CANADIAN
SILVICULTURE
NOVEMBER 2006

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Editorial

by Dirk Brinkman

Integrating traditional and scientific knowledge

Canada's tenth National Forest Congress' focus was "Sustainable Land Management in the Boreal: A Global Challenge". Many speakers referenced the World Resources Institute's 1997 classification of Canada's boreal forests as one of the last three frontier forests. A frontier forest is an extensive, intact forest ecosystem capable of supporting its large mammals. After 100 years of development, Canada's boreal is the only frontier forest remaining in any developed country. The congress' theme centred upon sustaining this intact ecosystem.

Stephen Woodley, Chief Scientist at the Ecological Integrity Branch of Parks Canada, amongst others, cited a global study Latent extinction risk and the future battlegrounds of mammal conservation, published in the Proceedings of the National Academy of Science in the US. The global assessment indicated Canada's boreal was one of the main future hot spots for habitat fragmentation and degradation.

The boreal crisis area is the Western Canada sandstone basin, home of Canada's booming oil reserves. Brad Pickering, Alberta's Deputy Minister of Sustainable Resource Development, highlighted this distinct area with a satellite night image of the world, in which Alberta, and especially the area of the boreal's habitat threat, stands out brightly. The oil price has been high and the oil patch is booming. That light is a point of pride to some, but the DM highlighted it at the congress as a problem area for sustainability.

Herb Norweigen, Grand Chief of the Decho First Nation in the Athabasca region of the NWT, declared that "hunger for energy… is…inflicting a cancer on mother earth." Herb talked about the tar sands oil extraction affecting the region's hydrology with formerly clean streams and lakes now brown and oiled. In response, the Decho First Nation launched a legal challenge to the largest capital investment in North America, winning the right to a new EA. Their writ also seeks to have clean water declared as a human right.

Alberta's response to the fracturing of habitat contiguity in its boreal by the twin disturbances of forest harvesting and oil and gas activity is to lead Canada in the development of Integrated Landscape Management (ILM) practices. ILM pragmatically attempts to reduce the cumulative impact of the booming energy and timber sectors by integrating their planning. However, neither Alberta nor BC requires that the energy sector comply with the same sustainable ecosystem-based land use practices to which the forest sector is held accountable.

The Forest Products Association of Canada (FPAC) declared that its members go beyond regulatory accountability by being certified to independent standards like FSC and SFC. FPAC used the congress to declare its members will go still farther towards sustainability in a joint venture with the Canadian Boreal Initiative. All FPAC members (who represent 60% of forest tenure area in Canada) have committed to first consulting through formal land use tables with First Nations before reallocating or considering allocating their long-term forest tenures. FPAC's partnership with the boreal Initiative may lead to a new level of accommodation of both aboriginal and conservation claims. It also lays the groundwork for integrating aboriginal and scientific knowledge. Conspicuously, the energy sector, whose added activity is fracturing the boreal to the point of distinguishing the region's latent extinction risk, is neither involved in this initiative nor leading a parallel initiative.

The highest form of integrated land management requires integrating traditional knowledge into scientific and spatial planning. Valerie Courtois, Forest Planner for the Innu Nation, brought some clarity to this challenge: "Traditional knowledge is layers of knowledge. Traditional knowledge has a higher level of reliability than western science, with severe consequences for error and 3,000 years of evidence. It is embedded in the language. Spiritual and moral relationships are tied directly to the land. This does not integrate well with scientific planning systems."

Fiona Schmiegelow, professor UA and Biodiversity Leader within the Sustainable Forest Management Network, challenged governments and industry to join their large scale scientific conservation-matrix model, which would guide adaptive management referenced to benchmark protected ecological areas. "The boreal", she said, "may be the last experiment in truly sustainable forest management, as such an endeavour is less likely to occur in Siberia or the Amazon, the other two intact 'frontier' forests, which are both in developing countries without the scientific communities or funding to undertake such a venture."

Larry Innes, Executive Director of the Boreal Initiative, to characterize the peril of the Boreal, shared with us an Innu Nation word "meca-quinta". Meca-quinta is what you say to someone going out onto uncertain ice. We could integrate meca-quinta into todays boreal cultural knowledge as we venture onto our uncertain scientific planning systems, which are characterized by theoretical assumptions. Like the uncertain ice caused by climate change now surrounding the Innu, the fracturing in the boreal by oil and gas disturbances have pushed the ecosystem into an unfamiliar state of change with new challenges in managing complexity.

While we cannot avoid operating on unproven assumptions, failure, as the latent extinction risk analysis shows, will have severe consequences. The challenge of curing our energy addiction within the boreal will clearly take wisdom and traditional wisdom will be welcome. The highest scientific knowledge the deepest traditional knowledge will not be enough, we also need the complete commitment of all players, industry, communities and government, for Canada's boreal to still be an intact Frontier Forest in the next century.

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SILVICULTURE & Climate Change

by Richard Hebda

Climate change now regularly hits the headlines. It was most strikingly emphasized this fall by the pronounced branchlet drop in western red cedars and the widespread wasting of coastal glaciers.

Whatever we may think about what climate change means to the urban and suburban dweller, there is little question that it will transform the living landscape and impact forestry and forest management. Forestry is ecology, and ecology depends on climate. Without forest ecology there is no forest economy. At the primary level, human communities depend on plant communities in the forestry sector.

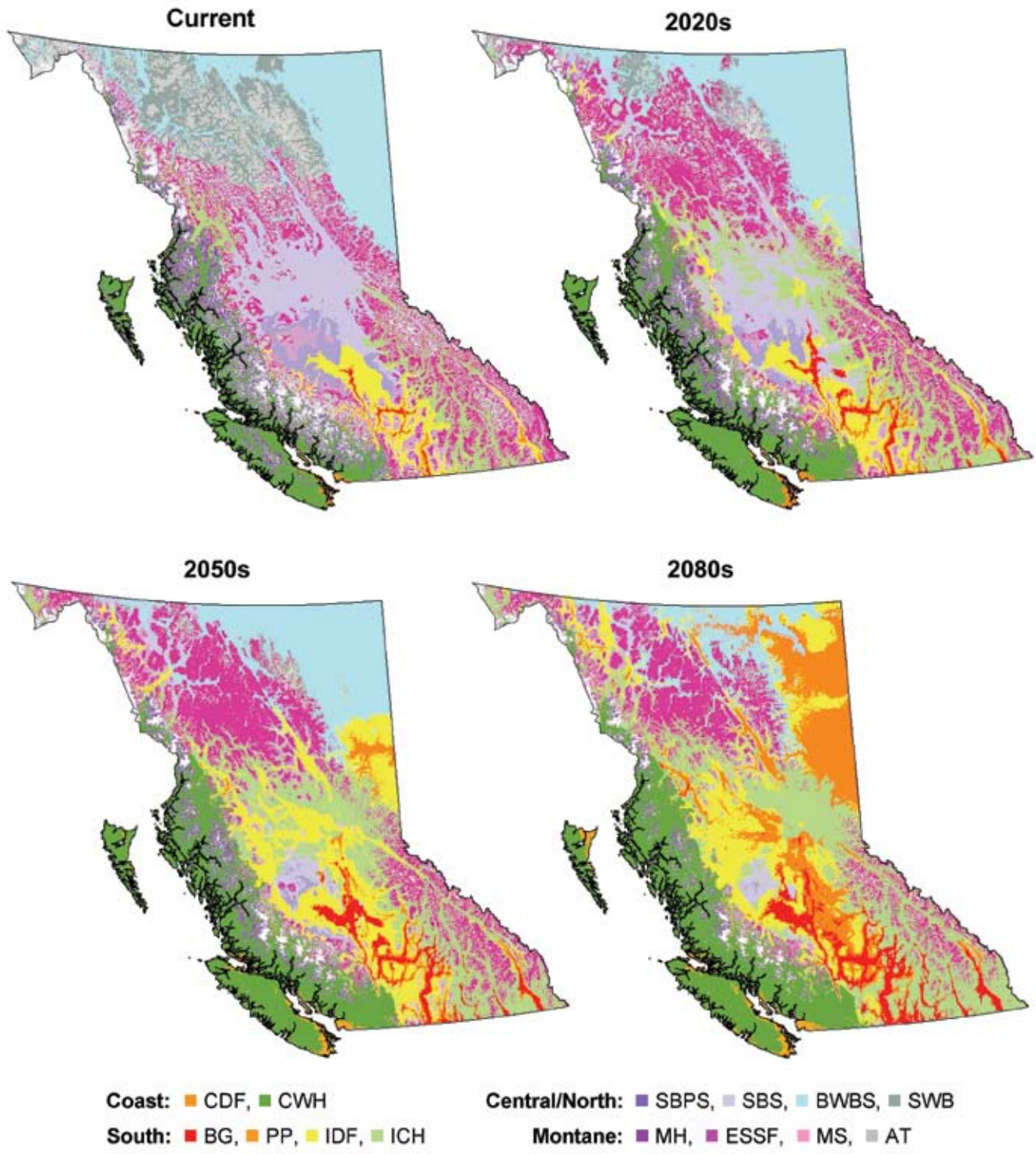
Silviculture itself is an ecological exercise, the manipulation of forest ecosystems and individual species within those ecosystems to reap timber, and these days, non-timber forest products. Planting, thinning, fertilizing, sheep grazing, selecting seed stocks, and insect management are all ecological experiments designed to enhance timber production and related values. The decades and centuries of knowledge gained through repeated experimentation by forest practitioners has allowed us to manipulate forest ecosystems to produce more and better timber.

In the next few decades, however, and certainly in the next rotation, the ecological framework will alter such that centuries of empirical dirt knowledge may not readily apply, or at least apply on a limited scale or in different places.

There are 2 powerful ways to gain insight into the scale of ecological transformation ahead: studies of past forest ecosystems and their responses to climate changes, and climate impact models.

