

Mid-Term Timber Supply: Non-Timber Values Implications

Questions and Answers

November 18, 2011

What are dead pine trees good for anyways?

- Dead pine trees do provide habitat conditions that differ greatly from harvested areas. Dead pine trees are also an important source of economic activities – dead pine trees retain their economical value for many years following death.
- Beetle attacks change the characteristics of habitats at the tree, stand and landscape scales. There are organisms that benefit greatly from that change and others who are negatively affected – the influence varies with the intensity of the attack at the stand and landscape scales.
- Once a tree dies, it tends to support a greater variety and number of species than when it was alive. The type of habitat shifts as the time since death increases and attributes of the dead tree changes.
- Rather than being spent toward growing pine tree, the energy coming to the ecosystem in the form of light is used to grow live trees and other vegetation underneath the dead stems. Berry producing shrubs, for example, now have enough light to produce berries and with the extra light, biomass of the understory vegetation is now greater.
- The MPB is simply accelerating the conversion of older stands to younger stands.

Why not harvest as much dead pine as possible and reforest? Aren't plantations better than dead mature trees?

- Currently, the industry is focusing the harvest in pine-leading stands with the highest productivity and promptly reforesting. This practice has been ongoing for the past decade and by keeping the focus in pine for as long as possible, the need to harvest non-pine leading stands is minimized – hence, this contributes to the mitigation of mid-term timber supply impacts.
- MPB-attacked stands provide habitat conditions that differ greatly from harvested areas.
- While the impact depends on the amount of surviving overstory and understory, accelerated harvesting can compound the effect of the MPB at the landscape level as it accelerates the conversion of older stands to younger stands. This could also significantly increase stream flow as well as flood magnitude and frequency for an estimated 25 year period.
- Older forests are an important feature across the landscape. Younger plantations also contribute to the diversity of habitat and even enhance this diversity by providing old growth attributes (such as wildlife trees and coarse woody debris) over time.

Is logging beneficial to non-timber values?

- The key consideration regarding the benefits of harvesting to non-timber values is related to the mix of conditions on the landscape. Timber harvesting and the MPB are shifting the landscape mix heavily to 'early seral' conditions.
- Harvesting can be beneficial to non-timber values when it is designed specifically for enhancing/restoring the non-timber value. This is different than the status-quo management practices. For example:
 - In the Chelaslie Caribou Management Corridor, the use of partial cutting (e.g. gaps and small openings < 1ha) targeted at dead pine in higher density stands while maintaining surviving overstory could be applied.

- In OGMA and connectivity corridors the use of partial cutting systems that would result in the removal of single tree or the creation of gaps and small openings could enhance the biodiversity value of these areas while providing for timber supply. However, this would require caution and an adaptive management approach would be required to ensure the success of the uneven-age management approach to all timber and non-timber values
- Pine-dominated OGMA lacking and abundance of old growth attributes or recruitment value could be harvested *and* replaced with OGMA with higher old growth conservation values.
- Partial cutting, coupled with good visual design management, could also be used in scenic areas, especially in those areas where multiple values overlap.
- Forests are not static, thus reserves established for certain environmental reasons may lose the desired attributes over time. Management intervention can be used to maintain the desired attributes.

