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WOODLOT TIPS



WINTER 2013

Saturday, March 23, 2013, at 10 a.m. — Annual Sugarhouse Tour: *Can Syrup be Made With Veggie Oil?*

Join sugarmaker Dan Crocker and County Forester Sam Schneski for a tour of Dan's sugaring operation in Westminster. Sidelands Sugarbush puts out an average of 24,000 taps, and Dan often tries out new approaches in his sugarbush and his sugarhouse to maximize syrup production. Please join us on this Maple Open House weekend as we tour Dan's new sugarhouse and his state-of-the-art operation, which is fueled primarily with used vegetable oil.

Directions-

Sidelands Sugarbush, 163 Burnett Rd. Westminster VT

From Rte. 5 in the center of Putney, turn WEST on Westminster Rd./Kimball Hill Rd. Pass West Hill Rd. on your left and take the next LEFT onto Hickory Ridge Rd. Go 3.5 miles to Burnett Rd., which is a hard LEFT and look for signs and the sugarhouse.

From Saxtons River Rte. 121, head SOUTH on Hartley Hill Rd/Westminster St., veer RIGHT at fork of Hartley Hill and Westminster West Rd. Stay on Westminster Rd. Travel 5.9 miles to Cross Rd. Turn RIGHT onto Cross Rd. and follow to the T intersection with West Rd. Turn LEFT on West Rd. take the next Right onto Burnett Rd.

Save this date! On Saturday, June 8th, Windham County Woodland Owners Association will once again have a booth at the Strolling of the Heifers event in downtown Brattleboro. The parade starts at 10:00 a.m. and the WOA tent will be staffed from 9:00 a.m. – 4:00 p.m.

The exhibit was originally suggested and organized by Willem van Loon, a consulting forester and logger based in Guilford. “Private landowners own roughly 80 percent of Vermont’s forestland,” van Loon said. “So it makes sense to have a presence at the Expo to connect with those people, and with anyone else who’d like to learn more about Vermont’s forest landscape. People can come to the forest management exhibit and learn about some of ways they can become more involved in sustainably managing their woodlands for the future.” The exhibit area also will feature displays and demonstrations and logging machinery that is sure to be a hit with children.

Big Tree Tour

This is the year! Every two years Windham County Forester Bill Guenther leads a tour of the big trees of the county. It is one of WOA’s most popular programs. The 2013 tour will be on a Saturday in late October or early November. The exact date will be in the next newsletter and on the WOA website.

The more the merrier! If you would like to receive email notices of upcoming programs and other events of interest to lovers of woodlands, email Carol Morrison, WOA Clerk, at woodlandownersassociation@gmail.com and ask to be put on the Woodland Owners email notification list. Similarly, if you enjoy the Woodland Owners Association newsletters and programs and know someone who might enjoy being a member, tell them about us and invite them to join. Dues are \$10 per year and support administrative expenses and the newsletter. Donations above the membership fee support WOA scholarship funds. A good deal!

President’s Column

By George Weir

Deer Doing Damage Update

When I studied silviculture all those years ago, our professor advised us to plan for forest management by first making a map showing the present forest species composition and condition; second, making a map that showed the species of trees that would replace those on the first map when all were harvested, and an operations map showing treatments intended to guide the vegetation to the forest shown on that far-in-the-future map. So the idea ingrained in our young minds was and is, throughout the course management, all actions should lead to reproducing the forest in a desirable condition.

That thinking is the basis for all silvicultural systems. As examples, the shelterwood system is well suited to regenerating maples, pines, oaks and ash that develop best under the shelter of a partial canopy; the clearcut system is best suited to white birch that regenerates best in full sun. Although the system we use will often call for cuttings that produce products, that is secondary to the ultimate goal of reproducing the stand to desirable species.

With the exception of a hemlock canopy that fully shades the understory, a forest canopy made up of other species will let increasing amounts of light

reach the forest understory as the stand develops. By as young as age 50, hardwood stands naturally will have begun to regenerate. Unless the canopy is disturbed, that regeneration will advance slowly to mid-story height and may persist for decades until a natural or man-made disturbance creates sufficient canopy space to allow mid-story species to advance to the canopy.

