

Community Sugaring Feasibility Study: Can We Bring Back Sugaring to Kirchner Woods?



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Abstract

Maple sugaring is a historical staple of Vermont culture as well as a provider of the state's economic activity. In recent years maple sugaring has become dominated by larger commercial sugaring operations in the Northeast, but with this came the push to maintain smaller scale operation for use as an educational tool to expose people the natural world. This report will present four different models of sugaring in Kirchner Woods to help the Stowe Land Trust determine the feasibility of reintroducing maple sugaring on the property with a focus in education. The presentation of these models comes after a semester of interviews conducted with local community members and site visits of varying sized sugaring operations around the state. The characteristics of three of these outside operations are described in detail for the SLT to understand what similar sites have done to start and maintain their operations. The four models that will be explored are all dependent on startup and maintenance costs and will be referred to as interpretive, minimal, mid-size, and "cadillac". The end of this report will include a recommendation for an appropriate educational maple sugaring model for Kirchner Woods in consideration with budget constraints, local interest and site composition, and future steps to take to continue work with this project.

Introduction

This past semester, our team, composed of six University of Vermont students in the Rubenstein School of Environment and Natural resources, conducted a feasibility study that looked at the potential of reintroducing maple sugaring to Kirchner Woods. Today, Kirchner woods is used primarily as a recreational area, with a small parking area and network of trails established and managed by the Stowe Land Trust. Remnants of past sugaring activities are present across the property, including old buckets, parts of an evaporator and a clearing of trees that once housed a sugar shack but was taken down and removed in 2014. Our team met with multiple community members throughout the semester including, maple sugaring specialists, sugaring operation owners and potential stakeholders. In these meetings we talked about how maple sugaring could be



reintroduced to Kirchner Woods and whether or not if it would be feasible to do so. Nearly all of these experts told us that a an educational maple sugaring site would be feasible since the makeup of the forest is largely sugar maples and sugaring has happened in the past. The models that will be discussed and possibly emulated in Kirchner Woods are taken from Rumney Memorial School, Green Mountain Audubon Center, and Shelburne Farms.

In addition to this expert advice, we needed to determine the interest of local and current users of the site. Since the site is already a popular spot for recreation, it was important to make sure current users agreed with the idea of adding in a sugaring operation. To do this we created survey that was put out by the Stowe Land Trust on their website and Facebook page, and in paper at the trailhead of Kirchner Woods. The survey and responses are included in the Appendix of this report. The responses to these surveys came back majorly positive, saying that the implementation of an educational operation would be supported as long as it was kept at a small scale and used buckets as the main method of collection.

Another crucial aspect in gaging local interest came from connecting with Stowe Elementary School, which is less than two miles away from Kirchner Woods. Because of their proximity and existing focus on outdoor education through the use of a school garden, Stowe Elementary was identified as potential users of the sugaring operation in an educational sense. We met with Richard Smiles, the principal of Stowe Elementary, to determine interest and he absolutely supported the idea. The fourth graders at the school currently focus on their local community of Stowe and Vermont, so a lesson on the process of local sugaring would fit in very well. This partnership would include hiring an outside educator that is knowledgeable in sugaring and ecology to teach and would need to determine logistics for traveling the students up the hill to Kirchner Woods. Once the size and details of the operation are determined by the Stowe Land Trust, these logistics, including travel, lesson plans and hiring should be addressed, which is part of our future recommendations.

Overview of Interviews

Steve Hagenbuch: October 16 & 30, 2015

Steve Hagenbuch is biologist for Audubon Vermont and owns a small scale sugaring operation in his backyard. We met with him first in order to learn about the process of sugaring, from how to tap a tree appropriately, to start up costs for materials like buckets, spiles and an evaporator. This first visit was completed at Kirchner Woods in order to get a good sense of what the operation could look like on the property. One of the first things he said was, “sugaring is definitely feasible here, it’s all a matter of how to go about it.” Hearing this right away really inspired us to dive right into the project and learn all we could in order to make this happen at Kirchner.

We met with Steve again later in the month to visit the educational sugaring operation at the Green Mountain Audubon Center in Huntington, VT. During this visit, we gained insight on the details of this operation, which are described in more detail below. This visit gave us more information on how to go about teaching the process of sugaring, which included taking a look at the lesson plan for the center and discussing how to staff the operation.