The fossil pollen, cone, needle and charcoal record of the last 10,000 years is unequivocal about the scale of change we must expect. 7,000-10,000 years ago cyclically high solar radiation fostered a warmer (2-4° C) and drier summer climate in BC than today, much as expected in the next decades. Grassland and parkland were much more extensive than today. Forest types without modern equivalents occurred in BC, and may have been widespread. Fires burned widely and tree lines reached into today's alpine zone. A 4,000 year-old tree ring record from Vancouver Island shows dramatic decline in tree growth over only 3 years about 3,900 years ago, an indication that climatic shifts can occur rapidly with major impact on growth increment.

Overall the fossil record reveals that the climate of the last 4,000 years has been relatively stable, compared with preceding millennia. Forest ecosystems and species distributions achieved a relative equilibrium



with the climate. Thus studies of the fossil record in BC indicate that we can expect future climate change to be rapid, of large amplitude, and occur as variations between extremes. But unlike in earlier millennia, the change will play out on a disturbed and fragmented landscape, one without the ecological resilience of the past.

Global climate change models use well-established principles of mathematics and physics to estimate climates for different concentrations of atmospheric greenhouse gasses. Climate impact models take the output from climate change models and by using the climatic envelope or limits of species, ecosystems or processes, to anticipate where, geographically, these changes might be distributed in the future.

There are several climate models available today for a range of future greenhouse gas concentrations. Their outcomes vary, but on average for western Canada a mean annual temperature increase of about 5º C is indicated, with about a 10% risk of as much as 10ºC change by the end of this century. Precipitation is expected to increase slightly but with stronger summer droughts. These climatic

conditions will be without precedent for the last tens of millions of years, taking us back geologically to a time when forests grew in Canada's high Arctic.

Climate impact models provide sobering insight into the scope of the ecological transformation ahead. Using a Canadian climate model, Wang and Hamman recently showed that the climate of BC's ponderosa pine ecological zone (dry climates of the Okanagan valley) might occur in the Peace River region and reach into the Northwest Territories by 2080. At the species level, Royal BC museum models (see the Pacific Climate Impacts Consortium website at www.pcic.org) reveal the disappearance of climate suitable for western red cedar (a good proxy for our iconic coastal temperate rainforests) in much of lowland southern BC, and its spread into northern BC by 2080 with major shifts underway by 2050. Climate suitable for Garry oak could spread to the Alaska panhandle and lower Skeena River by mid-century.

Dying cedars near Parksville, BC, 2005.

A key point is that at the predicted rate of change, the range loss of some tree species will be more rapid than range expansion into newly suitable regions. This "big squeeze" means that it will be many centuries before any sort of natural ecological equilibrium is achieved in our forest ecosystems.

For the silviculture practitioner these coming ecological transformations pose an enormous challenge because they require planning for a shifting target. Consideration of secondary interactions such as those involving pest-host relationships must be added; these will likely control what can grow, how well and where. Fine-scale tinkering with genetic stocks and adjustments in silviculture prescriptions will not do the job. Silviculture has to return to basic ecological principles.

A basic strategy is to develop maps of sensitivity to climate change in anticipation of species range shifts and ecosystem transformations. These maps can serve as a basis from which to devise appropriate and admittedly experimental planting mixes and management measures. Other strategies include identifying key ecological processes such as soil formation and then fostering and conserving them, maintaining and redeveloping landscape scale connections for natural migration to take place, establishing a network of experimental seed nurseries and plots in which a wide range of genetic diversity is maintained, monitoring growth in a wide range of climates to detect both positive and negative responses, and carrying out vigorous invasive species monitoring and control. In some cases, raising timber trees may best be carried out by intensive management of ecologically intelligent plantations as a way of reducing risk and countering uncertainty.

Overall silviculture may have to shift its focus from growing trees for harvest to, in some cases, simply sustaining forests and growing trees as part of ecosystems that sequester carbon while delivering it into storage in forest soils, and sustaining biodiversity for an uncertain future. Trees for people, yes, and for the planet too!

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Forest Health

by Richard A. Fleming

Forecasting Insect Outbreak Responses to Climatic Change

Insects as a whole represent the dominant natural disturbance factor in Canada's forests. During outbreaks, host trees, especially those in older stands, are often killed over extensive areas. This shifts the forest toward the smaller trees of younger age-classes that contain less biomass and thus store less carbon. One concern is that, together with climate change, insect outbreaks might even alter subsequent forest regeneration so that the original forest ecosystem does not return. Rather, it gets replaced by another with a different species mix, or possibly by an entirely different type of ecosystem (e.g., shrubs, grasses).

In general, as explained in the last issue of *Canadian Silviculture*, in the article, "Insects are Responding to Climatic Change", the predicted temperature increases associated with climatic change are expected to lead directly to increases in the potential population growth rates of many forest insects. Increased population growth rates, in turn, potentially lead to expansion of insect ranges northward and upward in altitude, to longer seasons of activity, and to increased peak activity during the year.

The extent to which this potential for increased population growth rates is realized will likely depend on a number of complications. These complications include changes in the abiotic environment, changes in species interactions, and changes in the regimes of natural selection. For instance, the increasing concentrations of atmospheric CO_2 constitute a potentially important change in the abiotic environment. The consequent increase in carbon:nitrogen ratios of plants is expected to cause insects to eat more in order to obtain adequate dietary nitrogen. Increases in plant biomass or carbon-based defences may compensate for this effect. For insects, the net result may be slower larval development and increased mortality.

Changes in climate are expected to affect interactions between species, because the direct effects of climate change will almost certainly differ quantitatively among the species in the complex food webs within which most insect species are embedded. The resulting changes in the relative abundances of different species would alter predator/prey, host/parasite, and plant/herbivore ratios, and thus quantitatively affect species interactions throughout food webs. Shifting species interactions and altered atmospheric chemistry make for novel environments, and hence changed regimes of natural selection with which each species must contend.

The most common approach to forecasting how insect outbreaks may respond to climate change involves analysing historical data from a certain region to reveal statistical associations between short-term climatic patterns and the frequency, duration, and extent of outbreaks. For example, colder weather has been associated with shorter outbreaks of the forest tent caterpillar in central Ontario, and less frequent outbreaks of the European pine sawfly in Finland's boreal forest. Warm, dry summers have been associated with outbreaks of a number of other insect species in Canada's forests (eastern hemlock looper, mountain pine beetle, western spruce budworm, jackpine budworm, and the spruce budworm). Assuming these same statistical associations hold as climate change progresses, one can infer how the characteristics for that outbreak regime might change in response to the climatic changes projected for the region. In general, this research suggests that the outbreaks of many species can be expected to occur more often, be more extensive, and/or last longer.

This does not necessarily mean that the direct economic impact of these insects will increase - some think increased tree growth will more than offset any increased losses to insects. But there are worrisome possibilities. Climate warming may allow certain insects (e.g., the mountain pine beetle) to extend their ranges into extensive, and previously geographically isolated regions containing vulnerable host species. Overall, the uncertainties associated with climate change influences on insect outbreaks will likely affect depletion forecasts, pest hazard rating procedures, and long-term planning for harvest queues and pest control requirements.

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forest management:

more than timber

by Wendy Cocksedge and Tim Brigham

In the last 2 decades, the term “non-timber forest products” has entered the lexicon of forest resource managers in Canada and many other parts of the world. The term refers to all of the botanical and mycological species of the forest and their associated services, such as ecotourism. Non-timber forest products (NTFPs) can be considered a sub-set of the larger concept of ecosystem services, as defined by the UN’s Millennium Ecosystem Assessment 2005. The relatively recent appearance of the term has often led to the misconception that these are ‘new’ products representing a new use of forest resources. In fact, the harvesting and use of these resources represents the first human use of forest resources, and they remain a key part of livelihood strategies for hundreds of millions of people around the globe. Apart from their significant commercial value - in BC, the non-timber forest products industry is valued in the hundreds of millions of dollars annually - these resources also make essential contributions in meeting subsistence needs as well as playing important roles in cultural practices and recreational activities. Although the use of non-timber forest products is globally widespread, their value is often under-recognized, under-reported, and, many would argue, under-appreciated by mainstream society.

Given the significantly greater economic value of timber compared to other forest resources, it comes as no surprise that much of the management of our forest resources in BC and elsewhere has been more about the management of timber than it has been about the forest as a whole. Where they enter into the discussion at all, NTFPs generally receive at best only secondary or incidental consideration.

However, the situation is gradually changing. As communities become aware of and/or are compelled to explore alternative forms of economic development, the demand for greater recognition of non-timber values in forest management is beginning to be heard. While many of the tools and methods remain to be developed, the push towards a more holistic form of forest management provided by different stakeholders as well as national and provincial policy commitments, is leading to the development of new approaches in forest management.

What is "compatible management"?

Compatible management refers to an approach to forest management that recognizes and seeks to enhance a range of forest values, including both timber and non-timber resources. The concept behind compatible management is not a new development, nor is it necessarily restricted to NTFPs. In that sense, a better term would be integrated forest management, as forest management goals focused on maintaining biodiversity, preserving wildlife habitat, and ensuring access for cultural purposes, all overlap nicely with maintaining a range of opportunities for NTFP harvesting.

Many current and emerging forest practices incorporate non-timber values, including ecosystem-based management, adaptive management and potentially forest stewardship plans. Managing for non-timber forest products often complements the management for other non-timber values – and vice-versa – with only minimal extra effort and planning. In the final assessment, the most important tools for incorporating NTFPs into management plans will be awareness of the opportunities and communication between forest managers and users. In order to realize these opportunities and to practice truly holistic and sustainable forest management, resource managers and others who utilize forest resources require a solid base of knowledge about incorporating NTFPs into resource management plans.

The continuum of compatible management

According to Brian Titus, a research scientist with the Canadian Forest Service, compatible management is best viewed as a continuum of possible activities. This continuum ranges from inactive compatibility (i.e., taking advantage of already existing forest management tools to increase NTFP values) to active compatibility (i.e., applying forest management with the explicit objective of increasing both timber and non-timber values). In between are incidental management scenarios, where management for one value happens to benefit the other, although this is not a clear objective of the management approach. Some examples of this continuum are provided below.

