Photo by **Catherine Van Tine Marcinek, Corridor:16 Graphics & Signs** **250-692-7887**
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This is a picture of some of the 200,000 hectares of natural old forests in Tweedsmuir Park that burned in catastrophic wildfires during 2018.

SO WHY WOULD I USE THIS PICTURE FOR THE TITLE SLIDE OF A PRESENTATION ABOUT OLD GROWTH FORESTS?
I use this picture for the title of my presentation because this in reality is what is happening to old forests in the BC interior that are reserved from harvesting.

Although there is a theory that old forests are "fire resistant". I would like you to consider this presentation and decide for yourself if old forests are resistant to the recent catastrophic wildfires.
The Old Growth Technical Advisory Panel claims that we need a paradigm shift to focus more on "ecosystem health". I couldn't agree more!
My **personal** opinion is that WILDFIRE poses the biggest threat to "**ecosystem health**" in BC's interior forests and therefore we should be doing everything reasonably possible to minimize negative impacts of catastrophic wildfire through the way we manage our forests.

Disclaimer:
This presentation contains no professional information

- On January 1, 2022, I changed my status to RPF Retired
- I am no longer legally allowed to provide professional opinions or professional forestry advice.
- I will present my personal perspective on old growth management in the interior of BC based on 45 years of working in our forests

My perspective is based on being an RPF for over 40 years,

- **Working 18.5 years for various forest companies where I executed a lot of broadcast burning and other treatments to minimize wildfire risk**,
- I worked for **8 years for the Forest Service** in a variety of positions including in Victoria, where I had the opportunity to examine forests all over the province, and
- For the last **16 years I worked as a consultant and the holder of 2 woodlot licenses, where I tried to be a salvage logging contractor**

I always spent as much time as possible in the forests attempting to learn how the forest reacts to different silvicultural treatments and natural disturbances.

I learned early in my career that sound forest management decisions are best made by experienced forest professionals who spend a lot of time working in the forest with a sincere desire to practice excellent forest management.

My first memorable encounter with an old forest

- In August 1983, I was involved in my very first broadcast burn of 2 winter logged cutblocks near Fraser Lake
- The higher cutblock was in a **very old** balsam spruce forest with an abundance of old snags, blowdown and poor-quality advance regeneration.
- While hand-lighting the lower cutblock, the fire jumped the top fireguard, burnt straight up the hill, and spotted into the old forest just below the higher cutblock, where the slash was almost 75 cm. deep.
- While fighting the fire until 2 AM, I learned just how well old forests with heavy fuel loading can burn!

Between 1983 and 1995 I carried out many broadcast burns on cutblocks ranging from 5 hectares to over 200 hectares.

We broadcast burned throughout the summers east of Quesnel, since it was not possible to obtain high enough fire weather indices to burn high elevation and north aspect Devils club sites during the fall.

While broadcast burning, we learned that if there was an adjacent old cutblock or old forest with an abundance of piled or elevated fuel, all it took was a few burning embers to ignite this dry fuel.

Individual snags in the forest adjacent to a broadcast burned cutblock would often burst into flames, while the nearby green standing trees didn't catch on fire.

Last fall I spent 2 weeks doing regen surveys on a WL that was burnt by wildfires in 2010 and 2017. In many places the wildfires burned so hot they consumed virtually all of the forest floor and the only evidence of the previous forest were stumps that were burnt almost flush with the ground. **This is a huge loss of carbon to the atmosphere.**

Attributes of old forests that make fire suppression difficult

Old forests almost always have much higher **dead** fuel loading than young forests, and fuel loading increases as all forests age.

Compared to young forests, old forests can be easily ignited during hot, dry weather, resulting in more intense wildfires which are extremely hazardous for ground crews to suppress.

As well, it's difficult to construct fireguards with machinery if there is an abundance of large trees, snags, and blowdown, as there typically is in an old forest.

Young trees contain a much higher percentage of lush green sapwood than heartwood. The % moisture content of the sapwood of BC conifers is about 3 times the % moisture content of their heartwood.

The following table indicates the % moisture content of sapwood and heartwood for most BC tree species:

% Moisture Content of Heartwood and Sapwood of Live Trees

Species	Heartwood % Moisture Content	Sapwood % Moisture Content
Interior Douglas-fir	30	115
Western hemlock	85	170
Western larch	54	119
Lodgepole pine	41	120
Ponderosa pine	40	148
Engelmann spruce	51	173
Trembling aspen	95	133
Black cottonwood	162	146

% Moisture Content is expressed as a % of oven dry weight.

As natural forests age, the amount of woody debris increases significantly as suppressed trees, dead branches and other dead trees fall to the ground.

Compared to managed stands grown until the culmination of mean annual increment, old forests have sufficient time for decay fungi to cause rot which can add to fuel loading and enhance ignition.

Abiotic factors such a blowdown from more severe windstorms and stem breakage and toppling from snow press and ice storms are becoming more frequent as our weather patterns become more extreme. Extreme weather is causing stress, mortality and damage to old forests which increases dead fuel loading.

The following quote is from the BC Government Old Growth Forests website: "**it's commonly agreed that they (*old growth forests*), tend to have more standing dead trees, or snags, and decomposing wood than younger forests.**"

