



P.O. Box 52031
Edmonton, AB., T6G 2T5
Ph: 780.432.0967 Fax: 780.439.4913
www.cpaws-edmonton.org
info@cpaws-edmonton.org

Forest Management in Alberta: Status Report and Recommendations for Policy Change

July 12, 2005

**Richard Schneider
Helene Walsh**

Table of Contents

Executive Summary	1
Introduction	3
Methods	4
Results	5
Discussion	16
Acknowledgements	26
Citations	26
Summary of Recommendations	29
Appendix 1 — Tables of summarized survey data	30

EXECUTIVE SUMMARY

The *Alberta Forest Conservation Strategy* (AFCS), developed in the mid-1990s, embodies the vision that Albertans hold for their forested lands and presents a blueprint for how that vision can be achieved. The AFCS was the product of over three years of effort involving over 800 representatives from a broad spectrum of forest interests. At its heart is the concept that forests must be managed as ecosystems and that maintaining the health and integrity of these ecosystems is a prerequisite to maintaining the flow of benefits that we as a society desire.

Although the AFCS outlines the general concepts and principles needed for achieving ecological and economic sustainability, it does not contain the level of detail required for implementation. Fortunately, the scientific community has been very active over the past decade in developing implementation strategies consistent with the AFCS. Another key development was the Forest Stewardship Council (FSC) National Boreal Standard for Canada, finalized in Dec. 2003. The FSC Boreal Standard, developed over a period of two years, presents a working guide to the current state-of-the-art in sustainable forest management.

The objective of our study was to document the current state of forest management in Alberta and to determine how far government policies and industrial practices still need to go to achieve the vision set forth in the AFCS. To do this we compared and contrasted the latest draft of the new Alberta Forest Management Planning Manual and the management plans of all large forestry companies in the province against the AFCS and the FSC Boreal Standard. An additional objective was to provide a set of recommendations to inform decision making with respect to tenure renewals, ongoing policy development, and legislative reform.

In our review of company plans we found substantial variability in terms of both format and content. In the absence of leadership from the government over the past decade companies have set their own course towards ecological forest management, implementing it to different degrees. One company, Alberta Pacific Forest Industries (Al-Pac), is awaiting the outcome of an FSC certification audit. At the other end of the spectrum, the approach of some companies remains indistinguishable in any meaningful way from sustained-yield management. Most companies fall somewhere in between — implementing some of the easier elements of ecological forest management (e.g., variable cutblock size) but otherwise continuing with traditional approaches (e.g., liquidating merchantable old-growth).

The government's draft Planning Manual marks an important transition point. In place of worn-out sustained-yield concepts that have formed the basis of forest management in Alberta since the early 1950s, the Planning Manual is built around the core principles of ecological forest management. Moreover, the Planning Manual includes a detailed set of criteria and indicators that companies are to employ in their planning efforts. Although some gaps remain, the suite of criteria in Annex 4 of the Planning Manual is reasonably complete and robust, and largely consistent with the FSC Boreal Standard.

A key deficiency of the Planning Manual is that, although it directs companies to include the elements of ecological forest management in their plans, it stops short of setting minimum requirements. The government, as environmental steward of crown forests on behalf of the public, should be defining the lowest common denominator, not corporations that exist to generate profits from the production of lumber and pulp. The standards should reflect broad societal values by ensuring that the health of our forests is maintained. The FSC Boreal Standard provides a working example of how this can be accomplished. A key concept embedded in the FSC standard is the linking of ecological management targets to structures and patterns characteristic of the forest immediately prior to the advent of large-scale industrial operations.

We found that the most important element of ecological forest management, the management of old-growth, is currently the least well managed. All but two companies — Al-Pac and Daishowa Marubeni International — plan to liquidate the existing merchantable old-growth of one or more species on their management areas. Although the government Planning Manual has appropriate old-growth indicators, it fails to set minimum targets. The Planning Manual also makes no mention of the spatial distribution of old-growth or the concept of floating old-growth reserves.

The architects of the AFCS recognized that the successful implementation of ecological forest management can only be achieved through integrated planning involving all resource companies operating on the land base. This remains a serious deficiency of the current system. Integrated planning is not addressed in either the Planning Manual or any other planning framework applicable to the boreal forest. In the absence of integrated planning, the efforts of forestry companies to implement ecological forest management will be frustrated by the cumulative ecological impacts of other industrial sectors, notably oil and gas. We suggest that the scope of the Planning Manual be expanded to include all operators on an FMA and that the government take a direct role in facilitating the planning process and mediating any disagreements among the companies.

Another element of the AFCS not addressed in the Planning Manual or anywhere else is the triad concept, wherein most of the land base is managed according to ecological forest management principles and the remainder is designated for either protection or intensive management. We found there has been an insidious spread of intensive management practices across Alberta, with tacit government support, while attempts to establish new protected areas have been resisted by government and industry.

In conclusion, although the vision set forth in the AFCS remains largely unfulfilled, there is reason to believe that we are now in the midst of a transition to a new era of forest management in Alberta. Having paid off the province's financial debt, the government must now realign its priorities — and maintaining the province's natural capital looms high on the horizon. The new Planning Manual represents an important step in this direction. Its deficiencies should be addressed and then it should be supported with appropriate legislative reform. Providing a road map for the way ahead is the AFCS, as valid today as the day it was released.

INTRODUCTION

A decade ago there was a growing recognition that our forests were in trouble. Our “sustained-yield” approach to forest management, unchanged since the 1950s, was out of sync with current realities and in dire need of an overhaul. In response to these concerns more than 800 representatives from a broad spectrum of forest interests convened over a three-year period in the mid-1990s to develop the Alberta Forest Conservation Strategy (AFCS).¹

The AFCS embodies the vision that Albertans hold for their forested lands and presents a blueprint for how that vision can be achieved. At its heart is the concept that forests must be managed as ecosystems and that maintaining the health and integrity of these ecosystems is a prerequisite to maintaining the flow of benefits that we as a society desire. This implies a significant shift in the way activities are planned and carried out. Crafting a workable compromise that balanced ecological and economic objectives proved difficult, but a consensus was eventually achieved and the Alberta Forest Products Association, the Canadian Association of Petroleum Producers, and the Alberta Government all signed on.

Recent polls conducted by McAllister Opinion Research for the Canadian Boreal Initiative suggest that in the public mind the AFCS does not go far enough². In the prairie provinces, 90% of respondents indicated that greater than 50% of the boreal forest should be permanently protected from industrial development. The public increasingly rejects the notion that the environmental objectives need to be subsidiary to economic objectives. Such public sentiments are also beginning to be felt in the marketplace, where the demand for wood products from sustainably managed forests is growing, particularly in the critical U.S. market.³

Additional impetus for implementing the AFCS comes from accumulating scientific evidence that Alberta’s traditional forest management practices are failing to sustain biodiversity. Over the past decade scientists have determined that high-profile species such as woodland caribou and grizzly bears, as well as several species of forest birds, are in serious decline in Alberta as a consequence of industrial development.⁴ Field data together with recent modeling studies suggest that we are on a similar trajectory to areas such as Scandinavia where many wildlife species have been lost as a consequence of unsustainable industrial practices.^{5,6}

Although the AFCS outlines the general concepts and principles needed for achieving ecological and economic sustainability, it does not contain the level of detail required for implementation. Fortunately, the scientific community has been very active over the past decade in developing implementation strategies consistent with the AFCS. Another key development was the Forest Stewardship Council (FSC) National Boreal Standard for Canada, finalized in Dec. 2003.⁷

The FSC is an international non-profit organization founded in 1993 to support environmentally appropriate, socially beneficial, and economically viable management of the world's forests.⁸ FSC does this by accrediting certifiers to assess individual forest

operations against the FSC Principles and Criteria for Forest Stewardship.⁹ Forest operations that meet these standards are permitted to affix the FSC logo to their products in the marketplace, thereby enabling consumers to purchase end-products which they know have come from forests managed according to FSC standards.

The FSC Boreal Standard was developed over a two-year period through the combined effort of four chambers: Aboriginal, Economic, Environmental, and Social. The Boreal Standard represents the state-of-the-art in forest management, based on current ecological knowledge balanced against economic limitations. It differs from other certification schemes in three important respects: 1) it is the forest that is certified, not just the activities of an individual operator; 2) it includes explicit targets and prescriptions; and 3) it was developed and is supported by more than just the industrial sector (e.g., the National Aboriginal Forestry Association, the Forest Products Association of Canada, and Greenpeace all support the Boreal Standard). By virtue of these features the FSC Boreal Standard is the closest thing available to a “gold standard” for forest management.

The objective of our study was to document the current state of forest management in Alberta and to determine how far government policies and industrial practices still need to go to achieve the vision set forth in the AFCS. To do this we compared and contrasted the latest version of the Alberta Forest Management Planning Manual¹⁰ and the management plans of all large forestry companies against the AFCS and the FSC Boreal Standard. An additional objective was to provide a set of recommendations to inform decision making with respect to tenure renewals, ongoing policy development, and legislative reform.

METHODS

As the basis for our study we surveyed the Detailed Forest Management Plan and/or the Sustainable Forest Management plan of each Forest Management Agreement (FMA) holder in the province. There are many ways the survey could have been organized and presented. We chose not to use the AFCS as an organizing framework because its scope was too broad and level of detail too coarse for meaningful comparison with company management plans. Instead, we decided it would be most useful to follow the framework presented in Annex 4 of the new government Planning Manual, which in turn follows the Canadian CSA – Z809-2002 Sustainable Forest Management Standard.¹¹ We also added three objectives (19-21) that are not covered in the Planning Manual. Our focus was on ecological management and we did not include Aboriginal or social objectives.