Paul Percy: October 16, 2015

Paul Percy owns a dairy farm in Stowe, Vermont and also owns a commercial sugaring operation of about 15,000 taps and distributes syrup to various restaurants and hotels. This meeting was a chance to learn about sugaring on a larger scale, although we knew the operation at Kirchner Woods would never grow to be this extensive. Paul was very knowledgeable about his own operation and while he did like the idea of teaching about such an important cultural and historical tradition in Vermont, he did not believe it was part of SLT's mission to spearhead. He proposed simply that students and visitors could come see how his own operation. If SLT were to consider leasing taps at the operation at Kirchner Woods, Paul would be interested in working with this operation in this capacity.

Mike Haynes: October 16, 2015

Mine Haynes is a SLT Board Member and manages a backyard operation at his home in Stowe Hollow. We met at his house to walk around his maple stand of about 250 buckets, which he uses a 2X6 Leader Evaporator to process. Mike is retired and therefore has the ability to manage and maintain his own sugar lot, for the most part on his own each season. He gave us information including the fact that it takes about 2-3 days for cleaning and set-up/tear-down at the end and beginning of each season. Because of his insight about labor, we walked away all agreeing that SLT would need to hire a seasonal worker in charge of maintaining the buckets, since it is too big responsibility for solely relying on volunteers. This being said, he stressed the importance and value of reaching out the Stowe community for support and involvement at many times during the process.

Dana Bishop: October 30, 2015

Dana Bishop is the Natural Resources and Assistant Woodlands Manager of Shelburne Farms, and does a lot of work to manage the woodlot for the educational sugaring operation at the farm. The operation at Shelburne Farms is explained in more detail below, but we learned a lot of more personal insight from Dana about the expanding operation. A major point she stressed to us was to really try to keep the sugaring at a small scale, a hard task when pressures like cost of maintenance are a factor. In order to combat this, she said that SLT should stay focused on education as the primary intention, and not switch to an interest in production because a small scale operation is not sustainable if syrup production is the main goal. In her

opinion, it's important to show both buckets and lines in an educational site, but that's something that needs approval from Kirchner's visitors before going forward with that model.

Richard Smiles: November 6, 2015

Richard Smiles is the principal of Stowe Elementary School, which is located less than 2 miles away from the trailhead of Kirchner Woods, a perfect candidate for potential visitors of the educational operation. This meeting was fairly brief because right off the bat, he said he'd be interested in having some of his students visit and learn about sugaring. As is explained earlier, the fourth graders would be a perfect fit for lessons that go along with their current curriculum focused on Vermont studies. He also touched on using the community as a large support for this project. Many parents of students are very involved and he imagined would be interested in seeing something like this happen. In the future, expanding on this partnership in terms of determining who will teach the program, how often the students would visit, what the potential cost would be and many other factors that are dependent on the model of sugaring SLT chooses to pursue.

Adam Rosen: November 13, 2015

Adam Rosen is the principal of the Rumney School in Middlesex, Vermont. The school has a focus on more experiential learning, and their sugaring operation is just one example of how the school practices this. This was perhaps one of the most helpful interviews we conducted because we got the chance to see an operation very similar to what our vision is for Kirchner Woods and Adam's opinions on the purpose of implementing the operation are too very much the same, as he is fully dedicated to it as a tool for education and community engagement. One of the biggest takeaways from this visit was his emphasis on finding unique ways to get support. The sugar lot that the school's buckets are on is owned by a neighbor, most of the work done to set up the operation is done by the VYCC, a grad student from Antioch University did work to tag and map trees, and much of their operation is funded by grant work. He was also very adamant about using volunteers from the community to help with implementation. This was inspiring and helpful to hear because budget is perhaps one of the biggest constraints for the SLT with this project, and this is a successful model where costs were decreased because of local support.

Jed Lipsky: November 13, 2015

Jed Lipsky is a SLT Board Member and lives on the same road that the Kirchner Woods trailhead is on. Jed has been a logger for many years in the Northeast and had some interesting insight on mapping out the layout of the operation. Even though there is a clearing where the old sugarhouse used to be, we walked around with him for a bit to think about another spot for the house, perhaps closer to the trailhead to make for easier access. This is something we hadn't really considered before, so it was good to be reminded that there are countless options

when going about a project like this. He also spoke about the value in reaching out to the older, retired, “active” population of folks in Stowe who he thought would be very interested not just in seeing something like this happen but actually being involved in the implementation of an educational sugaring operation.

