



ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Maple Syrup

How much maple syrup does Vermont produce? What kinds of investments are needed to support the growth of the maple industry? What will happen to maple trees and sap production as the climate changes?

Maple trees are synonymous with Vermont's landscape, and maple syrup is a key aspect of Vermont's cultural heritage, identity, and food system. Every fall, "leaf peepers" arrive by the thousands to take in the rich reds, oranges, and yellows of the changing season. Throughout Vermont's history, maple syrup has been an important staple, providing a natural sweetener as well as an additional source of income for many farms. First introduced to the earliest settlers from Native Americans, generations of Vermonters have passed down the art of sugarmaking. Each year, well before the first signs of spring, families with small sugar shacks and commercial-scale producers have tapped groves of maple trees (i.e., sugar bushes) in preparation for winter's end. Warm days in Vermont mean muddy roads and sugar on snow— an annual culinary tradition of hot maple syrup and a bowl of snow, served with a pickle and cider donut. Meanwhile, discriminating pancake lovers all over the world enjoy the pure, natural taste of Vermont's maple syrup year round. **Maple syrup production is a significant economic engine for the state with a market value of over \$50 million in 2011.**

Maple is pure, natural, real. It's a sugar but it's healthy. Maple is probably the bright light in Vermont agriculture.

—Vermont Maple Sugar Makers' Association stakeholder meeting



Collecting sap with tractor and sled, date unknown.

PHOTO CREDIT: UVM Special Collections

GETTING TO 2020

Goals 7, 9, 11, and 13 of the F2P Strategic Plan focus on increasing food production, including maple syrup production, for local and regional markets.

Goal 7: Local food production—and sales of local food—for all types of markets will increase.

Goal 9: The majority of farms will be profitable.

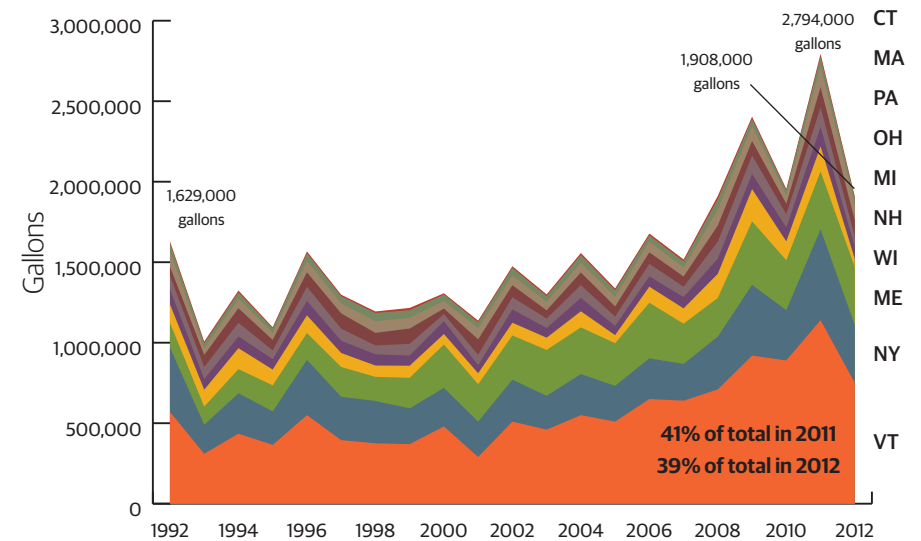
Goal 11: Vermont's food processing and manufacturing capacity will expand to meet the needs of a growing food system.

Goal 13: Local food will be available at all Vermont market outlets and increasingly available at regional, national, and international market outlets.

CURRENT CONDITIONS**🍁 Maple Syrup Production**

Vermont is the largest producer of pure maple syrup in the United States; it accounted for 41% of total U.S. production in 2011 - the highest year of production on record year (Figure 3.3.1). Total U.S. production of maple syrup grew about 72% from 1992 to 2011, from 1,629,000 gallons to 2,794,000 gallons. Vermont's maple production grew 100% during this time frame, from 570,000 gallons, to 1,140,000 gallons. **National production plummeted about 32% in 2012—and Vermont production decreased by 34%—as a result of weather that was too warm for sap runs.¹**

From 1992 to 2011 every state except Vermont, Maine, and Ohio saw its production as a percentage of total production shrink. Vermont's share of U.S. maple syrup production grew from 35% of total production in 1992 to 41% in 2011. However, U.S. maple syrup production is dwarfed by Canadian production, and most Canadian production comes from our neighbors to the north in Quebec (Figure 3.3.2).

Figure 3.3.1: U.S. Maple Syrup Production, 1992-2012

Source: USDA NASS, <http://quickstats.nass.usda.gov/results/9635150A-4D1B-3876-8C3B-29D2D94C8F2D> and [www.nass.usda.gov/Statistics by State/New England includes/Publications/O605mpl.pdf](http://www.nass.usda.gov/Statistics_by_State/New_England_includes/Publications/O605mpl.pdf)

The market value of U.S. maple production grew 70% from \$60,298,779 in 1992 to \$102,774,881 in 2011 (adjusted for inflation to 2010 dollars) (Figure 3.3.3).

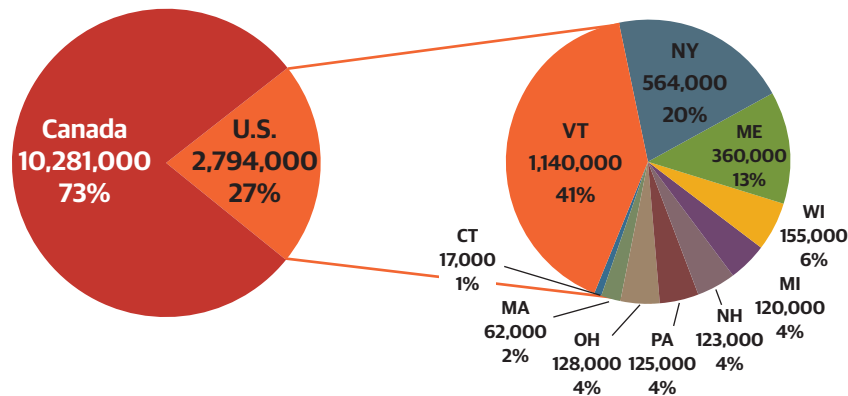
The value of Vermont's maple syrup production grew by 96% during this period, from \$19,755,594 in 1992 to \$38,679,084 in 2011. Vermont's share of the market value of U.S. maple syrup production grew from 33% of the total in 1992 to 38% in 2011. Vermont industry professionals believe that official data sources significantly underestimate total production and the market value value of maple syrup products. For example, the \$39 million figure represents the farm gate price of a barrel of maple syrup prior to refiltering, processing, labeling, and distribution. Each of these steps adds to the price of a bottle of maple syrup so that a more accurate lower bound for the market value of maple produced in Vermont is likely in the range of \$49 million. Data from the [USDA's National Agricultural Statistics Service](http://www.nass.usda.gov/Statistics_by_State/New_England_includes/Publications/O605mpl.pdf)

We do not face international competition beyond Canada; 17 states and [Canadian] provinces are sole producers. We're local to the whole world.