INACTIVE ← → ACTIVE

INCIDENTAL ← →

Use existing forest management tools to increase NTFP values	*Timber management happens to benefit NTFP values*	*NTFP management happens to benefit timber values*	*Explicitly manage for both timber and NTFB values*
• Roads (access)	• Felling practices	• Pruning	• Planting
• Topographic maps	• Product salvage	• Pre-commercial thinning	• Fertilization
• Inventory Data	• Prescribed fire	• Harvest of invasive exotics/competition	• Pruning
• Ecosystem/habitat maps	• Fertilization		• Thinning
• Aerial photos	• Thinning		• Delayed harvesting
• Gates for security			

Wild Black Raspberries

Oregon Grape Leaves

Before forest managers assess the investment required in moving towards an active compatible management approach, there are a number of relatively easily implemented actions that will benefit harvesters and could be considered immediately. Providing NTFP harvesters with access to maps (road networks, inventories, and ecological classification) and aerial photographs will help knowledgeable harvesters become more efficient in their harvesting activities. Similarly, effectively communicating with harvesters/buyers about the timing of forest management practices that can impact NTFP resources may create opportunities for product salvage before road building and timber harvesting commences. Providing secure gates and long-term leases (where possible/practical) would enable NTFP harvesters to benefit from their own stewardship of the NTFP resource.

What are some of the practical steps forest resource managers can take towards implementing compatible management?

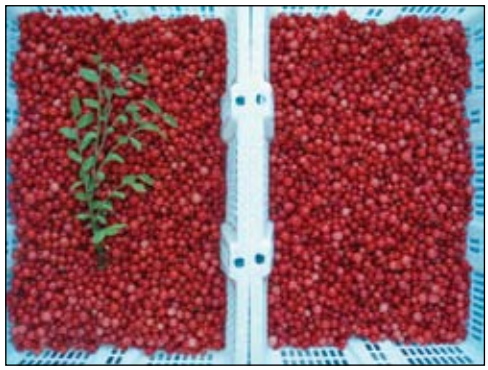
• Get to know local NTFP harvesters and buyers. They can help managers develop an understanding of the commercial quality of plant species, provide local knowledge of NTFP habitat, and help with understanding the impacts of forest management on NTFP resources.

• Establish good communication avenues with NTFP harvesters. Many compatible management opportunities require coordination of timing, the communication of forest management plans, and understanding the timing of NTFP harvester needs.

• Train NTFP harvesters in proper silvicultural techniques if applicable. For example, bough harvesters trained in appropriate pruning techniques can assist land owners/managers while obtaining their products.

Questions often arise about the rationale for companies to practice compatible management. With no clearly delineated rights to understory species, it is difficult for either timber companies or

Chantrelles



Red Huckleberries

Salal Berries

NTFP harvesters to justify investment into these species when someone else could benefit from these investments. This situation is a source of frustration for both parties and of great concern to First Nations who rely on these resources to meet subsistence, cultural, and other needs.

Although forest companies cannot collect revenue from non-timber forest products permits or leases within their timber licences on Crown land, they still have a number of incentives for including them within forest management plans, such as:

• Recognizing the rights of Aboriginal access to resources

• Meeting certification requirements such as biodiversity maintenance

• Increasing the value/health of some timber stands with the assistance of harvesters (i.e. through pruning boughs to control white pine blister rust)

• Providing additional income generating options that support the goal of community stability and diversification

• Practicing true forest stewardship that recognizes the broad range of goods and services forestlands can provide

The wide range of examples of compatible management already existing across North America suggests that there are many imaginative ways that NTFP values can be increased within our forests as part of forest management. Some of these ways will also increase the value of our forest timber products, and some may help forest managers realize financial returns early in a rotation. The next decade promises to be an exciting one, as the recognition of NTFP values increasingly becomes a part of mainstream sustainable forest management.

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by John Betts

Forestry figures don't add up

I have always had trouble with arithmetic. In public school, unable to memorize my addition tables, I completed my sums by putting peck marks in the margins and then counting them. This marginalia my teachers took as symptomatic of idleness and dismissed me as an aimless kid who couldn't add. (Later, with the introduction of new heuristic teaching methods involving sets, my approach might have been seen as innovative. But this was not a defense available to me at the time.)

Lately I have been having trouble with arithmetic again. I cannot get the reforestation statistics for BC to add up. These are pretty basic sums: hectares logged, area reforested, trees planted, etc.

At the turn of the century the annual area harvested was around 221,000 ha. By 2005 we have - whoops - no figures for that year. OK, and we only have provisional numbers for 2004, but total 174,000 ha. So is the cut decreasing?

During the same period, stumpage revenues hung around a billion dollars annually, but the harvest volume grew by almost 20%. So is the cut increasing? And those stumpage revenues - how many of those dollars reflect the ongoing clearance sale on salvage wood? It's hard to pick out a trend there. It looks like these 3 key indicators are all going in different directions.

Confounded somewhat, I then compared seedling requests to seedlings reported planted over the same general period. There appears to be an accumulated 60 million seedlings missing, according to my counting. We apparently have sown that many more trees than have been reported planted. This should make anyone nervous about looking under stumps in this province. Where are those would-be saplings?

Now I am beginning to think the problem is not my counting. When I wrote a senior Ministry of Forests and Range executive asking how many hectares we have salvaged for mountain pine beetle, how much of it has been planted, and what the response has been, I received a reply so acronym-rich and jargon-dense it proved indecipherable. (Maybe I lack some literacy skills, but when plain language doesn't suffice to answer a set of straightforward questions, you have to wonder.)

Another Ministry manager summed things up more forthrightly. "We no longer have the mandate to collect those figures," he said ruefully. And that brings us back to those missing hectares-logged figures for recent years that I mentioned earlier. A statistical steward I know says we haven't been this behind in the reporting of those kinds of numbers since the Second World War. And that was because Ministry foresters had enlisted and were serving overseas. What's happening today?

What might be happening is interesting. I can't help but notice that the wacky figures in the Ministry's reports start showing up around the time we shift to the "results-based" model. When I try to connect the dots around this coincidence I get the same problem I had counting the ones in my margins in public school: confusion, uncertainty, and not one reliable answer.

If industry needs only live up to their own independent minimum stewardship requirements, which doesn't seem to include prompt reporting of achievements, who has a handle on the big picture?

Silviculture planning is acutely sensitive to area disturbed. We need to know how much, where it is, where it is contiguous, and we need to know those numbers promptly and accurately. We need to know it on a scale comparable to the exceptional assault on forest health in this province. If we aren't tracking the basic bellwethers, our information is unreliable both for indicating what we have done and what we need to do. If our statistical landscape is full of holes and slop, particularly regarding the area we have disturbed, how do we guide forestry? What does it suggest about possible gaps in our strategies and possibly on the landscape? If we are practicing world-class forestry, we need numbers we can count on.

ONTARIO

FOREST RENEWAL CO-OPERATIVE INC.

by William F. Murphy, RPF General Manager

Winter is slowly settling in with small amounts of snow accumulating in the northwest region of Ontario. It will be a while before Ontario succumbs to its onslaught. This is something that occurs every year and changes very little.

The nursery growers are busy lifting and storing their seedlings in cold storage for the next spring plant. This is also something that is done each year but is steadily changing in its pattern. There are fewer trees to lift every year resulting in less trees being planted the following spring. Where is this leading? Companies are slowly shutting down or modifying their operations to make marginal profits or just break even. For the past 10-15 years, there has been a working relationship between forest companies and the growers and silviculture contractors. This is coming to an end. It is every man (company) for himself.

We are back to the bidding systems for most companies, not that bidding is a bad thing. Regeneration dollars are already put into the renewal trust system up to 2 years in advance of the regeneration practices. Can we provide the same level of service to the forest through the bidding system, or does it have the potential to compromise the seedling quality and planting by placing the onus on the suppliers to provide the same or better stock and handling practice while being the lowest bidder?

We talk of genetic gains and volume increases, yet we are compromising regeneration efforts that are modelled for a particular forest for the sake of the dividend. Why can't we see past the dividends that need to be paid before the forest is regenerated? Some companies have been very loyal to their growers, their silviculture contractors, and suppliers, but that loyalty is dwindling. We see very few long-term contracts, but would these not provide reduction in prices over the long term? Natural regeneration definitely reduces costs in the short term; however, over the long term is it truly a cost saver?

par Annie Beaupré, coordonnatrice à la formation, AETSQ

Un Sommet sur l'avenir du secteur forestier au Québec

En septembre dernier, le doyen de la Faculté de foresterie et de géomatique de l'Université Laval, M. Denis Brière, annonçait la tenue d'un Sommet sur l'avenir du secteur forestier au Québec, organisé par sa Faculté. Cette annonce donnait suite à la requête de différents intervenants du secteur forestier (Conseil de l'industrie forestière du Québec, Centre de recherche industrielle du Québec, Fédération québécoise des coopératives forestières, Fédération québécoise des municipalités, Fédération des pourvoiries du Québec, Fédération des gestionnaires de zecs, les instituts de recherche Forintek, FERIC et PAPRICAN), pour que l'Université Laval assume l'organisation de l'événement.

Le Québec ne peut se permettre de continuer bien longtemps à évoluer dans ce contexte de crise forestière qui menace la survie de plusieurs communautés monoindustrielles. La Commission d'étude sur la gestion de la forêt publique québécoise, mieux connue sous le nom de Commission Coulombe, avait pour mandat général de dresser l'état de la situation en ce qui concerne la gestion des forêts publiques du Québec et recommander des améliorations qui permettraient de bonifier le régime forestier dans une perspective de développement durable. La Commission a terminé son mandat, en décembre 2004, lors du dépôt officiel de son rapport au ministre des Ressources naturelles, de la Faune et des Parcs. Les analyses sont complétées et il est maintenant temps que les acteurs du milieu forestier s'assoient ensemble pour accélérer la concrétisation du virage que devra prendre l'industrie forestière.

