The changing taste of maple syrup

PennState Brandywine

Dr. Laura Guertin, Professor of Earth Science, guertin@psu.edu

Climate Change Could Mean Less Maple Syrup For Your Pancakes

npr

February 12, 2018 · 8:01 AM ET

Global Warming Pushes Maple Trees, Syrup to the Brink

NATIONAL GEOGRAPHIC

PUBLISHED DECEMBER 2, 2015

Climate Change Is Coming For Your Maple Syrup

CLIMATE CENTRAL

Published: March 28th, 2016

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

Changing climate may substantially alter maple syrup production

Challenges

Climate stressors may decrease the availability of maple syrup or shift production northward by the end of the next century because of direct changes in temperature, decreases in snowpack or increases in weather disturbances such as ice storms.

Flow of maple sap, which is boiled down to make syrup, is controlled by alternating freezing and thawing cycles in the late winter. Maple trees also rely on snowpack during this time to protect their roots from freezing. For sap to flow, temperatures need to be below freezing at night and above freezing during the day. Sugaring season used to kick off around March but has started as early as January in the last few seasons because the weather is warmer earlier. The season is shorter, too.

Maple producers are reporting that weather within the season is becoming more variable, causing more erratic sap flows and impacting quality. Chemical analysis of syrup is being conducted to see how temperature shifts affect the compounds that give maple syrup its distinct flavor. Qualitative feedback says the syrup is less sweet. Fifty years ago a sugar maple's sap was four percent sugar, now it's two.

The wild card is some other event that reacts with climate change that wipes out trees and then they can't come back because the climate has moved north. The two biggest threats are the possibility of an invasive pest arriving that sugar maples don't have defenses for and an increasing risk of drought and forest fires.

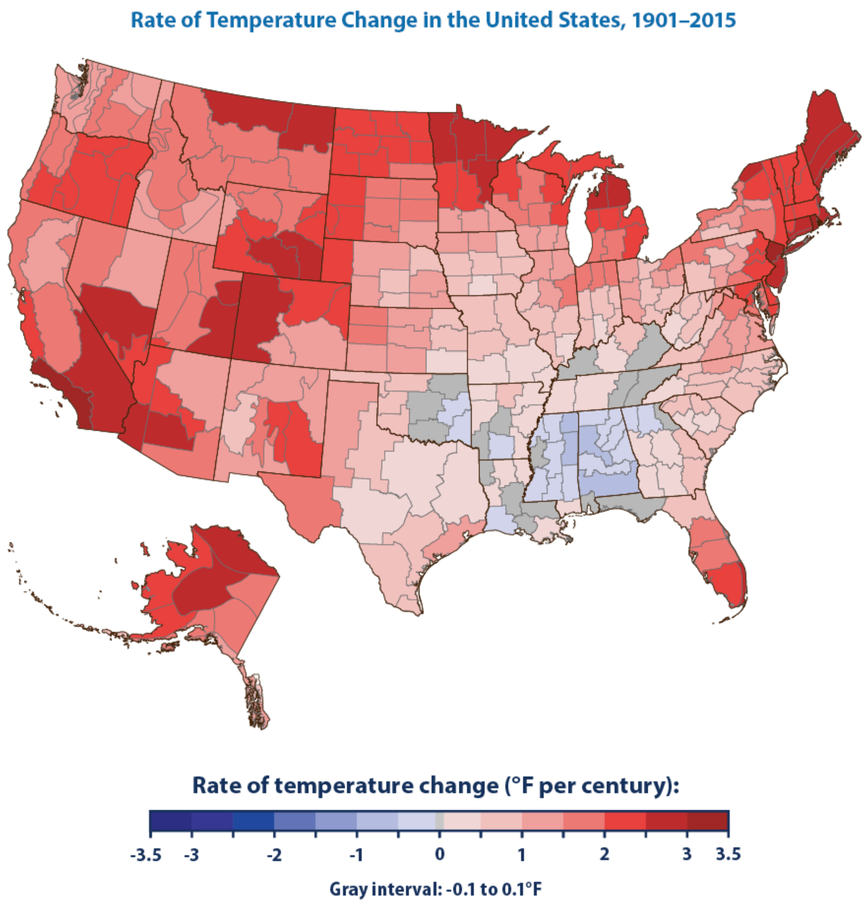
Adaptations

Advances in vacuum tubing technology, which has been around since the 1970s and uses pressure to suck sap out of the tree rather than relying on gravity for sap to drip from taps into metal buckets, continues to expand, helping bolster sap collection.

Improved sanitation practices during sap collection, such as changing taps and tubing to reduce contamination and decrease bacteria buildup in the tap hole, and exploring the potential to collect sap in the fall could help preserve the harvest. Tappers can get more from trees than they did 20 years ago—even with those trees stressed from warmer weather.

Replacing 100-year-old trees with 7 to 12-year-olds planted close together. Instead of extracting sap from a hole in the side of the tree, one can cut off the top and draw the syrup straight out the top. This would kill mature sugar maples, but not young ones. Six years of data proves that plantation tapping can produce comparable syrup from trees that withstand warmer temperatures and the taste is unaffected.