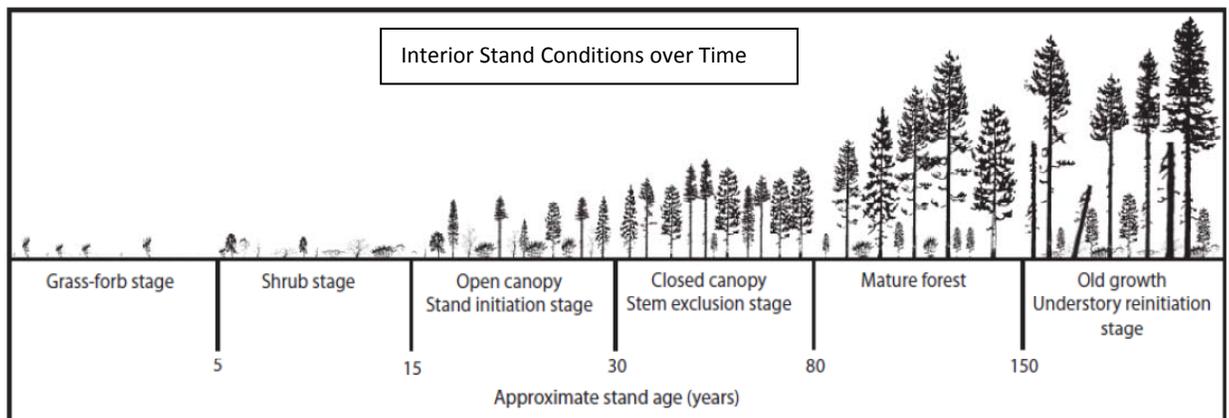
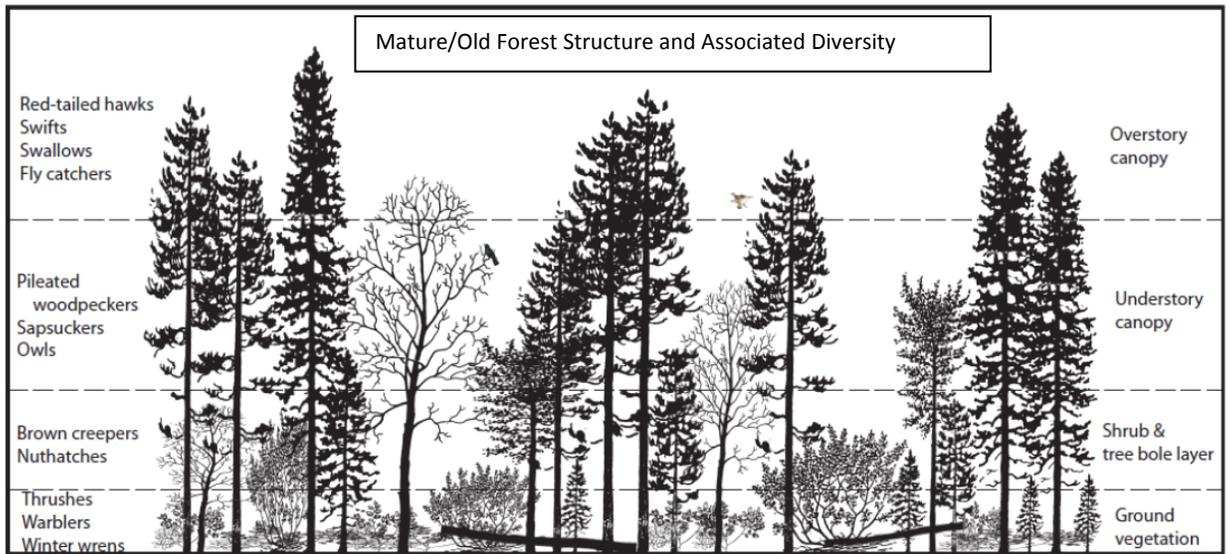
Has the MPB epidemic changed the way the public perception in visual landscapes?

- A 2010 public perception study shows that the MPB epidemic does not affect public acceptance. Landscapes with levels of alteration in the categories of Preservation, Retention, Partial Retention are acceptable. However, as more harvesting is introduced, Modification and Maximum Modification become unacceptable.
- The 2010 survey compared the community of Burns Lake response to that of the province. The response from the community of Burns Lake is similar to that of the province with the exception that the community assigned a higher acceptable value to Modification and Maximum Modification than the rest of the province.
- The *Post-Mountain Pine Beetle Recreation Usage Survey* (2011) indicates that maintaining visual quality remains an important value.
- Input received by the Nadina District indicates that while respondents associated with the forest industry overwhelmingly support changes to VQOs. Respondents associated with the tourism industry are overwhelmingly against changes to VQOs. Input from local public members not aligned with the tourism or forest industry indicates that the level of support for changing VQOs is about 50%.