Le Sommet ne vise en aucun cas à refaire le travail qui a été fait par la Commission Coulombe, mais il s'inspirera certainement de tout le matériel qu'il a rendu disponible. L'objectif du Sommet est plutôt de travailler sur la mise en œuvre des recommandations du rapport Coulombe et d'arriver à un consensus menant à une vision commune quant au nouveau modèle de gestion forestière que l'ensemble des intervenants du secteur forestier souhaitent voir s'implanter.

L'Association des entrepreneurs en travaux sylvicoles du Québec, l'AETSQ, devrait prendre part à cet événement. Elle souhaite y participer afin d'en tirer des consensus sur les sujets qui la préoccupent tels que la mise en place d'une vraie politique d'intensification de l'aménagement forestier, des solutions au manque de relève compétente en sylviculture, l'instauration d'une certification des compétences des entreprises sylvicoles et l'implantation d'une gestion forestière davantage axée sur les objectifs d'aménagement et adaptée aux réalités régionales et locales.

Divers autres groupes se préoccupent des ressources que recèlent les forêts québécoises et des activités qui y sont possibles, c'est pour cela que tous les intervenants seront conviés à ce grand événement qui aspire à de vrais dialogues et de véritables conversations.

Souhaitons que ce Sommet sur l'avenir du secteur forestier au Québec sera à la mesure de nos attentes et qu'il nous permettra d'atteindre une vision commune quant à un modèle de gestion pour la protection et la mise en valeur de toutes les ressources du milieu forestier. Il est essentiel d'en arriver à un accord qui, respectueux des considérations économiques, sociales et environnementales, nous permettra d'atteindre un véritable développement durable de nos forêts.

QUEBEC
ASSOCIATION OF SILVICULTURE CONTRACTORS

by Annie Beaupré, training coordinator, AETSQ. Translated by David Hayne

A Summit on the Future of the Forestry Sector in Quebec

Last September, Mr Denis Brière, Dean of the Faculty of Forestry and Earth Sciences of Laval University, announced that his faculty would host a summit meeting in the spring of 2007 on the future of the forestry sector in Québec. Various stakeholders in the forestry sector (Conseil de l'industrie forestière du Québec, Centre de recherche industrielle du Quèbec, Fédération québécoise des coopératives forestières, Fédération québécoise des municipalités, Fédération des pourvoiries du Québec, Fédération des gestionnaires de zecs, and the research institutes Forintek, FERIC, and PAPRICAN) had requested such a meeting, hoping that Laval University would organize the event.

Quebec cannot continue for much longer in the present crisis situation in forestry, which threatens the survival of several single-industry communities. The study commission on the management of public forests in Quebec, better known as the Coulombe Commission, had as its general mandate a survey of the management of public forests in Quebec, with recommended improvements that would enhance forestry administration and ensure sustainable development. The commission wound up its work in December 2004, and submitted its report to the Minister of Natural Resources, Wildlife, and Parks. The analyses are completed and it is now time for the players to sit down together and speed up the implementation of the new direction that the forestry industry must take.

The upcoming summit does not intend in any way to redo the work already done by the Coulombe Commission, but it will certainly take its lead from all the material made available during the latter's activities. The purpose of the summit is rather to work toward the implementation of the Coulombe Commission's recommendations and to reach a consensus leading to a common vision of the new forestry management model that the bulk of the stakeholders in the forestry sector want to see established.

The AETSQ should be part of this event. It wants to participate in order to arrive at a consensus on the topics that concern it, such as the implementation of a genuine policy of intensification of forestry management, solutions for the lack of competent replacement personnel in silviculture, the creation of a system of competence certification for silvicultural businesses, and the establishment of a forestry administration better focused on management objectives and adapted to regional and local realities.

Various other groups are concerned about the resources represented by Quebec's forests and the possibilities they offer, which is why all stakeholders will be included in this major event, which aims at real dialogues and meaningful conversations.

Let us hope that this summit on the future of the Quebec forestry sector will meet our expectations and will allow us to formulate a common vision of a management model that will ensure the protection and the utilization of all the resources of the forestry sector. It is essential to arrive at an agreement that, while respecting economic, social and environmental considerations, will allow us to achieve real sustainable development of our forests.

NEW BRUNSWICK

AGFOR REPORT

by Gaston Damecour, RPF

One of AGFOR's current projects relates to the forest sector's labour requirements, including silviculture. While a shortage of labour is in the news a lot today, people are often surprised when they are reminded that we had a serious labour shortage across eastern Canada in the 1970s.

At that time, there was a strong demand for skilled and semi-skilled labour, across several sectors, during a period of strong economic growth. The boom was accompanied by a high degree of temporary and permanent mobility in New Brunswick and all the way to the Lakehead in Ontario.

During the labour shortage of the 70s, the forest sector went to great lengths to attract and keep labour in an effort to maintain desired levels of activity in the forest. These efforts included impressive camp infrastructures and the rapid development of forest mechanization.

In an earlier issue of *Canadian Silviculture*, we looked at mechanical pre-commercial thinning (PCT) as a breakthrough in the pre-treatment of daunting high-density juvenile stands (> 60,000 stems per hectare). The mechanical PCT is now being used on larger industrial and crown sites to enhance production in response to a declining labour force. Its application is now being fine-tuned in lower density stands (> 40,000 stems per hectare). This was undertaken to keep up with the aggressive silviculture commitments of management strategies.

Aside from the silvicultural and technical challenges of mechanical PCT, there are logistical challenges to optimize scheduling of the mechanical units to keep costs in line with investment and with the task.

Over the last few years, several mechanical harvesting contractors have moved west, along with other skilled trades, and now the first mechanical PCT contractors are following suit. Will this put the development of mechanical PCT on hold?

The 5-year PCT commitments on crown land have been met and perhaps exceeded in some areas. Consequently, treatable areas should see a 20% decrease in the PCT program for the next 5-year period. This would help offset a possible reduction in a workforce with an estimated average age of about 45 with very little recruiting of replacement workers.

Crown planting is expected to remain stable for the 2007-2012 period.

The commitment by the previous Conservative provincial government to fund a 5-year silviculture program for private lands provides a degree of stability. This is in contrast to an estimated 40% decrease in harvesting activities in the private lands sub-sector.

Many of the private land-harvesting contractors have returned to their roots in silviculture, which has enhanced the productive capacity in this sector. There is every indication now that the 2006 $8 million program will be completed. According to Ken Hardie of the New Brunswick Federation of Woodlot owners, the 5-year commitment to fund silviculture work has created a significant amount of work and stability - extending several years.

The newly elected Liberal government committed itself during the election to the conversion of abandoned farmland to forest production. How this will play out now that they are in power is yet to be seen.

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DEPARTMENT OF NATURAL RESOURCES

by Don Cameron, RPF

How important is the forest industry to the Nova Scotia economy?

One of the most common topics discussed in the news, in workplaces and coffee shops, and along the streets over the past few months has been whether StoraEnso would be reopening their mills in Port Hawkesbury. It is a well-known fact that the forest products market is a difficult one in which to compete. The well-chronicled trade battles between the US and Canada have taken a large bite out of potential prosperity for many forest products companies, communities, provinces, and the country as a whole. The good news is that this long-simmering situation seems to be stabilizing somewhat, despite the variable support on both sides of the issue.

Closer to home, our sawmills and pulp and paper mills have been up against many challenges in recent years, including among others, high energy and production costs, the drastically increased Canadian dollar, markets flooded with products from western Canada, variable world demand for North American forest products, and new mill capacity coming on-stream from China and other developing countries where labour costs are relatively low.

At one time, not so many years ago, there were more than 300 sawmills scattered throughout our province. These local community operations employed many local people and supplied the necessary forest products for the population of the day. The forest harvesting and manufacturing industry formed the backbone of the provincial economy and was especially important and noticeable in rural areas.

Today, times have changed and so has the forestry industry. There are now fewer sawmills operating, but there are several large-scale, high-tech facilities. At one time the forest products industry was oriented toward producing timber for the pulp and paper mills, whereas the system today has changed such that most timber is harvested and transported directly to the sawmills. Any logs that cannot be used for lumber or veneer, due to size or quality, are chipped, along with parts of logs not used as lumber, to create wood chips that are consistent in terms of size and makeup. The chips are then trucked to pulp and paper mills.

What has not changed is that the forest products industry remains the backbone of the provincial economy, especially in the rural areas, as the following facts from the Forest Products Association of Nova Scotia (FPANS) indicate.

The FPANS is the largest organization of forest interests in the province. The organization, consisting of 900 members, represent all segments of the industry, including woodlot owners, pulp and paper companies, sawmills, silviculture and harvesting contractors, Christmas tree growers, and maple syrup producers

• Forestry is a $1.4 billion industry, providing 13,000 direct jobs and another 5,278 indirect jobs to the province. It is the largest provider of employment in rural Nova Scotia and communities depend on the forest industry.

• Forest-related products and newsprint account for nearly one-quarter of the provincial export base. The leading products shipped from the province include newsprint, woodpulp, lumber, and coated paper. Export growth in this sector has been one of the leading factors behind Nova Scotia's past export surge.

• Forest product exports reached nearly $1 billion in 1999, double the value of the early 1990's. These forest products are the most diverse of Nova Scotia's exports. They serve more markets than any other product, having reached 54 different countries on 6 continents in 1998 as well as 48 of the 50 United States.

• According to an economic impact study released in early 2000, and updated in 2003 by the Atlantic Provinces Economic Council (APEC), the forest industry is by far the largest generator of jobs in rural Nova Scotia. A job lost in a forestry-dependent community cannot easily be replaced since these regions are often plagued with relatively high unemployment rates.

