



ECOLOGICALLY BASED FOREST MANAGEMENT

THE CONSERVATION OF BIODIVERSITY IN WEYERHAEUSER CANADA FOREST MANAGEMENT AREAS IN ALBERTA

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 **Weyerhaeuser Canada**
Alberta

INTRODUCTION

Weyerhaeuser Canada - Forest Stewardship

Weyerhaeuser Canada's Forest Stewardship statement (1995) commits the Company to be: "*industry leaders in stewardship on public forest land ... accomplishing this by practicing sustainable forestry*". Sustainable forestry has a variety of definitions, but all contain elements of science and of human value systems.

Weyerhaeuser Canada - Alberta Operations

Concurrent with the Company's statement, and in accordance with the principles espoused by the Alberta Forest Conservation Strategy, Weyerhaeuser Canada in Alberta is committed to addressing the conservation of biological diversity and the long term ecological sustainability of managed forest ecosystems. In order to achieve this goal, Weyerhaeuser in Alberta will develop and implement Forest Management Plans which integrate ecologically-based forest science with changing economic and social expectations of the forest. The ecological science component of forest management plans will be addressed by the following three principles.

Ecological Guiding Principles

- 1. Maintain landscape diversity and stand structure within the range of natural variability.*
- 2. Conserve habitat for threatened and endangered plant and wildlife species.*
- 3. Allow for integration of societal needs and expectations.*

These principles address the conservation of biodiversity as well as the needs of individual (target) species.

Biodiversity and the Ecological Approach

In a general sense, the term "biological diversity" refers to the variety of life and processes that support it. However, the term encompasses concepts that differ in context and scale. Biological diversity may refer to genetic diversity within a species, to the diversity of species within communities, or to the diversity of communities across landscapes and regions. At different spatial scales, the diversity of species and communities reflect a complex set of environmental conditions (e.g. topography, climate, soil, etc.) that change over time.

Forest ecosystems are complex and dynamic mosaics of vegetation patches varying in size, composition, age-structure and distribution. Their dynamic heterogeneity is driven by natural processes (e.g. succession), by stand replacing events (e.g. fire, insect outbreaks, or disease epidemics), and by disturbances that occur at smaller scales (e.g. mortality of individual trees).

Depending on site-specific environmental conditions (e.g. soil, topography, climate), plants and animal species occur in different assemblages (communities) according to the stage of succession, the time-since-disturbance, and the scale (i.e. extent, intensity) of that last disturbance. To some degree, species are adapted to the disturbance regime of the region they inhabit. Hence, it is widely believed that the long term sustainability of the forest ecosystem and the ecological requirements of most species can be addressed by emulating the inherent natural processes of disturbance and succession characteristic of a site and/or a region, that is, by maintaining a variety of stand sizes, seral stages and stand attributes and structures across landscapes, within the range of natural variation in the system (i.e. the “*natural disturbance model*”).

Ecologically Based Forest Management

Ecologically based forest management implies a recognition of the complexity of forest ecosystems, and of the importance of preserving the functioning of natural ecological processes for the long term. It entails maintaining, through sound forest management practices, the inherent natural structural and vegetational diversity of forest landscapes, and the complex set of ecological relationships that determine the abundance and distribution of all plant and animal communities. Ultimately, ecologically based forest management means adopting a coarse-filter approach at the landscape and stand-level combined with a fine-filter (species-specific) approach to achieve a balanced perspective for analysis.

Ecological Guidelines

In its progress towards ecologically sustainable forest management practices in Alberta, Weyerhaeuser Canada will follow operationally-based ecological guidelines specific to individual Forest Management Areas. These guidelines will be integrated with timber supply analysis, operational considerations, and societal values, within the forest management planning process.

COARSE FILTER APPROACH

In managing for future forest landscapes, Weyerhaeuser Canada in Alberta will first identify broad regional resource objectives. Within forest regions, forest planning will be conducted over Landscape Management Units where more specific resource objectives and strategies can be described. Timber harvesting and silvicultural practices will be then implemented at the stand level, depending on site-specific topography, soil and micro-environmental conditions.

