

When faced with fire: Responding to Canada's wildfire risk

Ritch Seeley:

Since 1990, wildfires have consumed an average of [2.5 million hectares a year across Canada](#), with around 7,300 fires occurring annually. These fires can ravage communities, destroy buildings and infrastructure, and even claim lives. As the nation with the third-largest forest area in the world, this is especially concerning.

Hi, I'm Ritch Seeley, Western Canada practice lead for Marsh Advisory Consulting Solutions. Welcome to the first podcast in our three-part series from Marsh Advisory Canada on wildfire. The series will focus on helping you identify wildfire risks to your operations, discuss tools and resources to help mitigate the risks, and how to make your operations more resilient. We'll also explore what the risks may look like in the future. Why are we talking about this now? In the past five to 10 years, we've seen a dramatic increase in the frequency and severity of wildfires. We expect this trend will continue, and we want to help you be prepared.

Today, I'm joined by my colleague George Fan, who is Marsh Advisory Canada's lead consultant on catastrophe and climate risk. Welcome George.

George Fan:

Hi, Ritch, glad to be here to talk about this increasingly more prevalent risk with you.

Ritch Seeley:

Yeah, I'm looking forward to the conversation. In today's podcast, we'll be discussing the basic science of wildfire, how they start, and how they spread. We'll also discuss a few notable Canadian wildfires in recent history and their unique characteristics, and then we'll start discussing some mitigation strategies and helpful resources available for businesses. Let's get to it.

We're no stranger to wildfire in western Canada. It seems every summer it's something we need to be aware of and manage. I even hear people planning their summer vacations around wildfire season. Will they go earlier? Will they go later? How will they travel, just to avoid the smoke and potential fires that may happen in western Canada? George, would you be able to just give us a bit of the basic science around wildfires?

George Fan:

Yes. Wildfire science is actually pretty simple. A couple conditions you need: you need high temperatures and you need low humidity. When these two conditions are met, the only thing that you need is a spark. A spark could be either human-caused — someone flicking a cigarette out of their car or even the catalytic converter itself could be hot enough to start a fire — or it could be naturally caused, such as through lightning. The wildfires very much depend on factors such as strong winds. The stronger the wind, the faster the fire will grow. The heat and smoke from wildfires can also create what is

known as a fire cloud, which can start fires elsewhere. The distance to which these can travel is potentially several kilometres. We can't talk about wildfires without discussing the wildland urban interface.

Ritch Seeley:

Yeah, George, I've heard a lot about that, so I'd be really interested to hear more. People are going places that they normally weren't able to go by car, motorcycle, even just hiking. Can you maybe just elaborate a bit on that?

George Fan:

Of course, yeah. Wildland urban interface is basically the transition zone between unoccupied land/wild land, and human development. As more buildings are built, more industries are built, urban areas expand, roads are being built, we are progressively advancing more into nature, which inadvertently comes with higher risks of wildfires. Speaking of wildfire risks, wildfire risk can occur in many types of landscapes, whether it's woodlands, shrublands, and grasslands. In particular, woodland fires, which are the most common in Canada, can start at different levels. At the lowest level, which is below ground, you don't really see these fires. It's called the ground fires. They burn roots, duff, and peat. At the surface level, it's called surface fires, and they burn leaves, needles, and grass. At the highest level, which is known as the crown fires, these are what's burning the shrubs, and the trees, and the crowns and canopies of trees. These are the very fast moving fires that we see.

Ritch Seeley:

Yeah, that's really interesting. In terms of timing, I know the wildfire season in BC pretty well because I live in BC, but I have to assume that there are different times of year, depending on where you are. Can you maybe just let us know,

from a national perspective, what that might look like?

George Fan:

Yeah, very interesting, because the wildfire timing does differ depending on where we are in the country. This is entirely dependent on the region's climate.

Take BC for example, where we live, the driest season is usually in the peak of summer, so July and August. That's also where we see the highest number of wildfires, especially in the interior of the province.