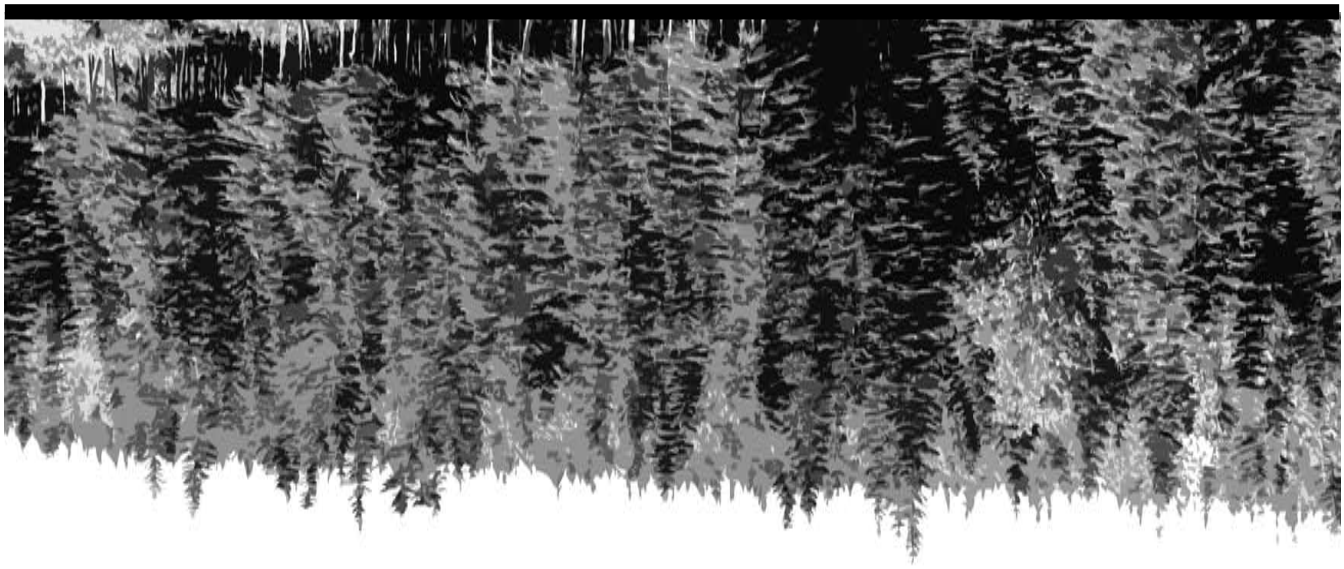
• Nearly three-quarters of the province's primary forest labour force resides in rural Nova Scotia.

When you stop to think how the forestry industry affects a community like Port Hawkesbury, it underlines the importance of maintaining healthy, sustainable forests that can support and maintain the economic backbone of many communities and our province. One might not realize how much urban communities, such as the Truro area, also rely on forestry. When the number of jobs in this region are calculated, including DNR staff, forest products companies, forest contractors and consultants, casual or seasonal labourers, truckers, suppliers of materials and services, and then all the spin-off jobs, it is not hard to imagine how many millions of dollars are generated and spent in the local and provincial economy to keep things chugging along at a healthy economic pace.

Let us do what we can to see that our forests and the forestry industry continue to play a vital and sustainable role in our future.

ADAPTIVE FOREST MANAGEMENT

by F. Wayne Bell and James A. Baker



If you asked 10 foresters "What is intensive forest management?" you would probably get 10 different definitions. This may not matter because the process of managing timber, forests, or ecosystems is neither intensive nor extensive. Management involves setting goals and objectives, evaluating and implementing options, monitoring and evaluating the effects of these options, and adjusting goals, objectives, or activities as required (see Figure 1). Evaluation of options necessitates learning about successes and failures, in other words, being adaptive. A universal problem faced by foresters is dealing with the uncertainty of future markets for wood products while practicing good forest stewardship to sustain all forest values.

Resource managers require knowledge about the resources they are managing. This knowledge can be acquired through updating inventories, monitoring, synthesizing information, or conducting new research. While inventories provide information about physical attributes (e.g., existing vegetation and soils) and presence of values (e.g., rare species), monitoring, if properly designed, provides timely information about the effects of management's actions on management's objectives. Experts can be called upon to help inform the resource manager through transfer and extension. New research will be required if alternative information sources are incomplete or inaccurate, or the manager is faced with critical uncertainties about how to achieve objectives regardless of incomplete or inaccurate information. There is no such thing as perfect knowledge because forest systems are dynamic, markets are dynamic, and social values of publicly owned forests are dynamic. Thus, managers need to acknowledge uncertainties, make assumptions, and take calculated risks.

Regenerating and growing a new forest requires investment in silviculture options that have the highest probability of achieving objectives of a forest management plan. These options can be loosely classified as extensive, basic, intensive, and elite (see Figure 2). Silviculture can be defined as the art and science of growing trees to meet a landowner's objectives. It may include growing trees to maintain ecosystem processes (e.g. sequestering carbon), providing wood or non-timber products, or enhancing recreation areas or wildlife habitat. Silviculture is based on 2 factors. The first is the degree of control of tree species/genetics within a forest stand. The second is the degree of control of the resources (e.g. light, water, nutrients) and growing conditions.

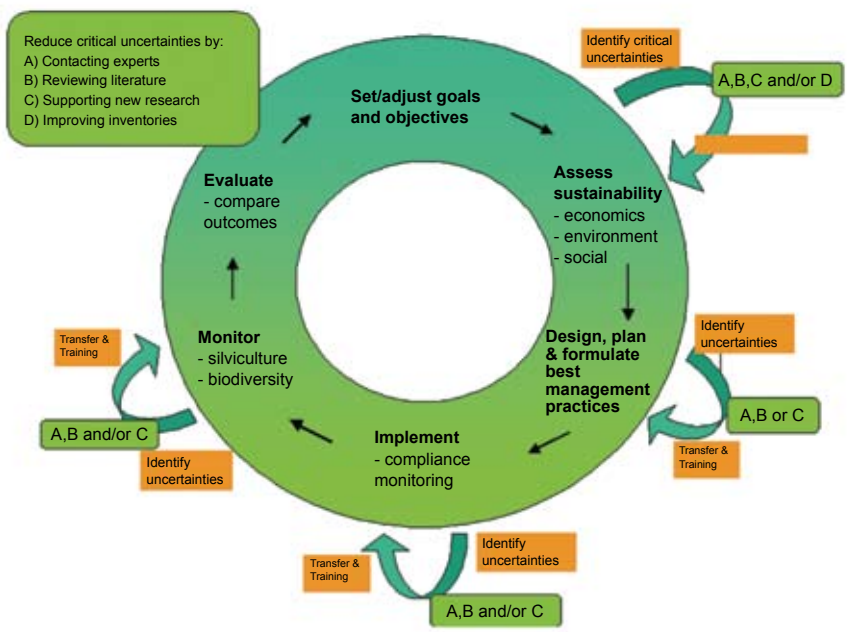
Resource managers seldom apply a single silvicultural intensity across a landscape. No two landbases are likely to be managed using the same portfolio. Rather they may use a range of conservative or aggressive fibre supply portfolios, depending on their goals and objectives as well as associated uncertainties and risks.

Four possible portfolios/strategic alternatives are described from most aggressive to least aggressive (see Figure 3), based on silviculture intensity and the area to which they are applied. Each has implicit assumptions of input costs and future product value outputs.

High Value Future This portfolio of silviculture practices, which is theoretically plausible, would have the highest percentage of intensive and elite management areas to produce high value products. This assumes that a demand for high-value products will exist in the future and that high input costs will produce profitable wood. It also assumes that impacts on biodiversity and ecosystem functions will be publicly acceptable. Depending on soil quality and other factors, intensive and elite areas might exceed 25-30% of the landscape. The amount of extensive and basic would be dependent on the percentage of intensive and elite. Protected areas would be kept at the current 12% level.

Bet Hedging with a Senate Sub-Committee Future This portfolio was recommended by the Senate Sub-committee on the Boreal Forest in 1999 as a means of maintaining a functional boreal forest and a viable forest industry. This is a bet-hedging policy because it assumes a degree of confidence or certainty in that there will be world markets for a range of product values, thus it places less emphasis on intensive silviculture and a higher percentage of protected areas than the previous "high value future" policy

Figure 1: An adaptive management framework indicating means by which critical uncertainties can be reduced.



achieved above. The recommended percentages are 20% protected areas, 60% extensive and basic silviculture, and 20% intensive silviculture.

Bet Hedging with an OFAAB Future This portfolio was recommended by Ontario Forest Accord Advisory Board (OFAAB) in 2002, and it advocates combinations of silviculture practices from extensive to intensive to rehabilitate and maintain the structure and function of the forest following harvest. This portfolio reduces risk by producing a range of product values and assumes that world markets for products ranging from high to low value could emerge. Recommended percentages are 12% protected areas, 76% extensive/basic silviculture, and 12% intensive silviculture.

Garbage and Glue Future This portfolio is not currently being advocated but deserves some attention because it relies almost exclusively on extensive silviculture with basic treatments implemented only where necessary to meet guideline requirements. The major driver is minimizing input costs. A major risk is the assumption that there will be a demand for low value products (e.g. composites) but not high value products, or that high value products cannot be produced profitably. Another major untested assumption and perhaps unacceptable risk is that this policy may not maintain the long-term structure and function of the boreal. The possible percentages are 12% protected areas and 88% extensive silviculture (with some basic silviculture where necessary).

With any of the above portfolios/approaches an effective feedback loop is required. Monitoring and evaluation of potential benefits and impacts are necessary to reduce uncertainties and risks before adjusting goals and objectives. Without these steps, resource managers do not learn about the effects of their management on the system.

In summary, management must be adaptive to deal with uncertainties in achieving goals and objectives. At the scale of forest management planning, silviculture portfolios should be evaluated up-front based on the attributes of the landscape and ownership objectives. The portfolio can then be custom-designed for each forest, since a single intensity is unlikely to be sufficient. Uncertainties and risks associated with each portfolio need to be evaluated using existing knowledge and information. The recent advent of spatial planning tools that incorporate economic and ecological evaluations can be used to conduct up-front evaluation of tradeoffs among the portfolios, and identify the critical variables to monitor in order to determine impacts on specific values. Evaluating these impacts and incorporating this information into revised plans will ensure continued management improvement.