Throughout much of Windham, County, we observe that a diverse overstory species composition is often replaced by beech and black birch, species we know endure deer browsing. And if we watch seedlings develop over a decade or so, we observe deer either rapidly or gradually eliminate oak, ash, maple and other species they prefer as food. This leads to the huge problem of finding a way to naturally link my three maps together and reproduce the full forest species composition we rely on and enjoy.

The silvicultural guides developed for Northern New England species offer no specific advice, simply because they do not anticipate deer related regeneration failures. Without going into detail, the most useful guide comes from Pennsylvania's Allegheny National Forest. Pennsylvania law prohibited the harvest of antlerless for 80 years, and the guide developed in 1993 assumed a deer overpopulation was inevitable. When I go through the complex decision model the guide requires, the final advice is too often "put up a fence and start over by spraying herbicides." The fencing requirement is economically impractical, and for most, broad scale use of herbicides is environmentally unacceptable.

For over a decade WOA pressed for changes in deer management policy to address what appropriately came to be called "deer doing damage" in a series of bills the legislature considered. During the entire time of trying to change the wildlife management culture from producing deer to controlling deer, I was often told by Department of Fish and Wildlife employees, the problem is a forestry problem, not a deer problem. So it should come as no surprise, the report on deer doing damage required by the legislature of the Department of Fish and Wildlife emphasizes changes in forest management and increased hunter access, rather than changes in rules that would result in fewer deer. In fairness to the Department of Fish and Wildlife, the report accurately describes the impact of too many deer very well, but other than creating a matchmaking website where hunters and landowners can find each other, the Department takes on no specific responsibilities. Any changes in

management of the actual resources, deer and vegetation, fall to the landowner. If you can find your way around the Department website, look in the library for *Deer Doing Damage*.

The report contains a brief appendix on silviculture, the general gist of which is to make openings in the forest up to several acres in size, and if that doesn't work, enlarge them. Openings in the forest may allow more regeneration to advance, but what regeneration? Overstory removal in many cases will simply allow beech to advance and make up the next forest, not what I intended on my future forest map. The recommendations don't address the problem of eliminating already established browse resistant vegetation. Also, numerous studies demonstrate the best way to increase deer populations in your forest is to make openings of several acres. Such openings may increase regeneration density, but also increase deer numbers.

The report also suggests making larger openings five to ten acres in size in areas of very high deer density. I think that could work if the desirable regeneration is present. As discussed above, many species, in fact most of Windham County species, regenerate under a partial canopy, not in big forest openings. Their seeds and acorns won't find their way into the openings, the environmental conditions are too harsh, and if there, they would have to compete with plants adapted to big openings. So before making the big opening, we have to establish saplings and allow them a few years in the understory to get their roots down to mineral soil and moisture and to develop hardy stems. And those few years are the time period when the saplings contain the most nutrients and deer do the most damage.

One of the major failings of the report is it views deer doing damage as "localized," a problem on individual lands, rather than as a resource problem. Ten years ago, working with the Dept. of Forest Parks and Recreation (FPR) and private foresters, Fish and Wildlife mapped the problem as involving half of Windham County. I wonder what changed. There may be individual landowners willing to closely watch their forests, schedule heavy cuts within a few years of sapling establishment, not have concern that the harvest may take place long before trees have reached maturity (remember what I said about hardwood stands developing regeneration early) and finally able to find loggers and markets to accommodate necessary timing. Those requirements will not

work for all landowners and will not solve a regional resource problem.

I expect that both the legislature and Fish and Wildlife, and perhaps FPR, consider the report a conclusion, the end of a legislative process. I don't think there is a logical next step. Certainly the report re-

quires no more of the state. In my view, the report is an unfortunate end to a lot of effort. I am disappointed the report doesn't at least discuss the possibility of changes in permitting. Changes in permitting were part of the series of bills the legislature considered. The report doesn't go there.

Remembering George Heller

George Heller passed away late last summer. He was a loyal friend to the Woodland Owners Association, serving as a trustee and twice hosting the annual meeting at his home in Putney. He was born in New York City, graduated from The Putney School and Harvard University in 1942 and 1946, respectively, and in 1976 received a degree from the Harvard Graduate School of Design. He served in the military during World War II in the Ski Troops, OCS, and for a year in Japan. He later taught an evening course in Japanese culture at the Putney School for several years.

