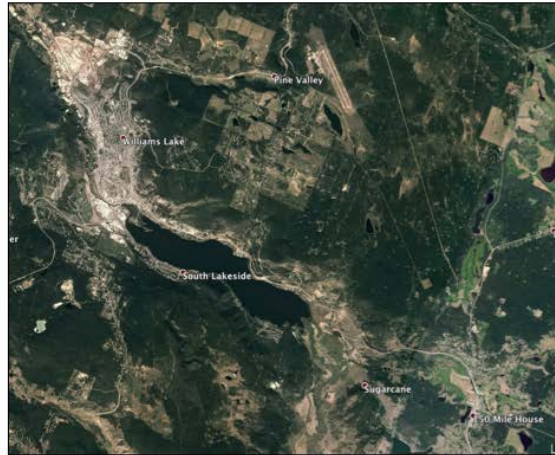


**Wildfire Science, Risk
& Management**

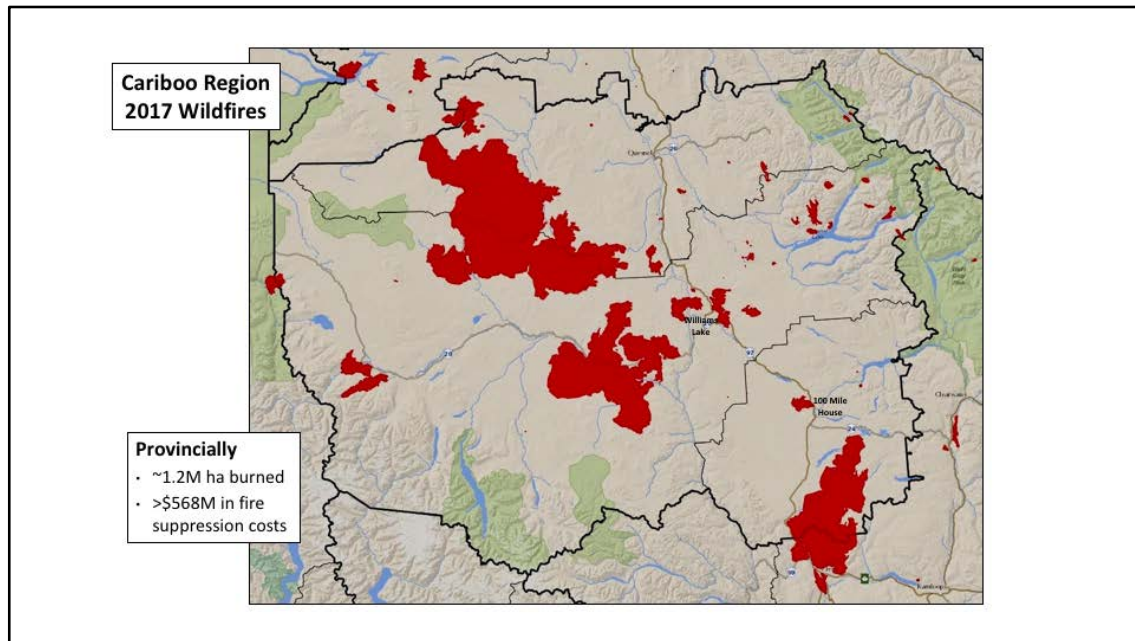
**BC Community Forest Association
Conference & AGM
May 26, 2018
Burns Lake, BC**

**Brian McNaughton
General Manager
Federation of BC Woodlot Associations**

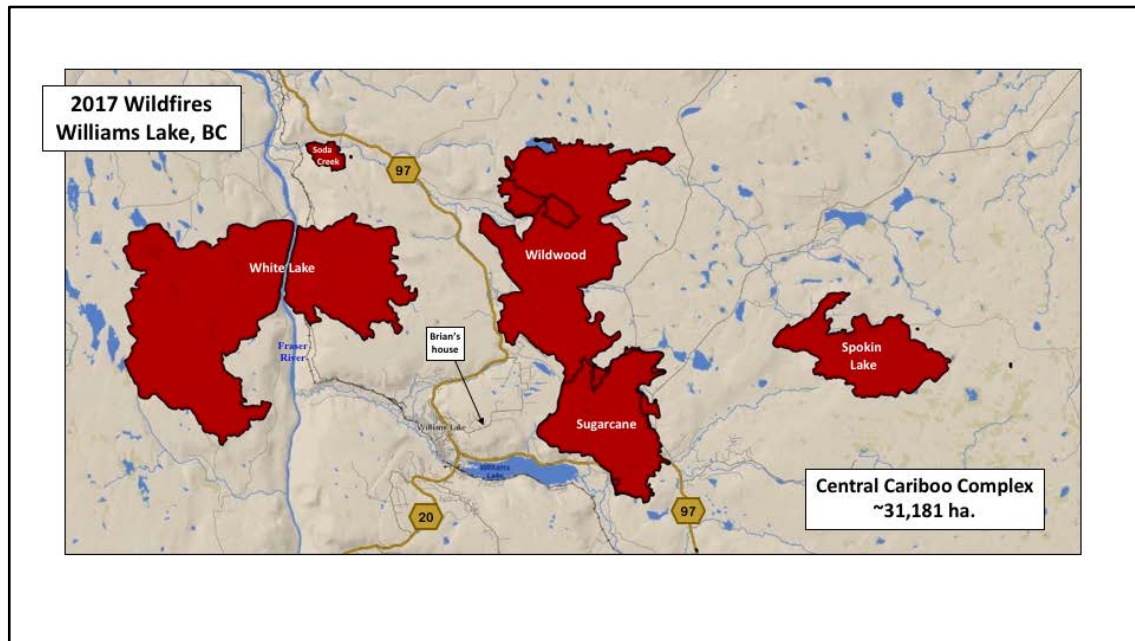


Williams Lake, BC

I'm Brian McNaughton and I live in Williams Lake., BC



Most of you probably heard that the Cariboo Region had a lot of wildfires in 2017 - the lions share of the ~1.2M hectares burned and \$568M spent provincially.



The situation around Williams Lake was particularly intense. The arrow shows where I live – about 10 minutes north of the city on Fox Mountain.

**Share my first-hand experiences
as an evacuee from the 2017 wildfires**

- ~40 year resident of Williams Lake, BC
- 2X evacuee
- 1 of 65,000 people evacuated
- District Manager, WL Forest District
- President (1st & former), Williams Lake Community Forest
- Woodlot Licensee
- Silviculture Officer, Nelson Forest Region
- Silviculturist (Stand Tending), Cariboo Forest Region
- Lone Tree Consulting Ltd.
- General Manager, Federation of BC Woodlot Associations

I've been asked to share my experiences as an evacuee from the 2017 wildfires.

click I've lived in Williams Lake for nearly 40 years and, for the record, I was evacuated twice. But I was only one of 65,000 people in BC who were evacuated ...so it's quite a honor to be selected as the one person to speak. Thank you to Jen, Susan, Ken & Miles for inviting me.

But I suspect the invitation may have had something to do with my forestry experience in the area. ***click*** I was formerly District Manager of the Williams Lake Forest District; was first & former president of the Williams Lake Community Forest; a Woodlot Licensee and Silviculturist in the region. I also own and operate Lone Tree Consulting Ltd and I'm the General Manager for the Federation of BC Woodlot Associations so I know a little bit about forestry and the forests in the area.

July 7, 2017



Early afternoon - July 7th, I was on a conference call in my basement office when a storm hit. There was thunder and lightning but what really caught my attention was the hail. Large hailstones pounding down. I was worried that the flowers got levelled. Now let me explain. These are not any ordinary flowers. I had to drive all the way to Ashcroft and back to get them. They were a special color that my wife wanted.

After the call, I went upstairs to check on them. But what I saw was ***click*** - a mushroom cloud that looked like a fire right behind my neighbor's house. I went down the road ***click*** to get a better perspective and was relieved to see that it was a few kilometers away toward the south end of Williams Lake. But the direction of the smoke plume – heading right towards my house – was quite disconcerting.

Wildwood Fire

Fox Mountain Turnoff
2 km N of Williams Lake
Looking N up Hwy 97



I went to town later which is when I realized there was another fire burning north of town – in an area called Wildwood.

Williams Lake Airport



It was until later that I found out it was around our airport.

The flames in these photos – that's what a small diameter, previously mountain pine beetle attacked pine forest – about 12 to 15 years ago - that wasn't salvage logged but in the process of regenerating looks like when it burns.

Williams Lake Airport



This is what it looked like around our airport before the fire. ***click*** This is what it looked like afterwards. Our Fire Control Center is at the airport and it had to be evacuated twice that day!