Figure 2: Plausible natural and silvicultural disturbances in a boreal forest near Dryden, Ontario; each frame represents one decade

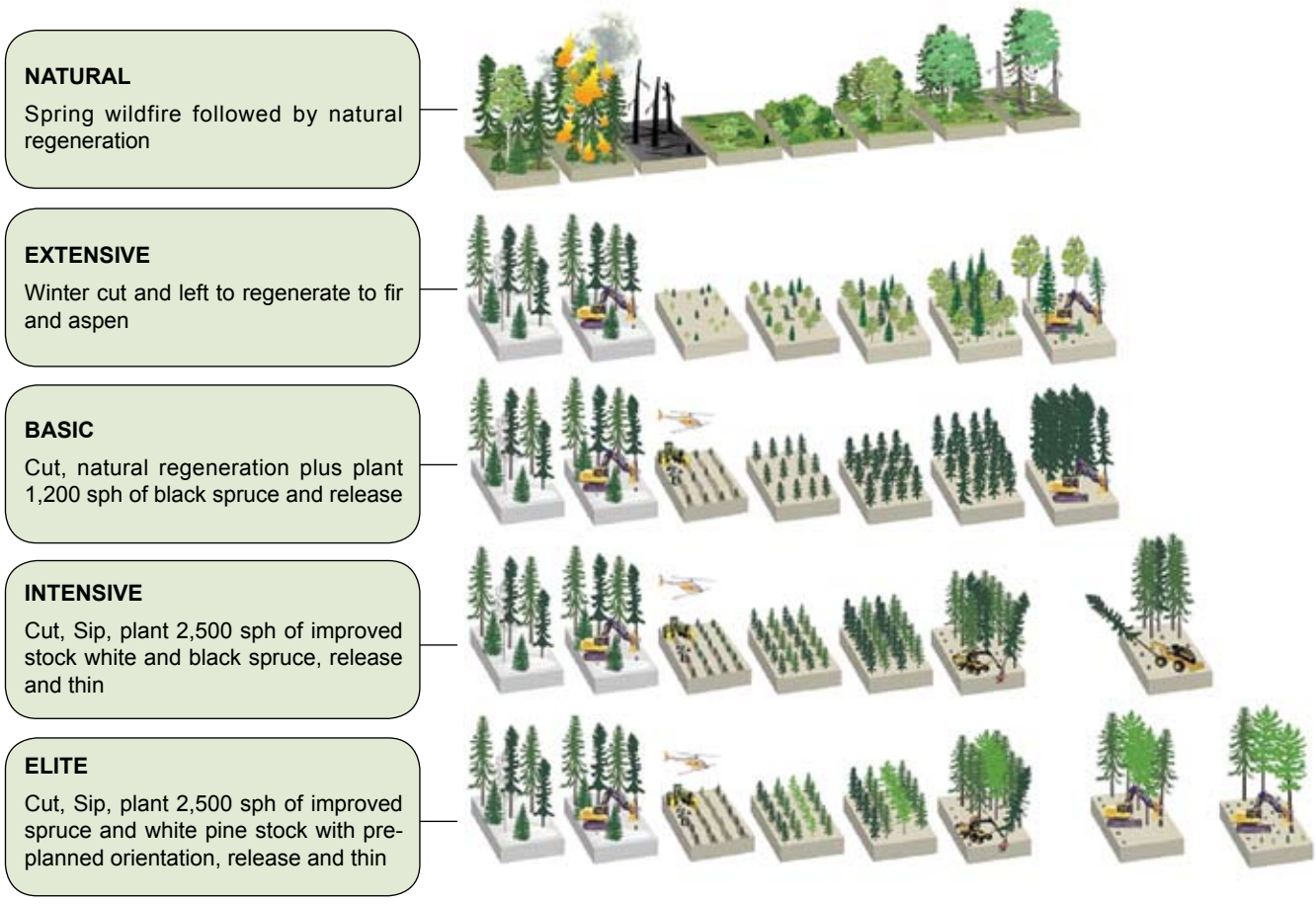
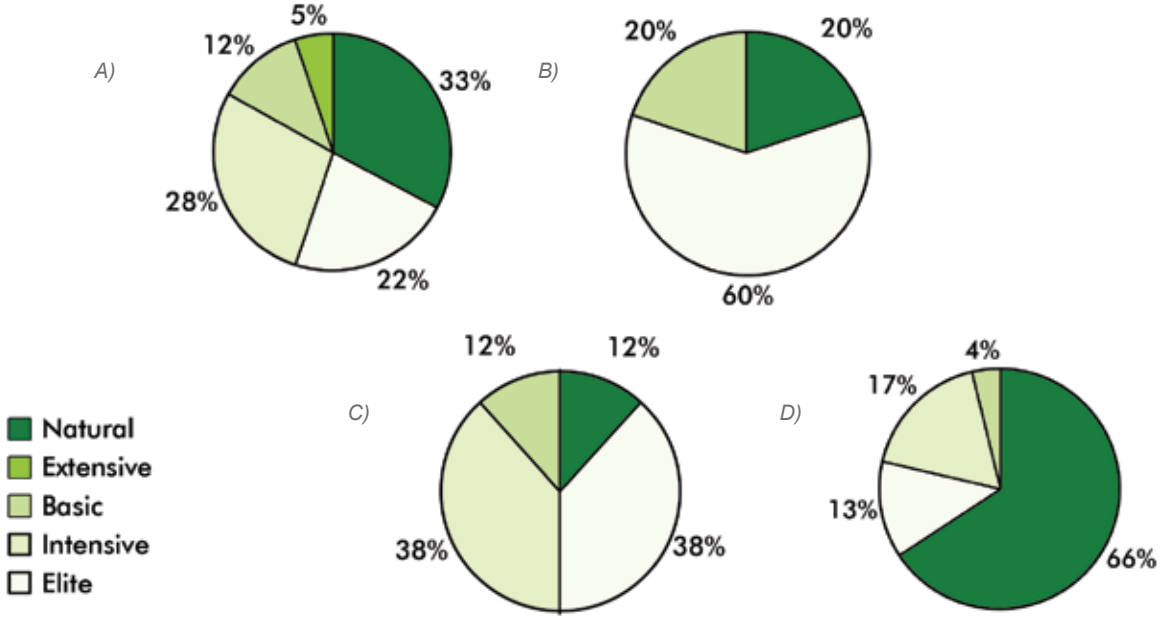
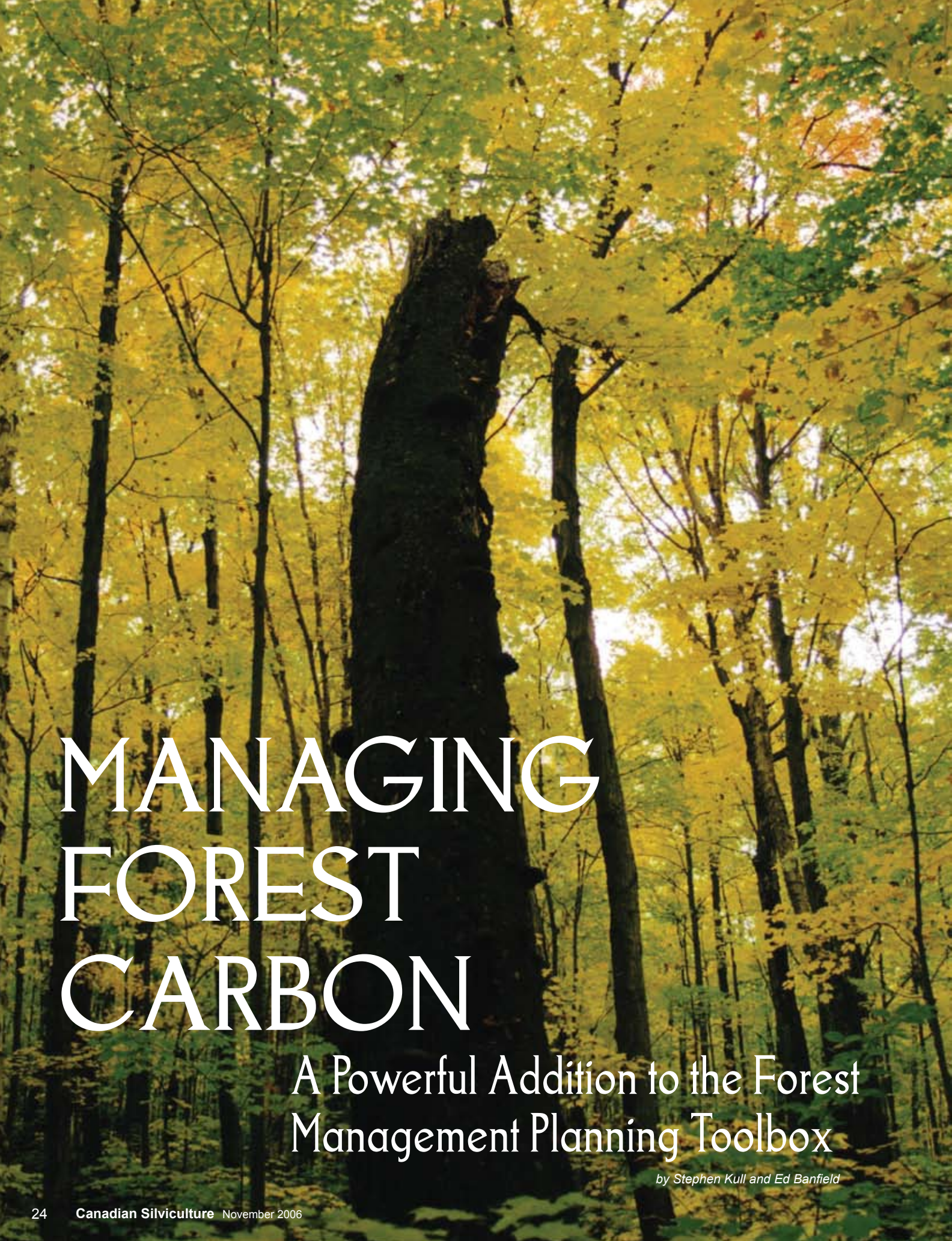


Figure 3: Silvicultural portfolios A) High value future, B) Bet hedging with a Senate Sub-Committee future, C) Bet hedging with an OFAAB future, and D) Garbage and glue future.





