Canadian Institute of Forestry/Institut forestier du Canada
"Voice of Forest Practitioners"

Position Statement

Emulation of Natural Disturbance Patterns as a Model for Forest Management

Issue

The forests of Canada in the 21st century are different than those growing here when the country was first explored and settled. We know we have changed the forest from its historical condition, sometimes permanently by turning forests into farmland and cities, but also through our efforts to manage the remaining forests. Our logging practices; our efforts to protect the forests from fire, insect and disease; the establishment of commercial tourist bases in previously un-accessed forests; and many other human uses of the forest resource have modified forest conditions as compared to those present prior to the European contact. There is a growing concern in the forestry profession, and elsewhere, these changes will have, or are already having, serious impacts on the many values forests provide.

Background

Forest practitioners think and talk about forest management using words like 'sustainability' and the 'maintenance of biodiversity'. Rather than looking at the forest only as a source of trees for forest products, practitioners look at the forest as a complete and complex ecosystem composed of many interdependent components that provide numerous values. In order to preserve those components and their relationship to each other, forest practitioners are looking to nature to learn how their activities can fit within the natural changes that occur during the life of a forest. This has introduced a new phrase into the forest practitioner's vocabulary, namely "emulating nature", which includes emulating natural disturbances.

We know we cannot copy or mimic nature in all aspects of its complexity. We simply do not have a complete understanding of all the relationships between the different parts of a forested ecosystem. But for those parts that we do understand, we can modify our management activities to resemble more closely the way nature has managed the forest. The use of harvesting practices to emulate the structural characteristics of a natural disturbance is one such example.

Nature "harvests" and renews its forests in different ways. For some forests, composed of trees that grow well in shade, as one tree dies it is replaced by another. For other forests, however, composed of trees that require full sunlight, nature provides the proper growing conditions through wildfires, insect infestations and blowdowns (the destruction of large portions of a forest as a result of an extremely strong wind).

There is a significant difference between the patterns produced through these natural events and the forest patterns resulting from our current forest management practices. Nature provides a range of sizes of disturbances, from very small to very large; our industrial harvesting and management of the forest has produced, especially recently, only smaller openings. This tendency, coupled with our success at suppressing or containing forest fires that would otherwise have produced very large disturbances, has resulted in a forest comprised of many, relatively small patches. The large, uniform forests created by past natural disturbance processes are either disappearing or are increasingly fragmented. .

Some wildlife species and other components of the forest ecosystem require these large, uniform forests that result from the larger disturbances. The needs and habitat requirements of species that are dependent on larger disturbances are not being met through our current forest practices that focus on the production of smaller disturbances. If forest practitioners are to emulate natural disturbances to the best of their ability, then they will need to produce a range of harvest block sizes, from small to large, in order to provide the habitat structure and distribution required for the full range of wildlife species that live in, and have evolved with, Canada's forests.

There is certainly more to emulating natural disturbances than just disturbance sizes, such as the amount of undisturbed forest that separates various sized disturbances. There are obviously some aspects of logging that do not resemble natural disturbances such as: road development; the removal of most of the timber from a harvested site; the different time intervals between harvest operations and natural disturbances on the same site; the impracticality of harvesting very large areas (i.e. some fires burn several hundred thousand hectares, but it is neither socially acceptable nor feasible to harvest this much forest at once); the compaction of the soil by large machines; the lack of burned or decaying material; and the fact that fire is a chemical process while harvesting is a physical process. Nonetheless, the concept of emulating natural disturbances is valid because it is a starting point, with a scientific and ecological basis, for improved forest management. The alternative is a much more simplistic and socially unacceptable plan to conduct harvest events across a management unit with limited regard for their impact on other forest values.

Some of the limitations noted in the previous paragraph can be addressed. For instance, patches and peninsulas of uncut trees can be left within the boundaries of a cut block to provide wildlife habitat and future sources of decaying fibre; heavy machinery can be equipped with special tires that reduce or eliminate soil compaction on sites where this is

a concern; and prescribed fire can be used as a management tool following the harvest to prepare the site for subsequent regeneration.

There are many questions that must be answered before managers can begin to plan their harvesting operations in a manner that will emulate nature. They must have information on the number and sizes of historical disturbances; the number, size and spacing of recent disturbances (both natural and human); the composition and age of the historical and current forests; the desirable structure to be retained within patches; the capability of wildlife species to move within and between disturbance patches; the differences between pure forest types and the transitional forests that lie between them; and how much old growth is required. Further, since these are new management techniques, the results obtained must be monitored closely and evaluated in order to make the necessary modifications for future application.

CIF/IFC Position

1. The CIF/IFC supports efforts to manage the forest based on the premise of emulating natural patterns of disturbance. There is, however, a clear need for considerably more research to provide a firmer basis for such management practices.

2. As forest practitioners, we need to improve our understanding of the similarities in structure and function of natural forests when compared to forests harvested based on the principles of natural emulation.

3. The CIF/IFC encourages the assessment of the effects of climate change on natural disturbances and our current forests.

4. The CIF/IFC supports the continuing research and practices to emulate natural disturbances with an associated monitoring program to begin to answer some of these questions, and to determine how successful we have been in maintaining the forest's biodiversity, function and sustainability.

The CIF/IFC

The Canadian Institute of Forestry / Institut forestier du Canada (CIF/IFC) is a national voice of forest practitioners. The CIF/IFC, formed in 1908, represents members who are foresters, forest technologists and technicians, educators, scientists and others with a professional interest in forestry. The Institute's mission is "*to provide national leadership in forestry, promote competence among forestry professionals, and foster public awareness of Canadian and international forestry issues."*

We are people with a professional interest in forestry, working in government, industry, academic and consulting fields. Our members use their education, training, and

experience to help manage the forests of Canada and to make the Canadian public aware of forestry.

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