Woodland Owners Association, Inc. 11 University Way, Suite 4, Brattleboro, VT 05301
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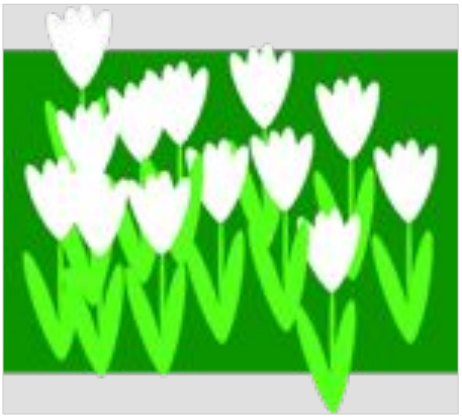
WOODLOT TIPS



SPRING 2011

Programs

(Save these dates!)

Thursday June 23, at 4:15 p.m. — Tour of Putney Furniture Maker Richard Bissell's Shop

The Woodland Owner's Association will sponsor a tour of Richard Bissell's furniture making shop in Putney. He is a craftsman and artist in the design and manufacture of Shaker, Mission and custom furniture, as well as Windsor chairs. Richard has been designing and building handmade furniture one piece at a time since 1982. He also does a considerable amount of custom furniture and built-ins from minor customization of standard pieces to designing and building completely new designs.

We will meet in the parking lot behind the Putney Town Offices at 127 Main Street in Putney Village. From there we'll carpool at 4:30, since there is limited parking at Richard's shop. The tour will last about an hour.

For more information, please contact Windham County Forester Bill Guenther at 257-7967, Ext. 305.

Saturday, June 25, from 10 a.m. to 2 p.m. — Black Mountain Hike: a Visit to the Flowering of the Mountain Laurel. WOA will be teaming up with The Nature Conservancy (TNC) to co-sponsor a hike into the Black Mountain Natural Area.

One of the many unique features of Black Mountain is the mountain laurel, normally found to the south of us. At the time of our hike, it typically is in full flower with showy white and pink blossoms. The Natural Area also supports stands of pitch pine and scrub oak, a rarity in Vermont. The hike will be led by Jon Binhammer, TNC's Director of Land Protection, along with Windham County Forester Bill Guenther.

We'll also get to observe some trail improvements to the steep slopes that were done with a Vermont Youth Conservations Corps (VYCC) crew last summer. The hike will be a strenuous and somewhat steep trip up from the West River to the West Summit. If time permits, we will also hike over to the East Summit, where the old cabin once stood. Both summits offer good views. If we only go to the first summit, the round trip distance is three miles, and going to the East Summit adds another two miles, for a round trip total of five miles. Participants will need to wear good hiking boots, bring bug dope, plenty of water, and a lunch. The hike will be held rain or shine.

There is limited parking at the trailhead, so we will meet at the Dummerston Covered Bridge on Route 30 and carpool from there. The trailhead is just two miles from the covered bridge. ***We will leave the covered bridge at 10 a.m. SHARP***. For more information or any questions, please contact Bill Guenther, Windham County Forester at 257-7967, Extension 305.

Saturday, September 24 — SAVE THE DATE! WOA Annual Meeting — (Details in Summer newsletter.)

President's Column

By George Weir

Potatoes, Sugaring, TSI and Scholarships

May first the snow was finally gone from my garden and the soil was dry, so I started in. Now I don't go at this entirely in a haphazard way, but unlike friends who make diagrams and research heirloom varieties, the day I start planning the garden is the day I start planting. I work around the perennials and develop ideas of what goes where as I go along. It seems to work out without a lot of forethought.

The first thing planted is always potatoes. I want them in early to stay ahead of Colorado beetles. I never entirely succeed with that, and some years I spend hours squashing, squeezing, spraying (plant oil, we're "beyond organic") to keep them under control. In addition to those efforts, getting potatoes in the ground requires a lot of digging, a lot of garden space, and even more digging to hill them up a time or two over the summer.

Some of my gardener friends don't grow potatoes because of all the work and because they cost so little to buy. People often talk about their beautiful tomatoes, bountiful berries and so forth. I've never heard anyone talk about potatoes that way. Not many of my potatoes would win prizes at the Guilford fair. But I grow them anyway.

About the time my potato year kicks off, my sugar-making friends are wrapping it up, cleaning buckets, lines and pans and distributing syrup. I loved reading Sam Schneski's description of his sugaring obsession in the winter newsletter and the long hours he works to make syrup for family and friends. I expect if a Harvard economist analyzed Sam's sugaring efforts and my gardening, he or she might advise us to find other pursuits.

