

# 'This is our forest': Climate change means uncertain future for maple trees, syrup season

May 16 2022, by Dinah Voyles Pulver

---



Credit: Pixabay/CC0 Public Domain

For centuries, the Abenaki people of the northeastern U.S. and Canada looked at maple sap as a gift from their creator, arriving at a time just before spring when their ancestors' food reserves were low.

But the sweet, amber syrup and the people who produce it today face an uncertain future. The continent's iconic sugar [maple trees](#)—revered for their sap and fall colors—can't escape the changing climate.

Rising temperatures affect the maple trees, with the [warmer climate](#) bringing more weather extremes, an earlier sap flow, shorter sugaring seasons and invasive insects. And some believe it may get too hot in parts of the northeastern U.S. for the sugar bushes, as the Abenaki call them, to remain where they've stood for centuries.

When you add drought and disease, "you're throwing multiple threats at these [tree species](#), and they're dropping out of the forest and weakening entire ecosystems," said Andy Finton, landscape conservation director for The Nature Conservancy in Massachusetts.

The good news is maple syrup producers, working with university researchers and employing newer technologies, have extended their seasons and increased their syrup harvest. But long-term concerns remain for the producers, Indigenous people and those who love the trees.

## **For the love of the trees**

"Maple trees are the whole package," Finton said. Whether they're wearing bright summer green or fall's brilliant orange, red and yellow or standing there in bare bark, they make their presence known.

"When you round a bend in the trail and you see just a stand of maple trees, they're saying: 'We're here, this is our forest.' It's usually just an

amazing spot, with shrubs, wildflowers and ferns."

The trees are intrinsic to Indigenous communities throughout the northeastern U.S. and eastern Canada, said Dave Arquette, a member of the Akwesasne Mohawk Nation, Bear Clan, which straddles the St. Lawrence River between New York and Canada. "When we give thanks to creation, and we give thanks to the trees, we look at the maple as the leader of the trees because it gives us sap for medicine, and it gives us maple syrup."

Historically, women oversaw the sap collection and sugar making, said Alexander Cotnoir, a citizen of the Nulhegan Band of the Coosuk-Abenaki Tribe, which has tribal lands in Barton, Vermont. The George Washington University graduate student is descended from "a long line of maple sugarers."

His ancestors would heat the sap in a series of soapstone pots over fires, then pour it into a trough and move it back and forth with a wooden paddle to produce the sugar. Traditionally packed into hand-woven birch bark cones, the sugar was lighter than syrup and easier to transport as the tribe moved on to agricultural, hunting and fishing grounds for spring and summer.

Adam Parke, owner of Windswept Farm in Barton, Vermont, answered the call of the maple trees in his family's backyard when he was in the second grade. He tapped 60 trees, learning to anticipate the rise of the sap at just the right time to capture the first blush of sweetness.

"It's something that got under my skin, and it's been with me my whole life. I love doing it," Parke said. He bought his 40-acre farm when he graduated high school, and he's been tapping the trees for 43 years.

Over the past three decades, he's seen a 10-day shift forward in the

sugaring season, he said. He also notices maple trees in the area hit their fall foliage peak later more often than they used to.

"I think the maples are being stressed by [climate change](#), although it's a long-term, slow-moving process, and it's very hard to pinpoint exactly what's happening," he said.

Cotnoir's family also has observed an earlier sugar season and more irregular temperature fluctuations in the spring, making it hard to predict when to start tapping.

## **The science of making maple syrup**

Even though the sap season is over for this year, maple trees are busy preparing for next year. Trees are most active around the summer solstice, said Tim Rademacher, a postdoctoral researcher at the University of Quebec who is studying the influence of weather and climate on maple trees and the sugaring industry.

Their leaves pull in sunlight and carbon dioxide and create the essential sugar molecules that could eventually wind up in a bottle of maple syrup. The average age of sugar molecules in syrup is about 3.5 years, Rademacher said, but they can be up to 10 years old.