—David Marvin, President,
Butternut Mountain Farm

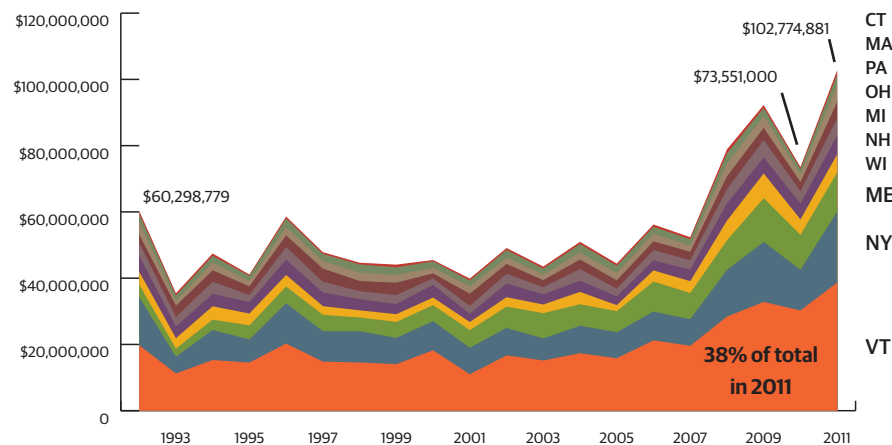
(NASS) also do not account for value-added maple production (e.g., granulated maple sugar, maple cream, maple fudge, maple candy, and maple liqueur, see sidebar), which, industry sources indicate, likely add another \$10 to 15 million in sales.

Figure 3.3.2: World Maple Syrup Production in Gallons, 2011



Source: USDA NASS, www.nass.usda.gov/Statistics/by_State/New_England_includes/Publications/0605mpl.pdf.

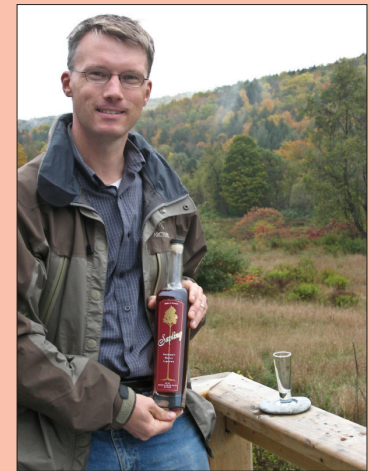
Figure 3.3.3: Market Value of U.S. Maple Syrup Production, 1992-2011



Source: USDA NASS: <http://quickstats.nass.usda.gov/results/E2B6F8DE-4A17-30D0-AF45-1AA363C4698F>.

Saxtons River Distillery

The *Saxtons River Distillery* in Cambridgeport sits nestled in a hillside by the banks of Weaver Brook. On this former flood plain, Christian Stromberg, the 36-year-old owner of the distillery, has worked for the past three years to fashion his unique maple liqueur. Descended from Lithuanian, Polish, and Swedish ancestors who were steeped in liqueur refining, Stromberg was inspired to use a local resource to produce his own variation of the family tradition. After experimenting with various liqueur flavorings, he stumbled upon a fit: Grade A maple syrup. Unlike Grade B, Grade A makes the product sweeter without yielding a bitter taste. He now makes his maple-flavored Sapling Liqueur from Grade A Vermont maple syrup and spirit distilled from American grain, and he ages it in oak barrels to produce a "rich, smooth flavor." For Stromberg, every day involves mixing, bottling, labeling, corking, sealing, or marketing. His current aims are to get suppliers lined up, acquire consistency, and get his product on more shelves. Currently, Sapling Liqueur can be found in Vermont Liquor Outlets and other stores.



Christian Stromberg with Sapling Liqueur.

Although Stromberg does not make his own maple syrup, he keeps each step of production as local as possible by purchasing local syrup. Through word of mouth, he found Dan Crocker and his company, *Sidelands Sugarbush*, in Putney. Crocker has developed a thriving business by practicing low-impact tapping techniques, such as using only one tap per tree, using shallow taps, doing corrective pruning, and thinning around production trees to provide room to grow. These innovative practices minimize the impacts of sugaring while maximizing tree health. Crocker's practices demonstrate that responsible land stewardship can directly sustain resources while providing viable products.

Stromberg hopes to one day distill gin from local juniper, spices, and herbs from his garden, and to expand to un-sugared liqueurs.

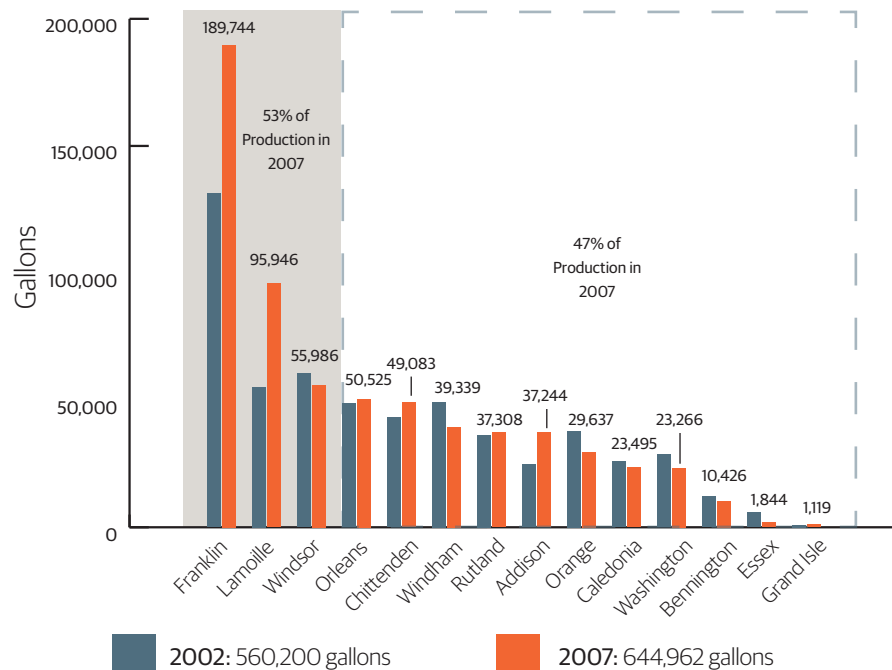
From Bonnie Hudspeth, "Beyond Maple Syrup," *Vermont's Local Banquet*, Winter 2008, www.localbanquet.com/issues/years/2008/winter08/beyondmaple_w08.html

🍁 Vermont's Maple Syrup Industry

Industry representatives estimate that approximately 75,000 acres of forest are being used to produce Vermont's annual crop. We do not know exactly how these acres are distributed across the state, but Franklin County accounted for 29.4% of total Vermont maple syrup production, with 25.8% of the taps on 13.8% of Vermont farms making maple syrup in 2007. Franklin (29.4%), Lamoille (14.9%), and Windsor (8.7%) counties produced 53% of Vermont's maple syrup in 2007, and these three counties had about 50% of the maple taps in the state (Figure 3.3.4 and 3.3.5).