In comparison, other parts of Canada such as the prairies, Ontario, and eastwards, the fire season could run from anywhere from May to September. A lot of these occurrences happen early on in the summer, when trees or plant vegetation is just growing. Imagine a picture where it's relatively low humidity, but all of a sudden, you have high temperatures coming in, with dry, hot air. Those are definitely favorable conditions for wildfire.

Ritch Seeley:

Yeah, like you're getting those 40 degree [Celsius] weathers in Ontario now.

George Fan:

I wish.

Ritch Seeley:

Maybe not.

George Fan:

Some of them most notable instances, speaking of 40 degree [Celsius] weather, in [Lytton, BC, where there was a heat dome in 2021](#). That fire happened in July, and the town is still recovering from that fire.

Ritch Seeley:

That was a nasty one.

George Fan:

The [biggest wildfire that's ever occurred in Canada was in Fort \[McMurray\]](#), in May of 2016. If you've ever driven through Fort Mac, the river's really wide, the river is almost some 2,000 feet in terms of width, and the wildfire jumped across the river. Like I previously mentioned, the embers flew a very far distance to start new fires on the other side of the river.

Ritch Seeley:

Yeah, that's amazing.

George Fan:

Aside from these major instances of wildfires, what have you heard from our clients, Ritch?

Ritch Seeley:

Yeah, I want to get to that, but I want to loop back to something that you talked about earlier, with the crown fires, and something that I've heard, and it may be more western Canada because of our topography, and maybe Fort Mac, there's probably something there as well. I've heard that on the mountain side, crown fires and embers would travel quite a bit faster up that mountain side, which causes some pretty major issues to forecast what's happening, but also, how do you deal with the issue? How do you manage that fire? Is that true?

George Fan:

Yes, absolutely. The topography, especially steeper slopes, definitely contribute very significantly to the wildfire spread rate. Compared to flat land, a mountainous terrain could basically cause the spread speed to double.

Ritch Seeley:

Yeah, it's crazy, hard to predict, obviously, for the wildland fire fighting teams. They have to be careful, and get out of the way, too. It's pretty hard to manage it. Interesting.

Going back to your question about what I'm seeing. We hear a lot about fires in BC and Alberta in the press over the last few years, but I have been working with some other organizations where we've had some pretty sizable fires that cost our client organizations' downtimes, and certainly some money as well. One of them was about 10 years ago, in Northern Ontario, actually north of Thunder Bay. The wildfire was really not significant enough to make the press, and the trees were actually relatively small, but it did rip through the acreage of the site. Thankfully, it didn't really damage any of their buildings. What it did do was damage a number of the power lines, and bring down some power poles, they were wooden power poles, actually.

They did evacuate the majority of the site during the wildfire, and the biggest issue was to get the site back up and running again. They were very resourceful at the site, and were able to actually source power poles outside of the independent power producers, and get themselves back up and running quicker than relying on the public entities to help them, so pretty resourceful.

The other interesting one recently that I'm aware of, that I've worked for some organizations on was a pretty good size fire up in the Yukon, north central Yukon, actually, up near Dawson City, which is an area that you wouldn't really think would be a wildfire-prone area. In this case the fire was sizable, but again, didn't make the press, but due to the nature of the area, there's very limited public roads. The fire was coming close to the site, but crossing all the major roads, so the whole area was required to be evacuated, because there was no way to bring supplies in, or the supply chain was actually

disrupted. Obviously, there was a personnel risk; they couldn't stay on site if the fire was getting close. That shut them down for two to three weeks. Again, you can mitigate some of these things, but also, you can only predict and be prepared as best you can.

George Fan:

Yeah, that's a good amount of time to be down for a business. Speaking of wildfire damage, you've mentioned a lot about how there's the indirect aspect of wildfire damage — evacuation, disruption to business. What about other types of damage, maybe more direct, from both the building and infrastructure side?

Ritch Seeley:

Definitely the flying embers and firebrand, and you talked about this, and this was a big issue with Fort Mac, obviously to be able to get across the river was something pretty spectacular.