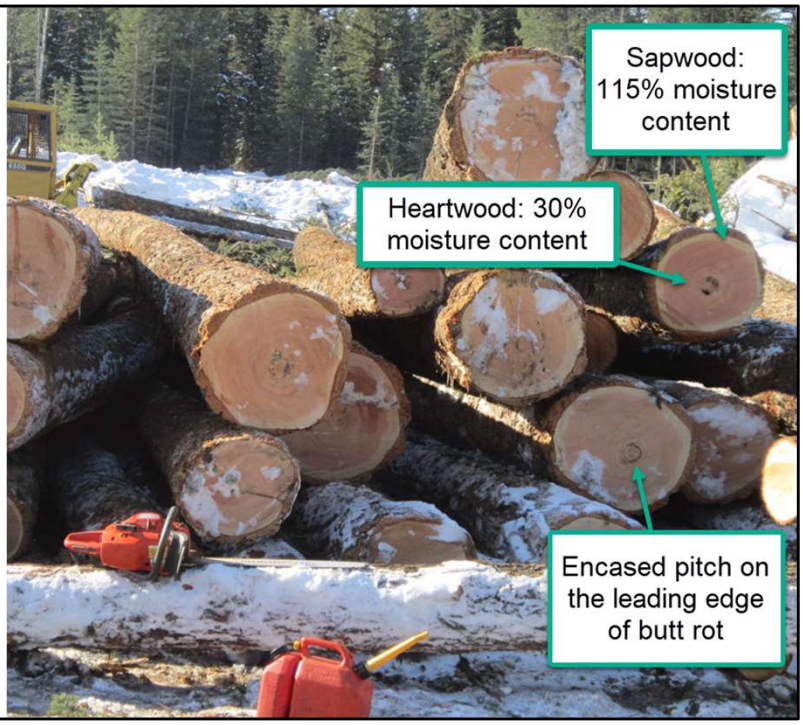
Ecologists call these accumulations of dead wood "**ecological legacies**" to disguise the fact that we are really talking about heavy dead fuel loading with a high or extreme fire hazard.

I have never before witnessed Douglas-fir lose all their 2-year-old needles in July, during 45 years of paying close attention to trees!

Douglas-fir trees normally retain 4 years of needles.

How are these stressed trees going to withstand attack by bark beetles, which are known to zero in on stressed trees?

Lessons learned about butt rot and heartwood while hand-bucking veneer logs from 120-year-old trees



There is no better way to get a true appreciation of butt rot and the amount of heartwood in old forests than to hand-buck trees into veneer logs and sawlogs.

In this 120-year-old stand, short lengths of rotten wood had to be trimmed off the bottom of many trees because veneer logs can't have any rot in the in the center. The dark pitch in the center of many logs marks the leading edge of butt rot.

In this picture you can see the narrow band of moist sapwood that surrounds the dryer heartwood. Young trees have considerably more sapwood than heartwood.
Older Douglas-fir trees usually have a lot more butt rot and heart rot than young trees. Veneer logs for plywood are generally worth about $20/m^3 more than sawlogs so when you are bucking you want to maximize the number of veneer logs.
A veneer log can't have any rot in the in the center 13 cm. core where the lathe will hold the log while the veneer is being peeled. Veneer logs also must also be $\geq$ 20 cm in diameter (inside bark).
If the butt has significant heart rot, but is > 50% sound wood we would buck off a 12' 6" sawlog (the shortest sawlog length allowed), in the hope that the next log would have no rot in the center.

I have only ever seen this resin encased heart rot in <u>old</u> Douglas-fir trees, and you can light it on fire with just a lighter!

If you have ever tried to light a campfire with green wood from a live tree, you will know how much easier it is to light a campfire with dry wood.

In the same way, dry wood makes all the difference with the ignition, intensity and spread of wildfires.

This isolated old tree on WL 845 was probably scarred when the area was selectively logged in the 1950s or 1960s and contained maturing adult Douglas-fir bark beetles that would emerge in the spring to attack additional trees.

These short chunks were bucked off the tree to find the point where the log would be > 50% sound and suitable as a sawlog.

Since the tree was well outside the active cutblock, we dragged the merchantable logs to a landing with my truck and burnt the rotten beetle infested chunks.

This old subalpine fir tree has a frost crack and hole near the base, which would allow a ground fire or windblown embers to enter the tree trunk and ignite the tinder-like decay inside.

If an old tree like this is burnt by a wildfire and remains standing, it would be a danger tree because < 1/3 of the stem's diameter is solid wood.

The need to fall danger trees reduces the speed that fire crews can access old forests to suppress wildfires.

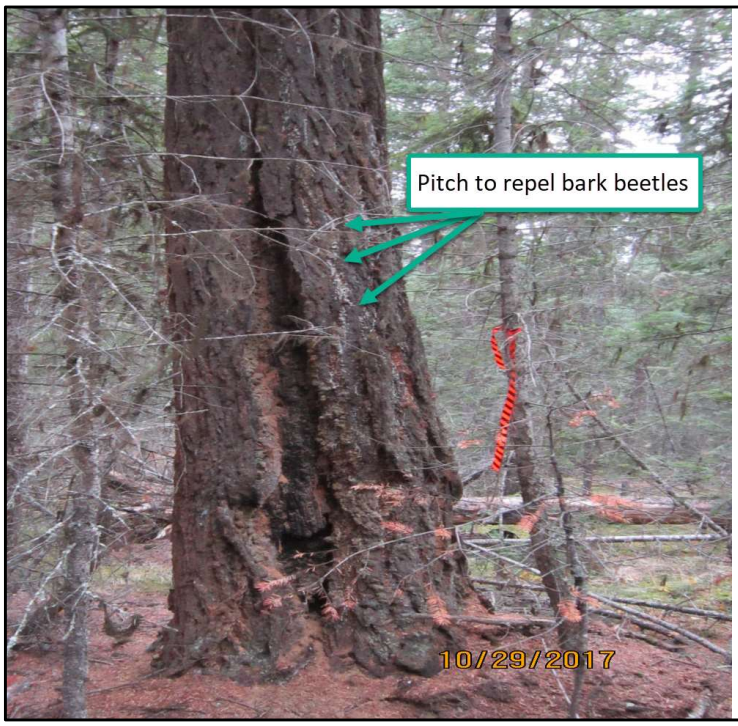
When trees with such decay fall to the ground, the decay usually remains dry if it is encased by a shell of solid wood.

Tinder-like decay easily catches on fire

These 2 pictures were taken a few seconds apart and show how easy it is for this type of decay to catch on fire.

While fireproofing our new cabin on Bowron Lake last March, I learned how well the decay from the Indian paint fungus burns, even if the decayed log is completely covered by the snowpack.

This type of decay makes excellent outside fire starter.



Most coniferous trees exude pitch when they are attacked by bark beetles or scarred. Conifer pitch is great for starting fires!

Pitch associated with scars and bark beetle attack is much more prevalent in old forests than young forests.

Scars near the base of trees are often caused when a trees in the stand fall down and scrape the bark off another tree.