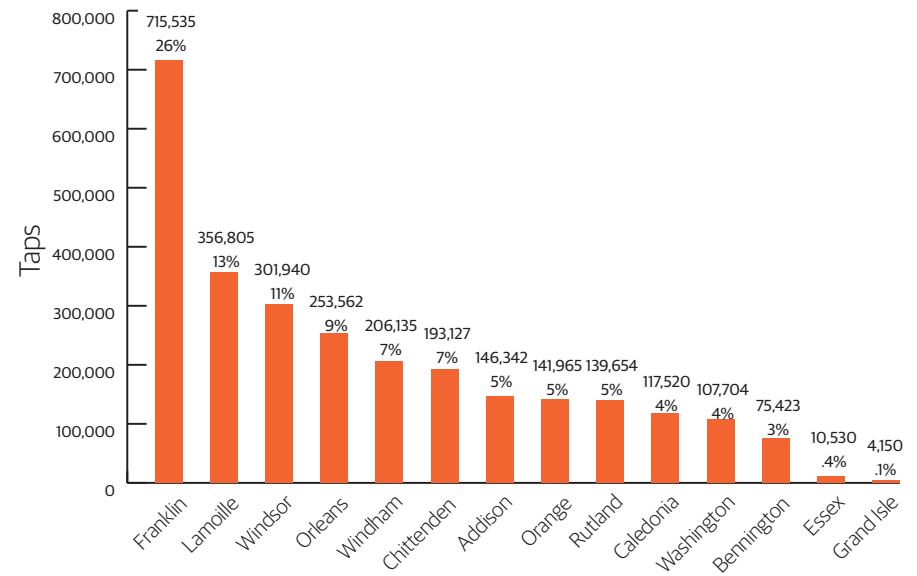
According to the last Census of Agriculture, 1,310 Vermont farms indicated involvement in maple syrup production.² In comparison, Quebec has approximately 10,000 maple syrup producers. According to the Census, about 50% of Vermont maple producers are in Franklin, Windsor, Orange, and Orleans counties. The [Vermont Maple Sugar Makers Association](#) (VMSMA) has over 1,100 members (Figure 3.3.6), but

Figure 3.3.4: Vermont Maple Syrup Production by County, 2002 and 2007



Source: USDA NASS: <http://quickstats.nass.usda.gov/results/2BD6E393-7DCF-3BBC-9933-342FC4D23716>.

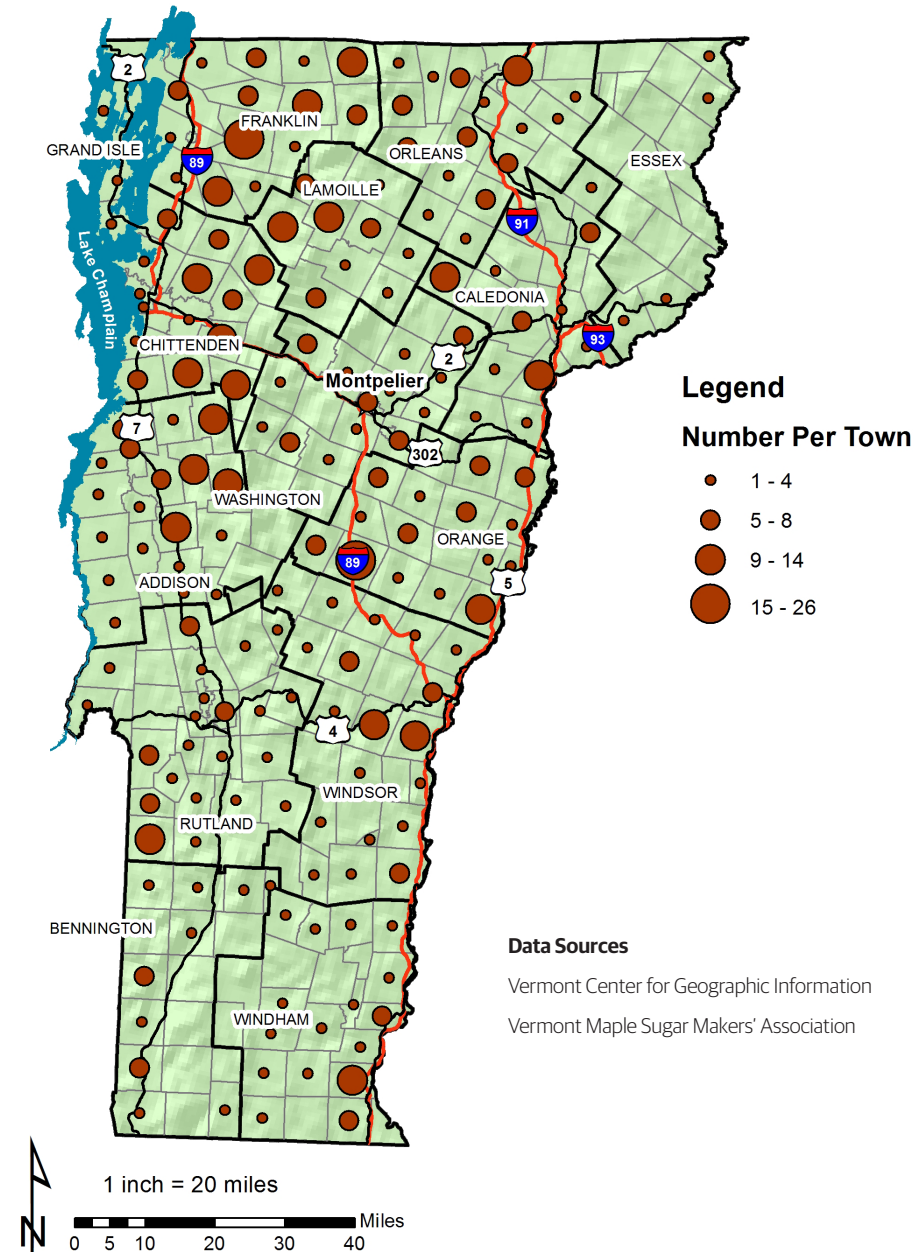
Figure 3.3.5: Vermont Maple Syrup Taps by County, 2007



Source: USDA NASS: <http://quickstats.nass.usda.gov/results/AA703953-B946-30DA-A2DA-B29A87A65361>.

maple industry professionals estimate that there are about 2,000 commercial operations in Vermont.

Interviewees indicated that about 20% of Vermont's maple producers generate about 80% of sales. The four primary maple processors in Vermont are [Highland Sugarworks](#) (Websterville), [Maple Grove Farms of Vermont](#) (St. Johnsbury), [Butternut Mountain Farm](#) (Morrisville), and [Coombs Family Farms](#) (Brattleboro, but headquartered in New Hampshire). These companies purchase syrup from other Vermont sugar makers, and some produce from their own sugar bushes. Their products are marketed under their own labels as well as private labels. For example, *Butternut Mountain Farm's* 70 employees bottle maple syrup, process bulk syrup, produce pure maple candy, and manufacture maple sugar (their facility is one of only two operations in the United States in which pure maple sugar is made). Most maple producers in Vermont are also doing some other form of farming and earn extra income from tapping trees during sugaring season. The Internet has opened a new frontier for the marketing of maple syrup. Dozens of Vermont producers now market their own products over the Internet as well as through traditional retail outlets.

Figure 3.3.6: Members of Vermont Sugar Makers Association by Town

☛ Meeting the Demand?

Many Vermonters are interested in whether we can feed ourselves with local food production. Unfortunately, no comprehensive data exist to indicate exactly how much and what type of food—including maple syrup—is currently being consumed by Vermonters. While we do not know how much of the maple syrup produced in Vermont is consumed in Vermont, throughout the F2P Strategic Plan we use the [food availability per capita estimates](#) of the [USDA Economic Research Service](#) and the [MyPlate dietary guidelines](#) of the USDA to contextualize current Vermont production.