Landscape level considerations

The Ecological Land Classification of Alberta provides a stratification of forest landscapes based on climate, topography, soil and parent material. At a regional level, Natural Subregions are characterized by distinct regional climates. Within each Subregion, Ecodistricts refer to areas with similar relief,

geomorphology and genesis of parent material. Ecodistricts provide ecologically based **Landscape Management Units**, where specific landscape objectives can be identified and forest planning and harvest sequencing can be conducted.

<p><i>Age structure and seral stages</i></p>	<p>Weyerhaeuser Canada in Alberta operates in four distinct Natural Subregions: Mixed-Wood Boreal, Lower Foothills, Upper Foothills, and Subalpine. In Ecologically Based Forest Management, planning for future forest landscapes will attempt to maintain a range of age structures, seral stages and relative abundance of forest cover types consistent with the inherent ecological processes characteristic of each Subregion. These Subregion-specific age structures will determine the percentage of forest in late to very late (old growth) seral stages that will be maintained over the planning horizon.</p>
<p><i>Cutover size, shape and distribution</i></p>	<p>With a decrease in size of disturbance and in the range of variability, such as occurs in traditional harvesting operations with many small cutblocks of similar size and shape, there is an increase in the amount of edge and decline in interior forest habitat. In contrast, stand replacing disturbances can affect very small to very large areas and create complex heterogeneous vegetational mosaics. In addition, gap-type disturbance and successional processes create multi-ages and mixed-species forest stands. For this reason, Weyerhaeuser Canada in Alberta will use a range of cutblock sizes and shapes, and adopt silvicultural practices (e.g. mixed-wood management, thinning, etc.), that are more consistent with the ecological processes characteristic of Natural Subregions and Ecodistricts.</p> <p>Weyerhaeuser Canada in Alberta will strive to maintain large extent of forest stands in late seral stages in each Landscape Management Units (Ecodistrict) to address the need of interior habitat species (minimum 300 ha). Similarly, attempts will be also made to maintain forest connections at the stand level (single trees, patches, etc.) and at the landscape level (crown cover of minimum 35%, height of 12 m) to facilitate the dispersal of organisms and the maintenance of well-distributed populations.</p>

Stand level considerations

The Ecological Land Classification of Alberta provides a stand-level classification of ecological units (Ecosites) that have developed under similar climate, moisture and nutrient regime. Weyerhaeuser Canada in Alberta will use Ecosites as templates for silvicultural practices that are consistent with site-specific ecological processes of succession and disturbance.

Forest harvesting and natural stand-replacing or gap-type disturbances differ in the amount of biomass left on site. Differently from forest harvesting, even the most intense fires leave most of the above ground biomass in the form of snags, individual green-trees, or clumps of live trees skipped over by the fire. This structure provide micro-habitat opportunities to a range of species that will differ depending on site-specific conditions and on the age of the regenerating forest.

Unique ecological sites

Within a forest ecosystem, there are many unique sites that may host rare plant communities and/or species, and also provide habitat opportunities for small mammals, amphibians, reptiles, and invertebrate species (rock outcrops, small patches of forest remnants from previous fires, large diameter downlogs, dens and hibernacula, etc.). Weyerhaeuser Canada will endeavour to identify and incorporate these sites in forest planning, and to protect them during harvesting.

Wetlands and riparian habitats

Wetlands, bogs, fens and riparian zones play a critical role in maintaining functioning forest ecosystem processes. Weyerhaeuser Canada will incorporate these sites in forest planning, and will buffer and protect them during harvesting. In the ecological approach to forest management, watershed protection issues and concerns will be addressed in a broad landscape context. Current riparian buffers do play an important part in watershed protection. However, Weyerhaeuser Canada, depending on site-specific watershed analysis and resource management objectives, may also propose expanding and/or reducing the width of currently established buffers, as well as managing riparian habitats through special silvicultural practices (e.g. thinning).