Many of us spend time in our woods, pre-commercially thinning young stands, felling or girdling inferior trees to release those that will make good timber a generation or two from now. I've come across, but not done more than briefly peruse, research that describes these thinnings as poor investments in time or money, given the decades required for the trees to come to maturity, the uncertainty of future values, the risks of pathogens, and so forth. If the Harvard economist considered not only those concerns, but also discovered that our land or your land may be owned by people totally unfamiliar to us or our descendants when the trees reach maturity, he or she might conclude we had totally lost touch with economic reality. But like many of you, I've released hundreds of these young "croptrees" on our land

without pondering their future or the intelligence of my actions. And I'll continue to identify good trees and give them more space to grow.

I think most of us undertake these efforts without justifying them in terms of material outcome. We trust they are the right things to do. The rewards are the enjoyment of the effort and the carrying on of traditions, and in the case of forestry efforts, believing they make the land better for those that come after us.

WOA is in its 60th year of carrying on a variety of important forestry traditions that have made a difference on the land. To me nothing is more important than promoting good forestry through education. When people ask me what WOA does, the first thing I mention is our scholarship program. It is one of our efforts that really stands out and sets us apart from other woodland organizations. Anyone that has had kids in college lately knows that college costs have risen dramatically in recent years.

Our scholarship funding hasn't kept pace. Each year we have an opportunity to contribute to WOA, beyond our annual dues, and I hope members will consider this year donating to our Memorial Scholarship fund.

Recent WOA Programs

Our hope is that members now can get the flavor of our programs, see what they missed, and turn out for future walks and talks. WOA programs are designed to add to the pleasure and knowledge of owning or frequenting woodlands. Thanks to Margaret MacDonald, a WOA trustee, for taking notes.

Cersosimo Lumber Company Chip Mill Tour

On March 16, 2011, WOA members had an opportunity to tour the Cersosimo Lumber Company's new chip mill in Vernon and to witness the entire process of converting pulp-quality logs into high-quality wood chips. Company representatives, led by Dominic (Butch) Cersosimo, chairman of the board of the Cersosimo Lumber Company, and his son Michael, the company's president, supplied us with refreshments and then explained the history, purpose, and functioning of the chip mill.

Cersosimo broke ground for the mill on June 1, 2010; the facility became operational in October 2010. Much of the equipment was purchased from Nicholson in British Columbia; some was bought second-hand from other sources. Before purchasing the equipment, Cersosimo staff looked at the chipping assembly in action in other mills, and then assembled the components themselves.

After we explored the facility and asked an initial round of questions, we put on the hard hats and day-glo colored earplugs provided by our hosts, we were ready to see the mill in action. The Cersosimo team switched on the diesel engine and the conveyor belt began to move.

Ashley Clark, one of two Cersosimo employees on site, can run the whole mill from his stationary log loader; a video screen inside the vehicle allows him to watch the inside of the facility and stop the machinery if problems occur. The pulpwood log starts its journey when Ashley loads the logs onto the conveyor belt. A Nicholson ring debarker, consisting of two fearsome-looking drums, strips the log of its bark, which falls onto a conveyor and is deposited onto a pile outside the facility. The bare log moves down a straight conveyor chain into the chipper itself, where four knives reduce it into chips in a matter of seconds. The chips are then propelled over a two-level screen that sifts them by size, directing the correctly sized chips onto piles: one for the paper companies and pellet plants, the "overs" (too large for paper mills) onto another, and the "fines" (in essence, sawdust) onto a third.

While the chips are under cover when they come off the conveyor and fall into storage bins, they eventually are moved outside into separate piles: hardwood chips, softwood chips, overs, and fines and bark. Rain does not damage the chips, but snow is a slight problem because of freezing; Cersosimo plans to build an additional storage bin.

Cersosimo expects that the mill will process some 50,000 tons of logs every year, although it could handle a larger amount. The mill can handle logs that are up to 24 feet long (straight) and range from 4 to 21 inches in diameter. Oversized logs exceeding 21 inches in diameter are cut into 8-foot lengths before being loaded into the chipper and are hauled to the pulp mill as roundwood pulp. The greatest concern is that logs might contain embedded metal, such as

nails or horseshoes, but so far, fortunately, Cersosimo has not had to deal with these problems.

Paper companies — many of which like to produce their own chips but have found that they cannot meet their own demand — are the mill's primary customers. Laboratory tests run by customers showed that Cersosimo's chips are of top quality — clean, properly sized, and with low bark content. Cersosimo sells the overs, substandard chips, and fines mixed with the bark to be ground by the customer for landscape mulch; white birch, which is difficult to debark cleanly, goes directly onto the fuel pile. The bark is sold to landscapers as mulch or can also become fuel for the boiler. Some hardwood and pine chips are also sold to pellet manufacturers.