Food availability per capita is commonly used as a proxy for food consumption, even though it does not measure actual consumption. The ERS calculates food availability per capita by adding total annual national production, imports, and beginning stocks of a particular commodity and then subtracting exports, ending stocks, and nonfood uses. This number is then divided by population estimates for the area of interest to arrive at per capita estimates of available food for any particular year. The ERS also attempts to account for food losses, from farms to retailers to consumers (e.g., spoilage and waste). Across the F2P Strategic Plan we use the **consumer weight** to reflect the state of a product at the time of purchase.

The USDA dietary guidelines recommend avoiding “[empty calories](#)” from sugars and solid fats. Nevertheless, the national per capita availability of sugars *increased* 10.5% from 1970 to 2010, from 106.0 pounds to 117.2 pounds (Figure 3.3.7). Cane and beet sugar, high fructose corn sweetener, honey, and edible syrups account for 88.2% (103.3 pounds) of sugar and sweetener availability in 2010, and 87.1% (92.4 pounds) in 1970. **The ubiquity of high fructose corn syrup, cane sugar, and beet sugar far outweigh the contribution of maple syrup as a sweetener: For example, the per capita availability of high fructose corn syrup increased 8,802% from 1992 to 2010, while per capita availability of edible syrups remained the same.** On a per capita basis, over 27 million pounds of high fructose corn syrup were available to every Vermonter in 2010.

USDA ERS indicates that 0.4 pounds of edible syrups, including maples syrup, were available to every American from 1970 to 2010. Unfortunately, it's not clear what proportion of the 0.4 pounds of edible syrups reported available on a per capita basis for all years are from maple syrup. Using the USDA ERS methodology, we can derive

Table 3.3.1: Comparing Food Availability Data and Dietary Guidelines with Vermont Maple Syrup Production

	U.S. per capita availability (consumer weight adjusted for loss) (2010)	Amount required if Vermont matched per capita availability	How much does Vermont produce? (2011)	Vermont per capita availability
	Pounds	Pounds	Pounds	Pounds
Total Caloric Sweeteners	117.2	73,336,845	>12,894,400	>20.6
Selected sweeteners	103.0	64,451,323	≈12,894,400	≈20.6
Cane and beet sugar	58.6	36,668,423	?	0.0
High fructose corn sugar	43.4	27,157,159	0.0	0.0
Honey	0.9	563,167	≈172,000	≈0.3
Maple Syrup	0.1	62,574	≈12,722,400	≈20.3
USDA MyPlate dietary guidelines	Annual recommendations	Amount required if Vermont matched guidelines	How much does Vermont produce? (2011)	Surplus or deficit?
	Pounds	Pounds	Pounds	Pounds
Maple Syrup				
Males (ages 20 - 49)	55.8 to 69.5	7,271,685	≈12,722,400	≈8,625,409 deficit
Males (ages 50+)	54.8	6,055,405		
Females (ages 20 - 49)	33.7 to 54.8	4,914,044		
Females (ages 50+)	25.3	3,106,675		
Subtotal		21,347,809	≈12,722,400	≈8,625,409 deficit

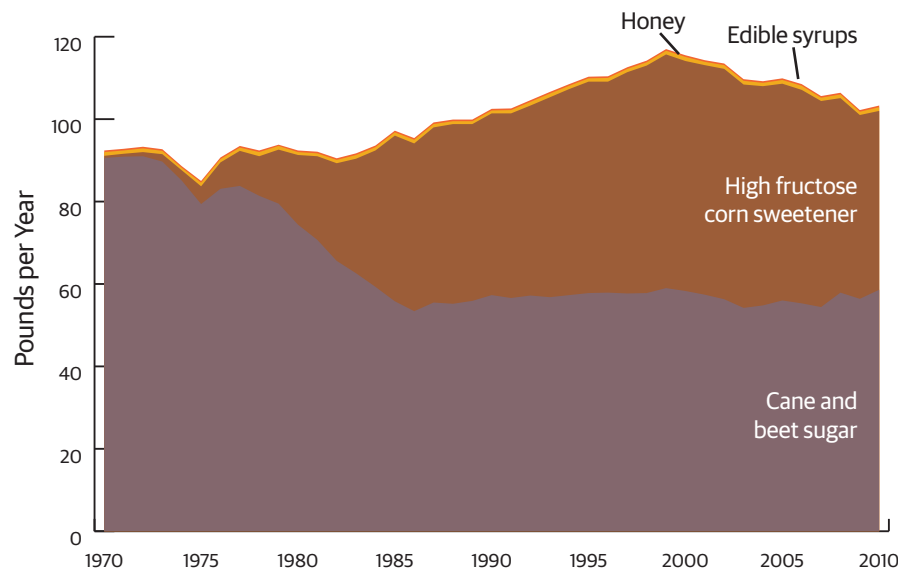
Note: Chapter 3, Section 1: Understanding Consumer Demand used 2007 per capita availability data for all food categories since more recent data was not available for some food categories (e.g., fruits and vegetables). Since annual data is available for maple syrup we use that information here.

Caloric Sweeteners Per Capita Availability

Deficit: ≈ 60,442,445 pounds

MyPlate Dietary Guidelines for Empty Calories

Deficit: ≈8,625,409 pounds

Figure 3.3.7: U.S. Per Capita Availability of Selected Sweeteners, 1970-2010

Source: USDA ERS, [Food Availability \(Per Capita\) Data System](#).

a per capita estimate by dividing national maple syrup production (2,794,000 gallons or 31,207,553 pounds in 2011) by the U.S. population (312,591,257), which yields about 0.009 gallons, or 0.1 pounds, per person.

While we do not know how much maple syrup Vermonters consume, if every Vermonter consumed exactly the national per capita amount of maple syrup available per year, 5,632 gallons, or 62,574 pounds, would be needed to meet the state's demand. This is equal to 0.5% of total Vermont syrup production in 2011 (Table 3.3.1). Alternatively, we can calculate the per capita availability of Vermont maple syrup just for Vermonters if no maple syrup was exported, which yields 1.8 gallons or about 20 pounds per person per year (1,140,000 gallons divided by 625,741).

The dietary guidelines of the USDA provide another lens for looking at this question. The USDA provides a range of recommended calories from "empty calories" from added sugars by age and gender. If it were possible for adult Vermonters to get all of their empty calories from sweeteners made from maple syrup, 21,347,809 pounds would be required (assumes 825 calories per pound of maple syrup). Of course, it is unrealistic

to expect all Vermonters to meet the USDA recommendations for empty calories just with maple syrup, but Vermont production would fall short by several million pounds.

This exercise has demonstrated that, 1) even though Vermont is the number one maple syrup producer in the United States, it produces a very small amount of total caloric sweeteners and 2) if Vermont saved all of its maple syrup for consumption just by Vermonters then the state would still not meet dietary guidelines for empty calories.