Certainly the firebrand can travel hundreds, thousands of metres, and cause fire. That is one of the biggest challenges with protecting sites and buildings, and they're one of the leading causes for sure. Certainly other things like radiant heat. As a wildfire moves through, it creates an exorbitant amount of heat, and that heat can autoignite. In some cases it might just need a spark, but in others, it might actually autoignite, which is a real issue. There are mitigating strategies to work around that.

Then, certainly direct flame. As the fire gets closer, that's the worst scenario when the fire is actually approaching your locations. Those are the three obvious ones that cause building fires and other things.

As I mentioned, what I'm seeing with industry and organizations is the real cause of production stoppages and outages is around the distribution network of power lines, and other linear assets like rail lines, and highways, and

pipelines. As the fire rips through and maybe is getting closer to their sites, it's disrupting all of the infrastructure, and that infrastructure causes them to shut down for whatever reason, for either logistics reasons or safety reasons, or they just can't get the supplies through. We're seeing more and more of that.

I think our organizations need to be able to predict how their operations can be upset by these outside linear assets and infrastructure, should a fire be in their area.

I just wanted to ask you what we can do to protect against wildfire. What are the things that organizations can do to protect themselves?

George Fan:

I'll answer that question from a few different layers. We discussed the wildland urban interface earlier. I think at the highest level that we can discuss, the main goal when it comes to wildfire prevention or mitigation is really not too much to do with wildfire itself. In general, it's about human development. It's about developing harmoniously with nature in a way that limits the amount of exposure that results. From a building perspective, which is taking the level down, especially for new buildings, it's really important to select the appropriate sites as well as construction materials that go into these facilities.

Associated with that is the importance of building codes. Building codes play a very big role in wildfire damage. There's been wildfires that rip through neighborhoods, where certain houses were not affected at all because of the non-combustible construction that was put in. Putting that into the building code would go a long way to actually prevent damages from wildfire. For existing facilities, the first point for wildfire mitigation is to understand the exposure. What is the exposure from nearby surroundings, nearby vegetation, and what about the building vulnerability itself?

Ritch Seeley:

It feels like a risk assessment of sorts.

George Fan:

Yes, exactly, and that's something that Marsh Advisory can help with. When it comes to mitigation of wildfire around the building, ensuring that any exterior construction use is non-combustible, and reducing the fuel load around the buildings between various distances, whether that's immediate, five feet, 30 feet, 100 feet away from the building. If need be, there are also options such as providing exterior exposure sprinklers, or water mist systems on the outsides of buildings.

Ritch Seeley:

I've seen that. We've actually seen some organizations, who will have that actually in their warehouse, and then they can deploy it as a portable system. Certainly, as you understand the fire dynamics, where it's coming from and where the biggest exposure is, you can deploy these portable systems to help even just wet the grass. If it's not the buildings, it's maybe the grass in the areas on the side of the building that may be potentially exposed.

George Fan:

Which brings me to my next point, which is wildfire response. Since wildfire response and management is involving measures like what you mentioned, it goes a long way towards mitigating these instances, or damages from wildfire. A wildfire plan could include actions such as planning out how to set up an incident command center, identify the personnel, whether that's within the organization or from the broader society, to be able to, let's say, help with evacuation, help with firefighting, and also identifying what equipment is available to undertake these measures.

For example, infrastructure; I've heard about companies that have committed a significant amount of money to actually move a lot of their power infrastructure, like power lines, underground, to limit the amount of exposure that could result.

Ritch Seeley:

That's interesting.

George Fan:

What are some of the resources that you have come across?

Ritch Seeley:

We're seeing, certainly some of the western Canada clients, dealing with independent consultants — wildfire specialists who would provide some consulting resources around identifying that risk, understanding the fuel load from brush and from nearby bushlands, how to protect the structures, what kind of equipment they should maybe have on hand, and then also, helping build those response plans that you had talked about as well. And then some training, because certainly, a lot of organizations — they're not specialists in this — so they need specialized training to help them understand how to best manage and prepare, and be ready in what to do. The more you do upfront, the less the impact can be on your organization. Obviously, we can help here, and you know this, George, so I'm not telling you what you don't already know, and I'll maybe ask you to expand on a bit, because I know there's some things that I don't know about that you you've been working on.