These basal scars are more frequent in old forests because there are more dead trees falling to the ground.

Veteran trees act like lightning rods and are often struck by lightning if they are the tallest trees in a stand

I first saw a tree hit by lightning when I was working on a fire suppression crew during the summer of 1974.

Both of these dead veteran trees have scars where they were struck by lightning. The lightning strike which hit the tree on the left started a wildfire in 2009, and both trees were killed by Douglas-fir bark beetles after being hit by lightning.

Short duration, heavy rain is often associated with lightning storms in the interior, but if the rain doesn't occur and there is an abundance of fine dry fuel under a veteran tree which is struck by lightning, there is a high likelihood of a wildfire.

There is more likely to be an abundance of dry fuel under a veteran tree after it dies and the branches fall to the ground.

Old forests burn, while young forests with low fuel loading are much less likely to burn

Picture of a 2017 wildfire west of Quesnel provided by Murry Wilson, RPF, formerly with Tolko Industries Ltd.

The green areas are 20-year-old regeneration after harvesting and the large burnt areas were old forests with mountain pine beetle mortality.

After the 2017 wildfires, people realized that fully stocked conifer regeneration with full crown closure was often surviving large wildfires, while old forests were consumed by unstoppable Rank 6 wildfires with 150-foot flames.

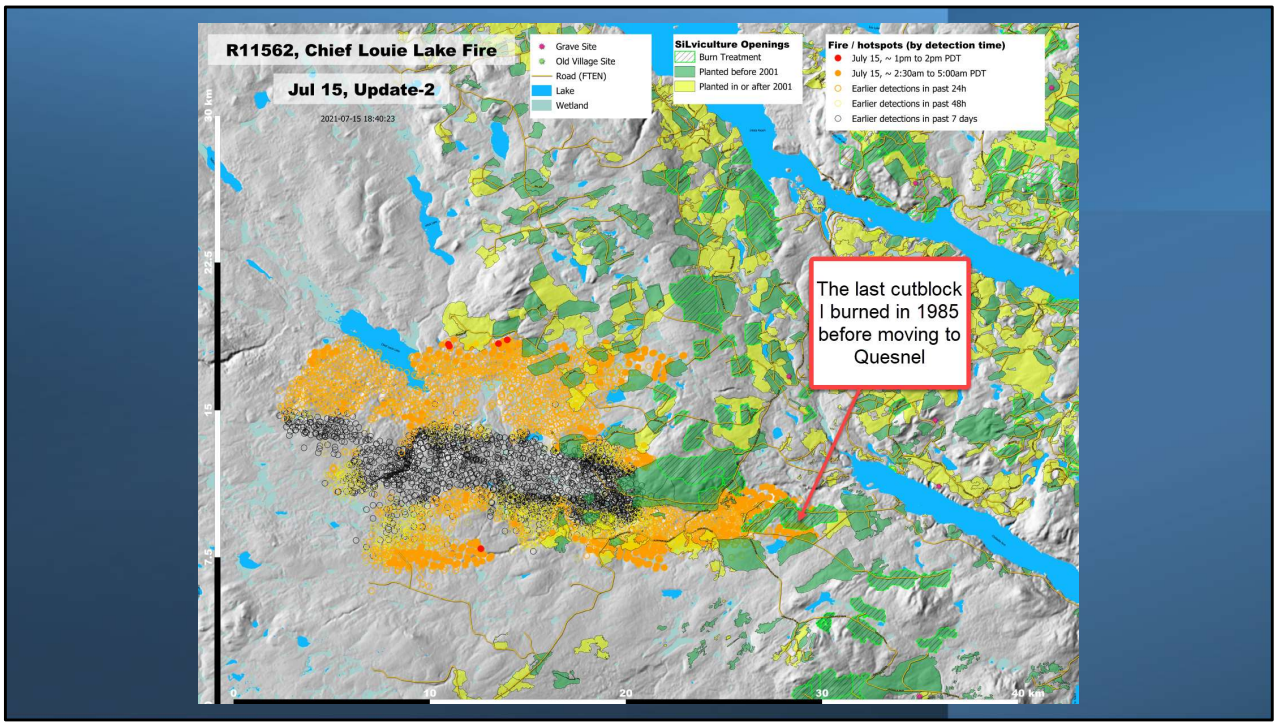
I believe this is a result of good utilization and fire hazard abatement that left insufficient fuel for a wildfire to readily ignite these areas of $\geq$ 20-year-old regeneration.

Decades of research by Dr. Jack Cohen of the US Forest Service demonstrated that wildfires spread to where there is an abundance of dry fine and larger fuels that are easily ignited by windblown embers that spread out ahead of the main fire front.
If the burning embers fall in a plantation with few fine fuels and low fuel loading, there is a good chance that most of the embers will go out.

The 2018 Nadina Fire

Most of the area of 20-year-old conifer regeneration in the center of this photo didn't burn, while the taller, <u>older</u> forest in front of the regeneration had much higher fuel loading from mountain pine beetle mortality and was consumed by a Rank 6 inferno.

In 2018 BCWS in the Nadina Fire Zone requested maps of older cutblocks that had been broadcast burned in the 1980s and 90s because these areas offered the most 'fireproof' locations to construct fireguards and try to stop the spread of large wildfires.



This is an actual 2021 BC Wildfire Service fire map showing the locations of cutblocks planted before 2001 and if these cutblocks had been broadcast burned.

The Chief Louis Lake Fire was started by lightning on July 7th in old forests with heavy mountain pine beetle mortality in Tweedsmuir Park.

This catastrophic fire, (like the one pictured on the title slide), quickly spread eastward, outside of the park until the main fire front encountered the 20 year old plantations on cutblocks which had been broadcast burned.

When the Rank 6 crown fire hit the 20-year-old plantations on broadcast burned areas, it dropped to the ground because there was insufficient fuel.

In 1985 I was in charge of the broadcast burn on one of the cutblock which checked the fire's spread to the east.

"The problem is, you blokes has got way too much dead wood in ya forests!"

-- Quote from a visiting Australian fire boss

Above the cutblock there is a lot of dead pine with an extreme fire hazard, like many of old forests in the BC interior.