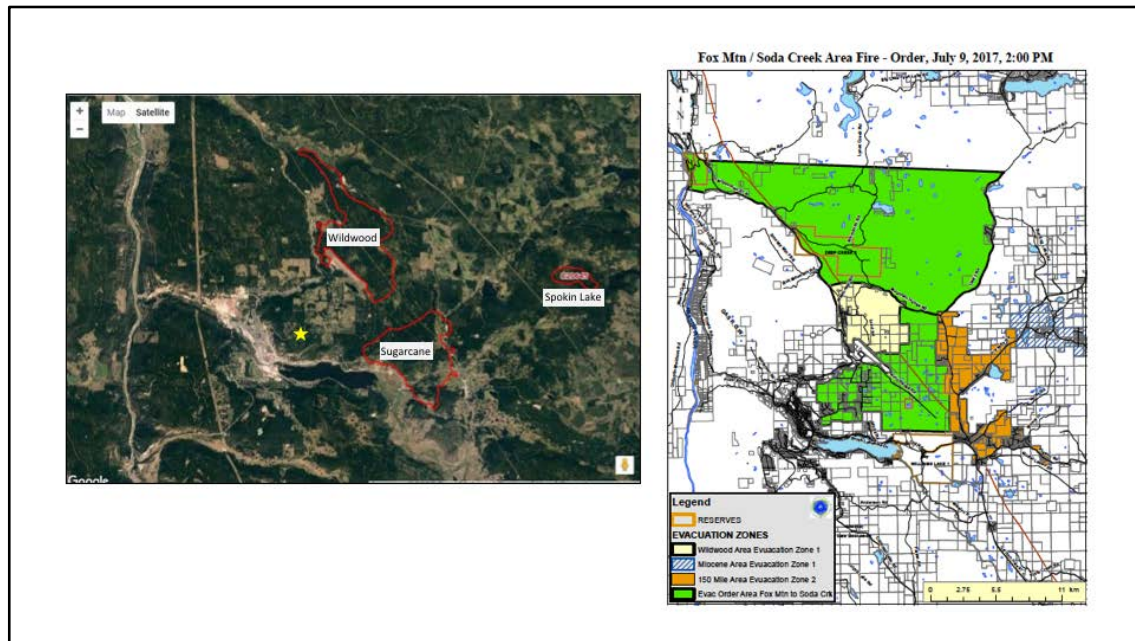
**Aerial View
Sugarcane
&
Wildwood
Fires**



So we had the Sugarcane fire burning to the south of town (on the left) and the Wildwood fire to the north.



Over the next couple of days both fires became more volatile and...

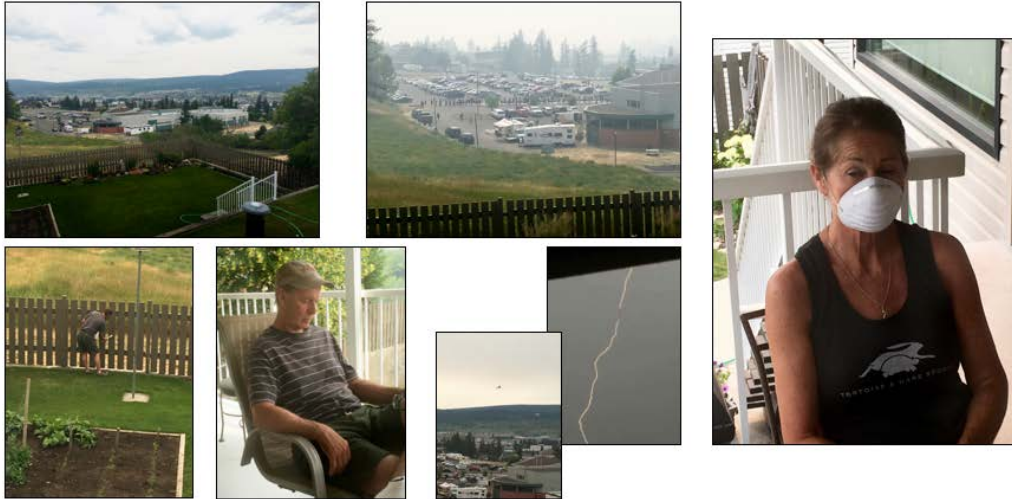


...continued to spread.

click At 2:00pm on Sunday, July 9th – about 48 hours after the fires started – an evacuation order was issued for the area in which I live.

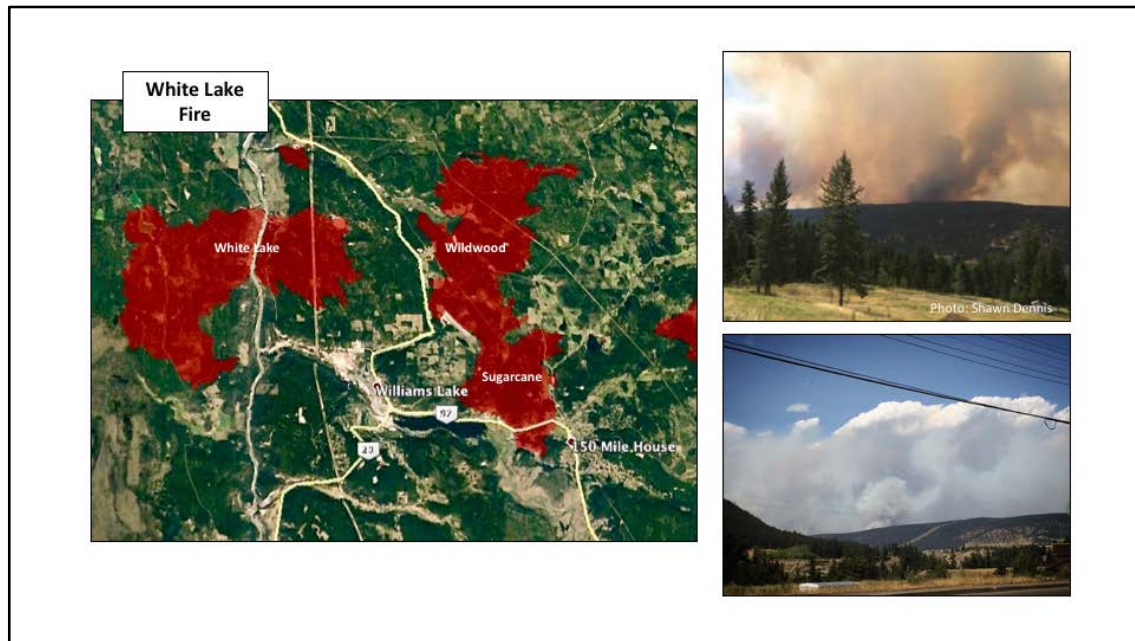
The scale is hard to see but the edge of the Sugarcane fire was within ~2 km of my house.

Evacuation Order – July 9, 2017



We went to my sister and brother-in-law's house in town where ordinarily they have a nice view of the valley; but as you can see the fires filled the valley with smoke. The school was busy because it was used as an evacuation registration center. Red Cross trailers used to serve meals are in the foreground.

So what do you do when you've been evacuated? You try to stick to your normal routine ***click* *click*** like my brother-in-law is doing in these pictures. ***click* *click*** Watch a lot of aircraft. BC Wildfire Service puts on quite an air show. The one photo, taken by a resident on south lakeside, caught a water bomber being hit by lightning. Fortunately the pilot and plane were both OK. Or, if we were really lucky, my wife ***click*** would model the latest in evacu-fashion.



Over the next few days, the situation worsened. The Wildwood and Sugarcane fires continued to spread and eventually merged. A third fire, the White Lake fire, west of town and west of the Fraser River became increasingly volatile and aggressive. It was threatening to jump the Fraser River, run up Slater Mountain and possibly into the city.

Williams Lake Surrounding Area Evacuation Order, July 15, 2017, 5:30 PM

Legend

- Boundary between Lake
- Highways
- Evacuation Zones
 - Williams Lake Surrounding Area, EVACUATION ORDER
 - Black Creek, EVACUATION ORDER
 - Green Lake Road to Fraser River, EVACUATION ORDER
 - Fraser River South to Williams Lake Road, EVACUATION ORDER
 - Fraser River North to Williams Lake Road, EVACUATION ORDER
 - Fraser River North to Williams Lake Road, EVACUATION ORDER
 - Fraser River North to Williams Lake Road, EVACUATION ORDER
 - Fraser River North to Williams Lake Road, EVACUATION ORDER

Scale

0 1 2 3 4 5 km

FYI, the White Lake fire did eventually jump the Fraser and reportedly ran up Slater Mountain and 40 to 50 km/hr. Why it stopped at the top of the mountain isn't 100% certain. The two most plausible explanations is that it came up to the power line and spaced stands at about 9:00 o'clock when overnight cooling was underway, dropped the ground and was able to be contained. The other is that the fire moved up the hill so quickly that when it crested it created its own vortex which sucked it back; essentially back burning onto itself. Whatever the reason, it didn't make it into town or cross highway 97 in which case it would have run up Fox Mountain right into my neighborhood.

Evacuating again... to Kamloops

Going south was the only option. Highway 97 north was closed due to a wildfire. In fact, Highway 97 south had been closed, but was opened to let us evacuate.

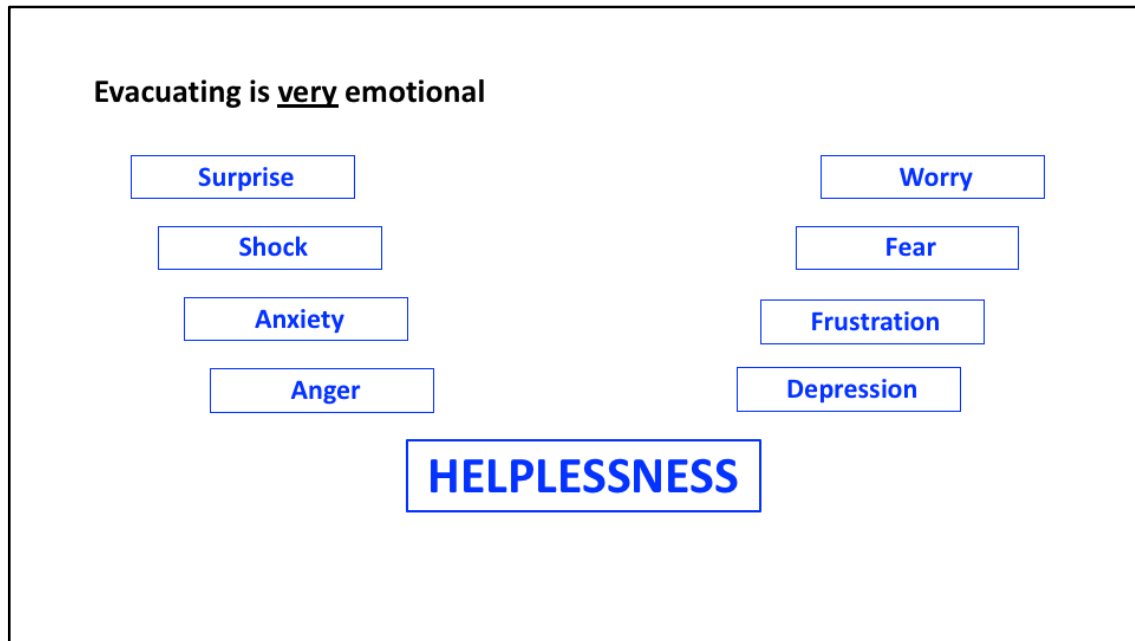


Up until the evacuation order was issued, highway 97 was closed by wildfires in both directions but they were able to open the south route through 100 Mile House and Gustafsen Lake fire but we had to head over to Little Fort because of the Elephant Hill Fire around Clinton and Cache Creek.