MANAGING FOREST CARBON

A Powerful Addition to the Forest Management Planning Toolbox

by Stephen Kull and Ed Banfield

Various national and international processes recognize the important role that forests and forestry play in the global carbon cycle. These processes include the Canadian Council of Forest Ministers (CCFM) Criteria and Indicators (C&I) initiative, and the National Forest Strategy (national reporting), the Montreal Process, the United Nations Framework Convention on Climate Change (international reporting), and the Kyoto Protocol. As a result, there is a growing need for forest managers to be able to consider how their activities affect forest carbon dynamics on their land base.

Forest managers need a tool that is not only practical, but is also scientifically well-grounded, in order to assess forest carbon dynamics, to report on indicators, or to explore possible ways to decrease carbon sources and increase carbon sinks. In response to this need, the carbon accounting team (CFS-CAT) of Natural Resources Canada's Canadian Forest Service in partnership with Canada's Model Forest Network, through the Local Level Indicators Strategic Initiative, developed a new tool for the national and international forest management community and released it in 2005.

The Operational-Scale Carbon Budget Model of the Canadian Forest Sector (CBM-CFS3) is a stand and landscape-level modelling framework to simulate forest carbon dynamics. The CBM-CFS3 is currently the central model of Canada's National Forest Carbon Monitoring, Accounting and Reporting System that is used for national and international reporting of the greenhouse gas balance of Canada's managed forest. The tool is also applicable to the National Forest Strategy, as it can be used to address the

carbon and climate change related objective and action item under the strategic theme on "Ecosystem-based management." The CBM-CFS3 is compliant with requirements under the Kyoto Protocol and with the Good Practice Guidance for Land Use, Land-Use Change and Forestry (2003) report published by the Intergovernmental Panel on Climate Change (IPCC).

About the Tool

To make it easy for foresters to use, the CBM-CFS3 has been designed to use as much of the same information required for typical forest management planning activities as possible (e.g., forest inventory data, tree species, growth and yield curves, natural and human-induced disturbance information, a forest harvest schedule, and land-use change information). Additional data is supplied with the model, including ecological parameter sets and volume-to-biomass conversion equations appropriate for Canadian species and forest regions.

Tools in the model assist users with importing required data from common timber supply models such as Remsoft®, Spatial Woodstock™, and the Strategic Forest Management Model© (SFMM), or from user-developed data files. With this sophisticated but user-friendly software tool, forest analysts apply their own stand or landscape-level forest management information to calculate carbon stocks and stock changes for the past (monitoring) or into the future (projection).

From a forest management planning standpoint, the CBM-CFS3 can be used to create, simulate, and compare various forest management scenarios in order to quantify the impacts on forest carbon, providing useful information for the forest management planning process. In Canada, many jurisdictions require that forest management plans report on ecological criteria and indicators, including those related to forest contributions to global cycles (including the carbon cycle), in order to comply with sustainable forest management guidelines. Similarly, forest certification organizations, such as the Canadian Standards Association (CSA) and Forest Stewardship Council, are incorporating reporting requirements on forest ecosystem carbon.

Indicator Reporting

The indicators used to assess carbon for local, national, and international processes, although similar, are not necessarily identical. For example, though the CSA Z809 Sustainable Forest Management (SFM) standards build on the CCFM Criterion 4 (Forest Ecosystem Contributions to Global Ecological Cycles), a specific, measurable indicator for CSA reporting is not stipulated. The CSA element pertaining to forest carbon uptake and storage (Element 4.1) states that a forest manager must "Maintain the processes that take carbon from the atmosphere and store it in forest ecosystems", leaving the choice of specific indicator to the practitioner. Given a choice, a good option is to draw upon the existing national CCFM C&I framework, which has 4 specific, measurable indicators under Element 4.1: Carbon Cycle. These are:

4.1.1 Net change in forest ecosystem carbon
4.1.2 Forest ecosystem carbon storage by forest type and age class
4.1.3 Net change in forest products carbon
4.1.4 Forest sector carbon emissions

Although national-level indicators were not designed to directly address the forest management unit level, drawing on established national and local C&I initiatives in the development process provides a good foundation for local indicator selection and

Forest carbon stocks change over time

ensures consistency between local and national indicators.

The tool will also assist in meeting the National Forest Strategy theme on "Ecosystem-based management" objectives and the theme's climate change action item: "Objective D: On a national basis, maintaining carbon reservoirs and managing the forest to be a net carbon sink, over the long term; and, "Action item 1.4: Develop a better understanding of the effects of climate change and the Kyoto Protocol commitments on the forest ecosystem and incorporate these into forest policy and forest management planning".

Managing a national carbon reservoir as a sink will require managers understanding the dynamics of each of their managed forest areas. The CBM-CFS3 produces results for a wide variety of categories and variables that can be used as indicators. Categories include carbon stocks, stock changes, ecosystem indicators, ecosystem transfers, emissions, and disturbance transfers. The specific indicator(s) chosen depend on the reporting criteria of interest.

Given the variability of forest conditions, including the current age-class structure and natural disturbance rates, an indicator should be assessed in relation to the regional situation. A decline in carbon stocks and a resultant net loss to the atmosphere over several years may be unavoidable in some regions due to the older declining forest conditions and increased natural fire or insect outbreaks. On the other hand, forest carbon stocks may be increasing, not necessarily due to management intervention but because of a generally younger forest sequestering carbon at a high rate or because of a temporary lull in natural disturbances.

Forest carbon stocks change over time, and variations from year to year are to be expected. To provide a basis for evaluation, a baseline scenario can be used, for example, carbon dynamics in the absence of management. With scenario analyses and comparisons like these, forest managers can not only assess carbon indicators, given current management practices, but can also assess the impact of different management strategies on the indicator(s) and implement the best adaptive management response.

Additional Applications

Forest analysts can also use the CBM-CFS3 for research and analyses. The impacts of different silviculture and management activities as well as natural disturbances can be assessed on a single stand basis as well as on the overall landscape. Default dead, organic matter parameters, biomass parameters, and climate data for the user-selected province or territory and Canadian terrestrial ecozone can be editted if the user has better data or wishes to see how sensitive an indicator is to a given parameter.

As our scientific knowledge of the global carbon cycle continues to progress, forest management reporting pertaining to carbon can be expected to follow suit, and the CFS-CAT will continue to update and improve the CBM-CFS3 to adapt to these changes and provide support to the growing user community. The model and user's guide are currently available free of charge via the Canadian Forest Service's Forest Carbon Accounting website at www.carbon.cfs.nrcan.gc.ca.

The authors would like to thank Dr. Werner Kurz for his comments. Stephen Kull and Ed Banfield work at the Northern Forestry Centre with the Canadian Forest Service.
Stephen Kull can be reached at 780-435-7304, or skull@nrcan.gc.ca.

Focus on Safety

by Ontario Forestry Safe Workplace Association

Good physical conditioning is a tree planter's best defence

Planting trees and competing in a triathlon are a lot alike. The main difference is that a tree planter has to get up at dawn the next day and do it all over again.

It's no wonder that some tree planters miss some or all of a planting season because of injuries to wrists, back, shoulders, and knees caused by strenuous, repetitive motion. Strain and sprain injuries (also known as musculoskeletal disorders) occur when excessive stress is placed on muscles, joints, nerves, ligaments, and tendons. Common injuries include tendonitis, carpal tunnel syndrome, muscle pull or tear (strain), tendon pull or tear (sprain), and ligament stretch (sprain). The injury can be sudden or have a gradual onset depending on the magnitude, frequency, and duration of exposure to the risk factors.

A number of risk factors arise over and over again in tree planting, from unavoidable circumstances such as heavy loads, frequent bending, and rough walking surfaces, to worker-based factors such as improper tools and poor planting techniques. The long workdays and the financial incentives to plant as many trees as possible also contribute to fatigue and physical stress.

Common signs and symptoms of a strain and sprain injury include pain or numbness; tingling the wrist, hand, shoulder or neck; loss of strength or numbness in grip; decreased range of motion; a burning sensation in a muscle or joint; swelling or bruising; and limb, back or joint aches and stiffness.

Individuals will react differently to the physical risk factors of tree planting. Different body size, stamina, or muscle strength and co-ordination may make some planters more susceptible to injury than others. Planters can reduce the odds of injuring themselves - especially during the hectic first weeks of strenuous work - by being in good shape when they report to camp.

A mix of the following physical assets is necessary for tree planting:

- aerobic capacity (stamina) to deal with long, hard days of planting and fatigue
- muscular endurance to manage repetition and fatigue
- flexibility of joints to deal with a wide range of movement
- strength to lift and carry heavy loads

Core strength and leg strength are critical to productive, injury-free tree planting. A planter's physical condition at the beginning of the season directly affects his or her productivity. To ensure the physical condition needed for a safe and productive season, an exercise regime such as the following is recommended prior to the start of the planting season:

- aerobic/cardiovascular training such as running, biking or hiking
- overall strength training with free weights or resistance machines
- stretching to ensure flexibility and prevention of muscle stiffness
- specific tree planting exercises

Each exercise can (and should) be modified to an intensity suitable to that of the individual tree planter. As muscular strength increases, muscular endurance can be improved by adding more repetitions and decreasing the load in each exercise.

The best tree planting companies invest in training programs for new recruits and encourage employees to work efficiently and safely throughout the planting season. They designate the proper equipment that planters must buy and they provide other personal protective gear as required. The best tree planters acquaint themselves early with the do's and don'ts of safe and efficient planting.

Once the planting work is underway, planters need to develop a keen awareness of their bodies and learn to differentiate between good pain (muscles are sore) and bad pain (muscles are really hurting). If injured, they have to know how to recognize and treat the symptoms of their injury immediately, and when to seek professional medical help. They also have to be aware of flaws in their working style that could be the root cause of their physical problems. If they are unable to identify the problem with their working style, they should talk to their supervisor and fellow planters.