We completed the initial survey ourselves, based on a thorough review of the most recent company management plan. Our preliminary results were sent to each company to provide them with the opportunity to make corrections and provide comments. In many cases an ensuing discussion with company representatives served to clarify results. The results for each company were then again presented to each company to ensure accuracy before they were finalized.

The government Planning Manual was also included in our survey, based on Draft 3 obtained in June 2005.

RESULTS

We reviewed the management plans for 15 of the 18 FMAs in the province. The remaining three FMAs (Tolko High Prairie, Spray Lakes, and Manning Diversified) did not yet have approved management plans that we could review. All but three companies with approved plans (Sundre Forest Products, Blue Ridge Lumber, and Alberta Newsprint Company — all West Fraser companies) provided feedback on our survey. For those three companies for which we received no feedback our review was based solely on their approved management plans. Some companies expressed dissatisfaction with the survey, primarily because we were unwilling to change the wording of the questions or because we insisted that answers had to be derived from the management plan. We acknowledge that our study only provides a “snapshot” of particular issues at the time the plans were written, not a comprehensive overview of company operations.

For each management objective in our survey we provide here the rationale, standards from the Planning Manual and FSC, and a synopsis of current practices employed by companies. Complete survey results for all companies are provided in tabular form in Appendix 1. Gaps between the AFCS and current management approaches are addressed in the Discussion.

Objective 1. Maintain biodiversity by maintaining the full range of cover types and seral stages.

Rationale: Many species are habitat specialists, with a clear preference or requirement for a specific forest type and age.¹² Therefore, to maintain biodiversity all forest types in all their seral stages must be maintained. In practice, it is reasonable to assume that if old forest is maintained all other seral stages will likely be adequately represented.

Government Planning Manual: Indicator – “Area of old, mature and young forest in each DFA subunit by cover class.” Target – “Over the 200 year planning horizon; a) gross landbase: greater than X% old forest, greater than Y% mature plus old forest, less than Z% young forest and b) net landbase: greater than X% of forest, greater than Y% mature plus old forest, less than Z% young forest. Note: old forest retention shall include the full natural range of ages. Targets and seral stage definitions shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes.”¹³

FSC Boreal Standard: “Targets for landscape patterns (disturbed and undisturbed patches) have been set, based upon the characterization of the pre-industrial forest. Management is returning the forest landscape pattern to one consistent with the pre-industrial forest. This approach is consistent with maintaining natural levels of core habitat and connectivity throughout the long-term planning horizon.”¹⁴

Company Results: There is great variability among companies in what they plan to do and how they present their information (this holds for most other objectives as well). Some companies provide a full breakdown of projected age by forest type over time, others lump different types of conifer, and others only provide seral stage data for the merchantable

land base as a whole. There is also substantial variability in the age class definitions, timeframes, and spatial zones used for analysis and reporting. More often than not the information is provided as graphs without accompanying tables.

The lack of explicit targets and the variability in methodology and reporting made it all but impossible to compare companies against the Planning Manual or against each other. But the available information did allow us to pose one fundamental question: is the company planning to maintain old-growth or liquidate it (where liquidate implies a permanent loss of 80% or more of the existing merchantable old-growth)? Based on the seral stage projections in the management plans we found that all but two companies, Al-Pac and Daishowa, plan to liquidate old-growth of one or more species on their FMA. It is worth noting that despite the projected loss of old-growth, most companies claim to be following the Range of Natural Variation concept.

Objective 2. Maintain biodiversity by minimizing landscape fragmentation due to forest harvesting

Rationale: Fragmentation caused by forest harvesting has been found to be detrimental to some forest species.¹⁵ Under ecological forest management, harvest blocks should be designed to produce patch size distributions similar to those in natural forests. There is mounting evidence that fragmentation at the landscape scale, resulting from dispersed harvest patterns, is also a significant problem, particularly with respect to old-growth.¹⁶

Government Planning Manual:

Indicator 1 – *“Range of patch sizes by subunit and entire DFA.”* Target 1 – *“A distribution of harvest area sizes that will result in a patch size pattern over the 200 year planning horizon approximating patterns created by natural disturbances.”*

Indicator 2 – *“Area of old interior forest of each cover class by subunit and DFA.”* Target 2 – *“Areas of old interior forest will not be less than X% of each cover class over the next 200 years. Targets shall be based on sound science, ecological considerations, wildlife zones, and disturbance regimes.”*¹⁷

FSC Boreal Standard: *“Targets for landscape patterns (disturbed and undisturbed patches) have been set, based upon the characterization of the pre-industrial forest.”*¹⁸

*“Large areas (thousands of hectares) of contiguous core forest habitat, representative of the habitat types of the landbase, exist and are maintained in the management unit. The proportion of the management unit in large areas of core is guided by the outcome of the pre-industrial forest condition analysis and by a target of maintaining at least 20% of the forest management unit. Large cores consist primarily of mature and old forest, but may also contain inclusions of up to 5% recently disturbed forest. To the greatest extent possible within the current forest condition, large cores do not contain roads and other linear disturbances. In planning future cores, the applicant chooses areas with a high probability of achieving the desired condition (e.g., areas likely to be in a contiguous, roadless condition) and is working within its sphere of influence to achieve this condition (e.g., access management, decommissioning roads, bridge removal, etc.).”*¹⁹

Company Results: Eleven out of fifteen companies intend to maintain existing distributions of patch size and shape. However, few companies provide projections of what is actually likely to occur as a consequence of their operations. Canfor's plan, which does contain such projections, indicates that over time there will be fewer large patches and that patch shape will become simpler.²⁰ We believe these shifts in distribution are due to operating constraints that are shared by other companies.

Only Al-Pac has implemented an aggregated harvest approach designed to minimize landscape-level fragmentation across the FMA. Other companies continue to employ a dispersed harvest approach, though a few are using an aggregated approach within caribou habitat.

Objective 3. Maintain biodiversity by minimizing linear disturbances and access.

Rationale: Through mechanisms such as providing transportation corridors for humans, predators, and exotic species, fragmenting wildlife habitat, soil erosion, and disrupting water flows, the effect of linear disturbances can far exceed their proportional presence in the forest. Roads have the most important effects; however, seismic lines, pipelines, and power lines also serve as access corridors and contribute to landscape fragmentation.

Government Planning Manual: Target – *“Forestry road density less than X km/km², by subunit. Targets shall be based on sound science, ecological considerations, harvest planning, wildlife zones, and social values.”*²¹ Note: the standard ignores the fact that linear disturbances produced by the petroleum sector greatly exceed those of the forestry sector.

FSC Boreal Standard:

“A comprehensive access management plan is being implemented that:

- *Avoids road building (and construction of other linear disturbances) in or near protected areas or candidate areas;*
- *Describes abandonment and maintenance strategies for all roads in the forest;*
- *Maintains remoteness in areas with sensitive biological or cultural values or where required for tourism; and,*
- *Identifies and maintains level of remoteness based on achieving a fair and equitable balance based on independent expert input between the ecological, social and economic importance of remoteness and the recreational and operational desire for motorized access.”*²²

“Where there are overlapping tenure holders, the applicant has in place incentives or joint planning programs and is making demonstrable progress towards:

- *Encouraging other tenure holders to adhere to the access management plan as described in 6.3.17;*
- *Minimizing size, intensity, and duration of linear disturbances and other disruptions to ecosystem functions; and,*
- *Encouraging other forest tenure holders to adhere to the forest structure retention requirements.”*²³

Company Results: No companies have road targets for the full FMA; however, some companies have targets for those parts of their FMA that constitute caribou range. No companies have targets for total linear disturbance.

Objective 4. Maintain plant communities uncommon on the DFA or province.

This objective was not reviewed in detail.

Objective 5. Maintain unique habitats provided by wildfire and blowdown events.

Rationale: Some species are partially or entirely dependent on habitat generated by natural disturbance events so it is necessary to maintain some of this type of habitat in its natural condition²⁴. As with growing forests, burned habitat is more valuable in an intact state than when fragmented.

Government Planning Manual:

Indicator 1 – *“Area of unsalvaged burned forest.”* Target 1 – *“At the compartment scale retain greater than 10% of merchantable black trees in patches greater than 100 ha. At the harvest area scale retain greater than 10% of merchantable black trees in patches 10-100 ha and retain greater than 5% of merchantable black trees in small patches, single trees according to logger choice. Retain all unburned trees recognizing timber condition, access, non timber needs.”* Targets based on *Fire Salvage Strategy: Forest Management Planning and Operations 2002* and ensure consistency with FireSmart objective.

Indicator 2 – *“Area of unsalvaged blowdown.”* Target 2 – *“Greater than X% of the merchantable blowdown will be left unsalvaged.”*²⁵

FSC Boreal Standard: *“The applicant avoids salvage harvesting in some proportion of burned habitat, because it provides ecological benefits. Expert input is used in determining the ecologically appropriate proportion.”*²⁶

Company Results: Companies are required to follow the Fire Salvage Strategy, which contains quantitative retention targets. No companies have spatial targets (i.e., no mention of retaining large intact blocks).

Objective 6. Retain ecological values and functions associated with riparian zones.

Rationale: Riparian areas have been identified as having special ecological values that need to be protected through buffers where no industrial use can occur.