🍏 Protecting the Vermont Brand

Vermont was the first state to pass a [maple law](#) that established purity, quality, and labeling regulations. Inspectors from the [Vermont Agency of Agriculture, Food and Markets](#) (VAAFMM) have the authority to conduct retail inspections, open containers, conduct tests, and assess penalties. To protect the Vermont maple syrup brand, the VAAFMM and the office of U.S. Representative Peter Welch recently asked the Commissioner of the [U.S. Food and Drug Administration](#) (FDA) to investigate whether *Pinnacle Foods* (makers of Log Cabin Table Syrup) is in compliance with FDA regulations regarding its use of "All Natural" on its label. Log Cabin is principally made from rice syrup, artificial flavors, and colors. Prior to an investigation, *Pinnacle Foods* agreed to remove the caramel color. In response, U.S. Representative Welch recently said, "By removing what is clearly an unnatural ingredient from its Log Cabin table syrup, *Pinnacle Foods, Inc.* has taken an important step to comply with FDA guidelines, but it does not go far enough. By continuing to market its product with jug-like packaging and all-natural labeling, *Pinnacle* leaves consumers with the impression that Log Cabin table syrup and Vermont maple syrup are one and the same. As Vermonters know, they're not even close. It's time for *Pinnacle* to stop misleading customers and stop imitating the Vermont maple industry."³

Retailers place significant demand on syrup producers for third party verification of good manufacturing practices. *Butternut Mountain Farm* routinely conducts audits through a third party inspector. *Coombs Family Farms* employs a full-time person for quality control oversight. Vermont also has strong maple research and technical assistance services. The [University of Vermont's Proctor Maple Research Center](#) in Underhill has made a significant contribution to technical and educational advances in the maple industry. The Center was established in 1946 with the donation of the

former Harvey Farm in Underhill Center to UVM by Governor Mortimer Proctor. Research has centered on the sugar maple tree (*Acer saccharum*) and its products—sap and syrup. [Maple research](#) conducted at the *Proctor Center* has increased knowledge of the sap flow mechanism, weather variables affecting sap yield, carbohydrate metabolism, sap biochemistry and microbiology, syrup chemistry, and wood anatomy and physiology. Other work has examined the health of the sugar maple in relation to various biotic and abiotic stresses, including climate and nutrition. Each year the Center sets out approximately 1,550 taps and produces 750 to 950 gallons of maple syrup, all of which is sold through the UVM bookstore.



Maple canopy in fall colors.

The Center is used as a [field classroom](#) for students, scientists from many disciplines, and maple syrup producers. The Center's educational mission is accomplished through presentations, demonstrations, and tours. Its facilities are open to maple producers, foresters, elementary through college students and faculty, and the general public. It also works closely with the [UVM Extension](#) maple specialists to provide maple education opportunities to groups and individuals throughout Vermont and the northeast region.

Three main maple organizations support the industry:

- 🍏 *Vermont Maple Sugar Makers Association* (VMSMA), founded in 1893, is one of the oldest known agricultural organizations in the country. The VMSMA focuses on promoting and protecting the brand of pure Vermont maple products. Each year VMSMA co-sponsors "maple schools" throughout the state to educate producers on new and more effective ways to produce quality syrup. The organization has become known as the official voice of Vermont sugar makers.

- 🍏 *Vermont Maple Industry Council* focuses on maple quality standards, regulatory issues, and promoting solutions to problems facing the industry.
- 🍏 *Vermont Maple Foundation* focuses on the marketing and promotion of Vermont maple products.

These three separate nonprofit organizations share the VMSMA website. Members and leaders in these organizations acknowledge that the existence of three Vermont maple organizations can be confusing. They are currently working to merge their entities to maximize their ability to collaborate, especially in the realms of regulation, quality control, and education.

Note: In 2011, after the original version of this section was published, Vermont's three maple industry associations merged and retained the Vermont Maple Sugar Makers Association name.

Educational sessions hosted by the maple organizations happen about three times a year in various places, and turnout has been increasing over time. In late March, the Governor's Tree Tapping ceremony is the official kickoff of the sugaring season and a significant media event. [Maplerama](#) is a two-day educational and networking event held every summer that draws sugar makers from all over the country to Vermont. The maple industry also coordinates the [Maple Open House Weekend](#) at sugarhouses across the state. Every year different counties host two signature statewide events.

⚡ Climate Change Impacts on the Maple Sugaring Industry

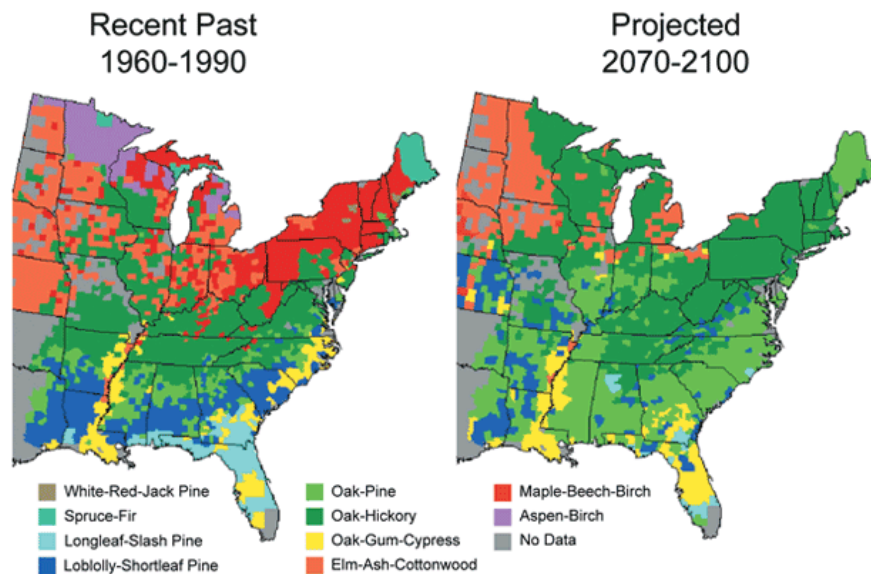
Climate change threatens the long-term viability of Vermont's maple industry.

According to the [U.S. Global Change Research Program](#), an effort to coordinate the federal government's research on climate change, "The Northeast is projected to face continued warming and more extensive climate-related changes, some of which could dramatically alter the region's economy, landscape, character, and quality of life. Over the next several decades, temperatures in the Northeast are projected to rise an additional 2.5 to 4°F in winter and 1.5 to 3.5°F in summer." Furthermore, "Agricultural production, including dairy, fruit, and maple syrup, are likely to be adversely affected as

favorable climates shift...The climate conditions suitable for maple/beech/birch forests are projected to shift dramatically northward, eventually leaving only a small portion of the Northeast with a maple sugar business and the colorful fall foliage that is part of the region's iconic character.⁴

Most *forest cover models* show the composition of Vermont's forest species changing from maple-beech-birch to oak and hickory by 2100 (Figure 3.3.8). **The implication of these changes is that the appearance, composition, and functioning of Vermont's working landscape will be dramatically different in the years ahead.**

Figure 3.3.8: U.S. Per Capita Availability of Selected Sweeteners, 1970-2010



Source: United States Global Change Research Program, 2009, www.globalchange.gov/images/cir/pdf/ecosystems.pdf.

Maple syrup production requires cold nights and warm days to get the sap running. The USDA reports that the number of hot nights are expected to increase during this century—by as much as 20 to 30 additional hot nights.⁵ *Research conducted* by the Proctor Maple Research Center shows that the sugaring season is starting significantly earlier than it did 40 years ago, and that the duration of the season has decreased by an average of 10%. Productive sugar bushes take 40 to 50 years to establish, but may remain productive indefinitely because 150- to 200-year-old trees continually

reproduce. As the climate changes, establishing new sugar bushes and maintaining existing ones may become increasingly difficult.

