



## Maple Risk and Adaptation Case Study 2: DIRECTIONAL WIND EVENT (DERECHO)

### FULTON'S SUGARBUSH AND MAPLE SHOP PAKENHAM, ONTARIO CA

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Managing risk and creating strategies to mitigate it involves identifying potential business risks. There are five key **RISK MANAGEMENT AREAS: PRODUCTION, MARKETING, FINANCIAL, LEGAL, and HUMAN** that are considered the primary sources of risk. This case study looks at the risk to production and the related implications of a severe weather event. Production risks include uncertainty due to disruptions from: weather events, climate trends, pests, disease, and equipment issues.

More information about risk management can be found in this resource: <https://www.rma.usda.gov/about-crop-insurance/managing-your-farm-risk>

### BUSINESS BACKGROUND

Fulton's Sugarbush and Maple Shop began operation in a rural Pakenham, Ontario, Canada in 1840. Scott Deugo is the owner and general manager, stewarding this family business now in its 6th generation. Scott manages maple production while his mother, Shirley, oversees Fulton's retail operation. The business employs one full-time staff person for packaging and shipping, and eight to nine part-time staff throughout the year for packing syrup, labeling and other activities. In addition to running the business, Scott also works full-time as a firefighter for the city of Ottawa.

Fulton's property encompasses 400 acres including about 150 acres of sugarbush. They are currently producing on 4,200 taps, down from a previous high of 6,300 taps. The reduction is due largely to disturbances like the significant derecho event in 2022 and a major ice storm years earlier. Fulton's is located off a well-maintained municipal dirt road, and their business access road is also a good quality dirt road, which makes it accessible to customers.

Syrup production ranges from 1,000–1,800 gallons of certified organic syrup annually. The smaller production scale is feasible because of Scott's outside employment, which provides financial stability and an additional income source. Scott believes that scaling to 20,000 taps would be necessary to operate as an independent sugar maker in Canada.

For roughly 50 years the family operated a pancake house on the property. This restaurant was the primary revenue driver until it was forced to close during the COVID-19 pandemic. The loss of the restaurant was an impactful business disruption that resulted in significantly reduced staffing and the reshaping of Fulton's business model. In response, they converted the restaurant into a farm store and a meeting site for activities that resulted in a pivot toward retail maple sales and agritourism. According to Scott, the family has always been flexible when making decisions and have diversified operations when needed to maintain a robust business.

### MARKET CHANNELS

Fulton's retails syrup and their value-added products, including candy and maple-infused spa products, through their farm store and website mail-order platform. Some bulk syrup is sold locally to a maple liqueur producer, with Scott delivering that himself. Fulton's also offers 'behind the scenes' tours in the sugaring season and other agritourism-focused events which bring in additional revenue.

Their customer base draws from the City of Ottawa and surrounding area, which has a population of 1.5 million people and is within a one-hour drive. The large population in relative proximity to Fulton's production and retail establishment provides a very stable market.

## RESOURCE OVERVIEW

The property sits on what was once part of the Champlain Seabed, an area comprised largely of limestone bedrock and characterized by shallow soils resulting in more shallow-rooted trees.

Although the property contains roughly 150 acres of sugarbush, certain stands have lower maple density than others. Scott is actively engaged in forest management, including thinning in maple stands to improve maple stocking, while also being mindful of maintaining species diversity and habitat. Overall, this sugarbush is healthy with uneven-aged stock and minimal disease pressure.

Elevation in the sugarbush acreage is moderate, and having limited aspect or slope can present an issue with finding sufficient slope for vacuum for their single mainline, which is ~3,000 feet long (900 m). They often rely on a laser level to get proper slope on the mainline.

All taps are on a vacuum system and fully monitored. Fulton's utilizes a 3-membrane reverse osmosis (RO) system for concentrating sap. Much of the production operation is electric, with hydropower electricity supplied by Hydro-Québec. According to Scott, this results in the business challenge of Ontario's higher electric rates, but using grid power provides the benefits of stability and reliability. Their evaporator is oil-fired.