Models

Rumney Memorial School

The Rumney School is a great example of an educational sugaring operation. The school educates students K-6 and maintains a small scale sugaring operation that all students get to take part in. The sugarbush is primarily operated by a neighbor volunteer, who owns the land, and the school’s principal, Adam Rosen. The whole operation is heavily dependent on volunteers, with much of the construction and tree tapping coming from the Vermont Youth Conservation Corps and locals. The boiling is done by a custodian from the school and the neighbor provides wood. The work is done on a small scale, they have fifty buckets and are currently installing eight lines. They have been doing this for the students since 2004, always on a small scale. For money they get grants and stipends to help bolster their operation. For an example Adam told us they got a \$500 stipend, but didn’t specify where they got it from.



The sugarbush is within walking distance from the school. On a good year they can produce approximately 8 to 10 gallons of syrup and on a bad year they will produce around 5 gallons. The school lets the students design a bottle label and sell the syrup to the community by the pint to make some profit. Education is the only real goal of this operation. All grades take part and do different jobs based on their own skill sets, which are diverse among different grades. For example the sixth graders collect sap because they are strong enough for that particular job. They keep all of their information laminated in the sugar house to keep track of production. They have a 4’x14’ Waterloo Small Evaporator and all of their equipment in the sugar house, as well. The operation is a great tool for education, letting the kids connect more

with their local culture, allowing everyone to benefit. This is a great sugaring example that we think is what the Stowe Land Trust should base their operation on if they intend to move forward with sugaring in Kirchner Woods.

Timeline:

2004: Operation began, sugar house built

2009-10: Vermont Youth Conservation Corps (VYCC) became involved

2011-12: Grad student from Antioch University tagged the trees and mapped the sugarbush

2015: VYCC adds 8 lines to existing bucket based sugaring operation

Green Mountain Audubon Center

The Audubon Center in Huntington, VT runs a small-scale sugaring operation, which holds a mission for education, historical preservation, and sustainability. We were fortunate enough to visit the site with Steve Hagenbuch, who acts as a director of the operation during the sugaring season. It was extremely helpful to get a first-hand look at a site that has been very successful in educational practices.

This site has a 10 acre tap zone with 500 taps that are all on buckets. They have 2 evaporators which are in use during the season, and they hire 2 seasonal employees. One of

the employees runs the boiling of the sap and one oversees the sap collection, which is done with a tractor and tank. The big evaporator is located in the larger sugar house and is involved with maximum production of syrup. The evaporator in this sugar house, from Leader Evaporator, is much larger than what we would be interested, but it is apparent that any evaporators are able to run for awhile, as this one was 15 years old. This sugar house was here prior to the Audubon owning the property, and it is primarily used for the 'sugar on snow'



open houses. The other evaporator is mainly used for education and it is located in a very small sugar house. This is a half-pint evaporator, which could boil sap for a maximum of 50 taps. There would only be one person needed to run this scale. This evaporator is 2'x3', but it was suggested that Kirchner may need 2'x4' if we were to expect growth of the operation over time. The whole setup for the small house and evaporator was approximately \$1,200. It is important to recognize that there would be few replacements to any materials purchased, as most of the more expensive equipment is durable.

Though this operation is a larger scale than what we would suggest for Kirchner, the Audubon's lesson plan and educational programs would be valuable for SLT to consider

replicating moving forward. This operation brings in approximately 3,000 students per year, from preschool to high school ages. About 10 students are allocated to each teacher. Preschool students partake in a 1 hour program, and all older students have a 2 hour program.



There is a small fee per student, which is allocated to expenses of the operation. The educators for sugaring are on their staff, so the SLT would need to hire educators that are experienced in the field. The lesson plan for the Audubon can be found in the Appendix.

The Audubon incorporates environmental consciousness into their operation. Their sustainable outlook is unique for sugaring, as they allow natural underbrush maintaining biodiversity within the plot. Steve developed a “Produced in Bird Friendly Habitat” certification, which further enhances their mission.

Steve proposed additional ideas that could be applicable to Kirchner, which came out of success stories of the Audubon. The production could be advertised through the website and the listserv could be a useful tool to recruit volunteers. At least one person who is local will need to monitor the site over the course of the season in order to maintain various aspects. The most important part, however, is to evaluate what SLT can invest, with both human and financial resources.