So here we are ***click*** under an emergency evacuation heading south at ***click*** 0km/hr while behind us ***click*** the situation looked very serious and ominous. ***click*** It was pretty much bumper to bumper all the way to Little Fort where people could decide to go north or south. We went to my nieces place in Kamloops. It took us about 6½ hours for what would normally be a 3 hour drive. We heard later that for people behind us it took between 10 and 12 hours to get to Kamloops.



As we left town, we got our first glimpse of what had been going on with the Sugarcane fire. The photo in the top left is a house in Frontier Estates, a subdivision just south of town. Two homes were lost in that subdivision. Top right shows the fire and fireguards near Chief Will Yum store and campground – which was spared. The bottom 3 photos are along the highway frontage.

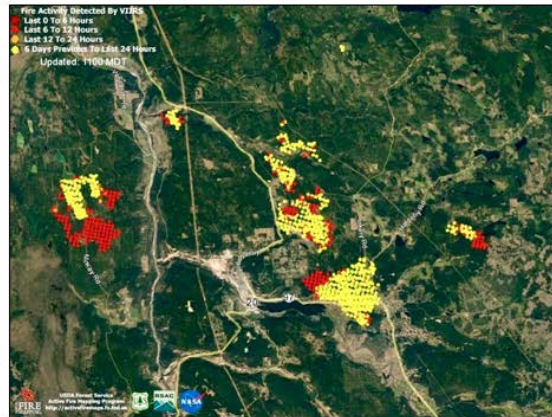


Being evacuated is extremely emotional. You run through a gambit of emotions – surprise, shock, anger, fear and for some, even depression. For me, it was the ***click*** the feeling of helplessness. The magnitude of the event is simply overwhelming.

Evacuating...

SEEK INFORMATION

- Weather
- Fire activity
- News about
 - Home
 - Family
 - Friends
 - Neighbors
 - Community



When you've been evacuated, you get an insatiable appetite for information. You follow the weather closely – watching the wind and praying for rain. You wake up in the morning trying to figure out which way you want the wind to blow until you realize there is no good direction. If it isn't blowing the fire toward your home, it's blowing it towards family, friends or someone you know. You want up to the minute information about the fires. ***click*** I found this NASA remote sensing site to be particularly good.

Evacuating...

INFORMATION SOURCES

Mainstream Media
Social Media
BCWS Fire Reports
CRD/BCWS nightly video updates
City & CRD website
Friends, colleagues, etc.



You accept information from every source – mainstream media like Global & CTV, the BC Wildfire Service’s website, regional district and city websites, even social media – although beware – some of the info on social media isn’t correct! In our case, we got nightly you tube updates by the Cariboo Regional District and BC Wildfire Services. That’s Mike McCauley and Emily Epp. They were terrific.

Scouring the media, I did come across some interesting photos. ***click*** Here we have the pigs talking to the (pause) – RCMP officer. People who couldn’t transport their livestock often just let them loose to fend for themselves. ***click*** and then there were the 3 bears; and ***click*** some dignitary who showed up for lunch and a photo op and my personal favorite ***click*** - the pink horse. A lady in Likely BC asked her teenager to go paint their phone number on their horse so if they had to let it loose, they would have a better chance of getting by someone calling to tell them where it was. Of course the teenage only heard ‘paint the horse’ – not the phone number.

WHY?

Why so many fires?
Why so many large fires?
Why was fire behavior so volatile?



Climate Change
Above Average Temperatures
Extremely High Drought Codes
Wind
Lightning
Human Caused

Fuel - the condition of our forests

For me ...and this is where my forestry background came into play – I became obsessed with why. Why so many fires, why so many large fires and why was the fire behavior so volatile?

So applied my extensive knowledge of fires – ummm, the fire triangle.

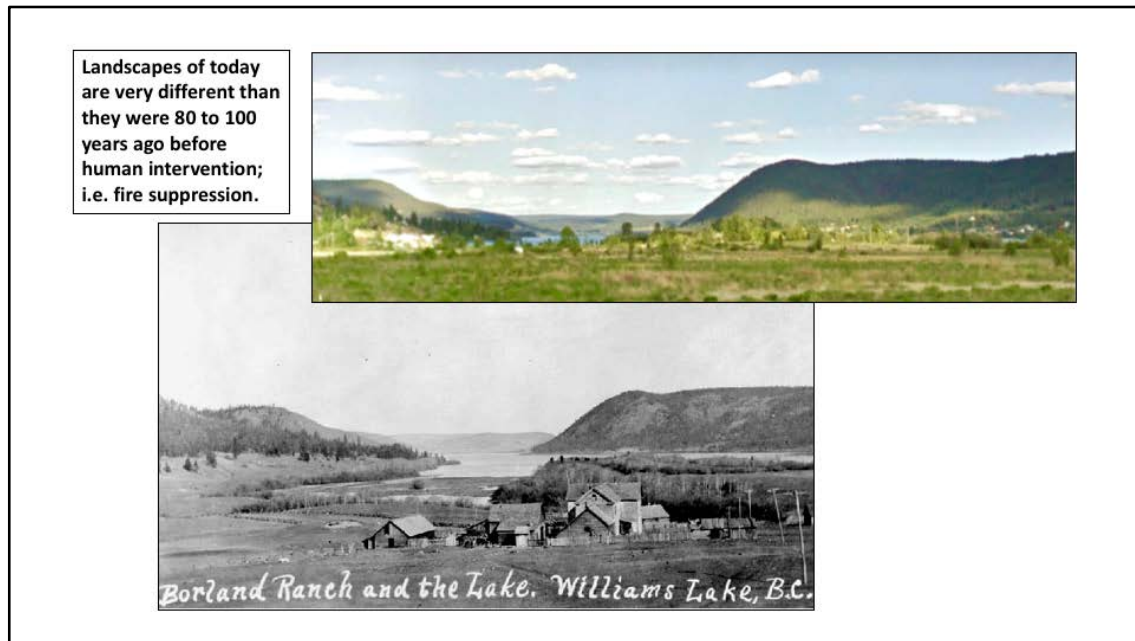
click First, let me say I get that climate change, hot weather, tinder dry forests, lightning and people starting fires all contributed. But for me, it was about the ***click*** the condition of our forests and the fuels they contain.

Living (Dangerously) in an Era of Megafires

Dr. Paul Hessburg
Research Landscape Ecologist
US Department of Agriculture
Pacific Northwest Research Station
Wenatchee, Washington



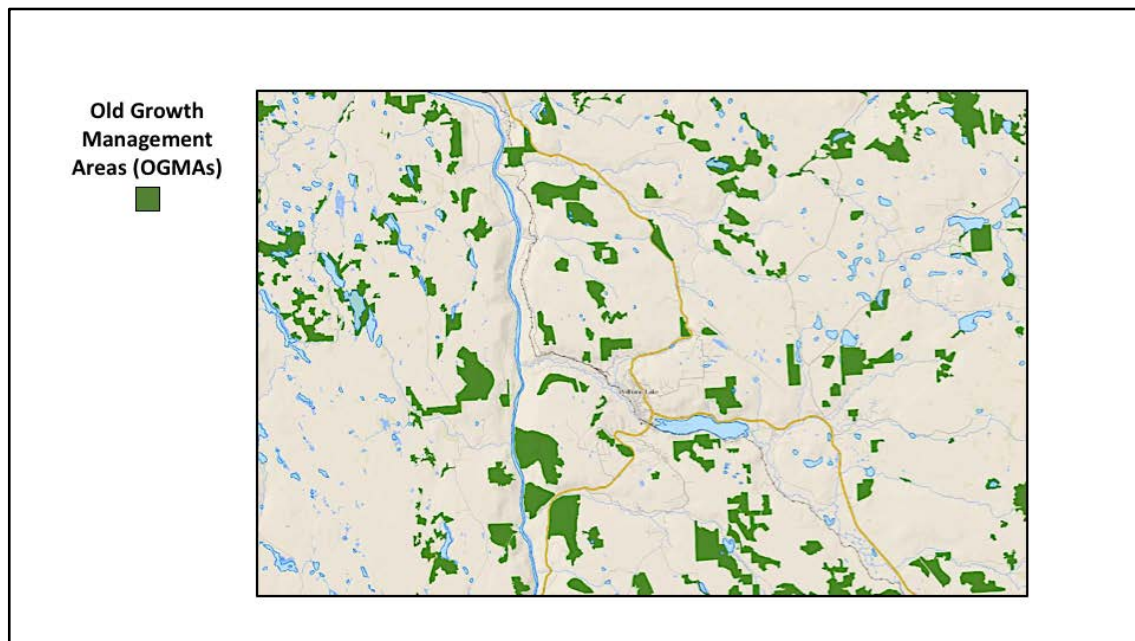
I was talking about this to a friend and colleague who suggested I watch a Ted Talk by Dr. Paul Hessburg called Living Dangerously in an Era of Megafires. He sent me the link. Dr Hessburg is a Research Landscape Ecologist for the US Department of Agriculture in Wenatchee Washington. How many of you have seen this video or another one of Dr Hessburg's presentations? One of the interesting things he points out is that the landscapes of today ***click*** ...