Government Planning Manual: Riparian buffer prescriptions are summarized in a set of provincial Operating Ground Rules. For example no logging within 60 m of high water mark on a large permanent river, within 30 m of a small permanent river, and within 100 m of lakes exceeding 4 ha in area.²⁷

FSC Boreal Standard: *“Forests surrounding or adjoining permanent water bodies are protected by riparian reserves that exclude all forestry activity (harvest, road building except for approved crossings, dumping, etc). The inner riparian reserves are a minimum width of 20 m from the treed edge of permanent water bodies. Partial harvesting within the inner reserves is permitted subject to public consultation and only to a limited extent based on a conservation or cultural rationale. Additional riparian reserves are applied to maintain fish and wildlife habitat and/or cultural and recreational values, as appropriate. The minimum total area within these additional reserves shall be equivalent to an additional 45 m, on average, measured from the end of the inner riparian reserve. The applicant may develop and apply an alternative protection prescription that varies from the additional 45 m average reserve if it is demonstrable that the ecological rationale has an equal or higher likelihood of achieving the objective to protect riparian values.”*²⁸

Company Results: Company plans generally acknowledge compliance with the provincial Operating Ground Rules.

Objective 7. Maintain biodiversity at the stand scale by retaining representative residual structure in harvest blocks.

Rationale: Application of the natural disturbance model at the stand scale entails taking steps to maximize the structural similarity between stands after fire and after harvest. Because fires typically leave unburned patches on the landscape, and leave most of the biomass on site, it is important to leave as much residual structure as possible after harvest.²⁹ Furthermore, the residuals should be representative of original forest types in terms of size of trees and species composition.

Government Planning Manual: Indicator – *“Percent area/volume/stems residual structure (both living and dead) within a harvest area, representative of the status (living/dead), sizes, and species of the overstory trees by subunit and DFA.”* Target – *“A combination of single stems, clumps, and islands comprising X% of the harvested area/volume/stems within a subunit. Note: a wide range in variability in harvest area-level retention within a subunit is desired as long as the target level is achieved.”* Targets based on – *“Wildlife zones, roadside vegetation screens, recreational values, aesthetics, local knowledge, ANHIC, Biodiversity /Species Observation Database.”*³⁰

FSC Boreal Standard: *“Harvesting during normal and salvage operations (following natural disturbances) and other stand management activities maintain residual structures in sufficient quantities and distribution so as to fulfill their ecological functions. The amount of residual structure retained in harvest operations is 10-50% by area, approximating levels of expected natural post-disturbance residual identified through the pre-industrial condition analysis or its equivalent. Post harvest residual includes patches or clumps of trees and individual trees and snags, which are representative of the size and species and condition (burned/unburned) of trees in the pre-harvest stand. Residual structure consists of a mix of dispersed trees and a range of patch sizes, with a preference for patches, and is well distributed at all scales throughout the harvest area.”*³¹

Company Results: Four companies do not have targets in their management plans for retaining representative merchantable residual in cutblocks. The targets of other companies range from 1% on the low end (FMA average) to 5% on the high end (FMA average). Daishowa-Marubeni has a target of 15% on a portion of its FMA.

Objective 8. Maintain biodiversity at the stand scale by retaining downed woody debris.

Rationale: Downed woody debris provides core habitat and shelter for many species and has an important function in soil development. Some decomposer species have very specific requirements for downed woody debris in terms of species, size and age.

The management of downed woody debris involves retention of existing debris and the handling of slash from harvesting operations. According to the Natural Disturbance Model it would be best to leave down woody debris in place and distribute slash throughout the block to approximate the effects of fire. Annex 4 does not address the management of slash and FSC does not deal with it well.

Government Planning Manual: Indicator – *“Percentage of harvested area by subunit with downed woody debris relative to preharvest conditions.”* Target – *“X% of harvest areas having downed woody debris retained on site. Assess preharvest downed woody debris condition by subunit or stand level average.”*³²

FSC Boreal Standard: Coarse woody debris and snags are attributes of the pre-industrial forest condition that companies are required to benchmark and maintain.³³

Company Results: Seven companies have a target for downed woody debris and six indicate they plan to maintain most of it (however, when they scarify it degrades the quality). Most companies handle slash using a combination of spreading and pile and burn, but they don't report the ratio of those practices. Four companies indicate that they only pile and burn logging slash.

Objective 9. Maintain the integrity of sensitive focal sites such as mineral licks and game trails.

This objective was not reviewed in detail.

Objective 10. Maintain aquatic biodiversity by minimizing the impacts of water crossings.

Companies are required to follow a detailed government Code of Practice for water crossings.

Objective 11. Maintain viable populations of identified high value species.

Rationale: Ecological forest management relies heavily on “coarse filter” approaches, such as the Natural Disturbance Model, to maintain biodiversity. However, for some species, particularly those at risk of extirpation, additional “fine filter” approaches that directly address habitat and other needs are required to maintain viability.

Government Planning Manual: Indicator – *“For identified high value species (i.e., economically valuable, socially valuable, species at risk, species of management concern): area of suitable habitat within the DFA or subunit – or – specific population parameters (e.g., trends, distribution, absolute size, recruitment) within the DFA or subunit.” Target – “Maintain above X hectares – or – maintained or increased.” Means to identify targets – “Based on sound science, ecological considerations, wildlife zones, COSEWIC list, provincially listed species, BSOD, ANHIC, recovery plans, Fish and Wildlife Division priorities, public consultations, habitat suitability analysis, literature review, observation data, local and traditional knowledge.”*³⁴

FSC Boreal Standard: *“Plans exist, or are under development to protect the habitat and populations of species at risk in the forest.”*³⁵

Company Results: There is great variability among companies in terms of the species selected for fine-filter management and the types of mitigation strategies employed. Even FMAs that share a boundary and have similar habitat types and wildlife species have radically different approaches to the management of fine-filter species. It is worth noting that most species of special management concern have requirements for old-growth and/or intact habitat — two attributes that most companies currently address very poorly.

Objective 12. Conserve genetic diversity by maintaining the variation of genes within native tree species.

Rationale: Selecting seed stock for economically-desirable traits can shift the genetic profile of the forest and narrow the range of genetic diversity within species. This in turn can reduce the forest’s ability to handle changing conditions, particularly those that occur over long time scales.

Government Planning Manual: Target – *“Number (X) of genetic conservation areas for each seed zone conforming with Section 3 of the Green Area section of Standards for Tree Improvement in Alberta.” Means to identify target. “Target is a portion of the required number of genetic conservation areas determined in consultation with other FMAs in the same seed zone of Alberta.”*³⁶

FSC Boreal Standard: *“The genetic diversity of tree species is maintained during forest management through: the maintenance of species at the limits of their range, use of natural regeneration, local collection of seeds for seedling stock and seed broadcasting, adherence to seed zones, and appropriate selection of seed trees and advanced regeneration.”*³⁷

Company Results: Common practices include selection of seed stock for desirable growth characteristics and culling of seedlings in greenhouses for the same purpose. Over half of the FMA holders intend to pursue tree improvement techniques such as growing in orchards.

Objective 13. Maintain biodiversity through a system of representative protected areas.

Rationale: Under ecological forest management it is acknowledged that management plans, including the emulation of natural disturbances, are experimental in nature. To balance the risk that management outcomes relating to the maintenance of biodiversity may not be achieved, the ecological forest management paradigm includes protected areas as core element.³⁸ Protected areas also serve as ecological benchmarks, providing experimental “controls” to the managed landscape, as required for the successful implementation of adaptive management. The need for protected areas is noted in the AFCS, the National Forest Strategy³⁹, and the Senate report on the boreal.⁴⁰

Government Planning Manual: *“Respect protected areas identified through government processes.”*⁴¹

The Canadian Standards Association section on protected areas is much more extensive than what has been incorporated into the government Planning Manual — *“Protected areas need to be designed on a landscape basis, and not solely within the limits of the DFA. The organization should determine whether representative examples of the ecosystems present in the DFA are protected at the landscape level either in the DFA or in the adjacent area; if not, the organization should strive to have examples of such areas protected. A peer-reviewed gap analysis is a useful tool to identify the existence and significance of protected areas when determining whether adequate representation of the range of sites has been achieved. When identifying local values and developing objectives, indicators, and targets for biodiversity, interested parties may want to consider relevant strategic or policy documents published by the government, in addition to the CCFM publications.”*⁴²

FSC boreal standard: *“The applicant completes (or makes use of) a peer-reviewed scientific gap analysis to address the need for protected areas in the eco-region(s) and ecodistrict(s) in which the forest is situated. The applicant uses representation, connectivity, intactness, age of the forest, rare ecosystems and other HC VF attributes to identify the location and extent of additional protected areas.”*⁴³

“The applicant designs, identifies and contributes candidate protected areas that make a maximum contribution to filling gaps in the protected areas system based on the relative responsibility of the applicant. The level of the applicant’s responsibility is determined by:

- *The level of representation of enduring features within the forest; and, the regional significance of the conservation values (e.g., quality or rarity).*

- *The applicant works cooperatively with interested parties (e.g., Environmental-NGOs, Indigenous People) in the analysis of gaps and candidate protected areas.*
- *Interested parties (e.g., Environmental-NGOs and Aboriginal People) are generally supportive of the outcome of the gap analysis and the identification and contribution of candidate protected areas.*
- *Forest operations including harvesting, silviculture and road-building are not undertaken in protected areas or candidate protected areas.”⁴⁴*

“The applicant is working within their sphere of influence to move candidate protected areas to full regulated protection as soon as possible.”⁴⁵

Company Results: Only Al-Pac has done a gap analysis and is striving to have more protected areas established within their FMA.

Objective 14. Reforest all harvested areas.

Companies are required to follow provincial regeneration standards.

Objective 15. Limit conversion of the forest land base to other uses.

Government Planning Manual: Target – *“Maintain or increase the forest land base.”⁴⁶* In addition, the Operating Ground Rules state that losses of productive forest due to in-block roads, landings, etc., cannot exceed 5% of the harvest block. Although it is not entirely clear, the Planning Manual does not appear to apply to losses of productive forest caused by other operators (e.g., petroleum, agriculture).

Forestry companies are required to follow the Operating Ground Rules.