Has the MPB fundamentally changed how we manage for biodiversity? Are the principles from the Biodiversity Guidebook now irrelevant or obsolete?

- No, the MPB has not fundamentally changed how we manage for biodiversity.
- The basic principle behind the Biodiversity Guidebook is that the more closely harvesting resemble natural disturbances, the greater the probability that all native species and ecological processes will be maintained. This principle holds true even in the face of the MPB epidemic as ecosystems with pine-dominated stands are characterized by frequent wildfires and frequent outbreak of defoliating insects. Wetter areas within the forest landscape provided special habitat characteristics not found in the upland areas – non-pine stands are typically located in these wetter areas.
- Even in areas affected by the MPB, the habitat needs of most forest and range organisms can be provided for by:
 - Maintaining a variety of patch sizes, seral stages, and forest stand attributes and structures (including connectivity corridors) across a variety of ecosystems and landscapes.

- Maintaining connectivity of ecosystems in such a manner as to ensure the continued dispersal and movement of forest-dwelling organisms across the landscape.
- Providing forested areas of sufficient size to maintain forest interior habitat conditions and to prevent the formation of excessive edge habitat.
- Retention of forest stands for biodiversity should prioritize sites of highest value to fish, wildlife and hydrology that reflect natural disturbance patterns. Often, these sites have a high proportion of non-pine species or are located in hydro-riparian areas and in valley bottoms.
- To sustain genetic and functional diversity, a broad geographic distribution of ecosystems and species must be maintained within forest and range lands.
- Not all elements of biodiversity can be—or need to be—maintained on every hectare. The intent is to maintain in perpetuity all native species across their historic ranges.



- The conservation of old growth attributes across the landscape is an important characteristic as older stands support a greater variety of wildlife than other stands. Areas with old growth attributes remain throughout the landscape following the MPB outbreak.
- The goal of seral stage distribution is to support various organisms and their habitat needs during different stages of forest development. This is because the composition of plant and animal

communities changes as forest stands develop through time after a disturbance. Most specialist species are associated with either the early herb/shrub stage or the mature to old seral stages. Most species are also associated with non-pine species, particularly in rich riparian areas.

- Forest harvesting generally increases the amount of young forest and decreases the amount of older forest, because commercial forest rotations are generally shorter than natural disturbance return periods. This effect is most pronounced in forest types that have the lowest frequency of natural stand-initiating disturbance. Therefore, the more that managed forests diverge from natural disturbance regimes, the greater the risk of loss of biodiversity.

What are the employment or revenue figures for guide outfitters /or trapper for the Lakes TSA area?

- Due to data compilation methodology, it is difficult to focus specifically on the Lakes TSA. It is estimated that there are approximately 6 guide-outfitters operating in the Lakes TSA. These guide-outfitters hire about 20 people seasonally.
- There are about 15 trap lines within the Lakes TSA, 5 of which are currently active. There is about 25-30 individuals associated with the active trap lines.
- The figures above do not include indirect revenue or employment benefits to merchants, hotels, and such.

How would the moose population be affected by increased logging? What would be the consequences of removing all management requirements to the moose population?

- The moose population is currently believed to be declining in the Skeena region due to a variety of factors (e.g. increased access, increased female mortality, willow borer infestation). Any factors affecting habitat supply would potentially contribute to the current decline.

Are caribou avoiding dead pine stands because they impede their movement and their ability to forage for terrestrial lichen?

