

Discovery



FORESTS

MAPLE SYRUP FOREVER?

The crisp March air is fragrant with woodsmoke and sap. Snow crunches underfoot as we haul metal pails of the translucent liquid to a squat wooden building, where my uncle tends the fire. His job is to ensure that the sap doesn't boil down too far, but he

always makes time to dribble fresh maple syrup onto the snow, where it turns into a gooey, sugary mess. With this taffy sticking to my teeth (and keeping me quiet), my uncle tells stories about growing up on an Ontario farm during the Great Depression and sings along to a scratchy Louis Armstrong eight-track.

These are my childhood memories of spring, of sharing in an intrinsically

Tapping trees for sap (ABOVE) is a spring tradition (BELOW) in Canada and the northeastern United States — for now.

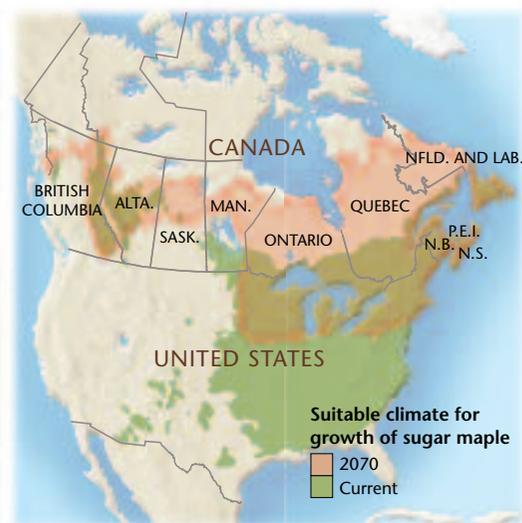
Canadian tradition that dates back centuries, when maple syrup season was seen by First Nations as a time of rebirth for the Earth. Canada produces about 85 percent of the world's maple syrup, a product valued at more than \$354 million in 2009, with the vast majority coming from Quebec. The United States is both Canada's largest export market and the world's only other major producer. But these statistics and this rite of springtime are at risk as a changing climate impacts the health of sugar maples and our ability to efficiently harvest their sap.

There's no immediate cause for concern. In Quebec, 2009 was a banner year, an anomaly with nearly double 2008's maple syrup production. But 2010's total will likely dip below the 2008 level, and taking a long-range view, Kevin Pelletier is worried. For 80 years, his family has been making syrup in the



Saint-Pamphile area east of Québec, near the Maine border. They've been producing syrup commercially for 18 years as Ferme Vifranc Inc. and keeping detailed notes to determine when to start tapping trees. But such predictions have become problematic. "Spring is coming sooner than expected," says Pelletier. "We normally start at the end of March, but this year, we started March 7."

The story is the same in Ontario. Wayne Horne, whose family has been making maple syrup near Orillia, Ont.,



for more than 100 years, says they can only be reactive to the changes. "We can't control how maple sap is produced by the trees," says Horne. In other words, producers can better time their tapping, use high-tech techniques, tap more trees and seed the soil with pellets to reduce acidity, but without conditions close to the ideal temperature swing from -5°C nights to 5°C days, those efforts could be moot.

Indeed, 2010 was wonky. Some producers began tapping as early as January. Yet in some recent years, the sap has barely run. "We've seen radical season changes," says Horne. "Either winter weather in spring or summer weather in spring."

Moreover, Ferme Vifranc's records show a decline in sap production over the past five years, from about 1.4 kilograms

per hole to about 1 kilogram. And that's despite the array of high-tech help, such as vacuum pumps and reverse-osmosis techniques, now commonly used to increase production.

All of this begs the question: Why?

To produce sap, sugar maples need nights below freezing, followed by warm days, but this once consistent spring-weather pattern is becoming erratic. Changing snowfall patterns also have an impact. Under a reduced snowpack, the ground freezes deeper and takes longer to thaw, which delays the flow of sap. Snow cover also moderates the rate at which the ground thaws, which can create a longer "sugaring period."

Acid rain, which changes soil composition, is also a factor. In acidic soil, sugar maples produce fewer seedlings that survive and mature, and more adult trees die as well. Smog, drought and severe heat are additional stresses that can reduce the amount of sugar a tree produces. And without the cold winters of my uncle's childhood, the pests and diseases that harm maples are more likely to proliferate.

In the United States, maple syrup producers face bigger challenges. As temperatures gradually increase, the climatic range that maples need in order to grow is shifting north. But maples prefer deep, fertile, well-drained sandy loam, which isn't found farther north. "Maples are likely to become extirpated from parts of the United States over the next 100 years," says Tim Perkins, director of the University of Vermont's Proctor Maple Research Center. "In the long term, the migration of the maple resource will render even hobby maple production impossible in the U.S."

Considering that much of Vermont lies north of prime sugar maple territory in Ontario, that's a cause for concern on this side of the border too.

Jonathon Reynolds

CASE STUDY

SEEING THE FOREST FOR THE TREES

Canada's forests are already experiencing the effects of climate change. The frequency and severity of natural disturbances — including fires, drought, severe storms and damaging insect and disease attacks — can be attributable in part to climate variability and change. Future effects are expected to include further increases in the frequency and severity of natural disturbances as well as changes in forest productivity, species composition and age-class distribution. This will affect the quantity, quality and timing of timber supplies used in various regions of the Canadian forestry and logging sector.... The physical and economic impacts of climate change in Canada's forestry and logging sector could be substantial but are highly uncertain. Given the magnitude of the potential negative economic impacts, a precautionary approach that seizes all feasible opportunities for adaptation is warranted."

— An excerpt from *Costing Climate Impacts and Adaptation: A Canadian Study on the Forest Sector*, commissioned by the National Round Table on the Environment and the Economy. The study's findings are preliminary and are still under review.