Objective 16. Control non-native invasive plant species.

Government Planning Manual: Target – *“Zero increase in incidence in weeds.”⁴⁷* In addition, the Operating Ground Rules require forest operators to follow Directive 2000-06 for weed management in forestry operations.

Currently, companies comply with Directive 2000-06, which applies to a specified set of weed species. However, companies still typically utilize non-native species when planting grass cover (e.g., along roadways).

Objective 17. Maintain soil quantity and quality.

Rationale: The maintenance of soil quantity and quality is integral to ecological forest management.

The Operating Ground Rule section of the Planning Manual contains a set of 11 prescriptions related to soils. Annex 4 essentially defers to these Ground Rules. The purpose of the soil regulations is to: *“minimize the potential for soil erosion; prevent soil,*

logging debris and deleterious substances from entering watercourses; and ensure that the capability of the site to support healthy forest tree growth is maintained.”⁴⁸

The Ground Rules require companies to minimize soil disturbance, compaction, and rutting and to use special management on steep slopes. However, site preparation techniques that result in deep disturbance of soil structure, such as scarification and pit mounding, are still permitted and widely used.

FSC Boreal Standard:

“Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and by so doing, maintain the ecological functions and integrity of the forest.”⁴⁹

“Harvesting, site preparation, and other forest operations should be undertaken in a manner that avoids site and soil damage and encourages the protection of the site.”⁵⁰

Companies: Forestry companies are required to comply with the Operating Ground Rules and this is generally acknowledged in the management plans.

Objective 18. Maintain water quantity and quality.

Rationale: The maintenance of water quantity and quality is integral to ecological forest management.

Government Planning Manual: Annex 4 includes a section on water intended to: *“limit the impact of timber harvesting on water yield.”* The target is: *“forecast effect of planned harvesting meets acceptable standards.”⁵¹* Annex 4 is supplemented by an extensive section on watershed protection in the Operating Ground Rules intended to *“minimize the negative impacts of timber operations on water quality, quantity, and flow regime.”* The Ground Rules include 12 operating regulations and a table defining watercourse buffers by type of waterbody (buffers are covered in Objective 6, above). These Ground Rules are generally consistent with the direction provided in the FSC Boreal Standard.

FSC Boreal Standard: *“At a minimum, the Standard Operating Plans related to preventing negative hydrological impacts address:*

- *Identification of sites and watersheds sensitive to negative hydrological impacts during the planning process;*
- *Levels of permissible harvesting in watersheds;*
- *Use of partial harvest systems on wet sites;*
- *Use of winter harvesting; and,*
- *Avoiding most sensitive sites.”⁵²*

Companies: Forestry companies are required to comply with the Operating Ground Rules. With respect to the water yield target in Annex 4, most companies have a target in place; however, there is no consistency among the targets.

Objective 19. Restrict intensive/enhanced forest management practices to intensive management zones.

Rationale: Intensive (a.k.a. enhanced) forest management practices are designed to maximize timber production. These practices are unsuitable for application in areas where the maintenance of biodiversity is a core management objective. Recognizing the basic incompatibility between intensive management and biodiversity, the AFCS recommended that the forest land base be zoned into separate areas for extensive management, intensive management, and protection. The AFCS further recommended that the majority of the forest land base should fall into the extensive category and that it be managed under the ecological forest management paradigm.⁵³

Government Planning Manual: There is no reference to intensive management zones and no prohibition against deep soil disturbance (e.g., deep scarification and pit mounding), spraying of herbicides, tree improvement, thinning, or fertilization.

FSC Boreal Standard: *“Should any conversions of natural forest to plantations occur, it will only be done if there are demonstrable long-term, sustainable conservation benefits to the forest.”*⁵⁴ *“A maximum of 5% of the productive forest area will be available for conversion to plantations.”*⁵⁵ In the FSC standard plantation is defined as: *“Forest areas lacking most of the principal characteristics and key elements of native ecosystems, as defined by FSC approved national and regional standards of forest stewardship, which result from the human activities of planting, sowing or intensive silvicultural treatments.”*⁵⁶

Company Results: Hinton West Fraser is the only company that does not use herbicides operationally, but they are experimenting to evaluate their use. All companies scarify for the regeneration of white spruce and often pine. Over half of the FMA holders intend to pursue tree improvement. Ten out of fifteen companies are using thinning. Fertilization does not appear to be currently used.

Objective 20. Ensure ecological and economic sustainability by setting harvest rates that do not exceed anticipated timber supply.

Rationale: For ecological and economic sustainability timber supply analyses must be robust and precautionary and harvest rates must not exceed anticipated timber supply. This implies that reasonable estimates of timber losses to fire and clearing by the petroleum sector must be taken into account in the calculation of the annual allowable cut.

Government Planning Manual: There are no requirements for incorporating either anticipated fire or clearing by the petroleum sector in timber supply analyses.

FSC Boreal Standard: *“The applicant demonstrates that the analysis and calculation of harvest rates of forest products is based upon a precautionary approach that reflects the presence and quality of information and assumptions.”*⁵⁷

Company Results: No companies have accounted for anticipated fire losses in their AAC calculation. Only Blue Ridge Lumber, Slave Lake Pulp and Weyerhaeuser Grande Prairie have made an attempt to include estimated losses to the petroleum industry in their AAC calculation. Al-Pac has removed future oilsands mine areas from their AAC calculations.

Objective 21. Certification

The Planning Manual has no requirement for forest certification or third-party compliance audits. Eight companies have CSA, three have SFI certification, and Al-Pac is the only company seeking FSC.

DISCUSSION

When the AFCS was being drafted in the mid-1990s it was clear that a significant shift would be required in our approach to forest management in Alberta:

“The Alberta Forest Conservation Strategy calls for significant change in how activities are planned and carried out in forest ecosystems at the legislative, commercial and personal level. The change has to do with giving forest ecosystems first consideration in all that we do, to ensure that the forest and forested lands of Alberta will continue to provide a sustainable flow of goods (such as timber, recreation, and tourism opportunities) and services (such as clean air, clean water, fish and wildlife habitat) for many generations to come.”⁵⁸

The government’s new Planning Manual represents the first meaningful step towards the implementation of the AFCS, though it has yet to be approved and implemented. It incorporates most of the elements of ecological forest management and is largely consistent with the FSC Boreal Standard. There are, however, several important elements of forest management that are still not addressed in either the Planning Manual or other regulatory mechanisms. These gaps are discussed below.

In our review of the forest management plans of FMA holders we found substantial variability among companies in terms of both format and content. In the absence of leadership from the government over the past decade companies have set their own course towards ecological forest management, implementing it to different degrees. Flexibility in maintaining fibre flow and perceived impact of changing societal values and market forces appear to have been the driving factors influencing the choices made by individual companies. One company, Al-Pac, is awaiting the outcome of an FSC certification audit. At the other end of the spectrum, the approach of some companies remains indistinguishable in any meaningful way from sustained-yield forestry. Most companies fall somewhere in between — implementing some of the easier elements of ecological forest management (e.g., variable cutblock size) but otherwise continuing with traditional approaches (e.g., liquidating merchantable old-growth).

Integrated Resource Management

Both the AFCS and the FSC Boreal Standard identify the need to manage forests, not the activities of individual resource companies. This implies a requirement for integrated planning that is both long-term and regional in scope. Despite several attempts by the government to move in this direction since the 1970s, no substantive progress has been made. By and large, government departments continue to operate in silos and companies continue to plan and carry out their operations independently. There is still no mechanism for limiting cumulative industrial impacts. The activities of the petroleum sector are of particular concern because the annual area cleared approaches that of the forestry sector⁵⁹, yet there are no limits on annual or cumulative rate of disturbance and no requirements for reforestation. As a result of combined industrial impacts, our forests have undergone a dramatic transformation and ecological thresholds are now being exceeded in many regions.⁶⁰ The need for integrated planning is urgent.

Given that past approaches to achieving integrated management have not been successful we propose an evolutionary approach based on expanding the role of FMA holders. FMA management plans provide a suitable foundation for integrated planning because they are regional and long-term in scope and they cover most of the forested lands of Alberta. It is also natural to focus on the FMA holders because they will have the greatest impact on the forest over the long term and because they are the only industrial operators that have the intrinsic motivation and capacity to do long-term regional planning. Finally, some FMA holders have already initiated integrated management pilot studies demonstrating the potential of this approach.

The critical piece missing from the equation is that FMA holders do not have sufficient authority as land managers to compel other industrial operators to participate in their planning process or to abide by the results. It would be unacceptable to devolve all authority for land management to the FMA holders; therefore, a hybrid approach involving government is required. The government needs to provide: 1) the impetus for companies to participate, 2) ground rules concerning process (including mechanisms for sharing costs), and 3) basic direction regarding desired outcomes. The logical way to proceed would be to expand, in a stepwise fashion, the scope of the new government Planning Manual to include all companies operating in a FMA. By doing so companies would be compelled to work together to achieve common outcomes relating to forest sustainability (implicitly dealing with the issue of cumulative impacts). Another key role for the government would be to serve as a facilitator and final decision making authority on contentious issues.

The petroleum sector may well be resistant to the concept of FMA holders serving as land managers. However, outside of the oilsands mines, none of the petroleum companies has the land base, planning horizon, or ecological knowledge base needed to undertake the task themselves. If petroleum companies cannot be convinced to engage in cooperative planning with the FMA holders then the government will have to take a more direct role in the planning process (which is arguably the way it should be done anyway). One way or

another, the activities of all operators need to be integrated and cumulative impacts need to be reigned in.