The free-growing stand on the other hand has very low fuel loading (because I broadcast burned it in 1988); it has sufficient crown closure so it unlikely to be burnt by wildfire.

I believe this Australian perspective is quite accurate. The recent increase in catastrophic wildfires is partly due to more dead fuel in old interior forests.

The mountain pine beetle killed an estimated 20 million hectares of lodgepole pine stands in the interior of BC, which is providing an overabundance of dry fuel in many old forests.

This is a cutblock where I established a free-growing stand across the Barkerville Highway from Troll Ski Resort. I walked the area and prepared the silviculture prescription prior to the cutblock being harvested in June and July of 1988, I broadcast burned it in October 1988 and was in charge of planting it in May of 1989.

The photo shows about 50 hectares of the more than 25,000 hectares where I successfully established free growing stands while working for West Fraser.

1. Abate the fire hazard on each cutblock to a high standard so the regeneration will have the best chances of not being burned by wildfire.

This picture shows an excavator piling logging slash on an area away from roadside accumulations on a 2-hectare cutblock on my WL.

To minimize slash loading and the amount of wood burned, I harvested pulp logs, aspen and firewood on my WLs even though doing so wasn't profitable.

I spent over $50,000 and months of personal effort piling and burning logging slash on my WLs. I could have purchased a new fishing boat with that money!
When I was carrying out reforestation east of Quesnel between 1985 to 1996 my optimum strategy involved the following:

- Harvest the cutblock during the winter to maximize fuel loading caused by broken branches due to freezing temperatures (January to March)
- Broadcast burn the cutblock in the summer to ensure good coverage on brushy sites and high enough fire weather indices for an appropriate burn impact (June or July)
- Summer plant the cutblock immediately after burning. (July to August 5th).
- This would result in a regeneration delay of +/- 8 months and provide the seedlings with the best competitive advantage against brush.
- We used to broadcast burn up to 2,000 hectares per year.

My strategy to regenerate resilient forests *(continued)*

2. Establish high-quality stands of regeneration by promptly planting 1600 trees per hectare on areas where natural regeneration is unlikely.
3. Using climate-based tree seed is a new and important addition to my strategy.

This picture shows a 7-year-old free-growing PlFdSx stand planted on my WL using the best seed orchard seed available.

This strategy also promotes earlier crown closure which will make the plantation less susceptible to wildfires in a shorter period of time.

TYPSY shows that planting 1600 trees per hectare in the interior will provide maximum merchantable volume at rotation.

This picture was taken after the heat wave in 2021, and the seedlings grown from seed orchard seed do not seem to have been negatively affected.
On my WLs I used a target planting density of 1800/ha. to ensure I got at least 1600 seedlings planted per hectare.
Michael (who is standing in the picture) was one of a small group of 20-year veteran planters who did a very high-quality job of planting this cutblock.
Quality workmanship in all phases of harvesting and silviculture can generate outstanding results on a WL that are hard to duplicate on large scale industrial forestry operations.

Declining quality of fire hazard abatement after logging

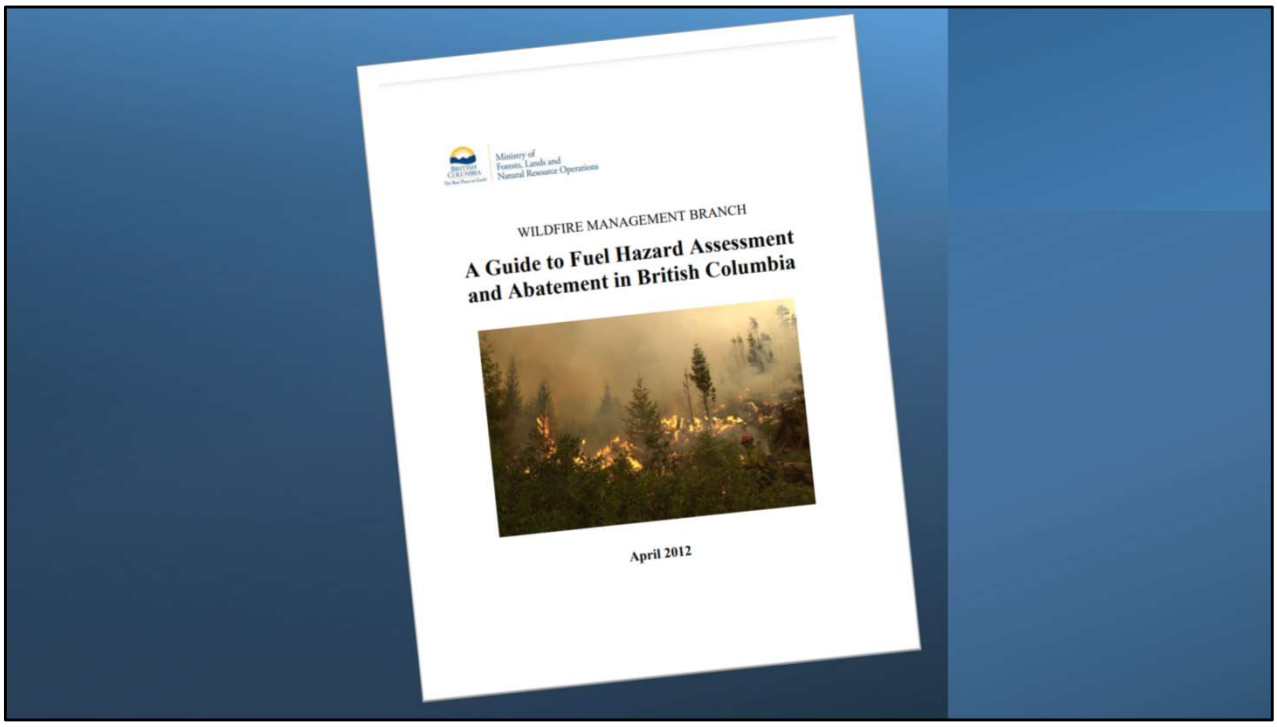
- In the 1970s and 80s, a forest officer would inspect every harvested cutblock and write a letter of instruction as to how the fire hazard had to be abated.
- If a licensee didn't comply with the instructions, they were fined.
- Under the Forest Practices Code, fire hazard abatement was required for all roadside or landing slash and all or part of a cutblock where a prescribed fire hazard assessment form indicated a fire hazard rating > 14 points.