Fulton's utilizes two pump houses to collect all their sap, which are located within 600 feet (180 m) of the sugarhouse. All buildings are sited in proximity including the pump houses, the maple shop, an office building, and a production building where they make and package their line of value-added products and syrup. The offices and production spaces are heated by an outdoor wood furnace, utilizing wood harvested on site.



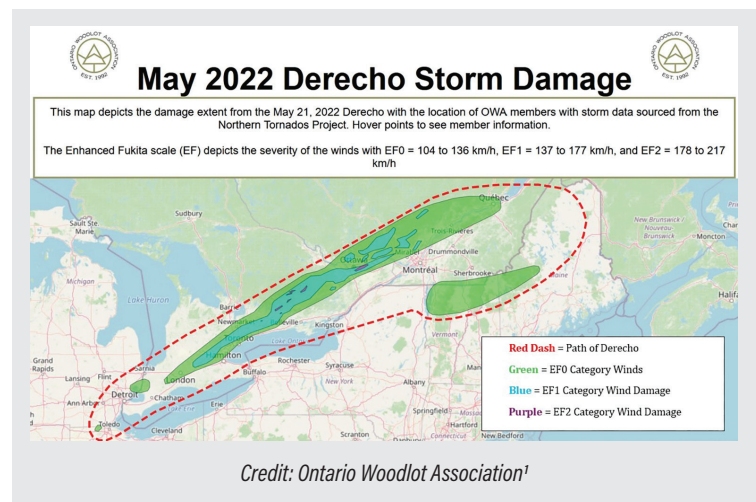
Scott Deugo in a repaired section of sugarbush that was damaged in the 2022 derecho

## THE DISRUPTIVE EVENT: DIRECTIONAL WIND (DERECHO)

A derecho is a widespread straight-line storm that produces intense and damaging winds typically covering a region of at least 240 miles (400 km). Derechos are a warm weather phenomenon usually occurring in the summer months when air is warm and moist. Due to the intensity of winds, the straight-line direction and vast distances they can travel, a derecho can cause damage comparable to the destructive forces of hurricanes or tornadoes.

The major derecho that impacted Fulton's occurred on May 21, 2022. This high magnitude event covered an area of over 620 miles (1,000 km) with winds in some areas topping 120 mph (200 kmph). The derecho caused widespread damage to forestland, maple infrastructure, and other vital infrastructure like buildings and utility poles in regions of Ontario and Québec. Significant damage was sustained in a 100-mile radius of Fulton's operation in Pakenham.

The map below details the geographic impact and severity of this derecho event.



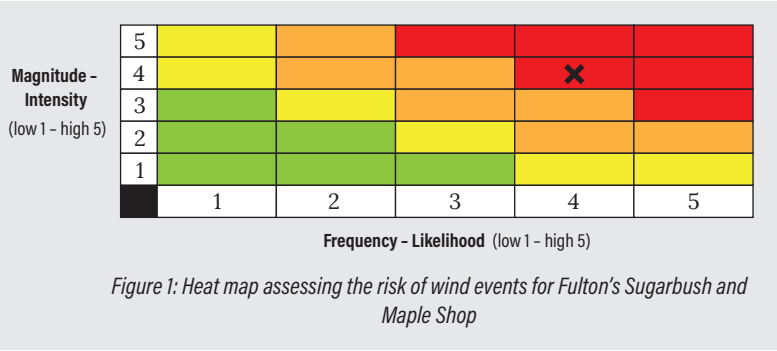
The damage in Fulton's sugarbush was very localized and most severe in a slightly higher-elevation section, splitting the sugarbush in half. The impacted section had heavy tree damage that included twisted, uprooted and downed trees; torn tree limbs; and a large amount of dangerous snags, brush and tangled debris. There were also many spring-loaded trees to contend with which created an extremely dangerous working environment.

Fulton's suffered the complete loss of mainlines and extensive damage to lateral lines across ~75 acres and lost about 1,000 taps in total. The unrecovered taps included 600 on their property due to tree damage, and another 400 taps they rented on an adjacent neighbor's property.

Scott expects similar events to have a higher likelihood of occurring in the future and is concerned about the impact this may have on the next generation as they seek to operate an independent agricultural business subject to increasing precarity and risk.