Our proposal to have FMA holders serve as land managers should not be seen as a desirable endpoint, but a logical first step in an evolutionary process. We can envisage a future where new corporate entities in the forest sector emerge, including companies that do nothing but integrated planning, companies that harvest wood, and companies that process wood purchased on the open market. Such a system would have the flexibility needed to implement novel approaches to land management, in comparison with the current system which encourages stasis. It would also remove many of the inefficiencies and perverse incentives inherent in the current system.

Recommendation 1. That the scope of FMA management plans, modeled on the new government Planning Manual, be expanded to serve as regional integrated management plans designed to maintain the ecological integrity of the forest.

Triad Approach

Another core concept identified in the AFCS was “Range of Management Intensities”, also known as the “triad” approach.⁶¹ The AFCS proposed that most of the forest land base be dedicated to “extensive management”, managed under ecological management principles. The remaining land would be dedicated to either protection or intensive forest management. The triad concept was also a central theme of the Senate review of Canada’s boreal forest conducted in 1999.⁶² The Senate committee recommended that 60% of the forest be dedicated to extensive management, 20% to protection, and 20% to intensive management.

In practice, even though ecological benchmarks are still lacking in many regions, government and industry have been very resistant to the establishment of any new protected areas. Conversely, we found there has been an insidious spread of intensive management practices throughout the extensive land base. If the goals of the AFCS are to be met then it is critical that the triad concept be formally implemented by filling the remaining gaps in the provincial protected area system and limiting intensive management to appropriately designated areas. Further, the government Planning Manual needs to be divided into separate sections for ecological forest management and intensive forest management, respectively. In our view, intensive forest management zones should be restricted to the White Zone on land marginal for agriculture (and possibly the region where oilsands are being mined, in a tradeoff for new protected areas the northeast). An important corollary to the triad approach identified in the AFCS is that the province’s forest land base needs to be maintained.

Recommendation 2. That the province formally implement the “triad” approach by applying ecological forest management to the majority of the forest land base, completing the protected area system, and limiting intensive forest management to marginal farm land.

Ecological Forest Management

Since the early 1950s forest management in Alberta has been based on the sustained-yield paradigm, with various extensions tacked on over the years. The government's new Planning Manual marks an important transition point. For the first time, peeling back the paint does not reveal a foundation built on worn-out sustained-yield concepts. Instead, the Manual is built around the core principles of ecological forest management.

We are encouraged by directives in the Planning Manual such as “*managing forest management activities to create a desirable future forest*”⁶³. But even more importantly, the new Planning Manual goes on to define exactly what is meant by sustainable forestry through a detailed set of criteria and indicators. Although some gaps remain, the suite of criteria in Annex 4 is reasonably complete and robust.

A key deficiency of the Planning Manual is that, although it directs companies to include the elements of ecological forest management in their plans, it stops short of setting any minimum requirements. It is naïve to expect that all companies will make use of this unlimited flexibility to achieve optimal ecological outcomes. Experience tells us that many companies, including the quota holders, will continue to focus on maximizing fibre throughput. Cutting trees is, after all, the *raison d'être* of forestry companies. It is the government that is truly mandated with environmental stewardship of public lands and, therefore, has the responsibility to set minimum standards for forest management. The FSC Boreal Standard provides a working example of how this can be accomplished.

A key concept embedded in the FSC Boreal Standard is the linking of ecological management targets to patterns of the pre-industrial forest. In most regions the pre-industrial forest can still be well characterized — it's measurable and concrete. As such it is more robust and defensible than the “Range of Natural Variability” concept being adopted by many companies, which in practice is nebulous and open to manipulation. A case in point is the management of old-growth. Most companies using the Range of Natural Variability approach plan to reduce the amount of existing merchantable old-growth on their management area by 80% or more. Some companies are also using the Range of Natural Variability concept to try to gain access to the old growth found within riparian buffers. Because the Range of Natural Variability concept is so easily abused we suggest that the Planning Manual follow the lead of the FSC Boreal Standard and define unambiguous targets for key ecological attributes on the basis of distributions present in the ecoregion immediately prior to the advent of large-scale industrial operations.

With minimum standards in place there would still be plenty of opportunity for innovation and flexibility for adapting to local circumstances. But the lowest common denominator would be set by the government, not by individual companies.

Recommendation 3. That the government Planning Manual specify minimum targets for ecological indicators. Wherever applicable, targets should be based on emulating patterns of the pre-industrial forest generated by natural ecological processes.

Another important deficiency of the Planning Manual is that it lumps together ecological forest management and intensive forest management (a.k.a. enhanced forest management). As noted in the preceding section on the “triad” approach, intensive forest management practices must be restricted to designated zones. It follows that the Planning Manual must also be separated into extensive and intensive sections so that companies clearly understand which practices are allowable in each zone. The section on extensive management should be built around the criteria and indicators presented in Annex 4 and exclude intensive forestry practices. Reforestation should generally be accomplished through mixedwood management techniques (see Recommendation 6). The section on intensive management should contain all references to the following practices:

- Herbicide and pesticide application
- Thinning
- Tree improvement, including the selection of seed stock for desirable growth characteristics and other genetic manipulation
- Fertilization
- Site preparation that involves disturbance of deep soil structure

Recommendation 4. That the government Planning Manual be divided into separate sections for extensive and intensive forest management, with clear directions for when and where each form of management is to be used.

The management of old-growth is an issue of special concern. Research has shown that old-growth stands have the highest overall diversity of species relative to other age classes, with representation of many rare species.⁶⁴ Furthermore, many species have their highest abundance in old-growth.⁶⁵ A recent modeling study based on field studies of forest birds in northern Alberta has determined that many of our forest birds will decline precipitously unless dedicated efforts are made to conserve old-growth.⁶⁶ Large declines in several bird species have already been observed in townships with high levels of industrial development.⁶⁷

It is abundantly clear, and was recognized in the AFCS, that if old-growth-dependent species are to be maintained then rotation lengths must be extended.⁶⁸ In the FSC Boreal Standard, targets for old-growth are based on the mean quantity of old-growth in the pre-industrial forest, with a 25% variance over time. Recent research suggests that the spatial distribution of the old-growth is also critical.⁶⁹ At the stand scale it is best to retain or generate patches of old-growth in a way that maintains the size distribution of such patches in unharvested forests. In practice, this means you either harvest an entire patch, or you leave it alone. Evidence is also accumulating that old-growth patches contribute most to maintaining biodiversity when they are clustered.⁷⁰ This can be accomplished through a system of floating old-growth reserves⁷¹. In such a system large blocks of the management area (on the order of 15 townships in size) are left intact while harvesting in other parts of the management area is aggregated. In time the reserves are harvested or possibly burned by wildfire and replaced by new reserves elsewhere on the management area. It should be noted that some forms of old-growth are effectively static (e.g., along larger watercourses) and these should be retained as permanent old-growth reserves.⁷²

In our review of FMA management plans we found that management of old-growth was the area of least progress among companies. Despite claims by some companies to be managing within the Range of Natural Variation, all but two companies — Al-Pac and Daishowa — plan to liquidate old-growth on their FMA (where liquidate implies a permanent loss of 80% or more of the existing merchantable old-growth of one or more species). The concept of old-growth reserves is not mentioned in any of the plans, though Al-Pac has implemented an aggregated harvest approach that has some similarity to the old-growth reserve concept.

The government Planning Manual includes a good old-growth indicator: *Area of old interior forest will not be less than x% of each cover class over the next 200 years* (Annex 4). The main problem, as previously mentioned, is that the determination of the actual target is left to individual companies. This obviously presents a huge conflict of interest in that forestry companies have an inherent desire to harvest old-growth as quickly as possible (i.e., before volume is lost or a fire occurs). The FSC Boreal Standard, based on emulating patterns of the pre-industrial forest, provides an appropriate approach for setting meaningful objective targets. The Planning Manual also needs to address the spatial dimension of old-growth management, particularly at the landscape scale. The FSC approach of retaining large intact core areas on the landscape, functionally equivalent to the old-growth reserve concept, provides a useful template.

Recommendation 5. That the government Planning Manual include a comprehensive section on the management of old-growth, including minimum targets for the quantity and distribution of old-growth based on pre-industrial forest patterns.

Although the new Planning Manual has made the shift to ecological forest management, it attempts to do so with the dual land base system (deciduous/coniferous) intact. This presents a fundamental and untenable inconsistency. Under ecological forest management the unit of management is the forest, not particular stands. It follows that the dual land base system should be merged into a single land base with a single land manager. FMA holders, by virtue of their area-based tenures and management capacity, are the logical choice for the role of land manager. Quota holders would receive an agreed-to volume of timber, but would otherwise have a limited role in operational planning. Any disagreements between quota holders and FMA holders would be arbitrated by the government.

An important benefit of the single land base system is that it removes intrinsic barriers to the retention of mixedwood forests, which have the highest species richness of all forest types.⁷³ The dual land base system is fundamentally wedded to monoculture regeneration techniques that are inefficient and inconsistent with ecological forest management. The key to mixedwood management is that instead of fighting against the system, you work with it. For example, instead of clearcutting, invasive site preparation, and extensive planting, natural softwood regeneration is accomplished through the retention of conifer understory at harvest time with minimal in-fill planting. Following the adoption of a single land base system the Planning Manual should formally incorporate mixedwood management⁷⁴ as the preferred approach to forest regeneration.

Recommendation 6. That the province adopt a single land base system for FMA holders and quota holders as the basis for implementing ecological forest management and transitioning from monoculture reforestation to mixedwood management.

Another holdover in the Planning Manual from earlier times is the approach to timber supply analysis. Whereas the AFCS and the FSC Boreal Standard both emphasize the importance of the precautionary principle, the Planning Manual continues to permit timber supply projections that are guaranteed to be overly optimistic.⁷⁵ Companies are not required to include either fire or petroleum sector disturbances in their projections, but conversely, they are permitted to include benefits from intensive management techniques before they are actually realized. We have previously noted the need to restrict intensive management to designated areas where special silvicultural practices and harvest schedules apply. To ensure ecological and economic sustainability on the extensive land base, timber supply projections must include realistic estimates of all external timber losses.