He and his wife of 62 years Laura (Wilson) moved to Putney in 1950 and raised livestock and poultry for ten years. George later moved into construction, forming his own firm, which led to pursuit of his graduate design degree.

George loved music and the visual arts, drawing and painting string quartets and draft horses and supporting local artists by having their paintings in his home. He and Laura have been generous to community organizations and projects over the years, and were especially connected to The Putney School, the Brattleboro Museum and Art Center, and the revitalization of the Putney General Store. George and his brother Peter, who predeceased him in 2006, founded a rowing club and began the Green Mountain Head regatta on the Connecticut River in Putney.

The Heller family owns and manages 750 acres of woodland and 50 acres of agricultural land on a hilltop in Putney. They maintain an extensive recreational trail network on the land in addition to growing and harvesting timber. There is a 14,000-tap sugarbush, numerous historic features are protected within the property. The land also has been used for nature education programs and forest management demonstrations. WOA annual meetings were held at the Hellers' home in 2002 and in 2006, when Bill Leak, U.S. Forest Service Researcher and Silviculturist, and Consulting Forester George Weir spoke about crop tree thinning in young mixed hardwood and black birch stands and led a discussion about future forest management.

The Hellers' neighbor, Hugh Davis, earlier had discovered the state's largest Black Birch tree on their property. That tree now resides in the Big Tree Registry as the champion. George Weir, the current WOA president, has been the Hellers' forester for many years.

Library Collection Downsized

Despite the small size of the WOA library, the holdings overflowed the shelf space available. Cartons of books and magazines cluttered the halls outside Bill Guenther's office, to the dismay of the Agricultural Extension. The Extension demanded that we clear the hallways, so the Library Committee ruthlessly pruned the materials, retaining only relatively recent materials with direct relevance to WOA and its mission. We disposed of obsolete items such as old bulletins, and put the other items out for "adoption" by

anyone interested. Fortunately, several trustees expressed interest in some of the older books and magazines, so actual destruction was kept to a minimum. The library collection now fits tidily onto its shelf—with room for a few well-chosen additions. If you wish to suggest items that WOA should acquire, or if you would like to donate a recent book relevant to forest or wildlife management, please contact Carol Morrison, WOA Clerk at woodlandownersassociation@gmail.com.

A Low Tech, Low Cost Forwarder

By Bill Guenther Windham County Forester

In recent years we have seen a big increase in the use of forwarders on timber harvesting jobs in southern Vermont. A forwarder is part log skidder and part log truck. The felled tree is cut into product sections in the woods, instead of being dragged on the ground to a log landing. The forwarder then uses its “cherry picker” to pick up the logs and place them on a “bunk,” or carriage, on which they are then transported out of the woods. Some of the advantages to the forwarder are that residual tree damage is less since you’re not dragging perhaps 80 feet of tree behind you. The log landings also have much less debris remaining, the ground is not subject to as much disturbance, and the logs are cleaner. A brand new forwarder can cost upwards of half a million dollars, but this is the story of a Luddite’s \$24.95 forwarder.

As I write this, it is 53 degrees on January 31st! This lack of normal winter weather has put a serious damper on my home firewood program. For 24 years I have conducted biennial harvests on my 23.6 acres of woodland to produce my own heat. Given the spaghetti lot shape of my land, I often have to skid logs across the front lawn, back lawn, up a high-crowned Sure Pack driveway, through the dooryard and, in short, I need lots of snow and lots of very frozen ground so that I don’t tear up the lawn, the driveway and drainage structures. Last winter when it was time to log, I kept waiting for a freeze-up and deep snow that never came. Normally my firewood “hobby” would involve felling the trees, then skidding them with a Kubota 4WD tractor to my log landing, blocking the logs into 18-inch chunks, splitting and finally stacking the wood. The four gallons of diesel and the power of 60 horses on the Kubota make the trip from the woods to log landing pretty easy. But without the ability to use the machine, I decided that my four-cubic-foot True Temper wheelbarrow would be pressed into service as a low tech forwarder!