The new mill benefits Windham County landowners, foresters, and loggers, since it provides a market for scrubby pine and hemlock as well as low-grade hardwoods. However, even pulpwood must meet some standards. As Butch noted, Cersosimo doesn't want "trees like corkscrews" as they will not debark cleanly and are difficult to process through the mill. According to WOA Trustee John Caveney, head forester on Cersosimo's Woodlands Team, many of the landowners whose trees feed the mill participate in the Current Use program; this may be one reason why Cersosimo is seeing a higher quality of wood over all than it did 20 or even 10 years ago.

The mill's supplier group is growing, as is its list of local customers – primarily in Windham and Cheshire (N.H.) Counties, and in Franklin County, Mass. For example, Brattleboro Union High School uses the chips to power its heating systems. Given their relatively low value, it is not economically sensible to transport chips for long distances. Even so, Cersosimo has received inquiries about possibly shipping chips to Virginia to make up for the wood shortfall that resulted from last year's devastating snowstorms. Markets that distant would be serviced by rail, which is available at the facility in Vernon.

WOA members thank Butch and Michael Cersosimo, Ashley Clark, John Caveney, John Randall, Bob Maclean, and Ellen Merrill for dedicating the afternoon to us, guiding us around the facility, and answering our innumerable questions.

Wild Apple Tree Release & Pruning in Andover

Contributed by James Stack, Andover, Vermont, and Member, Vermont Coverts Council

On a cloudy, cold day near the end of winter, 17 pairs of snowshoes ventured into the forest to learn the how and why of releasing and pruning wild apple trees. As part of our WHIP contract, my partner, Ron Theissen, and I hosted a workshop sponsored by Vermont Coverts: Woodlands for Wildlife, Inc. (a non-profit organization dedicated to educating landowners about sound forest management and wildlife stewardship).

On March 19, Sam Schneski, Windham and Windsor County Forester, was joined by Aaron Hurst, Vermont Forest, Parks and Recreation State Lands Forester, MaryBeth Adler, Vermont Fish and Wildlife Habitat Technician, and 14 eager landowners for a hands-on workshop. The timing of the workshop was important: We wanted to make sure we could prune before the apple trees began to flower in order not to "shock" the tree. Other topics covered included tree and area selection, release techniques and guidelines, basic pruning techniques, and maintenance for the long term.

Wild apple trees are an important food resource for wildlife and grow best in full sunlight. They normally become established in clearings or on the edges of fields, but as the forest matures around them they become shaded and lose their vigor. Apple trees can also "crowd" themselves as internal branches compete for space. Both of these scenarios limit fruiting. By following a few simple steps we can improve the growing conditions for the trees, increase flowering and fruiting, and potentially provide food and cover for a variety of game and nongame wildlife species.

Before we walked into the woods, Sam and Aaron made sure they were wearing protective clothing for the work they would be demonstrating. Once all the necessary tools were organized (chainsaws, chaps, helmets, pole pruners, hand saws, loppers and hand pruners) we headed into a part of the forest where we had identified a group of 10 wild apple trees. In the late fall we had released five of these trees, which Sam and Aaron would critique, in addition to using

these trees for pruning. There was another group of trees, and one tree off by itself.

The one by itself was a perfect example of a still healthy tree, yet surrounded on all sides by different aged trees, each of which was discussed in turn. It was decided that the south side of the tree was the area on which to focus, since that allowed the greatest exposure to sunlight. The younger trees could easily be cleared with a small saw, but the larger trees were going to require the use of a chainsaw. While this was not a Game of Logging course, the basics were covered and demonstrated on three of these larger trees. It is highly recommended that if you have not taken the Game of Logging, you do so before venturing into the forest to cut trees with a chainsaw. Even if you have experience with a chainsaw, you will be pleasantly surprised with the techniques you can learn.

After clearing several of the larger trees, the area was again examined. Had enough been cleared? This raised the question: What is enough? A wild apple tree can also be shocked by sudden exposure to too much sunlight. Since this apple tree had had limited exposure in prior years, it was decided that removing only those trees immediately to the south of it would be sufficient for this year. Looking ahead, several competing (non-apple) trees were "girdled," (a process of removing the life-giving inner bark and cambium from a continuous strip around a tree). An axe was used on a smaller tree to remove wood in order to interrupt the flow of sap, and a chainsaw was used on a larger pine by first cutting a ring and then enlarging the area so the ring would not heal and allow the tree to thrive. In a year or two, the girdled trees would no longer produce leaves; more nourishing sunlight would reach the wild apple tree. A consideration in tree girdling is the direction it might fall, as we would not want it to fall on the apple tree or on any potential path or trail that could place people in danger.