<sup>1</sup>This map was provided by the Ontario Woodlot Association (OWA) which created it to document the 2022 derecho damage sustained by its members. For privacy reasons, member-specific location information has been removed for this publication. More information about the OWA can be found at: <https://www.ontariowoodlot.com/>

The following Heat Map chart indicates this producers' estimation of the likelihood and magnitude of another event taking place.



The scale of the derecho created widespread shortages of equipment, materials, and skilled labor across the Pakenham area. Local suppliers quickly ran out of essentials like chain-saws, and rental equipment was largely unavailable — businesses were overwhelmed and, in many cases, stopped answering their phones. Unable to secure outside help, Scott and his sons began cleanup using their skidder but quickly found it insufficient for the volume of debris. After consulting other producers and loggers, Scott sold the skidder and purchased a tractor-driven log loader with a steerable axle for roughly \$40,000. This proved more maneuverable and less impactful for work in the sugarbush, and Scott credits that advice with guiding him towards a much better equipment purchase.

## ASSESSMENT, ESTIMATION OF LOSSES AND RECOVERY

Immediately following the derecho, Scott took a couple of days to conduct pre-planning work instead of moving directly into cleanup. Drawing on his experience as a firefighter, he conducted what he calls a 360-degree survey which involved a thorough assessment of the damage and issues, so that he could make a detailed plan for how to tackle the extensive work ahead. Scott credits this disciplined, systematic approach with helping him make sound decisions under pressure with the goal, as he describes it, of taking the chaos out of a chaotic event.

Scott began by assessing storm damage using a drone, allowing him to view the impacted area and identify access points. He and his sons then cleared temporary roadways and used a four-wheeler to reach damaged sections for closer inspection and documentation. Using a GPS-enabled app, Scott methodically recorded waypoints and took photos of downed trees, destroyed pipeline, and other damage. Because his pipeline system was already mapped and numbered (building on lessons learned from a previous ice storm), he could easily link damage to specific locations and quantify losses.



*Dense, tangled brush and uprooted trees documented soon after the derecho event*



*Dense, tangled brush and uprooted trees documented soon after the derecho event*

Cleanup was intensive, prolonged and challenging. Scott and his sons spent about six months removing downed trees, woody debris, and damaged lines. They continued repairs and installation of new main and lateral lines up until tapping in early February 2023 and ultimately thinned about 80 acres including extra thinning of 1-3" trees both in damaged areas and across the broader sugarbush, to improve forest health and productivity.

Poor summer logging conditions added to the difficulty. Logs were embedded with dirt and gravel which caused considerable wear on equipment, and limited timber salvage as mills wouldn't accept them. Some wood was processed for firewood to heat Scott's home and made into cutting boards to sell in the shop, but a large volume of debris was left in the forest as it was both too time consuming to remove and to provide habitat and organic matter.

Scott determined that it was not viable to bring the rented taps back into production. The damage was extensive and, given the scale of work required on their own property, it was not practical to invest scarce time and resources to rehabilitate land they didn't own.

Fulton's carries insurance on their pipeline, and repair and replacement costs were covered under their policy. In total, insurance covered about \$50,000 in costs, including chainsaw and log loader purchases, pipeline replacement, and some of the labor related to access and installation. However,

## ADAPTATION TO NEW SYSTEMS OR REDUCED RISK MOVING FORWARD

Scott feels that more proactive thinning prior to the derecho would have resulted in less damage, made cleanup work easier and Fulton's sugarbush more productive. Moving forward he is focusing more on sugarbush management to decrease density and remove unhealthy trees.

Scott has made other sugarbush improvements including widening the trails, so that a tractor can always access the woods, and upsizing culverts so that pipeline can pass underneath more crossings to be better protected. He has also changed the mainline layout and attachment wires to reduce the risk of damaged mainline from downed trees and is now following newer tapping guidelines which suggest using a single tap per tree.<sup>2</sup>

Fulton's has upgraded to a tracked four-wheeler, which makes it easier to navigate challenging terrain and conditions, and increased the stock of woodcutting/handling equipment to ensure they have adequate supplies in the event of future shortages.