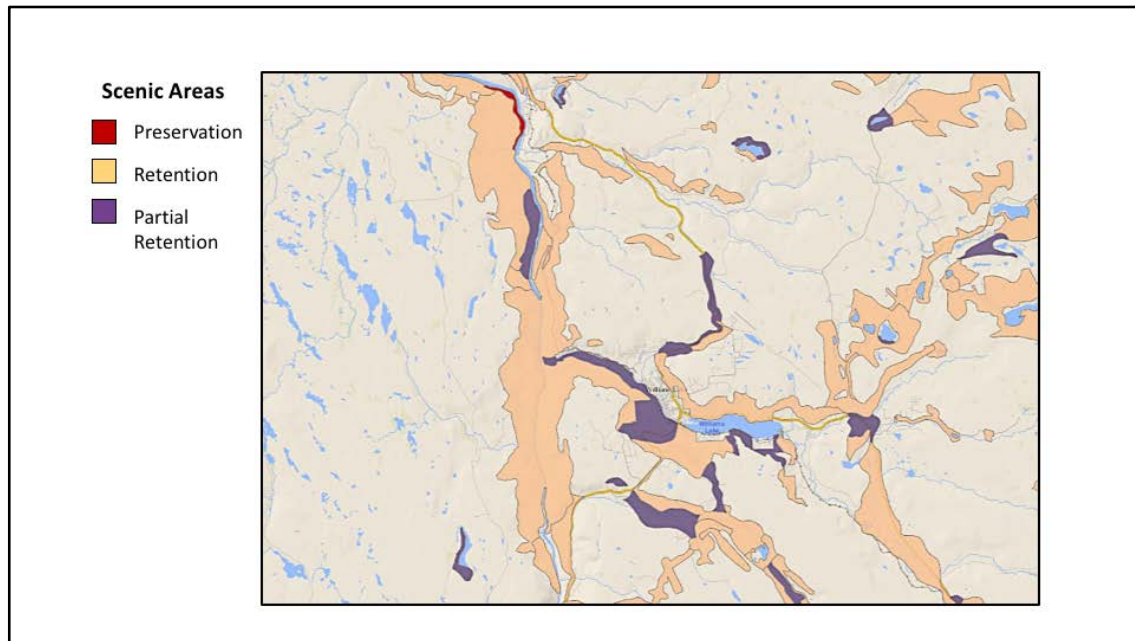
...are considerably different than those of 80 to 100 years ago. Fire suppression and human intervention have caused them to change significantly. Forests cover more of the landscape and are much denser.

This photo is of Williams Lake – looking south. I think it is from around 1923. By comparison, ***click*** this is a recent google earth photo of Williams Lake, also looking south. I think you can see the difference.

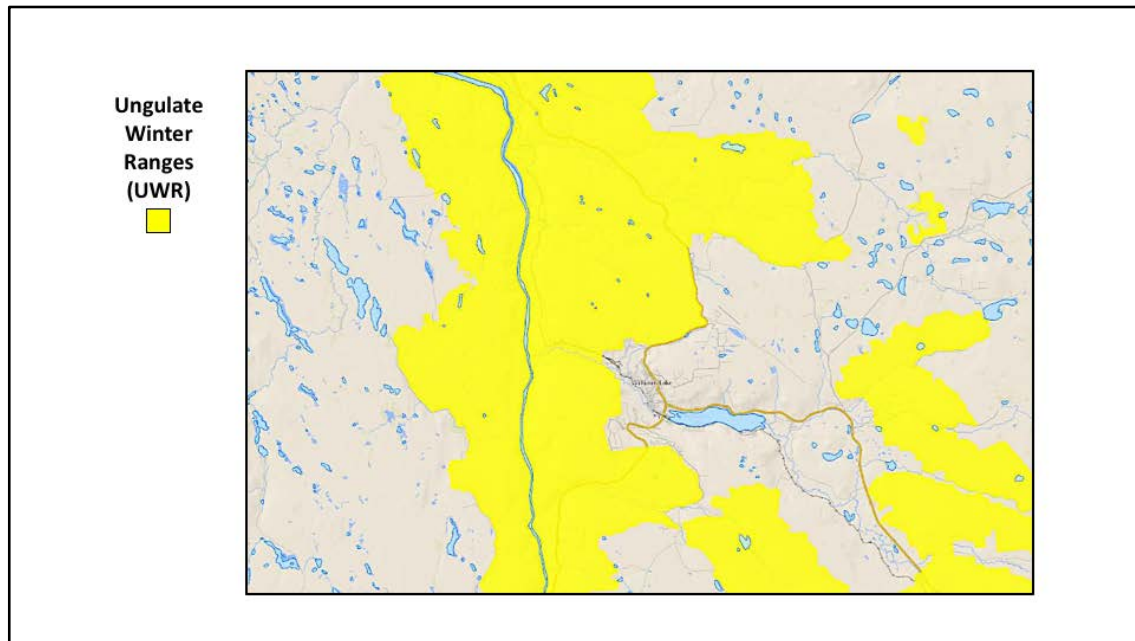
That got me thinking and asking myself how much the landscapes around Williams Lake have changed in the last 15 – 20 – 25 years ...basically a quarter of a rotation or a re-entry period for selective logging in dry belt Douglas-fir. ***click***



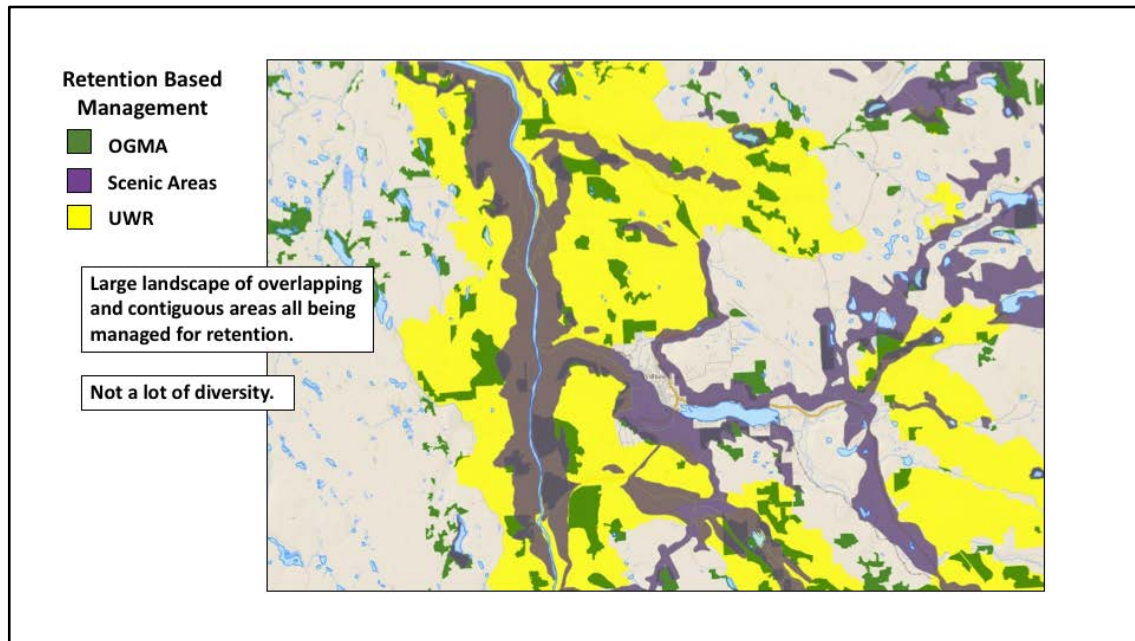
These are the Old Growth Management Areas around Williams Lake.



Here are the scenic areas – although only preservation, retention and partial retention.