The clouds began breaking up, allowing blue sky and warming sunshine to come through, similar to what we could now expect for the apple tree. Once the basics of releasing had been covered, we discussed pruning, prior to actually making any cuts. The first question concerned the best time to prune: Either late winter after the threat of severe cold or in the fall after all the leaves have fallen. We then looked specifically at the apple tree and discussed how to initiate the pruning. These wild apple trees were good examples of what is typically found deep in the forest: obviously scraggly and struggling to survive, with twisted stems, rotten wood, sapsucker damage, and several long branches reaching high to find an opening in the canopy for the sunlight we had now helped provide.

Where to start? We began by identifying dead branches for removal so we could have a better idea of what the live apple tree looked like. All of our trees looked like they could have a substantial portion pruned, but we were told that a rule of thumb is never to cut more than one-third of the live tree in order not to shock or kill it. The goal is to bring the tree back to a healthy apple producing state, with as close to a healthy canopy as possible, while allowing light to filter through to the fruit and lower limbs.

We then looked at each of the apple trees to see if any had major limbs to be removed, and several were identified. One tree had a large limb that would surely break during next winter's snow, now that it had been exposed, so a pruning saw was used to cut it off close to the branch collar (the interface between the branch and the main stem) for quicker and healthier healing. Another tree had two large competing leaders which came off of one another in a sharp "V," which could split from ice, so they were both removed, using an extending pole saw. Once any major limbs had been removed, we evaluated how much more could be pruned before we reached the one-third limit, keeping in mind that very few of the apple trees would actually have that much cut during the first year. It is better to under-cut than to over-cut.

We next took hand pruners and removed the smaller suckers growing straight up from the bottom of the tree and along the tops of lateral limbs. Again we assessed the amount pruned, one tree having been pruned enough for the first year. It was now time to examine the buds to identify which were potential fruit bearing buds or flower buds (there are leaf buds, which produce leaves, flower buds, which produce a flower or cluster of flowers, and mixed buds, which can produce both leaves and flowers). The more we pruned, the more likely we were to be removing the fruit source, so we became selective, using pruners to remove the thicker stems.

Under a bluebird sky and sunshine, many of the participants began working on different trees as Sam, Aaron and MaryBeth fielded specific questions. The answers would be helpful to these landowners when they returned to their own land to help bring their wild apple trees back to healthier fruit production for wildlife. And although Ron and I were the hosts, we were also participants who learned a great deal, and we are excited about the prospect of attracting more wildlife to our woods.

A Study in Contrasts: SugarhouseTour

This year's sugarhouse tour gave WOA members the opportunity to observe two sharply contrasting approaches to producing maple syrup — and (luckily) to sample the results. On April 9 we toured two Whitingham sugaring operations: first the Corse Farm, with its state-of-the-art collection, evaporation, and filtering processes, and then Maple Hill Farm, which gathers sap only in buckets and uses a team of Percheron horses to draw a sledge with the collecting tank. The tour was cosponsored by the Vermont Woodland Association as part of its "Walk in the Woods" series.

Corse Farm

The combination maple and dairy farm currently is operated by fifth and sixth generations of the Corse family. Leon Corse runs the organic dairy operation, and his brother Roy's passion is sugaring. As he says, "It's what I do." Sugaring is a family tradition dating back to 1868, and a wall chart in the large sugarhouse displays the farm's sugaring records from 1918 — when the family produced 138 gallons of syrup.

By contrast (and it's quite a contrast!) this year Corse Farm collected sap from 10,702 taps on nine separate lots, and reached a goal Roy had set many years ago, but never expected to meet: more than 4,000 gallons of syrup, a production record likely to stand for a long time. The sugarmaking team — Corse family members, plus three full-time and several part-time workers — celebrated with champagne and pizza.

This year Corse Farm began sugaring on Valentine's Day and expected to stop the day after our tour, when temperatures in the 70s were predicted. Roy designed the four-part, wood-fired evaporator, which was constructed in Vermont by the Leader Evaporator Company, but he designed and built the external piping himself. The design allows the sugaring operation to separate one pan from the other three, run two pairs of two pans, or run all four together. This flexibility makes it possible to make different grades of syrup simultaneously, producing fancy syrup from bucket sap and the amber grades from sap collected with plastic tubing, in a ratio of about 1:3.
Roy provided a detailed description of the steps that the Corse Farm follows to produce syrup. Normally, roughly 42 gallons of water must be evaporated to make one gallon of syrup. At Corse Farm, the sap first goes through a reverse osmosis process, with high-pressure pumps forcing the sap through a membrane (like the ones used in saltwater desalinization). This greatly increases the sucrose content of the sap, and reduces the amount of water to be boiled off by around half. The farm collects the water and uses it to rinse the machinery. The reverse osmosis procedure also reduces the amount of wood (or other fuel) required for boiling. The farm estimates that it burns through a cord of wood to produce 100 gallons of syrup. The evaporator produces an average of 50–60 gallons of syrup per hour.