The picture shows the intense fire that results when harvesting slash accumulations are burnt. If harvesting slash accumulations burn during the peak of the fire season, they are extremely difficult to extinguish and shower the surrounding area with burning embers, which accelerate fire spread.

This is the reason why between 1939 and 2004 the Forest Service compelled licensees to promptly burn all harvesting slash accumulations.

Since the Wildfire Act, (2004), the standard of fire hazard abatement after harvesting has deteriorated significantly. Requirements to abate the fire hazard promptly have also been replaced with longer time periods to complete fire hazard abatement on most cutblocks.

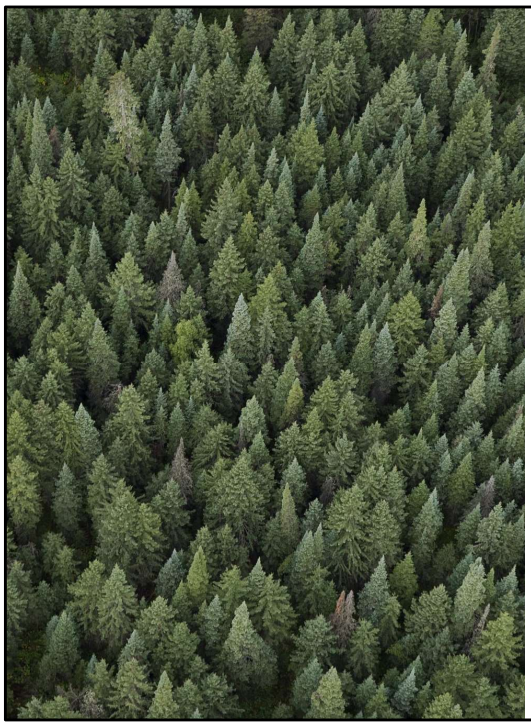
Fire hazard assessments under the Code had to be completed using a standardized form in regulation. This minimized arguments about if a fire hazard existed on a cutblock. Harvesting methods like processing trees into logs at the stump are creating considerably more slash on cutblocks and a much higher fire hazard than harvesting systems where trees are processed at roadside and the fire hazard associated with this woody debris is promptly abated.



Currently, under the Wildfire Act, licensee forest professionals complete their own fire hazard assessment and decide if fire hazard abatement is warranted.

Licensee forest professionals are under constant pressure to minimize costs so fire hazard abatement away from roadside slash accumulations is very rarely carried out.
Some major licensees do an excellent job of fire hazard abatement, (particularly on area-based tenures), other licensees don't, and many private landowners don't seem to know that they are legally required to abate the fire hazard after harvesting.
This current guidance on conducting fire hazard assessments is weak and goes so far as to suggest that slash accumulations on landings or roadsides may not constitute a fire hazard if public access to the slash accumulations is unlikely due to restricted, poor quality or non-existent road access. This completely neglects the statistic that ½ of BC's wildfires are started by lightning.

The declining quality of fire hazard abatement is alarming at a time when the fire hazard associated with forestry activities should minimized.



Proposed deferral areas to protect old forests

The next several slides show aerial views of some of the proposed deferral areas to protect old forests.

These pictures were taken by Dave Bedford, a 75-year- old RPF who is still hanging ribbons in the forest!

This is Dave Bedford, a forester I have always admired and respected.

When Dave heard about the deferrals for old growth, he organized a helicopter flight using a KMZ file to observe firsthand exactly what the proposed deferrals were like.

Like myself, Dave firmly believes that if you want to know what is really going on in the forest you have to go to there to find out.

Dave was willing to pay for the helicopter flight, but Tolko decided to join him and picked up the bill.

This is a proposed deferral area in an old lodgepole pine forest in the Montane Spruce biogeoclimatic zone **west of 100 Mile House. (<u>NDT 3)</u>**
The pine trees killed by the mountain pine beetle are falling to the ground. The green standing trees are mostly spruce from lower crown classes.

There are lots of snags and fallen trees that are elevated off the ground, which dry out to below 10 % moisture content and burn readily during the height of the fire season.

I am told by a BCWS contractor from the Nadina that this is what the stands in Tweedsmuir Park looked like that burned in the catastrophic 2018 wildfires.

Fires in mountain pine beetle killed stands (1 to 5 years after mortality) had faster spread and more crown fire than predicted, with a linear average of 2.7 times higher rate of spread (ROS) in best fit models than expected for unaffected pine. The most likely crown fire initiation threshold (P = 0.5) was ISI 5.5. Fire intensity is likely higher in **<u>early</u>** post-MPB stands due to increased ROS, lower crowning thresholds, and greater consumption of fine dead branches. (Most of the very combustible red needles fall off mountain pine beetle killed trees in 2 years)

This is another proposed deferral area in an old lodgepole pine leading stand in the Montane Spruce biogeoclimatic zone **west of 100 Mile House. (NDT3)**

You can see that most of the pine trees which were killed by the mountain pine beetle have fallen on top of each other and are elevated off the ground.

A lot of the fallen trees are slightly elevated off the ground or sticking out above the snowpack. This shows that during the winter if there are light snowfalls interspersed with periods of above-freezing temperatures, the down logs may not be covered by snow and will not become saturated like they might if they were covered by a wet snowpack.

In the spring, exposed logs at the surface or above the snowpack will absorb the heat of the sun and cause the snowpack to melt slightly faster. I have seen this occur over many years when checking cutblocks to see if they are ready for spring planting.

I have also seen many springs where a significant portion of the snowpack disappears quickly by **sublimation** on warm windy days, leaving very little moisture on site.

This is another proposed deferral area in an old lodgepole pine stand that was burned in a 2010 wildfire. (NDT 3)

This highlights the problem of using the vegetation resource inventory maps to select old forests for deferral without going to the woods to confirm what is actually there.

Is this stand a good candidate for the conservation of old forests?