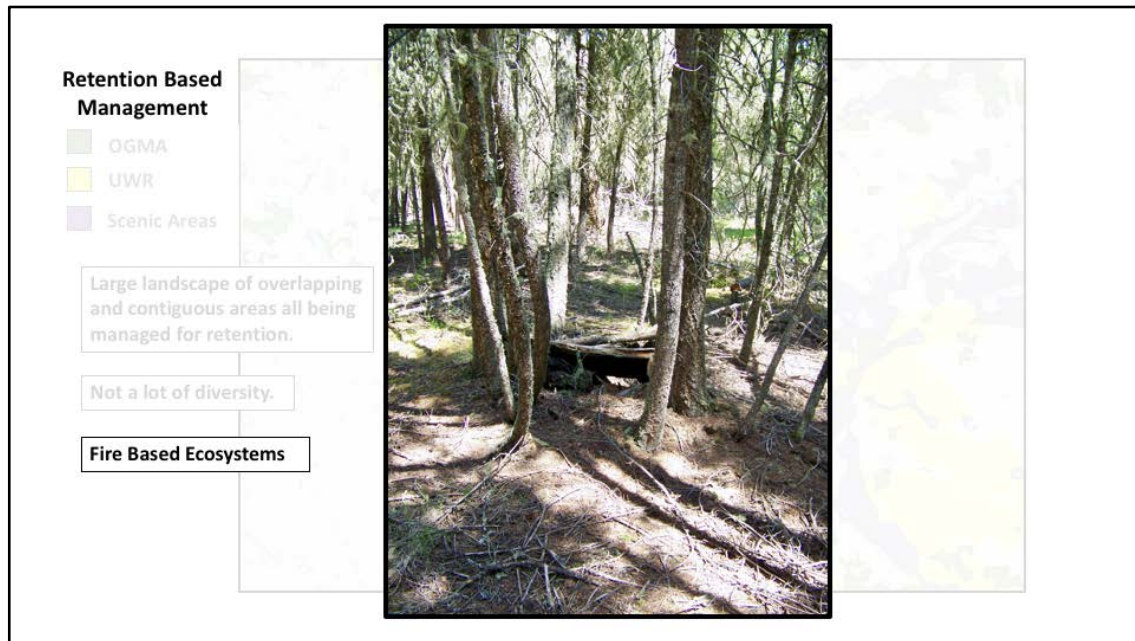
Here are the ungulate winter ranges.



When you put them altogether, this is what it looks like. So what does that mean?

click First, Williams Lake was/is surrounded by a very large landscape of overlapping and contiguous areas all being managed for retention. Retention basically means it is strongly preferred that there be no logging or any other industrial activity in the area.

click Second, because all the areas are basically being managed the same way, there isn't much diversity across the landscape or within the forests themselves. The forests are all very much alike.



And thirdly, these are fire based ecosystems which, if I remember my lessons from Ecology 101, Mother Nature is going to burn these forests at some point in time. It's not a question of "if," but rather when, where and how hot.

So what does all this mean in terms of the condition of the forests and forest fires. ***click***

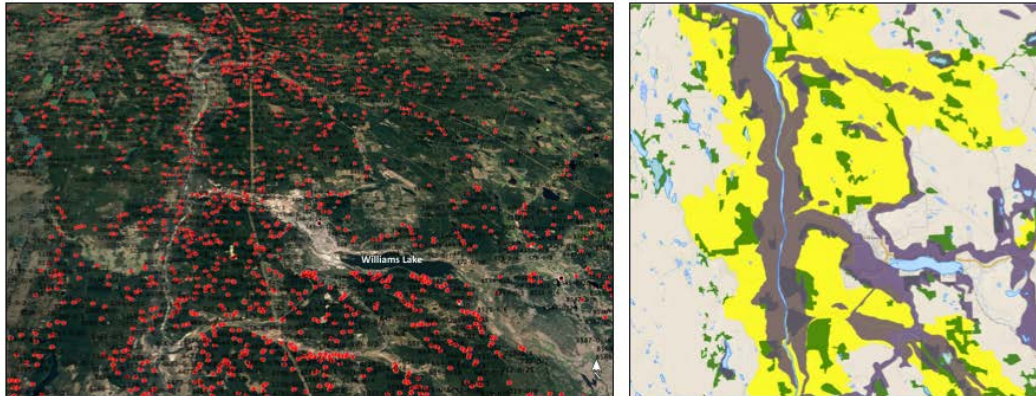


Old trees



It means there are lots of old trees; and what happens to old trees? Well, old trees like some old men (run hand over my hairline) have receding crowns. While my hair may threaten to clog the sink, the fallout from old trees is fuel for forest fires. Also, old trees are ***click*** susceptible to insects. In our case, it's the Douglas-fir beetle. How much of a problem is the fir beetle ***click***

Douglas-fir Bark Beetle



Douglas-fir Beetles
Red attack – late July 2017

...here is a map showing the red attack sites around Williams Lake from late last summer. There were nearly 8,000 sites in the Cariboo Region alone. And because of the wildfires, the population is expected to expand significantly. Fir beetles love stressed and dying trees! The dead and dying trees add fuel to the landscape and we shouldn't forget that snags attract lightning.

click Here's the map of the retention areas. I'll let you do your own comparison and decide if there's a correlation between the concentrations of beetles and the way areas are being managed.

So what else happens?

In addition to the old, beetle susceptible trees...



Dense understories with heavy lichen production and high mortality due to overcrowding, lack of moisture, shading and spruce budworm.

Dense understories with heavy lichen production have been allowed to develop. There is high mortality due to overcrowding, lack of water and insect attacks; such as the spruce budworm which was prevalent in the Cariboo and around Williams Lake about 8 to 10 years ago. These understories are loaded with fuel, including ladder fuels which help a fire get up into the crowns of the trees.

And...

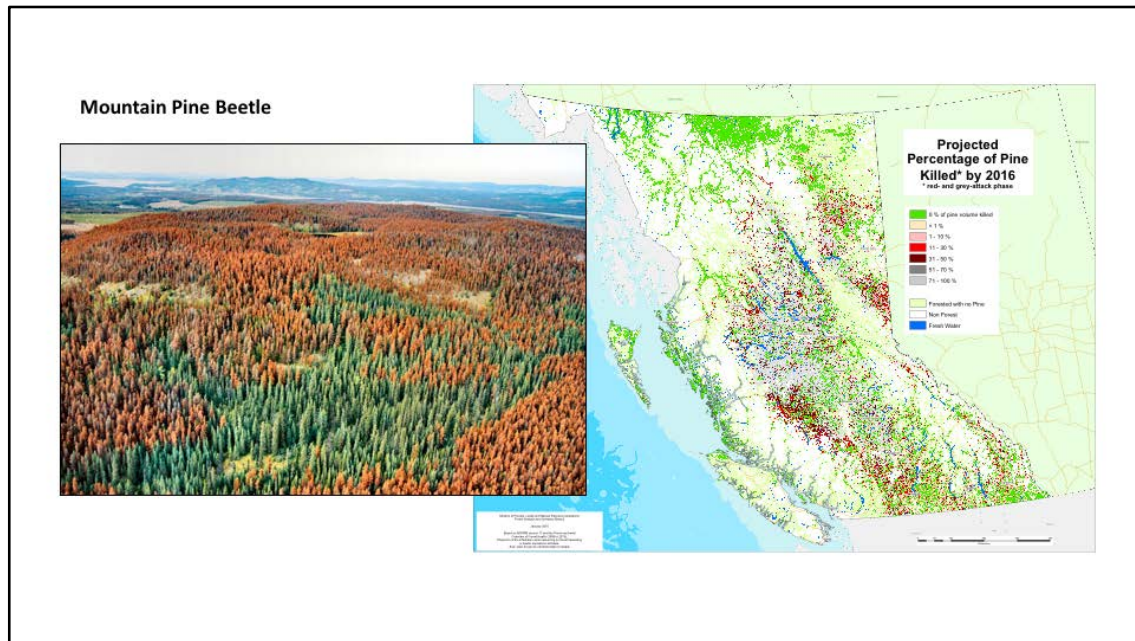


Snowpress



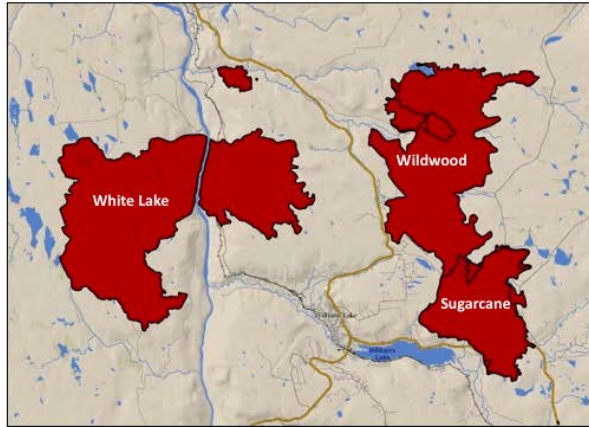
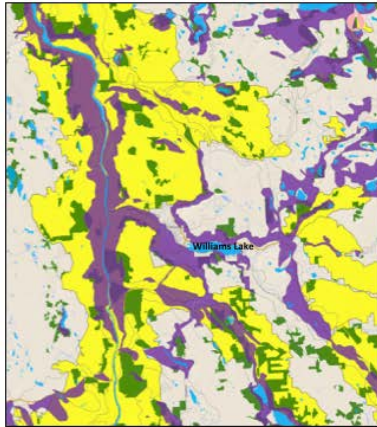
Blowdown

Then there's the snowpress and blowdown that occurs. In the past, periodic fires would consume these fuels and leave openings in the stands. New trees would grow in naturally. This is what helped these forests to be diverse, heterogenous.



And let's not forget about the Mountain Pine Beetle which, in addition to killing large tracts of timber, also killed the lodgepole pine in mixed stands – much of which was never harvested. It too added to the fuel loading.

So when we look at all of this as a package, we essentially created an ideal situation to have many large volatile wildfires on the landscape around Williams Lake. We allowed all the key fuel groups - fine fuels, ladder fuels and large fuels - to accumulate around the town.



Here is a side by side comparison of the retention areas and the wildfires that caused Williams Lake to be evacuated in 2017. I'll let you decide if there's a direct correlation between the two.

WHY?

Why so many fires?
Why so many large fires?
Why was fire behavior so volatile?



Too many trees
Too many old trees
Too many dead, dying & unhealthy trees



Too much fuel
Too much continuous fuel loading



Lack of landscape
&
stand level diversity

The answer to my questions? In my view,

click we have too many trees, too many old trees and too many trees that are dead, dying or unhealthy which are creating ***click*** too much fuel and too much continuous fuel loading and that our ***click*** landscapes lack diversity. There is not enough variability in our forests to act as natural fire breaks, to help contain fires when they break out.