Checkpoints throughout the syrup-making process ensure the syrup's flavor and purity. Automatic drawoffs from the evaporator are used to measure the syrup's sucrose content and density. The sap is filtered before entering the evaporator, and again after boiling. Roy explained that the syrup goes through two pressure filters to remove mineral content and ensure purity before being packaged for sale. Diatomaceous earth (DE) is added to the syrup; as the pump forces the syrup through the filtering papers, the DE adheres to the paper and creates a fine-grained filter to clean the syrup.

Corse Farm syrup is sold in the farm's signature jugs. Roy bought the molds from a company that folded, and his wife Vanessa created the sugarhouse drawings on the jugs, each of which also has a hang tag describing the grade of syrup and how the farm produced it. Corse Farm sells its syrup through regional wholesale accounts, farm sales, and mail order, as well as at the sugarhouse itself (several tour participants immediately bought syrup). Any syrup that that does not meet the farm's normal quality standard is sold to Bascom Maple Farms for use in bulk syrup and other maple products.

Maple Hill Farm

A short drive away, still in Whitingham, is Maple Hill Farm, a small, diversified farm run by Steve and Terry Morse, their son Jason, and Jason's wife Cathy. In addition to its sugarbush, the 375-acre farm also has a dairy herd, and sells hay and firewood. Jason is in charge of the sugaring operation, but all family members pitch in to help when needed. We walked through a field still lightly covered with snow to reach the sugarhouse, where the Morse family was hard at work using its wood-fired evaporator to make the farm's signature delicate-flavored, fancy grade maple syrup.

The family has made syrup in the same old-fashioned way since Steve's father bought Maple Hill in 1950. The farm briefly tried gathering sap with vacuum-pressured tubing, but gave it up and returned to manual methods because the Morses were dissatisfied with the taste of the resulting syrup. Instead, the family decided to focus on making only fancy syrup — and only sap collected in buckets yielded the high-quality syrup they insisted on. Currently, between 90 and 95 percent of the syrup that the farm produces is fancy grade.

This year sugaring began on March 19; before that, there was too much snow on the ground. To prevent the bucket spouts drying out, the Morses only put the buckets out right before they begin sugaring. Then, every morning during the sugaring season, Steve, Jason, and other family members strap on their snowshoes, harness a team of black Percheron mares to a sledge, load a collecting tank on the sledge, and head out into the sugarbush. They estimate that they get close to a quart of sap from each of their 765 taps; the yield varies depending on the day's barometric pressure, which affects the sap flow. The horses, we learned, know the route so well that at a voice command they stop at exactly the right places for their human companions to empty the contents of the buckets into wooden Tomahawk tanks. These tanks, made around 1900, are among a very small number of such tanks still in use. As the Morses say, "The tanks are only important if you're a fanatic — so I guess we're fanatics." At the end of their daily round, the horses pull the sledge back to the sugarhouse, the contents of the tank are piped into the evaporator, and the Morses immediately begin boiling the sap down into syrup. This process keeps the

sap cold and pure, minimizing the possibility of contamination by bacteria.

Every day during sugaring season the Morses complete all steps of syrup production, from collecting the sap through filling jugs with the hot syrup. They then clean their equipment and are ready to begin again the next morning. This careful, custom process produces the fine, delicate tasting syrup they want. Like Corse Farm, Maple Hill Farm displays its statistics on a wall board; by the time of our visit (on what the family believed would be the last day of their sugaring season) the farm had made about 270 gallons for the year. The farm sells all of its syrup by word of mouth, with no marketing effort, and the syrup is always sold out shortly after the sugaring season ends.

Terry Morse generously provided food for the tour attendees, demonstrating yet another use for the evaporator's firebox: she grilled the hot dogs below the merrily boiling sap. After lunch, Terry also treated us to a sample of freshly made maple syrup, giving us first-hand proof of the high quality of Maple Hill Farm's fancy syrup.

As we were leaving, we watched members of the Morse family leading the big horses around the woodlot to gather for the day's boiling. Good exercise for the one mare that was due to foal in a few weeks! The Morses were all looking forward to the new arrival; as Steve said, "I'm a horse person." The Percheron-Morgan foals are trained and sold at the farm — another sideline for this diversified family business.

