



## VERMONT MAPLE SUGAR MAKERS' ASSOCIATION

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[www.VermontMaple.org](http://www.VermontMaple.org)

Maple syrup is an iconic Vermont product and is closely identified with the state. It has a rich history, deep cultural meaning, and significant economic impact, both in Vermont and across northeast North America. Successful production of maple syrup is ultimately dependent on healthy maple trees and specific weather to stimulate sap flow. As a result, maple production is uniquely exposed to the risk of climate change [and this is in turn a concern to all maple producers and the VMSMA].

Ideal climate conditions to support maple sap harvesting have historically been concentrated in the late winter/early spring. Generations of maple producers have devoted their lives to making this unique product, but predictions about significant climate change have caught the attention of sugar makers of all sizes who wonder how their operations will be impacted. While predicted climate change poses serious threats to the health and productivity of the maple industry, there are also some areas for hopefulness.

Maple sap harvesting is highly sensitive to temperature changes of only a few degrees as well as unusual temperature volatility. The relatively narrow weather conditions that stimulate sap flow (air temperatures that fluctuate somewhat above and below freezing) have the potential for significant disruption with climate change. Observations collected over the recent past (<60 years) indicate that the ideal period for sap collection is shifting earlier in the calendar year. The use of vacuum tubing systems is considered the best currently available technology to effectively mitigate this change. Fortunately, this is the same technology producers employ to boost production. As a result, the average annual yields of sap have been increasing over the last 20 years as more and more producers deploy the technology. While this is potentially good news, vacuum tubing systems are not effective at mitigating the treats posed by all risk of more volatile temperature swings. Employing additional specific adaptations to maintain sap yield in the face of a changing climate is of great interest to many maple producers.

It is worth noting that maple production may also play an active role in mitigating the effects of climate change. Maple syrup is one of the few commercially significant food crops harvested from the wild, and continuous forest cover is essential to its efficient and profitable production. Large areas of continuous forest cover are also considered critical to mitigating the effects of a changing climate (moderating storm runoff, reducing erosion and maintaining water quality). Thus, protecting a viable maple industry may also help contribute to mitigating climate change by also preserving contiguous forestland. The concept of species migration is also a concern when talking about maple production. Species migration proposes that as long established temperature patterns change the mix of tree species in a given area will also change. In maple sugaring, producers historically have favored maple species and maintained a high proportion of maple in their forests through management activities. This active approach to may help mitigate the impacts associated with species migration by promoting the survival of maple in the next generation. Of course, if taken too far this could present challenges related to a lack of diversity.

Predictions related to climate change are notoriously challenging. One thing is quite clear though, and that is that the issue is complex and generalizations are difficult, if not impossible. Particularly when specifics related to time-period, topography, invasive insects and plants, species migration,

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ecosystem function and human behavior are considered. The interaction between some or all of these factors only adds to the complexity and further reduces the ability to accurately predict future conditions. One critical factor that must be clearly addressed when talking about climate change and maple syrup production is time-scale. Estimates about risks to maple production should be considered within rough time-scales such as near-term (0-50 years) mid-term (50-250 years) and long-term (>250 years). The uncertainty related to especially the long-term estimates must be acknowledged so as not to imply a higher degree of certainty than can be honestly predicted.

The Vermont maple industry takes the threats posed by climate change seriously but recognizes that there are some areas for hope. The complexity of the issues makes communication challenging, as does the uncertainty related to longer term stresses.