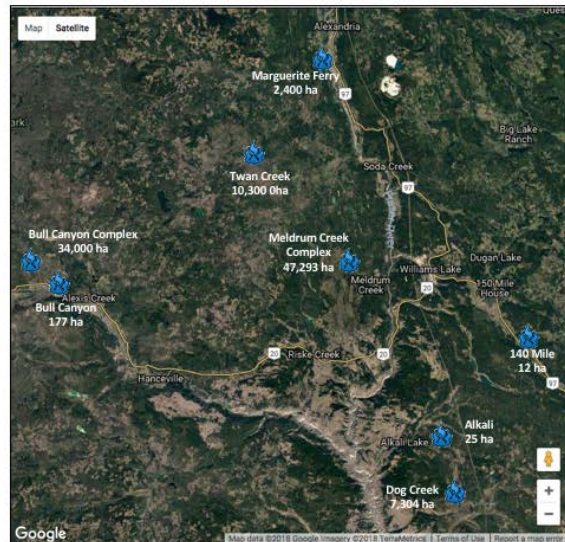
click

WE WERE WARNED!

2010 Wildfires

- 330,000 ha (most in 10 years and 3X the average).
- \$220M – 3rd most expensive year in history.
- ***“The hardest hit areas were in the central interior (around Williams Lake, through the Chilcotin and the area south of Houston, Burns Lake and Fraser Lake) where very large fires impacted many residents.”***

BCWS 2010 Wildfire Season Summary



It's not like Mother Nature didn't warn us. In 2010, she sent a warning shot across our bow. At the time, 2010 was BC's 3rd most expensive year for suppression in history. 330,000 ha burned which was a 10-year high and 3X the annual average. As you can see on the map, many of the fires were in or around the same areas that burned in 2017!

Since I was coming to Burns Lake to make this presentation, I thought this quote ***click*** from the 2010 BCWS Wildfire Season Summary was quite appropriate. It said the hardest hit areas were around Williams Lake and through the Chilcotin and **the area south of Houston, Burns Lake and Fraser Lake where very large fires impacted many residents.**

So I guess you've been warned too!

In my opinion,

...if we don't want 2017 to be the "new normal," BC needs to:

1. Establish a FRPA objective for **FIRE**
 - Use of fire
 - Wildfire reduction/mitigation
2. Establish a FRPA objective for **FOREST HEALTH**
3. Re-think our forest management paradigm

FRPA objectives:

1. Biodiversity
2. Cultural Heritage
3. Fish/Riparian
4. Forage & associated plant communities
5. Recreation
6. Resource Features
7. Soils
8. Timber
9. Visual Quality
10. Water Quality
11. Wildlife

In my opinion, if we don't want to experience more fire seasons like 2017, then there are 3 things that we need to do right away.

click First, establish a fire objective in FRPA (Forest & Range Practices Act). The fire objective needs to address two things ... one is the use of fire and the other is fuel reduction and fire mitigation.

click Second, we need a forest health objective in FRPA – not only to reduce fuel loading and risk of fires, but because BC needs healthy, fire resistant and resilient forests and ecosystems.

click Third, we need to re-think our forest management paradigm; which includes applying the two new FRPA objectives to the way we manage our forests.

Forest management paradigm can be a difficult thing to wrap our heads around so let me give you three examples of what I mean.

Forest Management Paradigm

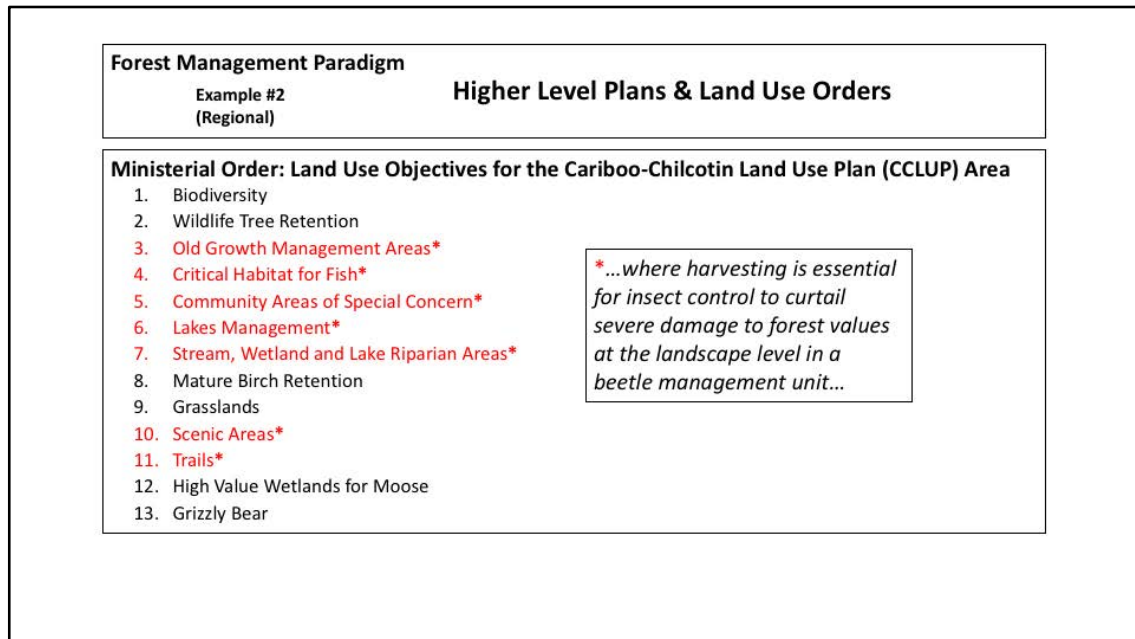
Example #1
(Site level)

Deciduous

Should we accept more deciduous
in our stocking standards given its
importance to ecosystem health,
diversity and resiliency?



Are we biased against deciduous? When I took ecology in university, I remember being told how important deciduous trees were to ecosystems – cycling nutrients, retaining moisture and providing shade. Maybe we need to examine our stocking standards to make sure we appreciate the importance of deciduous to ecosystems – particularly ecosystems that have been subjected to catastrophic events such as wildfires.



The second example has to do with higher level plans and land use orders. The CCLUP was approved in 1996. There are 13 land use orders, seven of which contain a clause which states that harvesting to control insects in those areas can only occur when the insects have

- spread outside of those areas to the surrounding landscape;
- are causing severe damage to not only the forests but forest values, and
- the bureaucracy has administratively declared the area to be a beetle management unit.

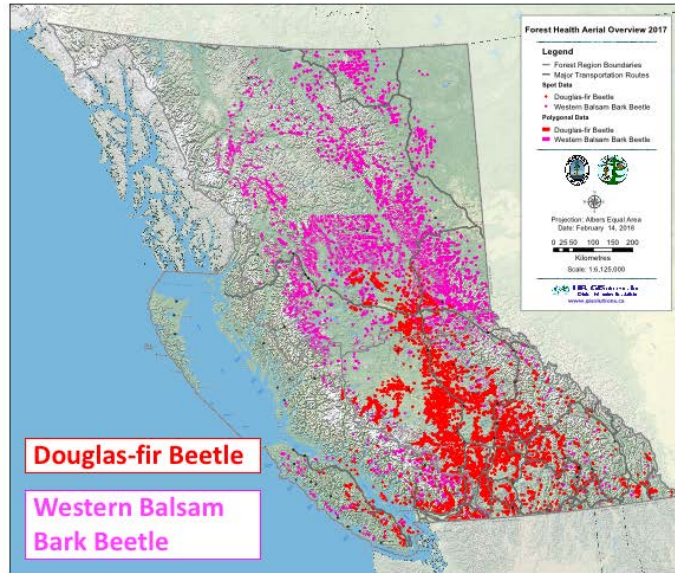
Think about that. Is that the way we want our forests to be managed? In my view, its kind of like saying thousands of people have to die before we'll start giving people the vaccine for the flu.

Forest Management Paradigm

Example #3
(Provincial)

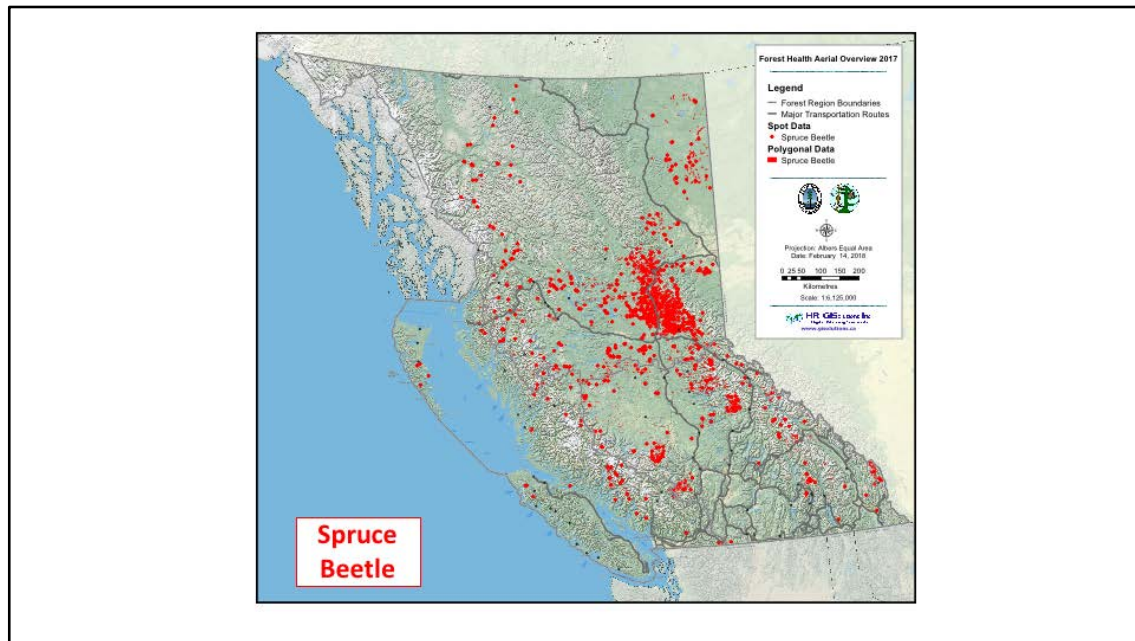
Forest Health

Is our forest management
paradigm working??