Despite profound differences in approach, the two operations have a key common denominator: the families' obvious love of sugaring. That love, as the tour participants can confirm, translates into superb maple syrup.

Super Sugar Maples — What and where are they?

Both the Corse Farm and Maple Hill Farm have received 25 "super maple trees," developed by Cornell University researchers and RPM EcoSystems. County Foresters Bill Guenther and Sam Schneski both have two of the saplings as well. These trees were cross-bred (NOT genetically engineered) from 53 ancestor trees identified as having especially sweet sap. The U.S. Forest Service worked with county foresters throughout the northeast to test 21,000 sugar maples to come up with the 53 sweet trees.

Since trees under 10–12 inches in diameter should not be tapped, sugarmakers must ordinarily wait some 40–50 years before a young tree becomes sufficiently mature to be used for sugaring. But thanks to an RPM (an acronym for "root production method") process that fosters extensive root systems, these super trees could grow as much as three feet a year. Sugarmakers might therefore be able to tap them after only 15 years without harming the trees, potentially a great boon to the sugarmaking industry.

Unfortunately for those interested in acquiring their own trees, RPM is currently in bankruptcy and has liquidated all its nursery stock, including the super sugar maples. Over time the firm hopes to re-build a downsized business and continue the sugar maple work.

Sam Schneski made sure the Windham County trees were picked up in time. The trees ranged from 8 to 30 inches in size, with the average being 12 inches tall, ¼-inch caliper. By Fall, when the trees were supposed to be arriving, they would have been more mature — 2 to 4 feet tall and ⅜- to ½-inch caliper.

Steve Morse and Roy Corse will be keeping the trees potted and watered until Fall, when the trees need less water and there is more time for planting. Sam is hoping to make this an ongoing research/monitoring project and to work with Steve and Roy to track the trees' growth and sweetness over the next 20 years.

Woodland Secret No. 2: Nitrogen Uptake

By Arthur H. Westing, Former WOA Trustee

An adequate supply of nitrogen is necessary for the survival and well-being not only of our trees, but, indeed, for all the other plants and animals on earth. Among other important roles, nitrogen constitutes an integral part of the chemical structure of all amino acids, proteins (including enzymes), and the nucleic acids DNA and RNA. Now it so happens that all of us terrestrial creatures live within a vast sea of nitrogen inasmuch as almost four-fifths of the atmosphere consists of the gaseous form (N_2) of that element. But such gaseous nitrogen is inert and unreactive and thus unavailable for the trees (or us) to use. Rather, it must first be converted to some soluble form acceptable to them (and the other living things), a process that has since the 1800s been referred to as "fixing" the nitrogen.

Modest amounts of usable fixed nitrogen reach the forest floor, having originally been emitted by volcanoes or industrial plants, or else after atmospheric nitrogen has been zapped by lightning — such fallout occurring at an annual rate of perhaps six pounds per acre. Then there exist a few types of free-living soil bacteria (species of *Azotobacter* and *Clostridium*)

able to fix roughly again as much from the atmospheric nitrogen. But the truly noteworthy action is represented by two kinds of mutually beneficial partnerships between certain species of plants and particular species of bacteria, a form of symbiosis [sym– = together; –biosis = life] of great benefit not only to the two symbiotic partners, but also to the site in which they live.

The more widespread of these two partnerships is between a legume (of which there exist about 13,000 species worldwide, both woody and herbaceous) and species of the bacterium *Rhizobium*. The *Rhizobium* has found a snug and safe home inside of the root cells of its leguminous host, and in return fixes lots and lots of atmospheric nitrogen. By way of example, a field of alfalfa (*Medicago sativa*), clover (*Trifolium* spp), or soybean (*Glycine max*) annually produces perhaps 300 pounds per acre, much of it leaking out into the soil for any non-leguminous neighbors to utilize. Our own local leguminous trees are limited to black locust (*Robinia pseudoacacia*) and honeylocust (*Gleditsea triacanthos*). The much less common symbiotic partnership of this sort to which I referred has become established in only about 200 plant species worldwide, locally including alder (*Alnus* spp), sweet-fern (*Comptonia peregrina*), and sweet gale (*Myrica gale*). The roots of all those woody plants play host to species of the nitrogen-fixing bacterium *Frankia*.

I close with three bits of unfavorable news: (1) To date, all attempts to teach non-legumes to accept *Rhizobium* into their roots have failed. (2) The currently rising levels of atmospheric carbon dioxide (CO_2) are not only leading to a warmer and more unsettled climate, but have recently been found to also be detrimental to nitrogen fixation in the soil. And (3) The fertilizers heavily used in modern agriculture result in runoff into adjacent waterways and on to the ocean that is sufficiently loaded with fixed nitrogen to cause human health problems, toxic bacterial blooms in lakes, and dead zones at sea.