I went out and marked the trees for removal, trying to keep them within 300 feet of the log landing if possible, but when done, I noted that half of the trees were below the landing, which would necessitate fighting gravity to get them where needed. The first week in April I started dropping trees, limbing and blocking them in place. Now the hard work began.

Green firewood has lots of moisture in it, so I would have to move both wood and water! Psychologically I figured it would be easier to start at the upper end of the tree (smaller diameter) and move at least a few pieces at a time. As I worked my way down the trunk there would be a big increase in weight. The first tree was a 16" diameter red maple, and when I had the first five chunks loaded and hauled uphill to the pile I thought, Wow, this won’t be too bad. But the last chunk was about 50 pounds of dead weight and it had a way of moving around in the wheelbarrow until I figured out how to block it in place. So after a whole afternoon of hard work, sweat and going through two gallons of water, the first tree was all piled up next to the splitter. This tree would likely yield me somewhere around 0.3-0.4 cords, and since



I needed to put up about five cords, it was looking like this was going to be a long summer of evenings and weekends out in the woodlot. The next evening the process started all over again. Then I got to the 22" diameter hemlock. Hemlock has the highest moisture content of any species when green, but when dry, feels like balsa wood. The first few 4–10-inch diameter sections were not too bad, but then the weight really shot up, and I could see that I would be keeping my chiropractor employed. When I got down to the last piece and heaved it into the wheelbarrow, I was feeling my 60 years. Then it was the long push up the driveway to the log pile. At this point I decided to soften the hard work with some good music. My 200-foot extension cord came out with the boom box and soon the blues were giving me a big mental boost as I heaved the wheelbarrow up the steep driveway.

The work progressed but there was yet another challenge. Since these trees were fairly close to the house, I wanted to ensure that the wildfire hazard was low, so I made the crazy decision to pile all the logging slash where it could later be safely burned.

The summer progressed and it got hotter and muggier as time went on. I kept telling myself, Relax — this is your “hobby” — enjoy it and remember, it is not a “chore.” Those who know me well are aware that I would rather be outside at forty below zero

than at 80 above. So this summer was a test; seeing the woodpile slowly grow eased the pain.

After four and a half months, I could finally look out and see five cords of neatly stacked firewood that took thousands of calories to get from standing tree, to being felled, to being blocked, to being hauled one piece at a time, to being split, then stacked and then having the brush piled and prepped for burning. At last the hard labors of the summer were about to be rewarded. On an evening with a near full moon, all the right weather conditions, and my burning permit approved, I started lighting the large piles of brush around the house. Soon I had five huge piles with

flames reaching for the sky, and the excitement of manning the flames to ensure their containment. Once they died down to safely glowing embers, I relaxed with a tropical Mai Tai in celebration of a summer's work.

As I now look out at those neatly stacked piles of wood, I find I am less eager to throw quite as much wood into the furnace, knowing how hard I worked for each and every piece. It was a labor of love, with crop trees released, muscles worked to the bone, Game of Logging felling skills tuned up, but I'm sure glad it's over. And that True Temper wheelbarrow? It was "The Little Forwarder That Could"!



"What in the Woods is That?"

What is this rusty piece of machinery? That was the question in the online *Northern Woodlands News* of Dec. 14, 2012, for the fun I.D. feature "What in the Woods is That?"

Congratulations to our own County Forester, Sam Schneski of Guilford, Vermont, who correctly identified the object as a Steam Donkey, once used for cable logging. This one hauled logs off Mount Ascutney, where it can still be seen on the Futures Trail. According to photographer Richard Cofrancesco, a nearby brook fed water to the boiler to produce steam to generate power.

Bumper Stickers Available

When cleaning out the library in the fall, we ran across a stack of large green-and-white bumper stickers that say:

Forests — Part of Our Working Landscape

You can pick up one of the stickers from Carol Morrison at the County Forester's office as long as supplies last. It's probably wise to check with Carol first (257-7967).