There are some really great publicly available resources, both for predicting when and where the fire will be, and how it's approaching your site, but also things you can use in advance to help mitigate the risk.

On the prediction side, I think one of the better ones is, Natural Resources Canada has a website called the [Canadian Wildland Fire Information System](#), and it is excellent for satellite imagery on hotspots, understanding fire weather, you can do weather forecasting, fire behavior. There's a lot there to help you predict what's happening. If you're curious if there's something going on in your area, you're able to go to their website and better understand what's going on in certain geographies.

On the mitigation side, this is really more about being prepared. [FireSmart™ Canada](#) has some excellent resources. There are some industry-specific tools that have been built for the energy industry, but it's around, again, preparing your site, talking a little bit about the building codes that George talked about, building materials you would select, how you would landscape, all those sorts of things. Incidentally, FireSmart™ with Smokey the Bear, apparently Smokey the Bear retired, and he is now been replaced by [Ember the Fox](#), which is pretty humorous.

George Fan:

Which is very interesting, and I think that underlines a fundamental shift in philosophy as well. Smokey the Bear was all about: "Only you can prevent forest fires." Whereas Ember the Fox is definitely a tamer approach, I should say, which is more focused around wildfire management, adaptation, and resilience.

Ritch Seeley:

I'm a former Boy Scout, so I get the Smokey the Bear concept, but you're right, there's more to it than that nowadays. We have to accept the fire will happen. We can't prevent them all.

Going back to some other resources, there are some other great free resources. FM Global, one of the insurance companies that we work with quite a bit, have an [excellent suite of data sheets](#) around wildland fire, and how to protect

yourself, how to look at the risk at your site level, and also how to prepare yourself, and how to plan. Those are all free through their website. That's one other great free resource for anyone.

National Fire Protection Association, we called it NFPA, have an [online series](#) as well. They're not free, they are by subscription, but it is an excellent organization that provides fire protection guidance across the world. They're world renowned. They have a suite of standards, they would call them. They're basically guidelines for wildland fire. Again, even going down to how you want to train your brigade, and how you want to deploy your equipment. There's a lot of information there.

We at Marsh Advisory, we consult and work with all these tools. Maybe George, I'll pass it back to you, because I know Marsh has been working on some things that I'm not aware of. What's new? What's coming down the pipeline from Marsh on wildfire?

George Fan:

We've got some very interesting projects that we're working on. We're partnering with a company that will provide a national wildfire map, potentially at the 10 to 20 metre resolution, which is quite detailed compared to what's currently out there. This map can help our clients identify their exposure, since this is actually captured from vegetation data. I think that's going to be a really cool tool once it rolls out later this year.

Ritch Seeley:

Could that be used for an entire portfolio, or is this more a big industrial site? Who would benefit from using this type of detailed modeling?

George Fan:

Any clients, any potential businesses that are looking to identify wildfire risk, whether it's a portfolio or individual sites, will be able to identify the risk from this mapping layer.

Ritch Seeley:

Very cool. I look forward to hearing more about that one.

George Fan:

Across the border to our south, our US colleagues have come up with a wildfire assessment methodology to assess the local exposure to wildfire based on weather, wind, topography, vegetation, of course building construction factors. They also talk with the local forest management agencies to comprehensively determine the risk of wildfire to a particular site, and provide opportunities for improvement to reduce that risk.

Ritch Seeley:

Yeah, that's also pretty neat. I've heard some stories about that being done in the west, so I look forward to seeing how that can be developed a bit further.

George Fan:

If you want to learn more about wildfire risk, any practical tips, feel free to check out our websites, reach out to [Marsh Advisory](#), contact your broker. You can even reach out directly to me on [LinkedIn](#).

Ritch Seeley:

We hope you enjoyed our discussion, and thank you for listening. Stay tuned for our upcoming episodes, where we will discuss the impacts of climate change on wildfire frequency and severity, as well as ways to improve your business resilience, and minimize wildfire-associated disruptions. In the meantime, you can find more insights from Marsh on our website, [marsh.ca](#). Until next time, thanks again for listening.

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