Hoof and Horn vs. Buckthorn

By Sam Rowley
The Youth Agricultural Project, UVM Extension 4-H

I live on seven acres in West Brattleboro. I have moved around, but currently find myself living in the first house I came to after birth. Over the years, I have seen the landscape change from open forest and meadows to one more cluttered and less diverse. The view from the porch to the meadow is now filled with undesired plants known as *Invasive Species*. Glossy Buckthorn, Multiflora Rose, Bittersweet, Honeysuckle and Barberry have taken root and are quickly out-competing the native plants. Walking the land, I encountered Bittersweet climbing up Buckthorn, with Barberry and Rose mixed in creating a nearly impassable wall.

Until recently, my water has been sourced from a shallow well, which sits at a low point on the property. The highly invasive populations exist above the well in its watershed. Because of this, I have been resistant to using chemicals, but I wanted to act to control the encroaching plants. What to do?

Discussing my concerns last summer with a friend who has a small herd of goats, I had an idea. Why not have goats eat my invasive plants? I did some research and found several articles about some municipalities, institutions and community groups with the same idea. For example, an Audubon sanctuary uses goats to graze conservation land and reclaim old pastures. I also found a goat rental business out of Wisconsin specifically geared to grazing invasive plants. You have to pay a little extra for a shepherd.

My mind was set, and I started getting excited. My friend had recently born does that needed to be separated from any male goats for the first year. I could have these goats on loan. The agreement was win-win for both of us.

I built a small shelter and laid out a grazing area with electric fencing. My idea was to give them a small, defined plot in which to forage, and then expand the area as the food source was consumed. The pen lay empty for a week. Then, one Saturday evening, under the cover of darkness, two goats arrived at the property.

My friend and I introduced the goats into the area and I closed them in the shelter for the night.

Sunday was rainy and filled with sounds of confused and hungry cries. My two young wards were experiencing their first day away from their mother and her milk. They were also testing the fence and my patience. My plan was to feed them mostly from the land. However, that first day, they ate quite a bit of grain.

Keeping goats can prove to be a formidable challenge. Despite my electric fence, they managed to escape and, more than once, I came home to be greeted by goats on the porch. By using various methods including drags (a heavy block of wood on a rope attached to their collars) and a lot of fence maintenance, I finally secured the goats. They soon got into a routine of browsing in the woods.

I learned that when the forage food became scarce, the goats started to seek ways to escape. These goats loved buckthorn — not as much as grain, but enough to get them running to a pulled over tree. They very much liked grazing on Multiflora Rose and Bittersweet, but did not seem to care for Honeysuckle. Because of its small leaves, Barberry may be more effort than sustenance for their time, but they ate it. I watched them make a growth of Goldenrod disappear almost overnight. The non-native plants kept them occupied for more than three months.

At the Invasive Plant Workshop at Scott Farm last August, I learned that where Barberry successfully invades, tick populations increase. I can't say the goats helped the tick situation. Ticks have been present and plentiful for many years on this property, but these goats were tick factories! I don't know if they had an abundance of ticks because of the Barberry, my regular local tick population, or simply because they were goats. At any rate, my goats attracted and harbored a large number of ticks.

With the goats on loan, the agreed-upon end of term coincided with complete leaf drop. As of early November, the goats were still eating off of the land. Many invasive plants hold their leaves later in the season than do native plants. This keeps the grazers at work well into the fall, and stresses the invasive plants as the weather starts to turn.

Talking with Windham County Forester Bill Gunther, we estimated a three-year plan is probably best to really have an impact on the unwanted plants. The best times to combat these problem plants are in the fall and winter. During the spring, the plants pull resources from vast stores of energy in the roots. They are ready and equipped to leaf out, even after a defoliation event like a late frost. In the fall, they have stored up energy collected all summer. If the goats start stressing them early enough in the spring or summer, the plants will be weakened enough to be severely injured or die.

Since goat grazing is not an official control method for invasive plants, I categorize this method as defoliation. Usually the defoliant category includes toxic chemical sprays, applied with an expensive backpack sprayer. And, you may need a license to handle chemical sprays. Goats are not too expensive, especially borrowed ones. They lack toxic qualities, and do not require licensing. They do perform the same action as the chemicals — they remove leaves.

Some drawbacks to goat grazing include the daily care needed for keeping a living animal, occasional noise, and indiscriminate browsing. Otherwise, care is pretty minimal. If forage food is plentiful, then water is the major chore. Goats do some serious bleating when they are first removed from their mother, but the noise subsides after a day or two. Once they change loyalties to the caretaker, they can be quite vocal and boisterous in their greetings.