Shelburne Farms

At Shelburne farms we met with Dana Bishop who talked to us about the maple sugaring operation that was going on on their property. Their initial property had about 100 taps in place. These tap ran into some some buckets, but mostly consisted of tubes, which ran into the sugaring hut. These tubes were very small at 3/16th inch of size. We were advised that this size tube is optimal for collecting sap. Inside the sugaring hut they had a half pint Leader Evaporator, which required 20 gallons of sap in order to start processing. This smaller operation is similar in scale to the operation that could be implemented at Kirchner Woods. This operation is optimal for an education portion because students get to see how sap is collected by both buckets and lines. The small scale operation shows students how to tap trees, and how sap is collected and processed in the sugaring house



After realizing the popularity and high demand for their maple syrup, Shelburne Farms has expanded their sugaring operations to 600 taps on another portion of their property. Additionally, Shelburne Farms has begun construction on another, much larger sugar house that will produce syrup on a commercial scale. Shelburne Farms used an outside contractor, Green Mountain Main Lines, for setting up their 600 additional taps, which cost around \$10,000 for labor and materials. Although Shelburne Farms sugaring operation has proven to be profitable, Dana advised us not to think about the money. She told us to only focus on the educational piece and how often times, once money comes into the picture, people lose sight of the educational component of maple sugaring.

Proposed Options

Mode I	Description	Equipment	Staffing/Labor	Start-up Costs	Operating Costs	Replacement Costs	Pros	Cons
A	Interpretive - No sugaring	None	None	Signs/structure - \$3-5,000?	Minimal	~\$5,000 in 10 years	Easy to maintain Affordable Educational	Doesn't give interactive experience of sugaring or make use of sugaring potential
B	Minimal	Used, galvanized buckets & spiles, Half Pint Evaporator, Sugar House	Tapping, sugarmaker/instructor. Possibly volunteer?	Buckets, taps & labor \$150-\$1,000 Sugar house & evaporator ~\$12,000	Instructor & sugar maker, Seasonal ~\$500-\$1,000	~\$5,000 in 10 years	Interactive experience with minimal maintenance and operating costs	Produces minimal product, won't be operating in an interactive way for the whole sugaring season

C	Mid	Galvanized buckets, spiles, Leader Supreme, Sugar House	Tapping, sugarmaker/instructor. Possibly volunteer?	Buckets, taps, lines & labor \$800 - \$3000 Sugar house and evaporator ~\$14,000	Instructor & sugar maker, Seasonal ~\$500-1,000	~\$5,000 in 10 years	Interactive experience on a larger scale. Lines show another side of sugar making	More expensive startup costs
D	"Cadillac"	Galvanized buckets, spiles, lines, Leader Supreme, Sugar House	Tapping & full time sugarmaker, instructor (possibly same person)	Buckets, taps, lines & labor \$1,000 - \$3,500 Sugar house & evaporator ~\$15,000	Instructor & sugar maker, ~\$1,000 - \$2,000	~\$5,000 in 10 years	Full - time employee can oversee operations more carefully, and ensure an interactive operation more consistently	More expensive, more noticeable impact and physical presence in the area

Model A: Interpretive Model

The interpretive model for Kirchner woods is a theoretical framework, which would have elements of sugaring, but not actually have collection and processing of sap on the property. A few buckets could be placed around the property, with signs next to them explaining how maple sap is collected. Since the old sugaring hut was dismantled, some of the sap processing equipment is still on the property. This could be left where the old sugar house is, and signs could be put up next to them and explain how sap is processed.

Though this model does not physically show people and students how maple syrup is collected and processed, there would be examples of the different stages of maple sugaring. The buckets would show the students how the syrup is collected, and the old evaporator would show them how it is processed. The signs would stress the educational portion of sugaring and teach students about traditional maple sugaring without interfering with the aesthetics of the property for the people who use it for recreation.

This model is also the most cost efficient model. The materials cost would be relatively low because only a few trees would be tapped for the education portion. The other equipment like the evaporator is already on the property so students can get an idea of how the sap is processed. Signs would need to be constructed however, with educational components on the sugaring process. Someone would need to be hired whose job is to teach the students on sugaring - their salary would vary depending on how many days they would work. The cost for the model would be from \$3,000 to \$5,000; this would include costs for making signs, setting up sugaring equipment for education, and hiring someone to teach students on maple sugaring.

Model B: Minimal

The minimal model would be the most cost effective way of actually producing syrup on the property. In this model there would be between 25 to 50 taps, which run into used,

galvanized buckets. The costs for the buckets, taps, and labor would be between \$150-1,000, based on whether or not used buckets can be acquired. The sugar house and evaporator would cost around \$12,000. The evaporator would be the Half-Pint size from Leader Evaporator, which costs \$1,200.