Warming temperatures also mean more habitable environments for insects, invasive plant species, and other pests that may impact agricultural productivity in Vermont. The Asian longhorned beetle and other pests are a major threat to hardwood trees throughout the Northeast, including sugar maple trees in Vermont. More oversight regarding logs and lumber crossing Vermont borders should be implemented to minimize the spread of invasive pests and other blights that can destroy sugar bushes.

ANALYSIS

Maple Syrup Development Needs

On a volume basis, maple syrup production will never displace high fructose corn syrup, corn syrup, and other refined sugars. However, with the growing interest in local food and growing skepticism of artificial ingredients and flavors in food products, **a substantial market opportunity exists in replacing the use of some percentage of artificial syrup with Vermont maple syrup.**

— Natural Resource Strategies

Maple industry interviewees suggested that access to land was the biggest challenge for growth. Maple sugaring is considered a sustainable, productive use of Vermont forests: it is a uniquely nondestructive forest management practice that allows annual extraction of value without harvesting the resource.

If it is the case that about 75,000 acres of forest land are being tapped to produce Vermont's maple syrup, then only about 2.3% of Vermont's maple-beech-birch forest group acres are in use for maple production (Table 3.3.2).

Over 77% of Vermont's land area is forested and the maple-beech-birch forest group makes up a little over 70% of Vermont's forested acres. Forest coverage across the counties varies quite a bit, from a low of 20% in Grand Isle County, to a high of 94% in Essex County. The maple-beech-birch group ranges from about 60 to 84% of all forested acres. The number of live hard maple trees as a percentage of all trees ranges

from 11.4 to 15.6%, with no information available for Grand Isle County. If the number of acres devoted to maple syrup doubled, from 75,000 to 150,000 acres, maple syrup producers would still theoretically be accessing only 4.6% of maple-beech-birch forest group acres.

Table 3.3.2: Maple Forest Group Acres by County, 2008

	Total Forested Acres	% of Total Forested Acres	Maple / Beech / Birch Group Acres	Maple Group Acres as % of Total	Live Hard Maple Trees	Live Maple Trees as % of All Trees
Windsor	506,245	11.0	386,643	76.4	45,804,794	15.4
Rutland	484,517	10.6	326,735	67.4	45,129,949	15.5
Windham	427,555	9.3	285,044	84.1	24,079,591	15.3
Essex	398,281	8.7	295,311	74.1	47,051,456	14.2
Orange	364,026	7.9	231,413	66.7	61,359,033	13.9
Bennington	360,145	7.8	302,824	72.7	25,324,630	12.3
Caledonia	342,656	7.5	205,957	63.6	43,434,689	15.6
Washington	340,811	7.4	247,604	60.1	26,842,229	12.1
Orleans	336,379	7.3	201,112	59.8	51,852,574	15.0
Addison	290,892	6.3	196,438	67.5	31,410,972	12.2
Franklin	268,373	5.8	195,836	80.7	33,271,849	12.8
Lamoille	242,688	5.3	189,509	70.6	28,227,406	11.4
Chittenden	214,980	4.7	166,690	77.5	24,600,351	15.3
Grand Isle	10,841	0.2				
Total	4,588,389	100	3,231,116	70.4	488,839,523	13.9

Source: USDA Forest Service Forest Inventory Data Online 2.0, <http://fiatools.fs.fed.us/fido/index.html>.

Note: sampling error in the FIDO system was significant in some instances.

Vermont's forests are, of course, used for multiple purposes, and there are many possible barriers that would inhibit the expansion of maple syrup production. For example, one maple industry interviewee suggested that fewer tracts of land south

of Route 4 are available for sugaring because many large landowners in that area are out-of-state owners who have no desire to have their trees tapped. Maple industry interviewees also described a need to identify and conserve key large maple sugar bushes in Vermont for future production and business development.

In 2010 the Vermont Legislature recently asked the [Vermont Department of Forests, Parks and Recreation](#) (DFPR) to develop responsible tapping guidelines and to issue licenses for tapping maple trees at appropriate sites on state forest and park land.⁶ The DFPR worked with the VMSMA to develop guidelines and identify eight potential sites for sugaring on state land: Groton State Forest (Town of Groton); Elmore State Park (Town of Elmore); Mt. Mansfield State Forest (Town of Stowe); Coolidge State Forest (two sites in the Town of Plymouth); Okemo State Forest (Town of Mount Holly); Putnam State Forest (Town of Grafton); and Quechee State Park (Town of Hartford).⁷ The DFPR put out an RFP for these sites and received six applications, three of which went forward at Okemo State Forest, Groton State Forest, and Mt. Mansfield State Forest. It is estimated that these three sites could accommodate 16,500 taps, which would bring the State of Vermont \$11,000 in license revenue annually. The DFPR noted that developing the program was a strain on staff time and resources during a difficult time for all state agencies, but that it was committed to establishing the program and expanding it.

Physical Infrastructure and Technology Strategies

Vermont's maple industry has more than enough capacity for bottling, but additional storage, warehousing space and acceptable storage containers are needed. There is also a need for producers to own stainless steel barrels for storage, which is a large capital expense (\$200 for a 40-gallon barrel). Industry leaders estimate that **buying all the barrels the state needs to properly store bulk syrup would cost about \$6.5 million.**

Technological gains such as smaller taps, tubing (instead of buckets), vacuum pumps, and reverse osmosis machines have greatly improved the efficiency of processing maple sap to produce syrup. For instance, maple syrup production increased 85% over the past decade while the number of taps increased only 52% (from 2,101,449 taps in 2001 to 3,200,000 in 2010). Reverse osmosis allows sugar makers to use much less wood



Grades of syrup and logging daily sugar making activities

and oil by concentrating the sap. Larger operators now boil for about 100 hours a year as compared to 1,000 hours prior to using reverse osmosis. A Vermont maple industry expert estimates that 90% of syrup now produced is done with reverse osmosis. Use of the [USDA Rural Development's Rural Energy for America Program](#) has given many Vermont sugar makers the incentive to transition to reverse osmosis technology.

A new tap, called a check valve spout, developed at the *Proctor Maple Research Center*, essentially prolongs sap production by employing a small ball to block bacterial backflow into the tree's tap hole. Bacterial backflow normally triggers a wound response that closes the hole. The check valve spout increases sap production by 50 to 90% per tree and is being manufactured by *Progressive Plastics* in Williamstown.

[Leader Evaporator](#), the largest U.S. manufacturer of equipment for the production of maple syrup, based in Swanton, now sells the spout. Gary Gaudette, president of *Leader*, is quoted as saying: "It's going to add as much to syrup and sap production as vacuum tubing did. I'm confident that this is going to be the thing to use in the future."⁸

The maple industry is dealing with a few new equipment cleaners. Stakeholders noted the need to be aware of these potentially toxic cleaners and suggested that research on plant-based cleaners for maple equipment be advanced. As the use of specialized equipment and cleaners continues to advance the quantity and quality of syrup produced in Vermont, it is important to continue to support producers with training and technical assistance offered through *UVM Extension*, *VAAFM*, and the *Proctor Maple Research Center*.