Recommendation 7. That the government Planning Manual require companies to include realistic estimates of all external timber losses, including fire and clearing by the petroleum sector, over the full planning horizon in their timber supply analyses.

The new Planning Manual references a set of provincial Operating Ground Rules that are similar in format and content to previous versions of the Ground Rules. In the past, these Ground Rules served as minimum standards at the operational level. However, this role has largely been subsumed in the new Planning Manual by Annex 4, setting up an internal competition among standards. Furthermore, because the Ground Rules were developed in a different era they are out of sync with the rest of the Planning Manual. It would be best now to integrate the Ground Rules into Section 2 and Annex 4 of the Planning Manual. The revised and expanded Annex 4 would contain explanatory text, serving the same function as the discussion segments in the Ground Rules, and minimum standards expressed as targets (incorporating any relevant standards from the Ground Rules).

Recommendation 8. That the Operating Ground Rules be fully integrated into Section 2 and Annex 4 of the government Planning Manual.

The following is a list of additional concerns regarding the government Planning Manual that should be addressed:

- There is a concern that an engineered FireSmart landscape may be incompatible with the maintenance of natural forest patterns, particularly old-growth. A move to a FireSmart landscape cannot come at the expense of ecological integrity.
- In our opinion, soil quality is being compromised by logging that is occurring when conditions are too wet and by site preparation techniques that disturb deep soil layers. We recommend a general shift away from logging on non-frozen ground and the restriction of scarification and pit mounding to intensive management zones only.

- The objective of retaining burned habitat should include an indicator for large intact blocks.
- To maximize the ecological benefits from slash, it should be distributed rather than burned.
- Locally adapted native species should be used wherever ground cover is required.

Legislative Framework and Accountability

As the government Planning Manual blazes a trail towards ecological forest management it leaves far behind any supporting legislative framework. The government had committed to updating the *Forests Act* as part of the AFCS process, but nothing has been done over the past decade and the *Act* is now seriously out of date. There is also a need to update other pieces of legislation to remove roadblocks to integrated resource management.

Because the *Forests Act* is so outdated forest management in Alberta is now being governed almost exclusively through policy, not law. The problem with this is a lack of transparency and accountability. Major forest management decisions are neither subject to legislative debate nor open to legal recourse. For example, should it take the government the next 20 years to implement the Planning Manual there would be no legal repercussions.

Recommendation 9. That the AFCS and the new government Planning Manual be used as the basis for reform of the *Forests Act* and other relevant legislation.

The AFCS also identified the need to improve accountability mechanisms for forestry companies. The Planning Manual should define a set of monitoring standards that companies must use to measure compliance with their plans and the status of targets defined in Annex 4. In addition, companies should be required to participate in the provincial biomonitoring program⁷⁶ as it becomes operational. Finally, the Planning Manual should include accountability mechanisms based on periodic third-party audits. Consistency among companies in monitoring and reporting will be important for facilitating evaluation by auditors and the public. This could be accomplished by requiring companies to carefully follow government-prescribed templates (e.g., Annex 4). The entire monitoring and accountability system must be supported by appropriate legislative reform that defines enforcement mechanisms and penalties for compliance failures.

Recommendation 10. That the government Planning Manual include monitoring standards and accountability mechanisms based on third-party audits, supported by appropriate enforcement legislation.

Decision-making

Commercial forests in Alberta occur almost entirely on public lands. Therefore, stewardship of these forests is ultimately the responsibility of the government and management objectives should reflect current public values and full-cost accounting. The

AFCS made the following recommendations regarding forest management decision-making:

- *“Meaningful public involvement must be an integral component of all major decisions.”⁷⁷*
- *“Citizens must have access to accurate, pertinent and timely information about the forest and proposals for its use.”⁷⁸*

In the years following the AFCS there have been no substantive changes in the way that decisions concerning forest management are made. It remains the government’s standard practice to consult with industry, but bypass other stakeholders and the public, when developing forestry policy.

Public input with respect to forest management continues to be limited to the feedback FMA holders receive from their public advisory committees. These advisory committees are dominated by local commercial interests and other user groups and generally lack an effective voice for the conservation of biodiversity. Moreover, the scope of the debate is defined and constrained by the FMA holders. Consequently, public advisory committees have not been an effective vehicle for ensuring that management plans reflect the forest values generally held by Albertans.

The whole notion of the public providing their input directly to forestry companies is flawed. It is the government’s role to steward the forest on behalf of the public. To accomplish this the current government-industry axis of decision-making must be transformed to a more inclusive form of decision-making. An effective broad-based provincial advisory council is an approach that should be considered for this, augmented by other approaches. The Clean Air Strategic Alliance (CASA) may serve as a useful model. In addition, the government needs to take a more active leadership role, translating desired outcomes at the provincial level into clear directions for forestry companies and other industrial operators.

Recommendation 11. That public values and desired outcomes are reflected in more active and responsive government leadership of forest management, particularly at the provincial level.

Recommendation 12. That the government establish an Internet-based clearing house for all information relevant to forest management, including forest management plans, stewardship reports, and monitoring results (including oil and gas activities).

Lessons From Other Jurisdictions

Though our recommendations may seem to some as extreme or unworkable, they are really nothing more than a restatement of the core principles of the AFCS and the FSC Boreal Standard. Moreover, looking beyond our provincial borders one can see that what may seem impossible here has already been accomplished in other jurisdictions. For example, a decade ago B.C. launched its Forest Practices Code to *“set and enforce mandatory minimum requirements for forestry operations . . . that will establish British Columbia as a leader in the attainment of environmental and resource sustainability.”⁷⁹* The Code was

supported by new legislation, the *Forest Practices Code of British Columbia Act*. B.C. also implemented a strategic land use planning system to produce integrated land management plans for the province (Land and Resource Management Plans). To date, plans have been approved for more than 70% of British Columbia.

Ontario went through a consultative process in the 1990s similar to the one that led to the AFCS in Alberta. The major difference was that 20 of the recommendations were incorporated directly into new legislation, the *Crown Forest Sustainability Act*.⁸⁰ The purposes of this Act are to “*provide for the sustainability of Crown forests and, in accordance with that objective, to manage Crown forests to meet social, economic and environmental needs of present and future generations. . . . In this Act, “sustainability” means long term Crown forest health.*”⁷⁸ The reform of forest management in Ontario also included a process for establishing additional protected areas in the commercial forest zone. Through this process 378 new parks totaling 24,000 km² were established in 1999.

Even Quebec, which has long been a hold-out with regards to forestry reform, has decided that substantive change is necessary. Following a report by the Coulombe Commission, a group assembled last year to study the sustainability of current forestry operations, the government of Quebec has decided to reduce the softwood annual allowable cut on provincial lands by 20%. Additional changes are pending.

Conclusion

Our review of forest management in Alberta shows that the vision set forth in the AFCS remains largely unfulfilled. Despite the efforts of a few progressive forestry companies, our forests today are in substantially worse shape than they were a decade ago when the AFCS was being drafted. Ecological thresholds have been exceeded in many regions and many wildlife species are in decline. Projecting the trajectory of the past ten years into the future it is evident that many species will be lost from the province unless significant changes are made. Clearly, the terms of industry’s social licence for operating on public lands are being violated, with the government as much to blame as individual companies.

Fortunately, there is reason to believe that we are now in the midst of a transition to a new era of forest management. Having paid off the province’s financial debt the government must now realign its priorities — and maintaining the province’s natural capital looms high on the horizon.⁸¹ Another important driver of change is the steadily increasing market demand for wood products coming from forests that are sustainably managed.

In our view, the new government Planning Manual represents an important first step on the way to Alberta’s new era of forest management. But if it is to succeed it needs to be strengthened (as described above) and supported by parallel policy and legislative initiatives that facilitate integrated resource management and the implementation of the triad approach. Providing a road map for the way ahead is the AFCS, as valid today as the day it was released.

ACKNOWLEDGEMENTS

We thank Chris Henschel for providing information on forestry reform in Ontario and Steve Cumming for his insights into the management of old-growth forests. We also thank Doug Sklar and Robert Stokes, with Alberta Sustainable Development, for providing access to the government Planning Manual and company management plans as well as answering questions, and we thank the various forestry companies for their cooperation with the survey.