Emerald Ash Borer Update

By Barbara Burns, Forest Health Program Manager, Dept of Forests, Parks & Recreation

In late January, updates on emerald ash borer were provided by state and provincial delegates to the Northeastern Forest Pest Council. While there have been no new sightings in the region since last fall, there will be changes in the footprint of the quarantined area. Some highlights:

Massachusetts has been following up on last summer's find of a single beetle on a purple trap in Dalton. They have now found a few infested trees in the

immediate area. So far, no trees with exit holes have been detected, so the source of the infestation remains unclear. The area to be put under quarantine has yet to be determined, but it will cover Berkshire County, at a minimum.

Meanwhile, New York has announced a substantial change in its quarantine. Starting in the spring, it will add everything south of the Thruway and north of the New York City metropolitan area, to the quar-

antine zone. With a separate firewood quarantine in place in the state, this change will primarily affect the movement of logs and chips.

http://www.agriculture.ny.gov/PI/eab/emerald_ash_borer_quarantine.pdf.

Connecticut is conducting a substantial EAB delimitation survey during the month of February. The insect is known to be in several towns within New Haven County.

Quebec saw some spread of emerald ash borer in 2012, but only within the three general areas already

known to be infested. No spread moving it closer to Vermont has been detected.

In other news, officials from both New York and Quebec believe their efforts to slow ash mortality through ash removal are having an impact.

For more information about emerald ash borer, visit www.vtinvasives.org/invaders/emerald-ash-borer or www.vtfpr.org/protection/forestpestsfrontpage.cfm or give us a call at the Dept. of Forests, Parks, and Recreation: 802-885-8821 [office].

Woodland Secret #9 — Maple Syrup

By Arthur H. Westing, Former WOA Trustee

All of our woodland trees produce food toward the end of each growing season to be stored as sugar or starch over the winter for use in the following Spring to permit the onset of growth before the new leaves develop sufficiently to take over their job of producing food for the tree. While most of our trees store this food over the winter in live root cells, the maples have discovered that the dead conducting cells within the several outermost rings of their tree trunks (in the sapwood) would be ideal for the job. These are the vascular xylem cells which during the growing season are that component of the tree's plumbing system that brings water with its dissolved minerals up from the roots to the leaves.

So, when we insert a spile into the outer rings of the trunk of a Sugar maple (*Acer saccharum*), the liquid, perhaps a two percent to four percent solution of sucrose, that has just been sitting there unmoving under mild positive pressure flows out into the receiving bucket or tube. The rate of flow can be increased if a mild negative pressure (a partial vacuum) is generated within the tube. As long as the trees are not tapped until they gain a Diameter at Breast Height (DBH) of 10 inches [25 cm], and if the taps around a trunk are kept at least 12–15 inches [30–38 cm] apart, that amount of deprivation of the overwintering food (under 10 percent) seems to do no harm to the growth and development of the tree, even if repeated annually. Flow occurs when nighttime temperature is below freezing and daytime temperature above, for as yet obscure reasons. The tapping season comes to an end once the buds begin to swell, with the result that unpleasant tasting amino

acids start moving down the tree trunk and get into the sap (which is then referred to as buddy sap). By then each tap may have yielded on the order of 2,000 gallons [7,600 liters] of sap.

Once collected, the sap is boiled down, with about 32 gallons of sap being reduced to one gallon of syrup [or 32 liters of sap reduced to one liter of syrup] containing about eight pounds [3.6 kg] of sugar. If the reduction from sap to syrup had been achieved through means not involving heat, a mild flavor would be produced, but the magnificent characteristic flavor we associate with maple syrup must be achieved via some caramelization during boiling. Maple syrup has been an important commodity since well before Colonial times. Benjamin Rush (1746–1813) — physician, humanitarian, and co-signer of the Declaration of Independence — promoted maple syrup both for its presumed healthful qualities and because its use would obviate the need to import sugar produced using slaves in the Caribbean islands.

Our other common local maples also store their overwintering food in the sapwood, but their sap is not used for syrup production. The sap of Red maple (*Acer rubrum*) is not only less sweet, but already during the winter contains unpleasant tasting impurities (primarily "sugar sand", a mixture of minerals and amino acids); and while the sap of Striped maple (*Acer pensylvanicum*) would work well, this species almost never gets big enough to tap.

