

The perfect storm:

How summer drought could mean severe fall storm fallout



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This summer saw record-breaking temperatures across B.C., which weakened trees and vegetation, especially in areas such as the South Coast where vegetation is less adaptable to extremely dry conditions. Making matters worse is the fact that La Niña is predicted to bring colder, wetter and windier weather to the West Coast this fall and into the winter. Inclement weather coupled with drought-weakened trees could result in the perfect storm for outages this fall and winter—especially on the South Coast.

Highlights

- Summer 2021 was one of the hottest on record in B.C. and it resulted in severe drought in many areas.
- Because of the drought, BC Hydro meteorologists are predicting a fresh accumulation of dead and weakened trees that will be a risk to electrical infrastructure when the first major windstorm(s) of the season hits.
- Adding to outage potential is La Niña which is predicted to bring colder, wetter and windier weather to the West Coast this fall and into winter.
- In fact, BC Hydro's two most damaging storms were enhanced by a drought in the summer of 2015 and unseasonably heavy rainfall in 2018, which left trees more vulnerable than ever to strong winds.
- The 2015 storm caused over 710,000 outages, some of which lasted for days—and this year drought conditions are even worse.
- Compared to 2015, B.C. saw less precipitation in many regions, and tree health over the past years has been on the decline—especially on the South Coast where precipitation is about half of average this summer.
- Some of the driest locations in B.C. from April–July this year were Abbotsford, Vancouver and Comox—with Abbotsford experiencing the lowest rainfall recorded in the Fraser Valley in over 60 years.
- B.C. has some of the highest densities of trees per kilometre of power line compared with most jurisdictions in North America.
- Trees and adverse weather are the single biggest cause of power outages, and vegetation that grows too close or into BC Hydro lines is a safety hazard that can conduct electricity.
- Despite increasing storms, power outage duration for BC Hydro customers has been on the decline and is currently below the five-year average.

Solutions

BC Hydro's vegetation management team regularly inspects trees and other tall vegetation growing under or adjacent to transmission and distribution power lines to identify potential problems.

- In order to keep up with the challenges of climate change and protect its electrical system, BC Hydro is increasing its vegetation management program this year.
 - In a typical year, BC Hydro will manage about 5,000 hectares, but over the next year, it will increase that to about 6,900 hectares.
 - Vegetation management typically follows a cycle and it is currently entering a more active phase of that cycle for the next few years.

With fall just around the corner, BC Hydro is also advising customers to prepare for what could be a challenging storm season. Because it is difficult to predict how much damage a storm may cause to the system and how long a power outage will last, it is important for customers to be prepared by having a well-stocked emergency kit that includes:

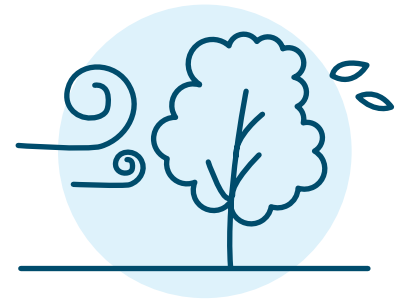
- a flashlight
- extra batteries
- first aid kit
- non-perishable food and water

BC Hydro is also reminding the public that if they come across a downed or damaged power line, assume the line is live, stay back at least 10 metres (the length of a city bus), and call 9-1-1 to report.

More trees, more outages

This summer prolonged heatwaves and a heat dome phenomenon across the province in late June/early July led to drought conditions that damaged vegetation, trees, and root structures. This could have big consequences for the electricity system when fall storms hit, especially because potential for storm-related outages could be even higher this year, as La Niña is predicted to bring colder, wetter and windier weather to the West Coast this fall and into the winter.

This report will explore how the prolonged heat this summer could lead to weakened vegetation and more tree-related outages this storm season, and the actions BC Hydro is taking year-round to mitigate tree-related outages through its vegetation management program. It will also outline how BC Hydro customers can prepare for storm season.



Trees and bad weather are the number one cause of power outages in B.C.

Trees and high degrees

Summer 2021 was one of the hottest on record in B.C.—and it resulted in severe drought in many areas. Dozens of temperature records were broken across the province during the heat dome beginning in late June—including recorded temperatures of 42.9°C in Abbotsford and 49.6°C in Lytton—the highest temperature ever recorded in Canada. On the South Coast precipitation was half of average this summer. Some of the driest locations in B.C. from April–July this year were Abbotsford, Vancouver and Comox—with Abbotsford experiencing the lowest rainfall recorded in the Fraser Valley in over 60 years.