- The question remains uncertain as substantive fall down is only beginning.
- All else equal, concentrations of dead-fall are not likely desirable for caribou habitat. However, since the caribou have lots of space and travel options in the landscape, prefer lower density stands which provide better forage, and since there are many wetlands, eskers and other routes, it is unlikely that migration will be more severely affected by dead-fall than by further extensive timber harvesting. Local site use, however, may well be affected, likely in a shifting mosaic through time.
- The area has historically been subject to large wild fires, and likely beetle outbreaks as well, yet caribou use has persisted.

Could harvesting and reforestation provide for better travel routes for the caribou, thereby facilitating their migration?

- If additional harvesting was designed specifically for caribou habitat enhancement/restoration, it could be beneficial. This would not, however, be status-quo management. Use of partial cutting (e.g., gaps and small openings <1 ha) in the 'high' to 'moderate' use zones, targeted at dead pine in higher-density stands while maintaining surviving overstory, could be applied.
- The non-pine stands may be important to caribou in the future for alternative arboreal lichen forage.
- Roads and trails should be rehabilitated to minimize risk of acting as predator access routes and radio-collaring of caribou used to avoid harvesting while the area is in use by the animals.

Currently, specific seral stage distribution targets apply for the Chelaslie caribou migration corridor. What would be the implications of changing these targets as follows, either permanently or if and when the current targets become constraining?

CURRENT TARGETS					PROPOSED TARGETS		
Seral Stages					Seral Stages		
Management Zone	BEC Zone	< 40 years	> 80 years	> 140 years	Early (40 years)	Mature (> 100 in the SBS and >120 in the ESSF)	Old (>120 in the SBS and >140 in the ESSF)
High Use	SBS	25	60	40	NA	34	16
	ESSF	25	60	40	NA	42	13
Moderate Use	SBS	32	45	30	NA	23	11
	ESSF	32	45	30	NA	28	9
Low Use	SBS	54	30	20	NA	11	11
	ESSF	54	30	20	NA	14	9

- The Chelaslie Caribou Migration Corridor (CMC) represents a significant portion of the fall, spring, and winter habitat of the Tweedsmuir-Entiako herd.
- The current management strategy is based on the results of monitoring radio-collared animals and on prioritizing portions of the CMC and habitat types based on relative use.
- The current seral stage objectives were intended to maintain a matrix dominated by mature stands (favoured by the caribou, especially on poor sites) in the Moderate and High use zones, and were also informed by the estimated historic disturbance rates.
- Those results were adapted into the Lakes South SRMP, including consideration of the mountain pine beetle outbreak. The view of the biologists involved in caribou research on the herd was that the beetle outbreak did not warrant substantive change to the management approach. However, some adjustment was justified – such as not counting beetle-impacted stands as early-seral and such as a suspension of the early-seral in the short-term (note – the short-term period envisioned ended in 2008).
- Some level of timber harvesting helps diversify habitat options, and the current SRMP allows for significant timber harvesting within the CMC.

What are the implications of changing the definition of “old” seral from > 140 years to > 120 in the SBS and from > 250 years to > 140 in the ESSF?

- Age is a surrogate for structure. Older stands tend to have more structure and more plant and animal diversity.
- Current definitions of old are based on historic disturbance rates by biogeoclimatic zones.
- Changing the definition of old may also imply changing the definition of mature as the gap between ‘old’ and ‘mature’ is considerably reduced.

What are the implications of replacing spatially explicit OGMA with non-spatial old growth targets?

- Spatially explicit OGMA maximize their value for biodiversity conservation or provide reserves for old growth-dependant species across the landscape.
- Spatially explicit OGMA can greatly contribute to old-growth habitat supply throughout the mid-term;
- Spatially explicit OGMA can be strategically located to both maximize their value for biodiversity and minimize timber supply impacts. Indeed, OGMA within the Lakes TSA were

designed to take advantage of existing old forest within special management zones (e.g. VQOs), habitat corridors and linkages, riparian reserves, or areas outside of the timber harvesting land base. About 65% of OGMA area within the Lakes TSA spatially overlaps other non-timber values or non-productive forests.