Someone would need to be hired to work the sugarbush and evaporator during the sugar season. This doesn't need to be very intense because there will not be very many taps. The entire goal of this model is solely education. Because there will not be very many taps, not much syrup will be produced. What is produced can be sold by the school similarly to how Rumney School operates. This can make a little money but in the long run revenue would be pretty insignificant. It is suggested that to be as frugal as possible, volunteers from the community should be heavily involved. There appears to be substantial interest from locals, so hopefully this wouldn't be very difficult to attain. There would be no lines in this model, only buckets.

Model C: Midsize

The mid-sized model shows a good mix of small scale and larger scale sugaring operations. There would be 50-100 taps, based on what type of evaporator gets purchased. In this slightly larger model, it would be smarter to get a larger evaporator, which would be the 2'-4' for Leader Evaporator. The cost to upgrade here would be \$2,895, which is \$1,695 more than the half-pint in the previous model. However this gives the ability to expand over time and add more taps if the operation proves to be fruitful. The sugar house would cost somewhere around \$11,000. Buckets are a range from ~\$5 for used, to \$26.50 for new, and spouts are \$3. Therefore the range would be from about \$800 to \$3,000, depending on what equipment is purchased. This model then has a more substantial startup cost.

Another important factor added into this model is lines. There would be 5-10 lines, which costs about \$5 a tap if set up by Green Mountain Mainlines. The taps would all run on gravity, coming from trees uphill from the sugar house. The point of the lines is to show an example of how modern sugaring is done today in the state. Although buckets are the ideal image, lines are the reality in Vermont today and it would be good to be able to show that.

Besides start up costs and the scale of operation, this model is similar to the minimal in usage. Someone would need to be hired, or find an incredibly dedicated volunteer, to run the operation full-time in the sugaring season. They would need to constantly be there to maintain production and also educate. The main goal would still be education, but now more syrup would be produced, which can then be sold similarly to how Rumney School does it. This would be more syrup produced, so more money can be made back in the future to help fund this project.

Model D: "Cadillac"

The “Cadillac” model is the largest and what could be done if money wasn’t an issue. This would have more buckets and lines overall. Used buckets would cost \$5 and new is \$26.50. Therefore the range of price is \$1,000-\$3,500. The evaporator size would increase to the 2’-6’ model from Leader Evaporator, which can handle 60-125 taps. However more trees could be tapped for lines, which would cost \$5 per tap from Green Mountain Mainlines, and the sap could be leased out to a larger producer of syrup. The lines would use gravity and run down to a collector at the bottom of the hill near the parking lot where it could be taken by someone else. The charge would be \$0.67 per tap, which could help with other expenses. The leasing agreement would be for three years according to the UVM Leasing Agreement that is used by sugarers.

This model would be most intrusive for recreation because the amount of lines would be easily visible. However this model has the best ability to make more money back in the long run, and can still be used similarly for educational purposes and the size would do nothing to hinder that.

Our Recommendation:

If Stowe Land Trust were to reintroduce maple sugaring back to Kirchner Woods, we recommend that they use the mid-sized model. We chose this size of operation as it is the most similar to that of Rumney School, which focuses mostly on education, while still producing some maple syrup to sell or give away to volunteers. In this model there is an absence of lines from the initial start up operations. This is important, as our survey results have informed us that the majority of people would not like to see lines running through Kirchner Woods. However, we do still believe that having lines is an important part of the educational process. Only using buckets for collecting sap is very ‘old school’ and inefficient when compared to using lines. We recommend that in the future, after the initial implementation phase, SLT implement 5-10 lines off the highly used recreational paths.

Future Recommendations

If our suggested maple sugaring proposal proves to be successful, we have a list of recommendations for the future:

- Partnering with future NR 206 classes for continued implementation and research on the sugaring operation.
- If all four models prove unsuccessful, possibly place buckets on trees without taps as means of achieving the aesthetics cultural appeal of Vermont maple sugaring.

- Consider networking with the UVM Environmental program to find seasonal interns who could teach sugaring to the Stowe Elementary students as well as maintain the taps.
- Continue to survey the Stowe community to see what value they have gotten from the sugaring operations in Kirchner woods.
- If sugaring operation proves to be successful, work with the Stowe Elementary School to figure out logistics for visits



Appendix

- Visitor suggestion for setting up interpretive info about sugaring at Kirchner Woods
- Green Mountain Audubon Center maple sugaring lesson plan
- Survey questions & responses