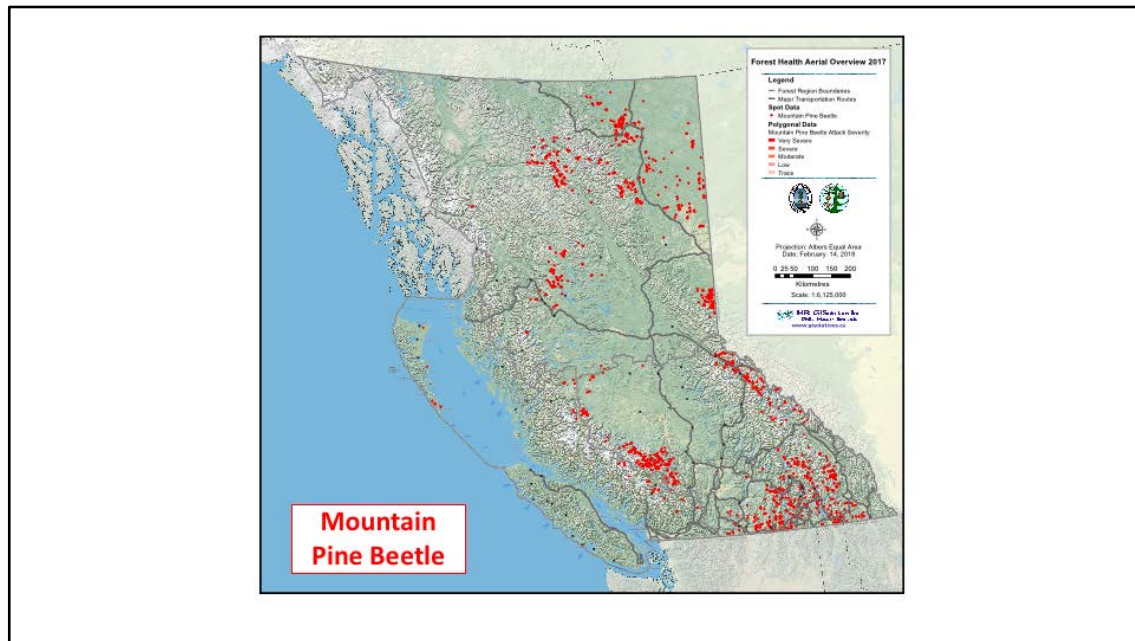


My last example is forest health. The next five slides are of the 2017 provincial forest health overviews for various forest agents. You be the judge. Ask yourself if the current forest management paradigm is producing healthy forests.

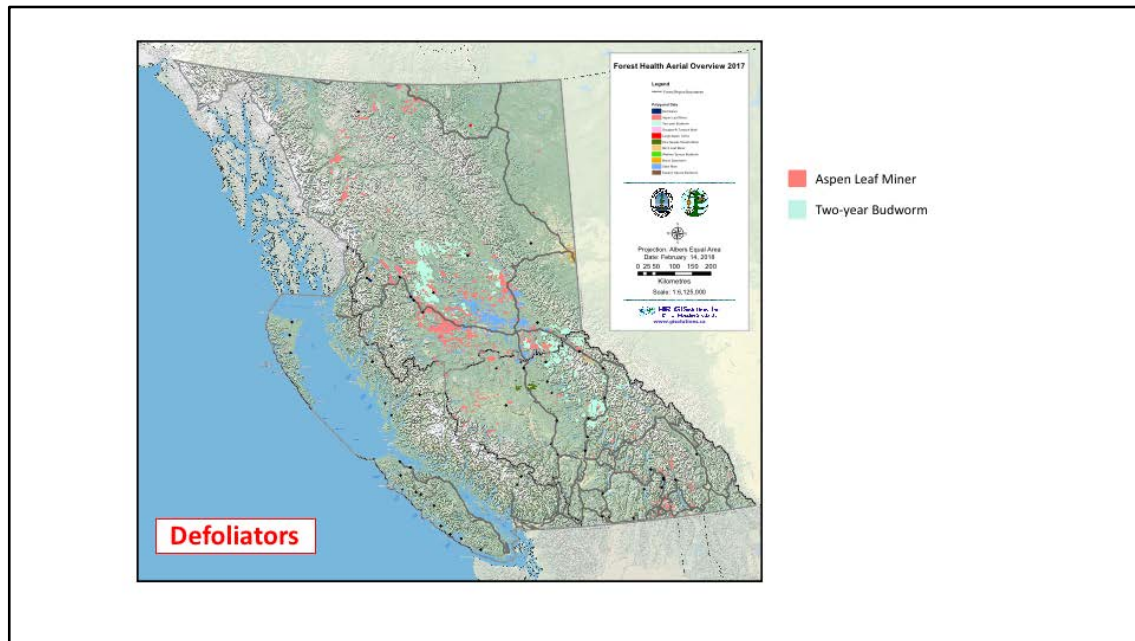
This map shows the Douglas-fir and balsam bark beetles. The entomologists tell us we can expect a huge upswing in the D-fir beetle populations because of fires. The partially burned and drought stressed trees are highly susceptible to attack.



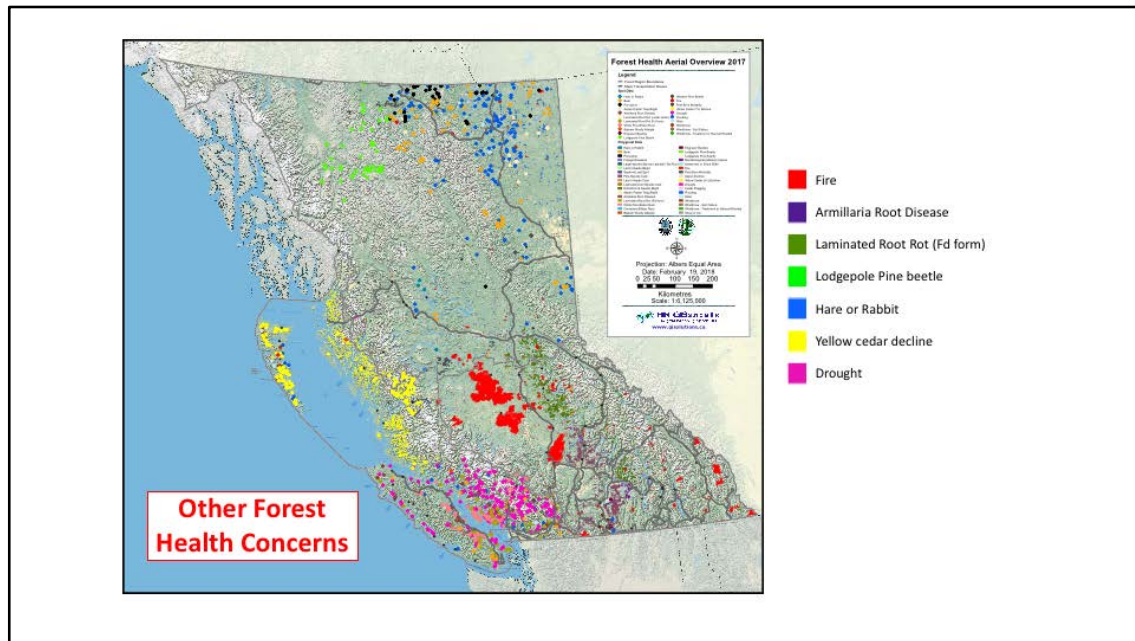
Here is the spruce beetle.



And for those who thought the MPB had come and gone ...not so.



Here's the map of defoliators.



And the last map is of other forest health concerns – to which I’ve copied the key factors on the left so you can read it better.

UBCM 2017

Late Resolution from the Cariboo Regional District & City of Williams Lake

LR 2 – Fire Mitigation Strategy

Whereas wildfires have plagued much of British Columbia's interior this summer, and will continue to threaten communities, particularly with predicted climate change;


And whereas forest restrictions continue to hamper fire mitigation efforts, and public safety should be the number one priority:

Therefore be it resolved that, under the Forest & Range Practices Act, the Government Actions Regulation (GAR) include regulations that initiate a Fire Mitigation Strategy that prioritizes public safety over other forest management initiatives including harvesting and reforestation of the affected areas.


At the 2017 Union of BC Municipalities convention there were a number of resolutions about forestry and wildfires in particular. This one is from my area – submitted by the City of Williams Lake and the Cariboo Regional District. It was submitted late. I think resolutions are due in July or August – so they get a pass for being late cuz they were kind of busy with fires.

It's significant for a few reasons – which I've underlined. The communities see forest restrictions as hampering fire mitigation efforts but, perhaps more importantly, compromising public safety. The resolution goes on to call for changes to the Government Action Regulation so that public safety is given a higher priority than forest management.