Trees need rain while they're making sugar. A June drought means sugar content is lower the following year, and it takes more sap to make the same amount of syrup, Parke said. "These wild swings in rainfall, drought and temperature are affecting the way the trees produce their sugar and store their sugar."

Lately, winters have been shorter and milder. December brings less snow and more rain, he said, and that means less snowpack to protect the roots from freezing temperatures.

In the early spring, the right combination of cold nights and warm days helps create pressures in the wood fibers and vessels that pull sap upward in the tree.

Cold winters tend to produce higher sugar concentrations in the following spring, Rademacher said. "It's very clear to us that climate is a huge influence on when exactly the season happens and how good the season will be."

However, winters with extreme variability such as 60-degree temperatures in January, followed by deep freezes in February and March that quickly transition into warm springs, can disrupt sap flow and syrup production, Finton said.

Such weather-related issues were blamed for a 17% reduction in production in the U.S. last year and a 21% drop in Canada.

In Canada, where a single red maple leaf adorns its flag, syrup production soared in 2017, then a harsh winter and early spring sent it to a three-year low in 2018. Production rebounded to a record high of 14.3 million gallons in 2020, before plummeting in 2021, prompting the Québec Maple Syrup Producers to tap into its strategic maple syrup reserves to meet the demand.

## **Battling climate impacts**

Climate-related change to the maple sugar season began more than a century ago, then accelerated in the latter half of the last century, said Timothy Perkins, a research professor and director at the University of Vermont's Proctor Maple Research Center.

By early in the new millennium, it had shifted the start of the sap run about nine days earlier, with greater change in Massachusetts than in



Maine, Perkins said. The transition from winter to spring began happening so fast that it had an even greater impact on the season's close.

Maple syrup producers and researchers looked to technology for ways to expand their seasons and production. Improvements in [vacuum tubes](#) and sanitation have helped them to extend the length of time the sap flows and get higher yields.

The tubes, connected to the taps on the trees, create a positive pressure to spur sap flow and move the sap to the sugar shacks, where filtration systems remove water from the sap and reduce the boiling time. By keeping the taps and lines cleaner, Perkins said, microbes can't enter the tap hole and dry up the sap flow.

Climate models vary on how much the warming planet will affect the maple tapping season, Perkins said.

One study by the Northeast Climate Science Center concluded maple tapping could start two to three weeks earlier by the end of the century with the best regions for syrup production moving north. But a U.S. Department of Agriculture report noted the season could only move so far forward in some locations.

Long-term, the range of the maple trees will contract northward as temperatures rise, Finton said. Their abundance is forecast to be reduced in southern New England, Pennsylvania and other areas to the south as the center of their range moves northward in Canada.

For the Indigenous tribes, changes to the maple trees are just one of the threats to their traditional ways of living. Ice fishing is another, Cotnoir said. "The period of time we can go out ice fishing is much shorter than when my grandparents were my age."

These impacts raise concerns about their ability to continue growing, harvesting and preparing their cultural foods.

Though Arquette worries the changing climate could mean the fulfillment of a prophecy he once heard that the maple trees would one day vanish, the researchers hold out hope for the future. They see the plight of the trees and the [maple](#) producers as a call to action.

If the world takes quick action to slash greenhouse gas emissions and thwart the increasing impacts of climate change, they said, the trees could survive and even help address global warming.

"Nature is very resilient," Finton said. "Give the trees a break, minimize the stressors to the forest and they'll do the rest."

Maple sugaring can be a good tool, providing economic income and protecting forests, the habitats they provide and the carbon contained in them, Rademacher said. And that helps to battle climate change where it's happening.

(c)2022 USA Today

Distributed by Tribune Content Agency, LLC.

Citation: 'This is our forest': Climate change means uncertain future for maple trees, syrup season (2022, May 16) retrieved 13 June 2024 from <https://phys.org/news/2022-05-forest-climate-uncertain-future-maple.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.