Native or invasive plants — the goat doesn't care unless it tastes bad. This may be a problem if you have plants you want to protect. Some plants are said to be harmful to goats if eaten. In my experience, they have iron stomachs. Wilted Cherry leaves and Rhododendrons are examples of potentially harmful plants to goats.

I am satisfied with the clearing these goats did. Over three months, they made a clearly visible impact on an estimated two acres. They could have eaten more if I had started earlier in the season and incrementally increased their grazing area. I spent minimal funds to set up the living area and provide a little time to care for them. Goats are a low-investment, beneficial way to get land cleared, while ridding your land of invasive plants. If you need plants removed and like generally friendly animals around, goats are for you.

Library Corner

Robert M. Thorson, *Stone by Stone — The Magnificent History in New England Stone Walls*, New York: Walker & Company, 2001.

To Robert Thorson, a professor of geology and geophysics at the University of Connecticut, the stone walls that crisscross our New England landscape are endlessly fascinating symbols of the region's unique history. His book *Stone by Stone* combines insight from geology, archeology, and history, as it traces the natural history of these walls, beginning with the geological forces that shaped the stones and brought them to the surface.

The author then describes how the walls were constructed, noting that the majority were simply repositories for stones that otherwise would damage farmers' plows. As agriculture declined, landowners stopped maintaining the walls, and over the years, natural forces such as frost heaves contributed to the (literally) dilapidated state of most stone walls today.

Ironically, after more than a century of neglect, the walls have become objects of interest to a new generation, but that interest is a dangerous one. Developers and homeowners often raid old stone walls to create design features for new houses, destroying not only the walls themselves, but also the ecosystems that grew up around them. Thus more and more of the walls are dwindling or disappearing — and with them, important artifacts of our New England heritage.

This book can awaken our respect for the stone walls that many of us take for granted or view as unsightly nuisances. As the author says, "The stone walls of New England stand guard against a future that seems to be coming too quickly. They urge us to slow down and to recall the past."

A Trip to Town

By Steve Morse of Maple Hill Farm

I guess I was born about 50 years too late.
Around 1900 would have been a pretty good date.
It's the 1930s, and I'm headed for town
Driving my spicy team — one black, one brown.
In the sled I have five bushels of taters and two cans of cream.
Sit back, relax, and share with me this dream.

A cold January morning, but the sun is shining bright
The trees are all frost, just glistening white.
I follow Clyde Allard's team down the steep hill.
He's after a load of sawdust from Hager's sawmill.
Merton Boyd's team is parked in front of the store.
Fred Bernard appears in the creamery door.

I unload my taters and Carrie will credit my bill.
I'm a month behind, but she trusts me still.
Zip Dickinson and Walt Wright are playing checkers by the stove.
"Carrie, I've got a toothache. Do you have any cloves?"
There is Ken Morse, Earl Dix, Nile Chase, and Peanut Bernard
Just settled down for a good game of cards.

I visit with Merton about sugaring. By God, the snow is deep!
I mention it's been cold enough so his cider should keep.
At Bert Roberts's grist mill I get two hundred of ground corn and oats.
I'll feed it to my cows, horses, and a pair of young shoats.
Jim Farrington is ordering syrup cans at Reed's tin shop.
He tells me he's sold out of last year's crop.

Schuyler Murdock comes in looking for a copper-lined water tank.
Floyd shows him one, but the price sounds a little rank.
They dicker back and forth and agree with a handshake.
I'll pay you after sugaring and that's all it takes.
It's only a dream, but wouldn't it be great
To take your time getting there, not hurry up and wait?

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Upcoming Programs — Save these dates!

(See inside for details.)

Thursday June 23, at 4:15 p.m.	**Tour of Putney Furniture Maker Richard Bissell's Shop**
Saturday, June 25, from 10 a.m. to 2 p.m.	**Black Mountain Hike: Flowering of the Mountain Laurel**
Saturday, September 24	**SAVE THE DATE! — WOA Annual Meeting**

Mission of Woodland Owners Association

WOA is a non-profit association of woodland owners and managers, members of the wood products industry, and other interested parties in the Windham County Region who advocate both sustainable management practices and the enjoyment of forests and their ecosystems. In support of these ends, WOA offers educational opportunities for all age groups. Areas of interest include: biodiversity; clean air and water; cultural and historic resources; fair and equitable taxation of woodland; forest products; recreation; scenic beauty; and wildlife habitat. We recognize that these concepts are continually evolving and therefore will strive to consider the most current thinking and values regarding them.