Marketing and Public Outreach Strategies

In *Chapter 3, Section 1: Understanding Consumer Demand* we recommend viewing food purchases as a set of behaviors that move along an adoption curve—from unsure to influenced, from influenced to proactive, and from proactive to committed—and that vary by combinations of **attitudinal factors** (e.g., values); **socio-demographic factors** (e.g., where a person grew up); **habits** (e.g., brand loyalty and convenience); **personal, household, and organizational capabilities**; and **contextual factors** (e.g., nutrition environments).

For example, *Aunt Jemima* syrup has been nationally marketed for decades, is prominently displayed on grocery store shelves, and many people grow up mistakenly believing that it is "real" (i.e., maple) syrup even though it is made from corn syrup and other sweeteners. The consumer behavior literature emphasizes the critical importance of convenience. However, convenience goes beyond the availability of local food products to include prominence (e.g., placement on shelves), food outlet location, and accessibility (e.g., prices and promotions).

Many people believe there is a need for increased and coordinated marketing efforts for Vermont maple products. Consumer research conducted by [Paul Kaza Associates](#) (PKA) in 2003 in New England and selected areas across the country revealed that "Vermont is the top of mind place that people associate with pure

We don't have enough marketing. In many places in the world, syrup is Aunt Jemima. A high percentage of the population doesn't know what pure maple syrup is.

—Vermont Maple Sugar Makers' Association stakeholder meeting

Ingredients in Artificial Syrups

AUNT JEMIMA, SYRUP, ORIGINAL

INGREDIENTS: Corn Syrup, High Fructose Corn Syrup, Water, Cellulose Gum, Caramel Color, Salt, Sodium Benzoate, and Sorbic Acid. (Preservatives) Artificial Flavors, and Natural Flavors, Sodium Hexmetaphosphate.

LOG CABIN, ORIGINAL SYRUP

INGREDIENTS: High Fructose Corn Syrup, Corn Syrup, Sugar Syrup, Water, Pure Maple Syrup, Salt, Artificial Flavors, Cellulose Gum, Sodium Hexametaphosphate, Sodium Benzoate, and Sorbic Acid, (Preservatives) Caramel Color.

MRS. BUTTERWORTH'S, LITTLE DUNKERS SYRUP CUPS, ORIGINAL

INGREDIENTS: High Fructose Corn Syrup, Corn Syrup, Water, Salt, Cellulose Gum, Molasses, Potassium Sorbate, (Preservative) Sodium Hexametaphosphate, Citric Acid, Caramel Color, Natural Flavors, and Artificial Flavors.

KELLOGG'S, EGGO, ORIGINAL SYRUP

INGREDIENTS: High Fructose Corn Syrup, Corn Syrup, Water, Sugar Syrup, Natural Maple Flavor, and Artificial Maple Flavor, Salt, Potassium Sorbate, (Preservative) Caramel Color.

COUNTRY KITCHEN, ORIGINAL SYRUP

INGREDIENTS: Corn Syrup, High Fructose Corn Syrup, Water, Natural Flavors, Artificial Flavors, Salt, Cellulose Gum, Sodium Benzoate, Sorbic Acid, (Preservatives) Caramel Color, Sodium Hexametaphosphate, Citric Acid.

Source: LabelWatch, www.labelwatch.com/prod_results.php?pid=183005, 2007.

maple syrup, regardless of whether they are consumers of pure maple or artificial syrups." Vermont syrup is also perceived to be of higher quality, purity, and "real-ness" than competing syrups, and Vermont syrup can command a premium in the marketplace. The PKA report suggests that **the independent nature of Vermont producers, the lack of a centralized distribution and marketing system, and a lack of comprehensive and sustainable funding for marketing are holding Vermont's maple industry back.**⁹

Canada dominates the maple export market and spends dramatically more than Vermont on marketing its syrup. Among all three Vermont maple organizations, only \$35,000 of grant funds are spent on promotion, employing one part-time person, whereas the [Federation of Quebec Maple Syrup Producers](#) spends over \$4 million in marketing. **Most Vermont marketing is done by producers and focuses on asserting that Vermont syrup is better than other pure maple syrup, rather than marketing against high fructose corn syrup and artificial syrups.** Industry stakeholders believe that marketing dollars dedicated to Vermont maple products should be significantly increased to compete with Canadian maple and artificial syrups.

The Vermont maple industry has identified four funding models that are predicated on the idea that Vermont can charge more for its maple syrup: the **container assessment model** uses a surcharge added to the cost of each container to pay for marketing efforts; the **premium price model** uses a premium added to the cost of each gallon of syrup to pay for marketing efforts; the **centralized buying model** uses a commission from brokering sales online to pay for marketing efforts; and the **certificate of authenticity model** that would essentially use a charge or fee for the certificate for marketing efforts.

Some Vermont maple syrup processors look to the Canadian model of quality control as a necessary step in the effective marketing of Vermont syrup. Bruce Bascom, owner of the *Coombs* label, believes that the Vermont name is rapidly losing value in the marketplace. Bascom stated: "Quebec is serious about quality with stringent standards being enforced; Vermont is nowhere near the same standard." Bascom believes that a more active quality standards program would increase the quality of Vermont syrup and help to protect the market share.

[U.S. Representative Peter Welch](#) (D-VT) recently promoted a bill that would authorize USDA grants to support maple industry promotion in Vermont.¹⁰

Financing Strategies

Agricultural lenders are amenable to supporting good business plans for maple production. However, accessing aggregated capital to hold year-round inventories is an issue because maple syrup is produced within a short window of time in the year, but sold year-round. As individual businesses and the industry in general continue to grow, access to patient capital may be important. Banks are much more willing to lend to sugaring operations now than they were in the past, likely because of maple becoming a viable business enterprise opportunity for many Vermonters.

Network Development Strategies

In 2001, [Sleeping Lion Associates](#) was hired by the three maple industry organizations to conduct organizational assessments and assist with a strategic plan for the industry. The consultant observed that "the maple organizations, their structure and the culture of sugar makers all contribute to the maple industry's propensity to be reactive rather

Wood's Cider Mill

Wood's Cider Mill in Springfield, on the Weathersfield Center Road, sells products you'd expect to find at a cider mill—apple-derived items such as boiled cider and cider jelly. But Willis and Tina Wood, who own and run the cider mill, also sell a lot of maple syrup—between 800 and 900 gallons a year, mostly retail.

Given that a gallon of their syrup can fetch \$40 to \$50, the maple side of Willis and Tina's business provides a significant portion of their income. They demonstrate that producing maple syrup can be a lucrative complement to a farm's main purpose—an activity that can be accomplished in a short season, leaving time during the rest of the year for other agricultural pursuits.

The Woods also sell hay and raise a small flock of lambs and some beef cattle. But maple syrup is their second biggest revenue source.

"If we didn't sugar, we'd notice it," Willis says. "We couldn't easily give it up."

In 2002, the Woods built a structure that doubles as their cider mill and sugarhouse; some of the same equipment is used during both the cidermaking and the sugaring. The processes are both labor-intensive, but require different kinds of labor: while sugaring calls for a lot of time in the woods, the couple spend more days boiling cider than boiling syrup, and repeatedly travel a 20-mile radius to procure local apples in the fall.

The "cider syrup" sold at Wood's Cider Mill—a combination of boiled cider and maple syrup—perfectly reflects the dual purposes of the farm, which has been in continuous operation since 1798. Cider-making was introduced there in the 1880s, while syrup has been made there pretty much since the beginning.

Willis notes that the family's strong syrup sales today can be partly attributed to the farm's location and the farmers' proximity to the sugarhouse and shop.