As our climate slowly warms, the natural range of Sugar maple will be forced to shift slowly northward.

However, since its natural range now extends down almost to Georgia, some 1,000 miles [1600 km] south of Vermont, Sugar maples will thus presumably remain a component of our woodlands into the foreseeable future. On the other hand, appropriate tapping conditions do not extend much further south than Massachusetts (and then only at ever higher elevations). Thus the changing temperature conditions may in time preclude further syrup production here, another sad side effect of our profligate and ever in-

creasing use of greenhouse-gas generating fuels.

Finally, it might be mentioned that the sap collected by some from Black (Sweet) birch (*Betula lenta*) for making birch beer is *not* obtained during the dormant period from the dead vascular xylem system, as from Sugar maple above, but rather during the early growing season from the live inner bark (the vascular phloem system).

Book Review [The reviewed book is about former WOA Trustee Arthur Westing, who writes the "Woodland Secrets" series (see above) in Woodlot Tips.]

"Arthur H. Westing, Pioneer on the Environmental Impact of War," (Springer Briefs on Pioneers in Science and Practice 2013) 150 pages, eight illustrations in color. The book is available at Brooks Memorial Library and may be downloaded as an ebook from the Springer website; www.springer.com/law/environmental/book/978-3-642-31321-9

Arthur H. Westing, PhD, was chosen as the Volume I Pioneer of the new ten-book series from the publisher Springer, which seeks to "present eminent conceptual thinkers, scholars, policymakers, and diplomats who — as pioneers in a specific field of research or an area of political debate — had an innovative, long lasting regional or global impact on issues critical for humankind in the twenty-first century."

According to the review, the Arthur W. Westing volume opens with a preface by the series editor Hans Gunter Brauch. He "states explicitly in his preface that [Dr. Westing] is "the most important pioneer on the environmental impact of war...."

Dr. Westing majored in Botany at Columbia University and "after graduation spent several years in the U.S. Forest Service and served in Korea as a Marine. He then went to Yale University ... to obtain a master's and PhD in forest ecology and tree physiology. ... His work with the U.S. Forest Service and the

Marines put him face-to-face with effects of man-made environmental degradation. His work with the Forest Service was to eradicate unwanted hardwood trees by using herbicides that eventually came to be known as Agent Orange." As a Marine "...his job was to call air strikes, which he realized later was in fact the degradation of the environment by the means of war. Dr. Westing has been a prolific writer on this topic; six benchmark papers were selected for reprinting in the volume. ..."

The papers deal with the environmental impact of the Vietnam War, the Gulf War of 1991, Nuclear War and other topics, including military guidelines for the protection of the environment in war.

Arthur Westing and his wife Carol have been longtime residents of Windham County.

Excerpted from the review in the Brattleboro Reformer by Brooks Memorial Library Director Jerry Carbone (See Reformer Archives for the full review.)

Webinar on Invasive Shrubs

The National Conservation Training Center of the U.S. Fish and Wildlife Service has an informative webinar presented by Dr. Jason Fridley, Assoc. Professor of Biology, Syracuse University: "Invasive Shrubs in Eastern U.S. Forests: Filling an Empty Niche?"

Go to the Conservation Science Webinar Series Video Archive.

Alternatively, copy the following URL into your browser:

<http://link.brightcove.com/services/player/bcpid1103685122001?bckey=AQ~~,AAAAv1RRo7E~,NyPVtykdKxVn-3CTXFXAUuwKQ06-6FJs>

The Past, Present and Future of Southern Vermont's Forests

Excerpts from a presentation at the Brattleboro Museum and Arts Center (BMAC)

Part II

By Bill Guenther, Windham County Forester

This article will continue some of the comments and points I made at last year's talk at the Museum. The next discussion point was to take a look at some of the typical harvesting equipment used in our woodlands. In the old days the typical means was for either a single horse or a team of horses to pull sleds or maybe just the logs themselves on a chain. This idyllic way of skidding is still used today but is becoming a lost and dying art. For horse logging to be effective the skid distance must be short and preferably downhill to the landing.