- There is a concern that replacing spatially explicit OGMA with non-spatial targets would result in old growth retention with negligible value.
- There is also a concern that the aspatial approach has more to do with an accounting process than with old growth value conservation and management.

What are the implications of removing the requirements for early seral stage in landscape units with an intermediate or high biodiversity emphasis option?

- Early seral stage requirements are important aspect of seral stage distribution, which is a critical aspect of biodiversity management.
- The goal of seral stage distribution is to support various organisms and their habitat needs during different stages of forest development. This is because the composition of plant and animal communities changes as forest stands develop through time after a disturbance. Most specialist species are associated with either the early herb/shrub stage or the mature to old seral stages.
- Forest harvesting generally increases the amount of young forest and decreases the amount of older forest, because commercial forest rotations are generally shorter than natural disturbance return periods. This effect is most pronounced in forest types that have the lowest frequency of natural stand-initiating disturbance. Therefore, the more that managed forests diverge from natural disturbance regimes, the greater the risk of loss of biodiversity.
- Current management objectives already allow significantly higher amounts of early seral compared to estimated historic medians.
- Removing the early seral stage requirements could result in habitat simplification as it would convert mature and old seral stages faster than they can be replaced. Habitat simplification results in a prevalence of generalist wildlife species (e.g. black bear) that can easily adapt to almost any situation and a reduction in specialist species (e.g. barred owl, caribou). Habitat simplification has the overall effect of loss of biodiversity.
- Removing the early seral stage requirements could also result in increased stream flow as well as flood magnitude and frequency. Increased peak flows can alter stream channels, fish habitat and increase fine sediment delivery, particularly if there is insufficient riparian protection.

What are the implications of allowing harvest of non-pine stands within connectivity corridors?

- With reduced mature and older forests compared to historic conditions, connectivity corridors are an important aspect of biodiversity conservation as they connect wetland complexes, riparian stands, and the mature forests between them. This provides opportunities for the distribution of species, populations and genetic materials.
- Higher rates of harvesting within the connectivity corridors could result in habitat fragmentation. Fragmentation decreases the size of habitat blocks and increases isolation of these patches one from another. Increased fragmentation dramatically alters species and landscape relationships and usually increases the risk of extinction. Fragmentation results in isolated populations with decreased resiliency to changes in landscapes that are either human induced or caused by a changing climate. The long term effect of increasing landscape fragmentation is the decline of biodiversity, ecosystem resilience, and ecosystem services.
- Partial cutting (single tree/small group selection systems) could be used in the corridors to enhance habitat attributes while providing for timber.

What are the implications of eliminating adjacency and patch size requirements?

- As long as seral stage distribution targets representative of the natural disturbance type for the ecosystem are present, along with OGMA, connectivity corridors and stand structure requirements in the form of wildlife tree retention, the spatial distribution of cutblocks can be subordinate. However, the temporal rate of harvest is extremely important and extensive conversion to young seral species should be avoided.

Have recent ECA calculations be completed in the Lakes TSA? How would increased logging affect watershed sensitivities? Which watersheds are the most at risk?