If you apply their resolution to the information I've just presented, it means they are calling for the areas around Williams Lake to be managed differently. They want the risk of wildfires to be reduced and public safety to be the priorities in these areas.



Alexis Creek



Peachland


UBCM 2017
Late Resolution from the Cariboo Regional District & City of Williams Lake

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Kelowna



Nelson

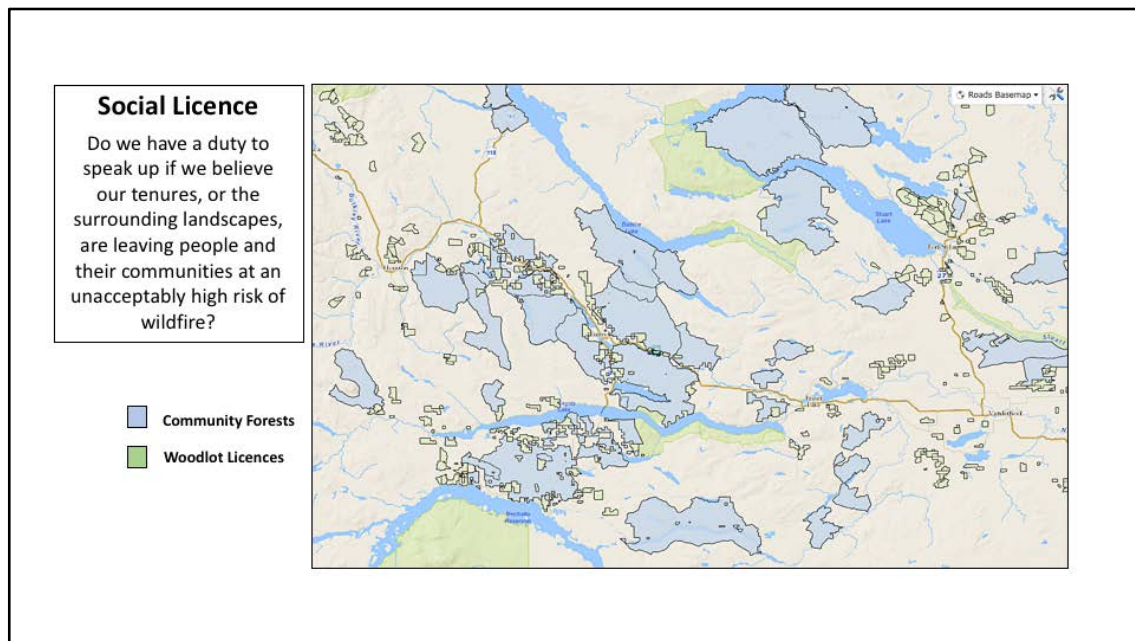


100 Mile House

Williams Lake isn't the only rural community that feels this way. Whether it be via a UBCM resolution or a call for fuel breaks or project proposals to reduce fuel loads, other communities are expressing similar the same thing.

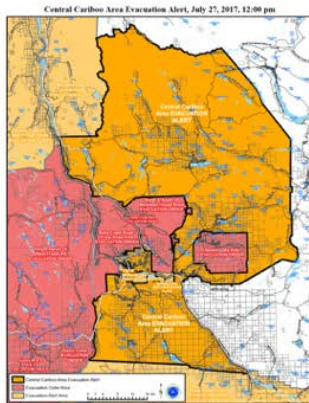
As an evacuee, I understand and support Williams Lake and the Cariboo Regional District's resolution. It is a cry for help and a demand for change.

As a forester and forest manager, I see this as signifying a shift in societal values. In forestry, we often refer to the 3-legged stool – social, economic and environmental values. Well, this is saying the balance between the 3 is off. Societal concerns around wildfire need to be a higher priority.



So when it comes to social licence, I would suggest that we, as CFA holders and woodlot licensees, have an obligation – if not a duty - to speak up if we think our tenures or the landscapes around our tenures are not being managed properly and leaving people and their communities at unacceptably high risk of wildfires. And if change doesn't occur, then we need to keep speaking up.

GOING HOME!
On July 27, 2017 the Evacuation
Order was changed to an
Evacuation Alert.



Walt Cobb, Mayor
Williams Lake, BC

Back to being an evacuee.

We got to go home on July 27th when the evacuation order was downgraded to an alert. Being under an alert meant we had to have a suitcases packed and sitting beside the door because if there was a new evacuation order came, we had to be out in 10 minutes. The RCMP went door to door in rural neighborhoods to make sure we understood. We remained on an evacuation alert until the 1st week of September!

And that's a photo of what a happy mayor looks like when it rains and an evacuation order can be lifted.



Our house was fine. ***click*** We even had a welcoming committee. And we were surprised to find out ***click*** that the potted plants on the back deck survived 3 weeks without being watered.



The piles of ash and half burnt needles all over the deck, roof and around the house were disconcerting. It was a wake up call and inspired me to be ***click*** fire smarter. Turned out my new neighbor used to be an arborist in Vancouver and likes to take down trees for fun.

So what does it look like around Williams Lake now?

Forests



Our forests don't look the same.

Viewscapes



Our viewsapes and scenic areas have changed.

**Wildlife
&
Wildlife Habitat**



The wildlife was impacted – including the very habitats they were trying to protect.

Riparian



Riparian areas were impacted although, not surprisingly, they were the first to start greening up – starting last fall.

Soils



Soils have been impacted. To what extent remains to be seen. The fires were so hot in some areas that the soil burned. Even revegetation might be a challenge. And, hydrophobicity (repelling water) and erosion are real concerns.

Range



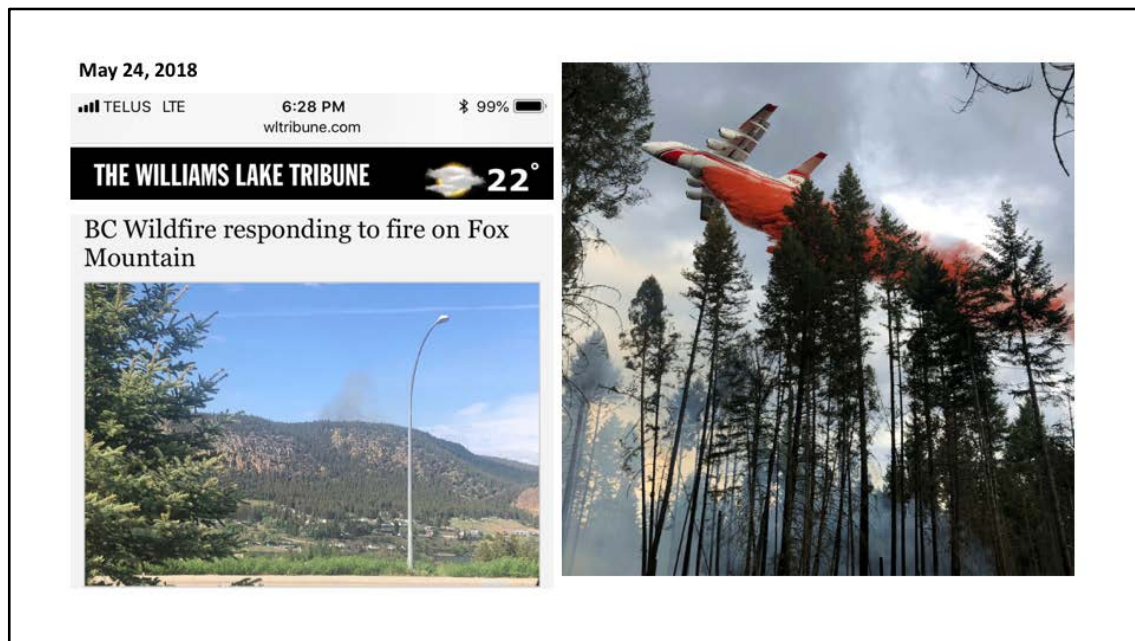
I would be remiss if being from the Cariboo I didn't mention the impact to cattle, the range and ranchers. At one point during the peak of the fires, it was estimated that approx. 20,000 head were either lost or killed. The impacts to fences and grass were huge. Also, many ranchers are older, so the challenge of re-building – if they decide to do so – will be difficult and long.



As for now, salvage logging has begun. These three photos are of the Williams Lake Indian Band's reserve and private land in their WL. To their credit, they have been fast off the mark to get this work done.

click But the impacts don't just end at the end of the fire season. For example, there's an expo in town on May 30th to go over preparations for 2018 and get a status report on recovery from 2017. But note one of the topics is mental health and well-being. This was a traumatic event which many people, particularly children, found profoundly disturbing. It is going to take time to recover.

Case in point...



I arrived in Burns Lake on Thursday evening, May 24th 2018 to attend this conference and give this presentation. I sat down for dinner and decided to read my local paper – the Williams Lake Tribune. I opened the app on my cell phone and this was the headline. A forest fire on Fox Mountain! My reaction surprised me. My initial thought was – NOT AGAIN and I started shaking. I texted my wife, found out she was OK. ***click*** She sent me this photo of the bomber working that was taken by one of my neighbors. Fortunately, the fire crews were able to contain the fire **THIS TIME**. It ended up being about a hectare and was less than 600 meters from my house. The point is - the risk of wildfire is real. It can happen at any time and it isn't going to go away unless we do something about it.



I now you are all sitting on the edge of your seats wondering what happened to the 'special' plants that I had to drive to Ashcroft to get.

Well... the hail didn't get them. They survived the wildfires. They even survived 3 weeks without being watered. But when we arrived home, this doe was lying on the lawn while junior was walking in the planter beside the house eating the last of the geraniums and begonias!



SWPI treated forest across
the road from my house.

***Thank
You!***

Thank you!