This is another proposed old growth deferral area in an old forest stand that was burnt by a 2010 wildfire. (NDT 3)

This slide illustrates another important point. When dead standing trees remain on an area burnt by wildfire, the fire hazard is not eliminated because these dead trees fall to the ground and are highly likely to burn again.

A significant amount of area burned in the 2017 wildfires around Quesnel burned in 2009 or 2010.

This is an old growth deferral area where almost all the dead old trees have fallen into a tangled mass that is elevated off the ground. (NDT 3)

If this area with extreme fuel loading is struck by lightning during typical hot, dry weather in July, the fire will rapidly become a catastrophic Rank 6 wildfire that is incredibly difficult to suppress and will burn into the old "green" forest adjacent to it.

This is a 200-year-old "remnant" balsam spruce forest with incredible dead fuel loading from snags and blowdown! in the Sub Boreal Spruce mc2 biogeoclimatic subzone (**NDT 3)**

Compared to a much younger stand, this old stand is not conducive to some new form of silvicultural system other than clearcutting.

Is it not better to generate some employment and economic activity to support a rural community by salvaging this stand and abating the fire hazard, than reserving the old forest to be consumed by a catastrophic wildfire which will threaten the community?

This stand is in the same biogeoclimatic variant and looks exactly like the stand I spent all night fighting a fire in during my first attempt at broadcast burning in 1983.

Most old forests in the interior are not like the beautiful stands of giant trees on the Coast.

Would you be spiritually uplifted after spending time in this forest?

Is preserving more old forests in the BC interior a good idea?

From a wildfire risk perspective, won't reserving more old forests with high levels of dead fuel loading increase the risk of catastrophic wildfires?

The 2017 and 2018 wildfires released over 360 million tonnes of carbon, compared to annual BC carbon emissions of 67 million tonnes.

To combat climate change, shouldn't we prioritize the harvesting of old forests with extreme fuel loading to reduce the carbon emissions from wildfires?

The 67 million tonnes of annual carbon emissions in BC include all sources except wildfires.

The data on carbon emission are from a BC Government report cited by Murray Wilson, RPF, in his article in the winter 2022 edition of the BC Forest Professional entitled "Reducing Wildfire Damage to BC Forests".

Murray provides solid evidence that reserving forests from harvesting **doesn't** protect them from wildfire.

One of Murray's conclusions is that reserving old forests from harvesting actually increases the area burned annually in BC.

My perspective is slightly different than Murray's, as I believe in conserving old forests. I believe we need to conserve old forests with low levels of the dead fuel loading in strategic locations where they are unlikely to be destroyed by wildfire.

Quotes from the webpage introduction to the new United Nations report on wildfires

- "Climate change and land-use change are making wildfires worse, and we anticipate a global increase of extreme fires even in areas previously unaffected."
- "Uncontrollable and extreme wildfires can be devastating to people, biodiversity and ecosystems."
- "They also exacerbate climate change, contributing significant greenhouse gasses to the atmosphere."

On February 23, 2022, the United Nations Environment Program released a new report entitled "Spreading like Wildfire: The Rising Threat of Extraordinary Landscape Fires" (https://www.unep.org/resources/report/spreading-wildfire-rising-threat-extraordinary-landscape-fires)

I believe this UN report confirms that recent wildfires have serious negative impacts on ecosystem health.

I also suspect that the fire regime in NDT 4 (the interior Douglas-fir biogeoclimatic zone) has changed from frequent stand-maintaining (ground) fires to frequent stand-initiating (crown) fires.

A retired ecologist once told me that OGMAs that are burnt by wildfire still provide very valuable biodiversity. I sure hope this is true because we have lots of burnt OGMAs.

The Cariboo Chilcotin has 432,072 hectares of spatially defined OGMAs

Old growth management areas (OGMAs) occupy 11 % of the productive forest land base in the Cariboo Chilcotin.

There is no government funding to carry out forest health or fire risk reduction treatments in OGMAs.

BC Wildfire Service places a priority on protecting communities and important infrastructure.

(90,000 hectares of these OGMAs burned in the 2017 wildfires)

Murray Wilson's article cites: **"Data from Inventory and Timber Analysis Branch indicate that provincially 180,000 hectares of OGMAs were burnt in 2017 and 2018, along with 400,000 hectares of parks, 400,000 hectares of designated wildlife management areas and 100,000 hectares of scenic areas."**

"Data from Forsite estimate an additional 48,000 hectares of proposed old growth deferral areas were burnt by the 2021 wildfires."
The estimate that 90,000 hectares of OGMAs in the Cariboo were burnt in 2017 is from a website document by Gord Chipman, RPF and the late Steve Capling, RPF

It seems that a disproportionately high percentage of the interior OGMAs and other areas of old forests where harvesting has been restricted have been burned by high-intensity, catastrophic wildfires, most of which were started by lightning .