The Ontario Forestry Safe Workplace Association has created SafePlanting.com, a comprehensive Web-based health and safety training program for tree planters. For more information or to order the program, visit www.safeplanting.com or contact OFSWA at 705-474-7233.

Industry News

Faller Trainees take to the woods

A group of students from the BC Forest Safety Council faller training program have completed their 30-day formal instruction program at a worksite near Port Alberni. They demonstrated their new falling skills to employers and Council representatives before being hired by falling contractors and heading into a 6-month work experience program.

The 8 trainees, representing the new face of safe logging, completed the first part of the Council's New Faller Certification Program at Malaspina University-College in Nanaimo. The comprehensive training program started with 5 days of class work followed by 25 days of closely supervised field training.

The trainees are now starting the second part of the program that includes up to 180 days of actual falling experience with a forestry employer. Trainees who successfully complete the training and work experience program are entitled to take a written exam followed by a field evaluation to become a certified faller.

This program represents an industry first, where safe falling practices are taught in both the classroom and the workplace. It leads to the certification that is now necessary to work as a faller in BC. More than 3,000 working fallers have already stepped up to be evaluated and received certification over the 18-month mandatory certification period.

In 2007, new faller training will be offered throughout BC, with the BC Forest Safety Council monitoring the quality of the training.

To find out more about the new faller certification program, visit the Council's website at www.bcforestsafe.org or call 250 724-2813.

Faller Safety Survey

3,300 professional fallers in BC were asked to participate in a survey on attitudes toward safety and the BC Forest Council Faller Certification Program. Approximately 1,300 fallers participated in the survey and all were entered in a draw for the prizes, which were donated by Stihl and Husqvarna.

Certified Faller Brian Kowalski (middle) of Armstrong with Bill Bolton, head of the Council's Faller Certification Program (left) and Keith Wilson of Savoy Equipment in Vernon (right).

Certified Faller Brian Nelson-Smith (middle) of Merritt with Bill Bolton, head of the Council's Faller Certification Program (left) and Grant Klassen of Nicola Motorsports in Merritt (right).

Pacific BioEnergy Drives Last Spike

Reminiscent of the last spike at Craigellachie in 1885, Pacific BioEnergy Corporation drove their "last spike" to celebrate the completion of their rail siding at the site of their new pellet plant development in Prince George. John Rustad, MLA for Prince George-Omineca, was joined by Prince George Mayor Colin Kinsley, Pacific BioEnergy CEO Scott Folk, and Director Don Gould, in driving the last spike, surrounded by an audience of local and regional politicians, supporters, employees, and invited media.

"We wanted to mark and celebrate this important step of our new plant development while thanking those who have supported us along the way," said Scott Folk, Chief Executive Officer of Pacific BioEnergy Corporation. "As the original last spike ceremony marked the beginning of a prosperous future for Canada, our 'last spike' marks a prosperous future for our company," added Folk.

The new rail siding can accommodate over 60 rail cars, up from their current 11, and is the first phase of a new pellet plant project that will be complete in the summer of 2007. Once finished, the new plant will increase existing production capacity by 20,000 metric tonnes to 160,000 metric tonnes per year. The plant has also been designed to process in excess of 300,000 metric tonnes pending the company's ability to secure long-term, cost-effective fibre, which will enable them to meet the ever-increasing world demand for bioenergy. Pacific BioEnergy is a part of the solution for dealing with the mountain pine beetle crisis by producing a value-added product from wood that would otherwise be burned or landfilled.

Commercial Solutions Wins Customs Clearance Approval

Edmonton-based Commercial Solutions has become the first Prairie company to be granted certification for self-assessed customs clearance and accounting. The company was certified by the Canada Border Services Agency under its Customs Self Assessment (CSA) program.

Floyd Smith, the company's Procurement and Logistics Manager, said, "This gives us a great advantage for our customers, who are urgently needing imported supplies. Being able to receive goods directly, rather than waiting for them to go through customs at the airport, saves our customers at least a day, if not more."

Smith explained that, while the new certification is important at the moment, the potential is even greater when the projected new US border regulations are set in force. "At that time, customs clearance could take 2-3 days."

A new reality in BC's forests – SAFE Companies

by Tanner Elton

This fall, the BC Forest Safety Council began accepting registrations for its SAFE Companies program. "SAFE" stands for Safety Accord Forestry Enterprise, and this is the most ambitious, comprehensive safety initiative ever undertaken by our industry. Ultimately, it will fundamentally change how BC's largest industry views and practices safety. The SAFE Companies launch is a clear signal that the forest sector is shouldering responsibility for worker safety in all of its forestry operations.

Implementing this program is an enormous task, given our target of having the entire industry - more than 5,000 forestry companies - engaged by the end of 2007. Joining them will be government agencies such as BC Timber Sales.

The SAFE Companies' goal is straight-forward. Every forestry operation will put in place all required safety programs and procedures, and demonstrate through an annual audit, that they are in place and working. Further, by adopting the Forest Safety Accord, companies agree to make safety an overriding priority and to participate in sector-wide safety initiatives.

This direct and simple approach presents significant challenges. As an industry, we must track and register companies, conduct and verify audits, develop sector-wide standards and guidelines, and much more. This will require significant and enduring effort by everyone involved - from the worker in the bush to the CEO in the boardroom. And, yes, it will require financial resources and time.

Can we afford to do it? In fact, we can't afford not to. Our current unsafe performance not only traumatizes workers and their families and disrupts individual companies, it burdens the entire industry with major, unnecessary costs that sap our competitiveness.

Protecting our workers and making our companies safer is more than worth all the effort and money. The payoff will be a healthier industry with far fewer injuries and fatalities, not to mention higher morale, greater productivity, and a new positive image.

Dramatic results will become evident quickly. Within the next five years, we will transform our poor safety performance from a painful and expensive embarrassment into a tangible point of pride.

BC's forestry sector will be the world's most innovative and resilient industry, maintaining the best safety record. "Unsafe is unacceptable" will be the new reality.

Tanner Elton is Chief Executive Officer of the BC Forest Safety Council and can be reached at 604-632-0211.

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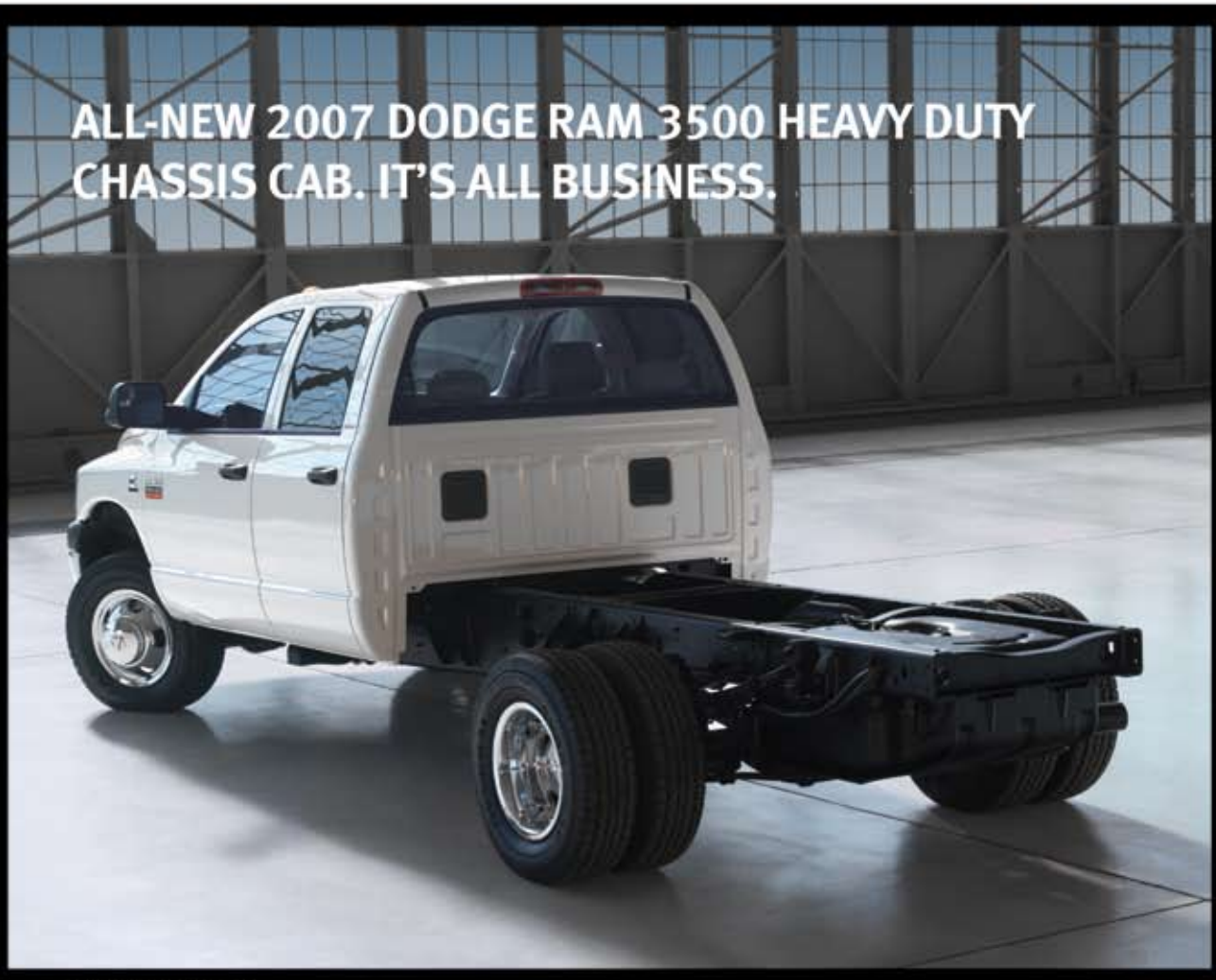

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