adjacent to protected areas generally prohibit this practice. The safe and effective restoration of fire as an ecosystem process must be directed by sound planning.

A fire management plan is a type of resource stewardship plan that provides a strategic framework for fire response and fire use within a defined area over a length of time. Fire response involves the detection, suppression, and prevention of wildfires. Fire use involves ecological fire and prescribed burning. This framework is based on factors such as fire history, risk to facilities and other values, the role of fire in the ecosystem, and managers’ objectives.

A fire management plan addresses: the objectives for the protected area; the role of fire; values affected by fire, and potential impacts of fire occurrence and suppression on these values; fire management compartments; response prescriptions; and, visitor safety.

The implementation components of these plans usually include the zoning of protected areas into fire management compartments based largely on full, modified, or monitored response. For example, a modified response that confines fires within natural boundaries can be more cost-effective and ecologically sound than full suppression to minimize area burned.

Fire management compartments are designated based on considerations such as fire behaviour in a particular fuel type and terrain, weather patterns, and the presence of people and facilities. In some northerly areas, it may be possible to provide for monitored response to lightning-caused fires in large fire management compartments. Other protected areas will likely require a mix of compartments, providing for full, modified, and monitored responses in various locations. Protected areas in more developed areas of Ontario may have to rely on prescribed burning, and suppress other fires.

This work requires the expertise of various disciplines. Communication between protected area managers and fire managers is essential to preparing and implementing effective plans.

Draft Fire Management Policy for Provincial Parks and Conservation Reserves

A task team of nine MNR staff from Ontario Parks, Field Services Division, and the Fire Program is preparing a draft policy and planning guidelines to address fire management in provincial parks and conservation reserves.

This draft policy seeks to advance the management of fire in provincial parks and conservation reserves to restore and maintain the ecological integrity of these areas and contribute to ecological sustainability in the larger landscape of Ontario, while preventing personal injury, value loss, and social disruption associated with forest fires.

The draft policy encourages park and conservation reserve managers to consider and document the role of fire in the protected area, and where appropriate, identify areas where fire could be used to meet resource stewardship objectives.

Fire Management Planning Guidelines for Provincial Parks and Conservation Reserves

The Fire Management Planning Guidelines for Provincial Parks and Conservation Reserves are currently being prepared. These guidelines, which will direct the process of fire management planning, and the procedures through which the draft policy will be implemented.

To help address the wide range of situations, the guideline will provide assistance in:

1. developing and documenting preliminary objectives for fire management for all provincial parks and conservation reserves;
2. incorporating effective fire management direction within relevant protected area planning documents, if appropriate; and,
3. preparing a fire management plan, if appropriate.

The *Fire Management Policy for Provincial Parks and Conservation Reserves* (OMNR, 2003) directs that protected area managers develop and document preliminary objectives for fire management. This requirement can be met by preparing a statement of fire intent, which involves three steps:

- Step 1 – Describe the context for planning and the land base;
- Step 2 – Outline how fire interacts with the land base; and,
- Step 3 – Develop general objectives for fire response and fire use.

A statement of fire intent can be prepared fairly quickly, and serves several purposes. First, it allows preliminary objectives for fire management to be communicated among protected area stewards, fire managers, and the public. Second, it helps to identify what, if any, additional planning is appropriate. Third, it provides material that can be incorporated into other planning documents. In fact, if a fire management plan is prepared, the plan should incorporate and build upon the statement of fire intent.

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