Quesnel OGMAs burnt during a 2017 wildfire

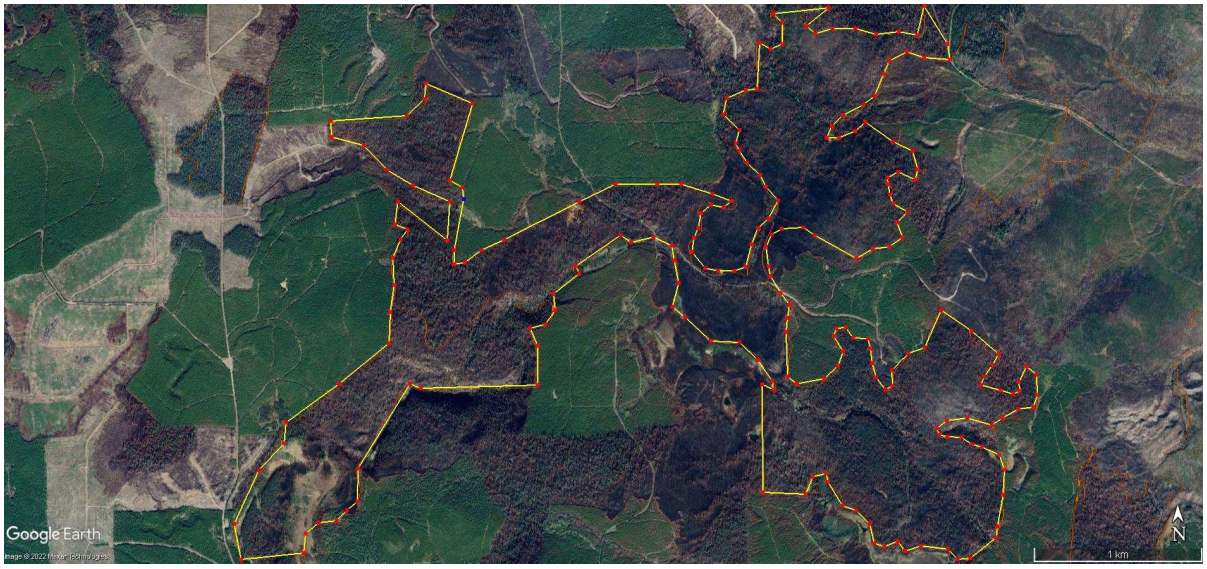


Image created by Pete McLean, RPF - President of the Quesnel Woodlot Association

On this October 2017 Google Earth image, the area outlined in yellow (+/- 475 ha), encircles several OGMAs that were almost completely burnt by a 500,000-hectare wildfire in 2017.

The cutblocks with 25- to 30-year-old regeneration were much less impacted by the wildfire.

<u>Does it make sense to preserve additional old forests when the highly important old growth attributes in existing OGMAs are being destroyed by catastrophic wildfires?</u>

The forest cover types in the OGMAs were mostly SxPl 831, SxPl 931 and lesser amounts of PlSx 831. Age class = 141 to 250 years; Age class <u>≥</u> 251 years

The 20 to 50% of the stand volume which was dead lodgepole pine certainly contributed to the fuel loading, along with spruce snags and blowdown.

An OGMA with Douglas-fir bark beetle mortality

This is an OGMA west of Quesnel where Douglas-fir bark beetles are killing the old trees. I hear from foresters all over the BC interior of similar mortality in OGMAs.

Industry foresters claim that bark beetle infestations and tree mortality in OGMAs can put the adjacent Crown forest at risk of bark beetle infestation and wildfire. However, I believe the reverse is equally true. If the forest adjacent to OGMA isn't managed to minimize bark beetle populations, fuel loading and risk of blowdown in the OGMA it put the OGMA at risk.

"Certainly our OGMAs are not standing up well to bark beetles and stand replacing fires." Ken Day MF, RPF (former manager of the Alex Fraser Research Forest south of Williams Lake)

Firewood cutters are removing the dead trees from OGMAs and damaging other old trees and bringing bark beetles into the OGMAs in the process. There aren't even any signs telling people not to cut firewood in the OGMA.

Reducing wildfire risk to protect the forests on woodlot licences

In 2012 and 2014, I purchased 2 woodlot licences (WLs) near Quesnel, and one WL had 2 OGMAs next to it.

I purchased the second WL 845 from an 82-year-old faller who had selectively logged the WL for 23 years.

He had used his Cat 518 line skidder and a self-loading truck, so he wasn't able to pile harvesting slash very well or abate the associated fire hazard.

I spent the first 2 years on the WL piling and burning lots of old slash accumulations to reduce the risk of wildfire on the WL.

The previous WL holder started logging in the 1950s, and told me at that time it was standard practice to just push harvesting slash into the timber.

Burning old harvesting slash accumulations on WL 845

You can see from the age of the pine regeneration that this slash accumulation is over 10 years old. It will still burn intensely during the peak of the fire season because piled logs do not rot quickly or absorb moisture like logs that are in contact with the ground.

Burning old harvesting slash accumulations on WL 845

On several old landings, old harvesting slash was pushed into the timber, so we pulled it out with the quad and burnt it in the middle of the landing.

To ignite this 15-year-old slash pile, I felled some dead understory trees, cut them into 1-meter logs, piled the logs against the old slash pile, and used Flash 21 jellied gasoline to get a hot fire burning.

Strategies to minimize bark beetle populations to keep old forests alive

- Annually probe all the areas that are identified for beetle attack on beetle flight maps plus other susceptible old stands
- Attach MCH (prior to April 1st), to highly susceptible old Douglas-fir trees that are retained as wildlife trees or in wildlife tree retention areas.
- Fall trap trees (prior to April 1st) in areas you plan to harvest that summer or winter, if there are bark beetle infestations nearby

Promptly harvest blowdown to prevent increasing bark beetle populations, reduce losses of merchantable timber, and minimize dry fuel loading

In the 1980s while working for West Fraser, we had a lot of small salvage permits for dead and damaged timber with minimum stumpage. Then stumpage policy changed, and the incentive of minimum stumpage was eliminated.

Today the person at the district office who issues cutting permits tells me there are virtually no small salvage cutting permits or CP amendments for salvage. This confirms what I see every time I drive through the forest – lots of dead timber that is not being salvaged.

The Forest Service has lost the ability to direct major licensees to salvage dead timber.

Actual harvest of the blowdown in the previous slide before the bark beetles emerge to attack new trees

Burn or grind slash accumulations containing large green Douglas-fir logs in the fall after winter harvesting, before the adult bark beetles emerge

The large green Douglas-fir logs in this roadside slash from winter harvesting (January to March) will be attacked by Douglas-fir beetles between April and July. If these logs in the slash pile are not burned or ground before the following April, the new adult bark beetles will emerge from the logs to attack more Douglas-fir trees.

Attach MCH before April 1st to highly susceptible old Douglas-fir trees to prevent Douglas-fir bark beetle attack

MCH, (the Douglas-fir bark beetle anti-aggregative pheromone), is highly effective in preventing Douglas-fir bark beetles from attacking highly susceptible old Douglas-fir trees.
I have also used MCH to protect several hectares of susceptible Douglas-fir trees from being attacked.
I have never seen a standing tree that had MCH attached to it be attacked by Douglas-fir bark beetles.

When I attached single MCH capsules to several fresh blowdown trees in different locations the MCH didn't completely prevent bark beetle attack on the highly attractive blowdown. You can smell the volatile fragrance of fresh cut logs or blowdown the bark beetles hone in on.