Scott has increased safety by using a phone-based app for finding friends, so that family members know where he is in the woods, and a smart watch so that he can more easily contact someone if he's injured and can't access his phone. This technology also contains a crash detection feature that can be set to alert someone if an impact is experienced.

Scott meets annually with his insurance company to review all aspects of Fulton's commercial policy, ensuring they maintain appropriate coverage that is correctly sized for the business each year. His advice to other producers is to control what you can: plan for weather events, plan for injuries, and carry good insurance.

Canadian maple producers have a varying level of grants and subsidies available to them, sometimes depending on the province. While Fulton's does not yet participate, in Ontario, producers can access a suite of risk management programs delivered through AgriCorp in partnership with federal and provincial governments.<sup>3</sup>

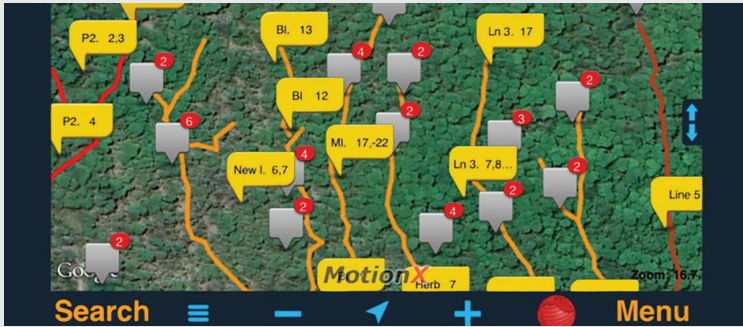
The Self-Directed Risk Management (SDRM) program and AgriInvest function as producer-managed savings tools with government matching contributions. For more significant losses, AgriStability offers whole-farm margin protection, and in cases of extraordinary events AgriRecovery provides targeted disaster assistance for costs not covered by other programs. Ontario is also looking at crop insurance to help mitigate risk for producers. Quebec, Nova Scotia and New Brunswick already have crop insurance.

<sup>2</sup>Tapping guidelines resource located at:

<https://mapleresearch.org/wp-content/uploads/Tappingguidelinesfactsheet.pdf>

Under the "conservative" approach, one tap/tree is recommended with either gravity or vacuum sap collection. A second tap would only be used in those cases where trees are in excellent condition with fast growth and no other stresses. With vacuum, adding a second tap at 18–20" DBH gains only about 30% more sap, for example.

<sup>3</sup>Find more information about Ontario's risk mitigation programs at: <https://www.agricorp.com/en-ca/programs/Pages/Default.aspx>



Monitors throughout the sugarbush identify the location of vacuum leaks

insurance didn't cover the full clean-up costs. Scott estimates that he paid himself about \$3/hour in labor given how much effort was involved.

Thorough documentation was a key factor in speeding up the insurance process. Fulton's system is numbered with metal tags at each line's beginning and end and mapped, providing a detailed record of mainline lengths, the number of lateral lines and taps on each line. This pre-planning work allowed Scott to quickly identify damaged areas and produce accurate damage estimates for his insurer. Scott provided drone video footage, the waypoints of damaged sites, and corresponding photo documentation, which allowed the adjuster to avoid the most hazardous areas and accept his claim without having to physically tour the entire sugarbush.



Work underway to remove a dangerous high snag and Scott replacing pipeline after sugarbush thinning

## KEY RISK MITIGATION TAKEAWAYS

### PRE-PLANNING STRATEGIES

- Tubing/pipeline insurance
- Marking lines and mapping system

### IMMEDIATE RESPONSE

- 360-degree assessment
- Drone to survey impacts
- Plan for access and clean up

### CHANGES TO THE BUSINESS

- Equipment investments: extra chainsaws, tracked 4-wheeler, steerable axle log-loader
- Sugarbush improvements: road widening for equipment access, upsizing culverts for pipeline, thinning
- Communication app and smart watch for increased safety



*Reconfigured mainline wires in sugarbush*



*Thinning, line repair and widened access roads in sugarbush*



Find videos of Scott Deugo talking about Fulton's Sugarbush and Maple Shop at the UVM Extension Maple YouTube channel at:

<https://www.youtube.com/@uvmextensionmaple> or by using this QR code.

Visit <https://www.maplemanager.org> for more maple resources.