- Work is currently underway in the Lakes TSA to determine the risk of increased peak flows and fine sediment productions for 62 watersheds across the TSA. Of note, 38 watersheds had a moderate risk of increased peak flows, 5 had a high risk and one had a very high risk. The key driver in determining risk was equivalent clearcut area (ECA).
- It is anticipated that watersheds with a high and very high risk will require hydrologic assessment prior to additional forest harvesting. Additional harvesting in moderate risk watersheds could result in tipping those watersheds into the high risk category. Addressing watershed risks could require constraining the timber supply, but this requires further investigation.
- The hydrologic impacts of past and proposed logging can be reduced to some degree through provisions for green-up and adjacency and seral stage distribution. However, the hydrologic recovery of stands less than 3 m in height is zero, and stands between 3 and 5 m only have a recovery of 25%. Thus other provisions provide only limited reduction to hydrologic impacts.
- The unprecedented scale of the mountain pine beetle (MPB) infestation and the widespread mortality of lodgepole pine stands will affect stand and watershed-level hydrology.
- A study conducted by the Forest Practices Board suggests that salvage logging of beetle-infested trees can significantly increase stream flow as well as flood magnitude and frequency.
- Despite the variety of factors influencing snow accumulation, salvage harvested areas and their young plantations are expected to have more snow and a faster snowmelt than MPB attacked pine stands for a period of up to 15 years after logging. Once plantations mature (25-30 years), they will have slower snowmelt than MPB killed pine stands left to recover naturally, assuming the plantations do not experience serious health problems.
- An additional concern recognized recently, is that plantations without prescribed burning appear to have a higher probability of being consumed by wildfire. This situation extends the period whereby logged areas could continue to act as hydrologically unrecovered. This is because fires kill the planted trees and reforestation is necessary, thus setting the ECA back to 100%.
- In addition to reduced evapo-transpiration, salvage harvesting can increase wet ground areas through canopy removal and soil disturbance effects on natural surface-drainage patterns.
- A synoptic survey of the Bowron River watershed conducted more than 20 years after extensive salvage harvesting showed that many sites have not yet hydrologically recovered. Study sites in heavily harvested sub-basins had lower levels of ecological function than reference sites. Larger streams scored better than small headwater streams because they had larger riparian buffers. The majority of streams in the Lakes TSA tend to be in the smaller size class and thus more easily impacted.
- A basal area survey of small stream watersheds in the Vanderhoof Forest District (DVA) shows that even within pine-leading stands, the dominant tree species within 10 m of the stream bank is spruce. This suggests that riparian zone retention can be increased within this 10m area without hampering sanitation goals. Such attention to stand types is critical given the predominance of small size streams in the Lakes TSA.

- MPB affected riparian zones in the DVA had higher shade levels than those with salvage harvesting within the 5m of the channel bank. MPB affected small stream watersheds also had a higher level of ecological function than those with salvage. Increasing retention within the 10m zone closest to the stream edge will increase ecological function and maintain stream temperatures.
- While there may be increased risk associated with salvage harvesting, negative impacts can be mitigated through the implementation of specific BCFS planning guidance related to erosion and sediment control, riparian management hydrological integrity, and MPB salvage.

Considering the magnitude of the mountain pine beetle outbreak and the upcoming mid-term timber supply fall down, what forest management questions should we be asking?

- The mountain pine beetle is a natural disturbance agent. While the MPB is changing the amount and type of wood available for lumber, pulp and fibre production, affected ecosystems still provide for a variety of non-timber services and resources.
- One of the key services provided by ecosystems is the conservation of the environment through biodiversity management. Ultimately, the environment is the source of all life and every economy.
- Forest stewardship is the responsible use of forest resources based on the application of an ecological understanding at the stand, forest and landscape levels and based upon an ethical responsibility to the land and people.
- In order to ensure forest stewardship and in order to mitigate mid-term timber supply impact while maintaining all forest values, the following actions are recommended:
 - Place 30% of the timber harvesting land base under uneven age management. Priority for uneven age management is for OGMAs, connectivity corridors, Chelaslie Caribou Migration Corridor and scenic areas. Non-pine stands and some pine-leading stands are suitable to uneven age management.
 - Include OGMAs as part of the timber harvesting land base. All OGMAs contribute to the 30% uneven age management target.
 - Before implementation, work will be needed to determine the type of appropriate silvicultural systems that would benefit all values.
 - Investment in intensive silviculture should be made by both government and industry. These include fertilization, pruning, commercial thinning, more regular entry in a larger portion of the land base, intensive management in all seral stages, strategic access and planning.