For maximum effectiveness, the MCH must be attached to trees before the bark beetles start to attack trees (< April 1).

I spent $ 3844.70 purchasing anti-aggregative pheromones to protect old trees.

When I sold the WL in March of 2021, MCH was not attached to these veteran trees and 3 of the 8 trees were killed by Douglas-fir beetles.

Expect Douglas-fir bark beetles to attack large fir trees on the edge of a winter logged Douglas-fir cutblock

Attach MCH on the most susceptible Douglas-fir trees on the edge of new winter logged cutblocks containing Douglas-fir to prevent bark beetles from attacking these perimeter trees.

MCH should also be attached to mature Doulas-fir trees retained in partial cut Douglas-fir stands, or where fire risk reduction treatments involve leave large green Douglas-fir stumps.

Fall trap trees (prior to April 1), in bark-beetle-infested areas that you plan to harvest

If you fall trap trees, you must harvest them before the new brood of bark beetles emerges, or you can be fined up to $10,000.00

By minimizing the fire hazard and bark beetle populations in the surrounding area, you stand a better chance of being able to keep old trees alive.

8% of every WL area must be retained for wildlife tree retention under FRPA

- Since old trees make the best wildlife trees, WL holders are already conserving old forests, with the added benefit that the licensee has a vested interest to protect their WL from wildfire.
- Small-scale salvage operations can occur in WL wildlife tree retention areas to control bark beetles and other forest health factors that could cause significant damage to the forest.
- Trees in wildlife tree retention areas that are harvested must be replaced with trees or stands of comparable wildlife tree value.

I believe that many old forests which are proposed for deferral on WL areas are already deferred from harvesting within the 8% of each WL that must be conserved for wildlife tree retention.
I also believe these old forests on WLs will be better protected than if they are removed from the WL and established as OGMAs.

Changes to guidance to explicitly require that old forests should be conserved on 8% of each WL would be equitable to all WL holders and would avoid huge negative impacts to WLs where large deferral areas are currently proposed, (up to 60% on one WL area).

I know of one WL holder who used the GPS coordinates from the Lightning Tracker app to pinpoint the location of a lightning fire on his WL and extinguish the fire rapidly while it was just a small spot fire.
Other WL holders with their own fire suppression and logging equipment, who live close to their WL patrol their WL after each lightning storm to make sure there are no fires.

Providing incentives (e.g., free MCH) could encourage more WL holders to reduce bark beetle mortality in the old forests within their wildlife tree retention areas.

A wildlife tree retention area on a WL area consisting of a 130-year-old stand with 60 cm diameter trees

This is a 130-year-old Douglas-fir stand with 60cm dbh trees that are protecting an S6 stream

This wildlife tree retention area on WL 1413 contains 100- to 200-year-old trees in a location which overlaps a scenic area

Large old cedar in a wildlife tree retention area on WL 2075

Despite record high cedar log prices, this old cedar stand was retained in a wildlife tree retention area next to a selection harvesting area.

A wildlife tree retention area providing a visual buffer along the Barkerville Highway on WL 537

Unfortunately, you can see some Douglas-fir bark beetle mortality in these 200-year-old trees.

The 56-year-old stands on WL 411 have been commercially thinned twice since 1984 by removing the smaller trees while conserving old wildlife trees throughout the WL.

This picture is to demonstrate that I don't think clearcutting, burning and planting is the only way to manage forests.

In the right stands I am all in favor of carefully executed partial cutting and commercial thinning. The largest trees in this young stand are already 50 cm in dbh.

Partial cutting and commercial thinning can produce big trees faster than in natural stands and can significantly reduce the fire hazard if thinning from below removes smaller trees that are likely to die and increase fuel loading or become ladder fuels.

Ecologists and anti-logging activists are constantly belittling the efforts of industrial silviculturists with claims that managed forests lack the **magical properties** of old natural forests.
This fails to recognize the reality that even with our best efforts to preserve them, all old forests eventually die and will need to be replaced by younger forests.

Excessive stand density often restricts the growth of old trees and creates overlapping canopies that promote crown fires.

An unthinned 56-year-old stand on WL 411

This unthinned stand has a much higher wildfire hazard than the thinned and pruned stand in the previous picture.

Are the proposed deferrals on Woodlot Licences fair, equitable and in the best interest of rural BC?

- Large proposed deferrals of old forests cover up to 60% of some WL areas, and the deferrals prevent harvesting of the mature timber that is essential to maintain the sustainable AAC until the young forests on the WLs are ready to harvest.
- Is it appropriate for the government to sign 20-year agreements granting WL holders the exclusive right to manage areas of Crown forest land and then take back a significant portion of the WL area?
- Some WL holders provided bonus offers of several hundred thousand dollars to obtain recent WLs that were competitively awarded.

I sold both my WLs shortly before the proposed deferrals for old growth were announced, so the proposed deferrals don't affect me financially.

However, I feel terrible for the First Nation and rancher who paid hundreds of thousands of dollars to purchase my WLs, since both WLs now have proposed deferrals overlapping almost all of the old forest that is essential for continued harvesting of the sustainable AAC.

Proposed old growth deferrals are also preventing salvage harvesting of dead and damaged stands that need to be harvested promptly to reduce bark beetle infestations, the fire hazard and non-recoverable losses of merchantable timber.

Conclusions

Old forests in the BC interior:

- Lack the majestic giant trees found on the coast
- Continue to be killed by bark beetles, diseases and weather extremes, which increases fuel loading, and predispose these forests to catastrophic wildfires

Areas for conservation of old forests must have low fuel loading and be strategically located on shaded aspects near watercourses to have the best chance of not being destroyed by wildfire.

Legislation to require salvage and bark beetle control harvesting and high standards of fire hazard abatement would make the timber harvesting land base less susceptible to wildfire and help protect OGMAs.

There should be no additional old growth deferrals on WLs, unless the licensee is not conserving appropriate wildlife trees or stands on 8% of their WL area.

It is my suspicion that the old growth technical advisory panel did not know that they were proposing old growth deferrals on WL areas if they were only using the vegetation resource inventory data to identify old forests that met their desired criteria.

I have tried to find out if this was the case through the provincial old growth email address but did not receive a response.