4-month (April–July) precipitation rankings at key South Coast locations

	Driest	2nd driest	3rd driest	Average	# Years of Record	2021 ranking
Vancouver (YVR)	77 mm (2015)	96 mm (2021)	104 mm (1975)	207 mm	85	2
Abbotsford (YXX)	116 mm (2021)	133 mm (2015)	170 mm (1967)	170 mm	62	1
Victoria (YYJ)	45 mm (2015)	54 mm (1951)	62 mm (2016)	124 mm	81	*7
Comox (YQQ)	65 mm (2004)	83 mm (2021)	84 mm (1985)	166 mm	77	2

The heat and dry conditions also resulted in a very active wildfire season, with 1,590 wildfires occurring in B.C. so far this year, burning 864,525 Hectares compared to 670 fires and 14,500 Hectares in all of 2020.¹

Trees and adverse weather are the number one cause of power outages in B.C., and climate change resulting in drought and other types of extreme weather is making things worse. Because of the prolonged heat and drought this summer, BC Hydro meteorologists are predicting a fresh accumulation of dead and weakened trees that will be a risk to electrical infrastructure when the first major windstorm(s) of the season hits. This is because prolonged drought can make trees more susceptible to dehydration and pathogens such as insects or fungi, leading to higher mortality rates. There are also the issues of weakened root structure and soil—loss of fine root structure due to drought makes trees more susceptible to uprooting, and dry soil is more rigid and acts as less of a shock absorber when the wind hits. On top of this, dry wood is more brittle with less flexibility to bend or stretch as the wind passes through—meaning greater susceptibility to tree failures. In fact, even a small-scale windstorm can cause numerous tree failures and associated power outages.

¹ BC Wildfire Service

Recipe for the ‘perfect’ storm

Adding to the potential for more storm related outages is the fact that La Niña conditions are anticipated this fall into winter, which will likely mean stormier weather.²

La Niña conditions mean a cold event, specifically the appearance of cooler than normal waters in the eastern and central Pacific Ocean. This will translate into a stronger jet stream which can be a pathway for storms—meaning more rainfall, wind and colder temperatures across much of B.C. These conditions, coupled with dead and weakened trees could create the perfect storm, and more storm-related power outages. This is because wind could bring down weakened trees with far more ease, and extremely dry soil could mean easier uprooting of vegetation into electrical infrastructure.

BC Hydro has already seen a 117% increase in storms that it has responded to over the past several years, rising from 52 in 2014 to an average of 113 over the past three years—and more storms mean more outages. Storm-related damage has caused over one million outages on average annually over the past few years, and this is certainly not the first year that extreme weather has left vegetation vulnerable. In fact, BC Hydro’s two most damaging windstorms were the outcome of summer drought in 2015 and summer drought followed by unseasonably heavy rainfall in 2018, which left trees more vulnerable than ever to strong winds.

The best example of a drought and wind situation creating the ‘perfect storm’ situation happened in August 2015, when after four very dry months, BC Hydro experienced a summer windstorm with wind speeds reaching greater than 89 km/hr. The winds blew drought damaged trees to their limit, resulting in over 710,000 customers without power at the peak of the storm. It was the first time in decades that BC Hydro had experienced a summer windstorm of that magnitude, and many of the outages were concentrated in urban areas with dense tree canopies and power lines.

The conditions coming out of the summer months this year are slightly more severe than they were in 2015. Therefore, BC Hydro meteorologists warn that storm conditions could be especially challenging for areas such as the South Coast where there is a lot of vegetation that is not adjusted to the desert-like conditions.



A tree knocked down by the wind on Nelson and Howe in Vancouver during the 2015 windstorm.

At the other end of the spectrum, unseasonably wet conditions can loosen soil causing vegetation to weaken and fall. For example, unusually heavy rainfall contributed to loosening soil and weakened trees falling on power lines during the 2018 windstorm—the worst in BC Hydro’s history—that left over 750,000 customers without power. Some of the worst hit areas during this storm were Vancouver Island and the Lower Mainland, which experienced the brunt of the rainy weather that year.

² AccuWeather fall forecast

As fall begins, BC Hydro is taking measures to prepare for a potentially more severe storm season because of summer drought coupled with the onset of La Niña conditions. It is also asking customers to prepare for the possibility of more storm-related outages this year. Despite increasing storms, power outage duration for BC Hydro customers has been on the decline and is currently below the five year average, with the majority of customers restored within the first few hours of an outage.

Managing vegetation and preparing for storms

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