CITATIONS

- ¹ Alberta Forest Conservation Strategy Steering Committee. 1997. Alberta Forest Conservation Strategy. Alberta Environmental Protection, Edmonton, Alberta, Canada. (Available at: www.borealcentre.ca/reports/reports.html)
- ² McAllister Opinion Research. 2004. Communications research conducted for the Canadian Boreal Initiative.
- ³ Boreal Market News. Available at: www.cpaws-edmonton.org/CPAWS-BMN.html
- ⁴ Dzus, E. 2001. Status of the Woodland Caribou (*Rangifer tarandus caribou*) in Alberta. Alberta Wildlife Status Report No. 30. Alberta Ministry of the Environment, Edmonton, Alberta, Canada.
- ⁵ Schneider, R.R., B. Stelfox, S. Boutin, and S. Wasel. 2003. Managing the cumulative impacts of land-uses in the western Canadian sedimentary basin: a modeling approach. *Cons. Ecol*: 7, issue 1, article 8.
- ⁶ Weclaw P. and Hudson R.J. 2004. Simulation of conservation and management of woodland caribou. *Ecological Modelling*. 177:75-94
- ⁷ Forest Stewardship Council Canada Working Group. 2004. National Boreal Standard. (Available at: www.fscscanada.org)
- ⁸ FSC web site: www.fsc.org
- ⁹ Forest Stewardship Council. 2005. FSC Principles & Criteria of Forest Stewardship. (Available at www.fsc.org/en/about/policy_standards/princ_criteria)
- ¹⁰ Sustainable Resource Development. 2005. Draft Alberta Forest Management Planning Manual, version 3 (June 2005). (Available at: www3.gov.ab.ca/srd/forests/managing/planning_rules.html)
- ¹¹ Canadian Standards Association. 2002. CSA Sustainable Forest Management Standard CSA-Z809-2002. (Available at: <http://certifiedwood.csa.ca/>)
- ¹² Stelfox, J. B. 1995. Relationships Between Stand Age, Stand Structure, and Biodiversity in Aspen Mixedwood Forests in Alberta. Alberta Environmental Centre, Vegreville, AB. (Available at: www.borealcentre.ca/reports/reports.html)
- ¹³ Government Planning Manual, Annex 4, Section 1.1.1.1
- ¹⁴ FSC Boreal Standard, Section 6.3.6
- ¹⁵ Schmiegelow, F. and M. Monkkonen. 2002. Habitat loss and fragmentation in dynamic landscapes: avian perspectives from the boreal forest. *Ecol. Appl*: 12: 375-389.
- ¹⁶ Steve Cumming, unpublished data
- ¹⁷ Government Planning Manual, Annex 4, Section 1.1.1.2
- ¹⁸ FSC Boreal Standard, Section 6.3.6
- ¹⁹ FSC Boreal Standard, Section 6.3.12

- ²⁰ Canadian Forest Products. 2003. Detailed Forest Management Plan: Fig. 135 and 141
- ²¹ Government Planning Manual, Annex 4, Section 1.1.1.3
- ²² FSC Boreal Standard, Section 6.3.16
- ²³ FSC Boreal Standard, Section 6.3.19
- ²⁴ Sustainable Resource Development. 2002. Fire Salvage Planning & Operations — Retaining Natural Disturbance Elements. Appendix 2 in Fire Salvage Strategy Framework
- ²⁵ Government Planning Manual, Annex 4, Section 1.1.1.5
- ²⁶ FSC Boreal Standard, Section 6.3.11
- ²⁷ Provincial Operating Ground Rules, Section 6
- ²⁸ FSC Boreal Standard, Section 6.3.17
- ²⁹ Song, S.J. 2002. Ecological basis for stand management: a synthesis of ecological responses to wildfire and harvesting. Alberta Research Council, Vegreville, AB.
- ³⁰ Government Planning Manual, Annex 4, Section 1.1.2.1
- ³¹ FSC Boreal Standard, Section 6.3.10
- ³² Government Planning Manual, Annex 4, Section 1.1.2.1
- ³³ FSC Boreal Standard, Section 6.1.7
- ³⁴ Government Planning Manual, Annex 4, Section. 1.2.1.1
- ³⁵ FSC Boreal Standard, Section 6.2.4
- ³⁶ Government Planning Manual, Annex 4, Section. 1.3.1.1
- ³⁷ FSC Boreal Standard, Section 6.3.8
- ³⁸ Alberta Forest Conservation Strategy, p. 17.
- ³⁹ Canadian Council of Forest Ministers. 1998. The National Forest Strategy.
- ⁴⁰ Senate Subcommittee on the Boreal Forest. 1999. Competing realities: the boreal forest at risk. The Senate of Canada, Ottawa, ON. (Available at: www.parl.gc.ca/36/1/parlbus/commbus/senate/com-e/rep-e.htm)
- ⁴¹ Government Planning Manual, Annex 4, Section 1.4
- ⁴² Canadian Standards Association. 2002. CSA Sustainable Forest Management Standard CSA-Z809-2002: Element 1.4 (Available at: <http://certifiedwood.csa.ca/>)
- ⁴³ FSC Boreal Standard, Section 6.4.1
- ⁴⁴ FSC Boreal Standard, Section 6.4.2 and 6.4.3
- ⁴⁵ FSC Boreal Standard, Section 6.4.6
- ⁴⁶ Government Planning Manual, Annex 4, Section. 2.1.2
- ⁴⁷ Government Planning Manual, Annex 4, Section. 2.1.3
- ⁴⁸ Provincial Operating Ground Rules, Section 9
- ⁴⁹ FSC Boreal Standard, Section 6.0
- ⁵⁰ FSC Boreal Standard, Section 6.3.1
- ⁵¹ Government Planning Manual, Annex 4, Section. 3.2.1
- ⁵² FSC Boreal Standard, Section 6.5.1
- ⁵³ Alberta Forest Conservation Strategy, p. 19
- ⁵⁴ FSC Boreal Standard, Section 6.10.2
- ⁵⁵ FSC Boreal Standard, Section 6.10.3
- ⁵⁶ FSC Boreal Standard, Glossary
- ⁵⁷ FSC Boreal Standard, Section 5.6.1
- ⁵⁸ Alberta Forest Conservation Strategy, p. 1

- ⁵⁹ Pope, D. 2001. Integrated landscape management on the Alpac FMA. In: Oil and gas planning on forested lands in Alberta: overview of CIF-RMS technical session, March 23, 2001. Canadian Institute of Forestry, Edmonton, AB.
- ⁶⁰ Dzus, E. 2001. Status of the woodland caribou (*Rangifer tarandus caribou*) in Alberta. Alberta Wildlife Status Report No. 30. Alberta Ministry of the Environment, Edmonton, Alberta, Canada.
- ⁶¹ Alberta Forest Conservation Strategy, p. 19
- ⁶² Senate Subcommittee on the Boreal Forest. 1999. Competing realities: the boreal forest at risk. The Senate of Canada, Ottawa, ON. (Available at: www.parl.gc.ca/36/1/parlbus/commbus/senate/com-e/rep-e.htm)
- ⁶³ Government Planning Manual, p. 11
- ⁶⁴ Stelfox, J. B. 1995. Relationships Between Stand Age, Stand Structure, and Biodiversity in Aspen Mixedwood Forests in Alberta. Alberta Environmental Centre, Vegreville, AB. (Available at: www.borealcentre.ca/reports/reports.html)
- ⁶⁵ Schieck, J., and M. Nietfeld. 1995. Bird species richness and abundance in relation to stand age and structure in aspen mixedwood forests in Alberta. Pages 115-157 in Stelfox, B., editors. Relationships Between Stand Age, Stand Structure, and Biodiversity in Aspen Mixedwood Forests in Alberta. Alberta Environmental Centre, Vegreville, AB.
- ⁶⁶ Cumming, unpublished data
- ⁶⁷ Schneider, R.R. 2002. *Alternative Futures: Alberta's Boreal Forest at the Crossroads*. Fig. 5.11
- ⁶⁸ Alberta Forest Conservation Strategy, p. 10
- ⁶⁹ Cumming, unpublished data
- ⁷⁰ Cumming, unpublished data
- ⁷¹ Cumming, S. G. , P. J. Burton and B. Klinkenberg. 1996. Canadian boreal mixedwood forests may have no "representative" areas: some implications for reserve design. *Ecography* 19:162–180
- ⁷² Timoney, K. 2000. Old-growth forests in space and time: fire, logging, falsehoods, and old-growth conservation. *Ecoforestry*. 15:7-16.
- ⁷³ Stelfox, J. B. 1995. Relationships Between Stand Age, Stand Structure, and Biodiversity in Aspen Mixedwood Forests in Alberta. Alberta Environmental Centre, Vegreville, AB. (Available at: www.borealcentre.ca/reports/reports.html)
- ⁷⁴ Lieffers, V., and J. Beck. 1994. A semi-natural approach to mixedwood management in the prairie provinces. *For. Chron.* 70:260-264.
- ⁷⁵ Schneider, R.R., B. Stelfox, S. Boutin, and S. Wasel. 2003. Managing the cumulative impacts of land-uses in the western Canadian sedimentary basin: a modeling approach. *Cons. Ecol*: 7, issue 1, article 8
- ⁷⁶ Alberta Biodiversity Monitoring Program. Web site: www.abmp.arc.ab.ca/
- ⁷⁷ Alberta Forest Conservation Strategy, p. 24
- ⁷⁸ Alberta Forest Conservation Strategy, p. 24
- ⁷⁹ Government of British Columbia. 1994 Forest Practices Code.
- ⁸⁰ Government of Ontario. 1994. Crown Forest Sustainability Act.
- ⁸¹ Canada West Foundation. 2003. Western Canada's Natural Capital

SUMMARY OF RECOMMENDATIONS

1. That the scope of FMA management plans, modeled on the new government Planning Manual, be expanded to serve as regional integrated management plans designed to maintain the ecological integrity of the forest.
2. That the province formally implement the “triad” approach by applying ecological forest management to the majority of the forest land base, completing the protected area system, and limiting intensive forest management to marginal farm land.
3. That the government Planning Manual specify minimum targets for ecological indicators. Wherever applicable, targets should be based on emulating patterns of the pre-industrial forest generated by natural ecological processes.
4. That the government Planning Manual be divided into separate sections for extensive and intensive forest management, with clear directions for when and where each form of management is to be used.
5. That the government Planning Manual include a comprehensive section on the management of old-growth, including minimum targets for the quantity and distribution of old-growth based on pre-industrial forest patterns.
6. That the province adopt a single land base system for FMA holders and quota holders as the basis for implementing ecological forest management and transitioning from monoculture reforestation to mixedwood management.
7. That the government Planning Manual require companies to include realistic estimates of all external timber losses over the full planning horizon in their timber supply analyses.
8. That the Operating Ground Rules be fully integrated into Section 2 and Annex 4 of the government Planning Manual.
9. That the AFCS and the new government Planning Manual be used as the basis for reform of the *Forests Act* and other relevant legislation.
10. That the government Planning Manual include monitoring standards and accountability mechanisms based on third-party audits, supported by appropriate enforcement legislation.
11. That public values and desired outcomes are reflected in more active and responsive government leadership of forest management, particularly at the provincial level.
12. That the government establish an Internet-based clearing house for all information relevant to forest management, including forest management plans, stewardship reports, and monitoring results (including oil and gas activities).