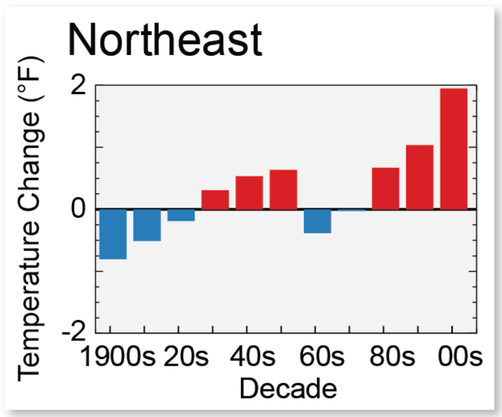
Sustainable forest management can protect the health and longevity of sugar maples. For example, a forest where at least 25 percent of the trees are species other than maple can help protect against pests.

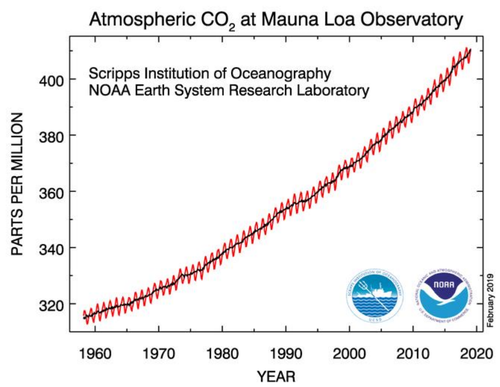


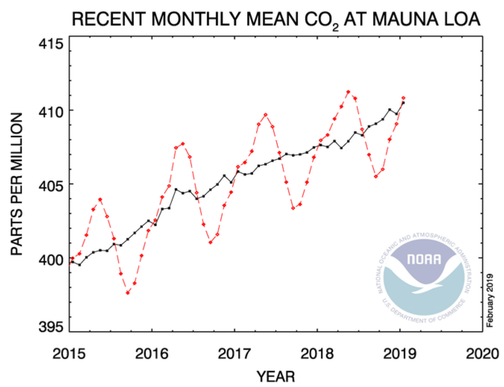
*Alaska data start in 1925.

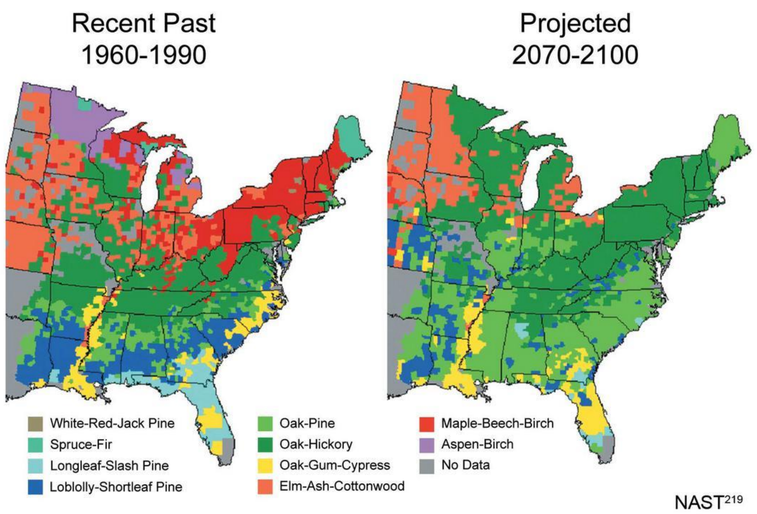
Data source: NOAA (National Oceanic and Atmospheric Administration). 2016. National Centers for Environmental Information. Accessed February 2016. www.ncei.noaa.gov.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climate-indicators.



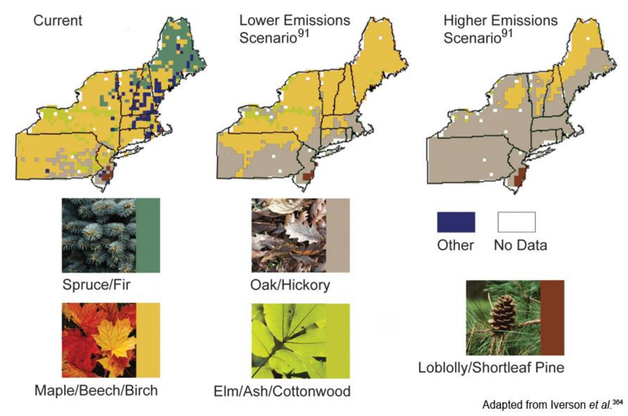






NAST[219]

The maps show current and projected forest types. Major changes are projected for many regions. For example, in the Northeast, under a mid-range warming scenario, the currently dominant maple-beech-birch forest type is projected to be completely displaced by other forest types in a warmer future.[243]



Adapted from Iverson *et al.*[364]

Much of the Northeast's forest is composed of the hardwoods maple, beech, and birch, while mountain areas and more northern parts of the region are dominated by spruce/fir forests. As climate changes over this century, suitable habitat for spruce and fir is expected to contract dramatically. Suitable maple/beech/birch habitat is projected to shift significantly northward under a higher emissions scenario (referred to as "even higher" on page 23),[91] but to shift far less under a lower emissions scenario.[91,363]