Snag retention

In order to approximate snag densities present immediately following a stand-replacing disturbance, Weyerhaeuser Canada in Alberta will endeavour to maintain, within safety and operational constraints and silvicultural considerations, all snags present at the harvest site. Live trees (*see* green tree retention) will be retained where needed so to contribute to future snag abundance, and eventually coarse down woody material

Green tree retention

Single trees will be retained in a cutblock to provide habitat opportunities for a range of different species immediately after harvesting and in the regenerating stand. Single, merchantable and non-merchantable trees, understory protection, etc. can contribute to future snag abundance in the regenerated forest.

Clumps and patches in cutblocks

The retention of trees in **large** clumps or patches within cutblocks is an attempt to emulate stand-replacing events and provide small refugia for biota that might be otherwise impacted by harvesting. In addition, clumps and patches within a cutblock may contribute to maintain connectivity between habitat patches as they can facilitate the dispersal of various plants and wildlife species. Clumps and patches in a cutblock may include riparian habitats, inoperable sites, mesic ecosites, as well as merchantable trees, and can contribute to the older age class distributions.

Coarse Down Woody Debris (CDWD)

The retention of green trees and snags at the harvest site will have a bearing on the success of maintaining coarse down woody debris. However, it will be still necessary to leave woody debris at the harvest site. Consequently, attempts will

be made to retain all unmerchantable downed logs. In addition, within operational and silvicultural constraints, the disposal of woody debris by burning will be minimized to address nutrient recycling and to provide habitat opportunities for small mammals and furbearers.

FINE FILTER APPROACH (Rare, endangered and threatened species)

The ecological approach to forest management (*coarse filter*) may not be sufficient to address habitat requirements of species that are either rare, endangered or threatened, or are of special societal value. For that reason, Weyerhaeuser Canada is committed to identify these species in Forest Management Areas in Alberta, and to address their habitat requirements (*fine filter*). Special practices may include multi-pass systems, alternative silvicultural practices (e.g. thinning), timing restrictions, and habitat protection and/or management.

More specifically, Weyerhaeuser Canada will:

- Identify and inventory provincially and nationally rare, endangered and threatened plants and wildlife species that occur in Forest Management Areas in Alberta
- Assess the habitat requirements of these species and integrate them into timber harvest planning.
- Maintain habitat conditions required by species of special management concern

MONITORING AND ADAPTIVE MANAGEMENT

Our understanding of forest ecosystem dynamics and ecological relationships is very limited. While many researchers have looked at individuals and, to a lesser degree, at populations, there have been few long term, large scale studies that are relevant to forest management. Due to the complexity of forest ecosystems, science cannot predict with certainty and quantify with precision their responses to forest management practices. Nonetheless, while research continues, forest managers are expected to adopt best management practices that recognize the importance of biodiversity conservation, and that maintain long-term ecological sustainability.

The progress towards ecologically sustainable forest management requires maintaining biodiversity and the functioning of forest ecosystem processes. This strategy requires the setting of specific biodiversity objectives (targets) at a variety of temporal and spatial scales (e.g. landscape, stand) so that progress can be measured.

Monitoring and adaptive management

In acknowledgment of the uncertainty surrounding our understanding of ecological processes and of animal-plant relationships, Weyerhaeuser Canada in Alberta is committed to monitor its operations and ensure that specific forest management objectives are met. The objectives of monitoring are to:

- Measure compliance with the guidelines developed to achieve specific management objectives.
- Assess the effectiveness of the guidelines in meeting biodiversity objectives

- Detect changes in biological diversity.
- Assess the response of representative plant and animal communities, as well as soil conditions, to forest harvesting.

The adaptive management component of ecologically based forest management provides a feedback and adjustment mechanism that will ensure that the goals of management are being achieved. By measuring key components and comparing their status to those forecasted, differences will be identified and adjustments made to further improve forest operations.

Research

Ultimately, the success of ecologically based forest management in maintaining biodiversity and the sustainability of forest ecosystems hinges on gaining better understanding of forest ecosystem processes, of local disturbance regimes, and of the range of natural variation in forest structure and diversity. To this objective, Weyerhaeuser Canada in Alberta is supporting and/or sponsoring numerous University based research initiatives that are being used to develop specific guidelines and in assessing their effectiveness.

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