APPENDIX 1. SUMMARY OF SURVEY RESULTS

1. **FMA Size.** Size of Forest Management Area (ha).
2. **FMA Duration.** Years FMA agreement in effect.
3. **Plan Years.** Years Detailed Forest Management Plan in effect.
4. **Type and Age.** DFMP provides timber supply projections by forest type and age?

Company	1. FMA Size	2. FMA Duration	3. Plan Years	4. Type and Age
Alberta Government	N/A	N/A	N/A	Yes
FSC Boreal Standard	N/A	N/A	N/A	Yes
Alberta Pacific	5, 812,185	1991-2011	2004-2014	Yes
Alberta Newsprint Company	378,726	1989-2009	1999-2009 rev. 2002	No. Conifer combined
Canadian Forest Products	649,160	1999-2019	2003-2011	No. All types combined
Daishowa- Marubeni	2, 900,000	1989-2009	1999-1909	Yes
Millar Western	440, 680	1997-2017	1997-2006	No. Conifer combined
Sundance	265, 834	1997-2017	1997-2007	No
Tolko and Footner High Level	3, 560,311	2002-2022	2003-2007	Yes
Tolko Slave Lake	717, 884	1986-2005	1998- 2008	No. Conifer combined
West Fraser- Blue Ridge	664, 662	1995-2015	2004- 2010	Yes
West Fraser- Slave Lake Pulp	655, 789	1990-2020	2000-2010	Yes
West Fraser- Sundre	559, 354	1992-2012	1996-2006	No
West Fraser - Hinton	999, 559	1988-2008	1999-2009	No. White and black spruce combined
Weyerhaeuser Drayton Valley	427, 700	1985-2005	2000-2010	Yes
Weyerhaeuser Edson	505, 344	1997-2017	2003-2013	Yes
Weyerhaeuser Grande Prairie	1,142, 388	1989-2008	1999-2009	Yes

- 5. Old Forest Reduction.** Approximate amount of permanent reduction of existing merchantable old forest, based on timber supply projections presented in the DFMP
- 6. Stand.** Intention to maintain patch size and shape similar to existing? (Yes/No)
- 7. Core.** Target for large areas of intact mature and old forest core habitat? (Yes/No)
- 8. Roads.** Target for maximum road density for the FMA? (Yes/No)
- 9. Residual.** Target for representative merchantable residual in cutblocks? (Yes/No)

Company	5. Old Forest Reduction¹	6. Stand	7. Core	8. Access	9. Residual
Alberta Government	No target set.	Yes	No	Yes	Yes
FSC Boreal Standard	Maintain old forest	Yes	Yes	Yes	Yes, 10-50% ²
Alberta Pacific	Maintain old forest	Yes	Yes	No	Alpac 5% Quota Holders, 1%
Alberta Newsprint Company	100% loss deciduous (100-140 age class) and 95% loss pure conifer (100-140 age class) over 100 yrs.	Yes	No	Yes, 0.3 km/km ²	No
Canadian Forest Products	74% over-mature age class over 200 years	Yes	No	No	No
Daishowa-Marubeni	Maintain old forest	Yes	No	No	Yes, 15% Not quota holders
Millar Western	87% loss of old hardwood over 50 years	Yes	No	No	Yes, 4-7%
Sundance	100% reduction	Yes	No	No	Yes, 1.5%
Tolko High Level	100% loss of deciduous (> 110 yrs old) and 100% white spruce (160-190 age class) over 200 years	Yes	No	No	Yes, 1%
Tolko Slave Lake	100% loss of deciduous (> 80 yrs old) over 100 years	Yes	No	No	Yes, 1%
West Fraser- Blue Ridge	100% loss of deciduous (80-120 age class) and 100% white spruce (120-160 age class) over 100 yrs.	No	No	No	No
West Fraser- Slave Lake Pulp	100% loss of all old commercial forest types (>80 yrs) over 160 yrs.	Yes	No	No	Yes, 1-3%
West Fraser- Sundre	No information on merchantable old forest	No	No	No	No.
West Fraser - Hinton	80% loss of old deciduous and 90% loss of mature pine over 100 yrs.	Yes	No	No	No ³
Weyerhaeuser Drayton Valley	80% loss of old white spruce in upper foothills	No	No	No	Yes, 5%
Weyerhaeuser Edson	No information on merchantable old forest	No	No	No	Yes, 3-8%
Weyerhaeuser Grande Prairie	80% loss of Lower Foothills white spruce (> 80 yrs) and >50% Upper Foothills white spruce over 200 yrs.	Yes	No	No	Yes, <1%

¹Note: Fire and other disturbances are not included in the estimates; therefore they are optimistic.

²FSC does not specify how much of the retention has to be within cutblocks

³Company plans to include 2% structure retention in their management plan

10. DWD. Downed Woody Debris. Target for maintaining DWD relative to pre-harvest condition? (Yes/No)

11. Slash. 1 – distribute; 2 – pile and burn

12. Watershed. Targets for watershed protection?

Company	10. DWD	11. Slash	12. Watershed
Alberta Government	No	1 or 2	Water yield increases <15% in 3 rd order streams.
FSC Boreal Standard	No	1 or 2	Yes
Alberta Pacific	No	Al-Pac, 1 and 2	No
Alberta Newsprint Company	Yes, preharvest amounts	No information	No
Canadian Forest Products	Yes, 90%	1 or 2	Yes. ¹ To not exceed a range of 20-40% of forest cover removal, above the “H60” line.
Daishowa-Marubeni	Yes, all possible. Not quota holders	1 or 2	<15% increase in water yield.
Millar Western	Yes, all possible	2, leave 4 piles/ha	Water yield increase less than one standard of deviation of historical.
Sundance	Yes, all possible	2	Maintain quality and quantity.
Tolko High Level	Yes, 5% of piles	2, leave 5% of piles	Within 34% of current levels + or – 12%.
Tolko Slave Lake	Yes, all possible	1	Water flow remains within natural variance.
West Fraser-Blue Ridge	No	No information	No information available.
West Fraser-Slave Lake Pulp	Yes, all possible	1 and 2, leave 5% piles	Yes. No more than 50% of watershed below species specific threshold ages.
West Fraser-Sundre	No	2	No. Two and three pass harvesting will ensure that entire watersheds are not harvested at once.
West Fraser - Hinton	No	1 or 2	Yes. ² Sensitivity ratings of watersheds.
Weyerhaeuser - Drayton Valley	No	1 or 2	Maintain natural water flows.
Weyerhaeuser - Edson	No	1 or 2	Maintain natural water flows.
Weyerhaeuser-Grande Prairie	Yes	1 or 2	Maintain natural water flows.

¹To not exceed a range of 20-40% of forest cover removal, above the “H60” line. H60 is the elevation above which 60% of the watershed lies. The watershed area above the H60 is considered as the source area for the major snowmelt peak flows (B.C. Ministry of Forests 1999).

²The assessment produces sensitivity ratings for each measurement endpoint for each basin resulting from the maximum amount of activity in the underlying compartments. The sensitivity ratings can be used to guide adjustments to compartment schedules to reduce undesirable outcomes of concentrated activity over short timeframes and smaller geographic areas.

13. Herbicides. Using herbicides for forest regeneration? (Yes/No)

14. Scarification. Mechanical disturbance of the soil structure? (Yes/No)

15. Thinning. Using thinning to increase tree growth? (Yes/No)

16. AAC Fire. Estimated future impacts of fire included in timber supply modeling? (Yes/No)

17. AAC Oil. Estimated future impacts of oil and gas activities included in timber supply modeling? (Yes/No)

18. Cert. Certification to either CSA, FSC or SFI?

Company	13. Herbicides¹	14. Scarification¹	15. Thinning¹	16. AAC Fire	17. AAC Oil	18. Cert.
Alberta Government	Yes	Yes	Yes	No	No	No
FSC Boreal Standard	Yes- phase out	Not mentioned	Not mentioned	Yes	Yes	FSC
Alberta Pacific	Yes	Yes	Yes	No	No ²	No
Alberta Newsprint Company	Yes	Yes	Yes	No info.	No info.	No info.
Canadian Forest Products	Yes	Yes	Yes	No	Yes, 2.2%	CSA
Daishowa Marubeni	Yes	Yes	No	No	No	No
Millar Western	Yes	Yes	Yes	No	No	No
Sundance	Yes	Yes	Yes	No	No	SFI
Tolko High Level	Yes	Yes	Yes	No	No	CSA
Tolko Slave Lake	Yes	Yes	No	No	No	CSA
West Fraser- Blue Ridge Lumber	Yes	Yes	Yes	No info.	Yes	SFI
West Fraser- Slave Lake Pulp	Yes	5%	No	No	Yes 1.6%	SFI
West Fraser- Sundre	No info.	Yes	No?	No info.	No	CSA
West Fraser - Hinton	No	Yes	Yes	No	No	CSA
Weyerhaeuser Drayton Valley	No	Yes	No info.	No	No info.	CSA
Weyerhaeuser Edson	No info.	Yes	No info.	No	No info.	CSA
Weyerhaeuser Grande Prairie	Yes	Yes	Yes	No	Yes	CSA

¹In many management areas only the quota holders are conducting these activities, not the FMA holder.

²Future surface oilsands areas have been identified, and do not contribute to AAC calculations.