"There are an awful lot of sugarmakers who are also carpenters or shopkeepers," Willis says, "but we're home most of the time—and we're on a good road."

than proactive," and that "despite years of discussion, focus groups, and a variety of committee reports, the industry still has not come to a consensus" on a vision for the industry and whether the configuration of the industry was capable of responding to challenges. The Vermont maple industry is again involved in a strategic planning process to consider the merger of the three statewide maple organizations and to clearly articulate the roles and responsibilities for providing technical assistance, education and outreach, and policy recommendations.¹¹

Note: In 2011, after the original version of this section was published, Vermont's three maple industry associations merged and retained the Vermont Maple Sugar Makers Association name.

— Regulation and Public Policy Strategies

The need for quality control and regulatory vigilance were common themes in stakeholder interviews.

Coordinated work is needed to improve quality control standards and establish an accessible process for producer registration with VAAFM. To date, with limited resources at the Agency, the maple industry has had to either work with a third party audit service or provide the necessary funds for VAAFM to carry out the task. Regular vigilance is required to ensure that artificial syrup makers (i.e., makers of maple-flavored products and artificial maple-flavored products) comply with FDA and Vermont regulations. The maple industry must work to eliminate advertising or packaging that leads consumers to believe they are purchasing pure maple syrup when they are not, and to educate consumers about the benefits of choosing pure maple syrup.¹²

State cutbacks have eroded regulatory capacity. In the old days maple was produced by dairy farmers who wanted to diversify. Today there are a lot of folks approaching full-time work in maple. As a growing business opportunity, there's a need for business assistance and quality control. Syrup lends itself to adulteration. Cuts at the Agency of Agriculture and tight budgets at UVM Extension are a concern to quality control.

—Vermont Maple Sugar Makers' Association stakeholder meeting

GETTING TO 2020

Vermont is already the national leader in maple syrup production but there are many opportunities for strengthening and expanding the industry. Expanding the number of acres devoted to sugaring, allocating significant dollars to marketing maple syrup as the natural replacement to artificial syrups, and streamlining Vermont's maple industry organizations were all identified by interviewees. At the same time, climate change is a direct threat to the entire industry. Maple syrup production levels were dramatically down in 2012 as the result of high temperatures. The Conference of New England Governors and Eastern Canadian Premiers signed a Climate Change Action Plan in 2001, but little progress to reduce greenhouse gas emissions has been made since then. Researching and implementing adaptation techniques, including changing the timing of tapping, widespread adoption of high-yield production techniques (e.g., check valve spouts) may help to offset climate variation in the short-term.



Blueberry pancakes with Vermont maple syrup.

Table 3.3.3: Objectives and Strategies for Maple Syrup Production

OBJECTIVE	STRATEGY
Research Strategies	
To help Vermont farmers and technical assistance providers adapt to climate change.	Climate change is a direct threat to Vermont's maple syrup industry. Researchers, technical assistance providers, sugar makers, and others should aggressively explore adaptation techniques, including changing the timing of tapping, widespread adoption of high-yield production techniques (e.g., check valve spouts).
Natural Resource Strategies	
To conserve key Vermont sugar bushes and identify potential new sugar bushes.	VMSMA, VAAFM, the Vermont Land Trust, and local land trusts should identify essential sugar bushes and run educational and fund-raising campaigns to protect and conserve those acres, as well as enroll more sugar makers in sugaring on state lands.
To minimize the fragmentation of land supporting large parcels of highly productive sugar bushes.	Establish GIS mapping of all available land parcels of appropriate-sized sugar bushes, and create online and staffed matchmaking service for sugar makers and landowners interested in tapping their sugar bushes.
	Establish tax and other incentives to large landowners (especially south of Route 4) to encourage them to lease, sell, or otherwise make their sugar bushes available for tapping.
Physical Infrastructure and Technology Strategies	
To develop additional storage capacity for bulk and bottled product for carryover and year-round sales.	Inventory current bulk scale processing and storage facilities and identify the best locations for new storage facilities. Investigate opportunities to transition all containers to stainless steel barrels.
Sales and Distribution Strategies	
To increase the number of maple syrup distribution channels: farmers markets, CSA farms, co-ops, Internet companies, independent grocers, restaurants, and supermarkets.	Encourage the <i>Vermont Fresh Network</i> to increase the involvement of large maple producers at matchmaking events.
	Encourage maple trade associations to partner with organizations that provide support to CSA farms, and provide matchmaking services to link maple producers and CSA farms.
	Encourage the involvement of Vermont maple producers in any processing, storage, and aggregation services developed by Regional Food Centers or other private aggregation facilities.

OBJECTIVE	STRATEGY
<i>Marketing and Public Outreach Strategies</i>	
To develop a marketing campaign to replace the use of some percentage of artificial syrup with Vermont maple syrup.	The Vermont maple industry organizations should launch a marketing campaign to raise awareness of the nutritional, health, taste, and other benefits of using pure Vermont maple syrup. Market Vermont pure maple syrup against high fructose corn syrup and artificial syrups rather than other pure maple syrups.
	Conduct demonstrations at local and regional supermarkets and other larger market outlets, in coordination with marketing materials and education campaigns and price discounts.
To provide at least \$100,000 in annual funding for the marketing of pure Vermont maple syrup to national and international markets.	Investigate container assessment, premium price, centralized buying, and certificate of authenticity models to fund marketing initiatives, both for centralized industry marketing and individual business marketing.
	Examine other opportunities to fund marketing efforts (e.g., maple industry association membership dues and any workshop or training event registration fees could be directed toward coordinated marketing development and staffing).
To increase attendance at annual maple conferences by 10% annually, for the next 10 years.	Expand outreach to regional producers and consumers.
	Coordinate with Canadian maple industry leaders to expand attendance at all maple conferences.
<i>Financing Strategies</i>	
To increase the financing available to sugar makers for inventory management, equipment, and storage needs.	Conduct outreach to lenders to educate them about the financing needs of maple producers.
	Establish a special revolving loan fund for the short-term financing of inventory and equipment specific to the needs of maple producers.
	Provide funding for a feasibility study on the economic viability of a cooperative or privately held multiproducer storage facility.
<i>Network Development Strategies</i>	
To increase the coordination and collaboration of Vermont's main maple industry organizations (Vermont Maple Syrup Industry Council, Vermont Maple Promotion Board, and Vermont Maple Syrup Producers Association) to maximize the success of the entire Vermont maple industry.	Complete the strategic planning process and implement the merger of the three statewide maple organizations with clearly defined roles and responsibilities. This strategy took place in 2011.
	Identify volume targets and viable price points for Vermont maple syrup to be sold nationally and internationally. Provide funding for staff to prepare market information and any other materials needed for evaluating volume and viable price point targets.
	Use industry association annual meetings to discuss volume and price targets, coordinated marketing, and consumer education plans.

OBJECTIVE	STRATEGY
<i>Network Development Strategies</i>	
To increase the number of value-added products containing pure Vermont maple syrup or maple sugar.	Encourage the Proctor Maple Research Center to expand its research scope to include additional research and development for value-added maple products.
	Increase the research and development of value-added maple products.

End Notes

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- 12 Most maple producers are exempt from FDA registration, whereas maple-flavored products fall under FDA supervision.



ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Maple Syrup

Credits

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farm to plate
STRATEGIC PLAN

farm to plate
NETWORK



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