We also looked at some images of the standard bulldozer with winch, the rubber-tired log skidder (the traditional Vermont logging workhorse of recent years) that uses either cables or a grapple to latch onto a hitch of logs, which are then pulled out of woods, dragging on the ground. A lighter touch is to use smaller machines, such as a Kubota 4WD tractor with a Scandinavian winch on the back. These tractors can get around real tight places in the woods but have to be on ground that is not too steep. Lastly we looked at the mechanical harvester and forwarder. The harvester has a cutting head that severs the tree while the operator is safely enclosed in a protective cab. These machines can not only fell the tree, but also limb it and cut into various lengths for sawlogs, pulp or firewood. The processed wood typically is then hauled out of the woods on a forwarder (see my other article in this newsletter for info on this type of logging equipment).

Next we looked at the type of species mix that occurs in Windham County's forests. Here in the Connecticut River Valley many of the more southerly species, such as the hickories and black birch, tend to reach their northern extent. Conversely some of the northern or boreal species start approaching their southern limits. A couple of examples in this category are white spruce and paper birch. This provides for a wide diversity of species mix, and much of the variation is elevation related. From a low point of about 300' at the Connecticut River to the county high point of Stratton Mountain at nearly 4,000', this elevational gradient provides for changing species as

one goes higher or lower. In the river valley you'll see the more southerly species. You would never see a native shagbark hickory on the summit of Stratton Mountain and never a native white spruce on the banks of the Connecticut. Our large number of species makes this area a great place to practice dendrology (the study of tree and shrub classification).

Ownership patterns were next explored. Eighty-six percent of the forestland in Windham County is privately owned, most of it by Non-Industrial Private Forestland owners (NIPFers). There are about 6,000 acres that are privately owned by Cersosimo Lumber Co. spread out in nearly half of the county's towns. The remaining 14 percent are in public ownership, with 1 percent owned by the State of Vermont, 2 percent by local municipalities, mostly town, school or watershed forests, like Brattleboro's 370-acre Pleasant Valley Watershed. The U.S. government owns the last 11 percent, and most of this is located in the Green Mountain National Forest. The U.S. Army Corps of Engineers also owns a strip of land along the West River near the Ball Mountain and Townshend Dams, and lastly, the U.S. Fish & Wildlife Service owns a small woodlot high up on Putney Mountain.

A very interesting set of statistics examined the age of our woodland owners. Sixty-five percent of them are aged 45-64 while 30 percent are over 65. Just 5 percent of the forest landowners in Windham County are under 45 years old. About 20 years ago, we in the forestry community began talking about a huge, impending generational transfer of large amounts of our woodlands. That trigger has been pulled, and we are now seeing a huge number of land transfers where children are now taking title to land long held by their parents. For more insight into the ramifications what that means, please go back to WOA Trustee Diana Todd's article in the Summer 2012 issue of Woodlot Tips and look at her article entitled "Who is the Next Generation of Forest Landowners?"

(To be continued in the Spring newsletter)

Expanded Uses for Forest Products

By Margaret MacDonald

In October 2012 I attended the 40th anniversary conference of the International Institute for Applied Systems Analysis (IIASA) and was particularly interested in a presentation by Professor Sten B. Nilsson, CEO, Forest Sector Insights AB, Sweden. During a seminar on “The Green Economy,” he described opportunities in the forest sector, which currently uses only a fraction of its output. Beyond traditional wood products, the cellulose and fiber from trees and other plants can be used in many other products, including biochemicals and pharmaceuticals.

Nilsson based much of his presentation on the Phase II report of the Future Bio-pathways Project, an activity launched by the Forest Products Association of Canada (FPAC) together with FPIInnovations and individual experts. The project examines opportunities for producing a wide range of bioproducts from wood and other plant fiber. The study suggests that wood-based products could replace fossil fuel-based products for use in construction, fuel, chemicals, packaging, or other purposes. For example:

- Wood can be processed to create fibers for synthetic textiles, not only replacing fossil-fuel-based fiber but also easing the demand for cotton – a crop that notoriously depletes the soil.
- The aerospace and automotive industries could use cellulose composites produced from wood fiber to replace heavier, more expensive, non-renewable materials. For example, replacing thermo-plastics

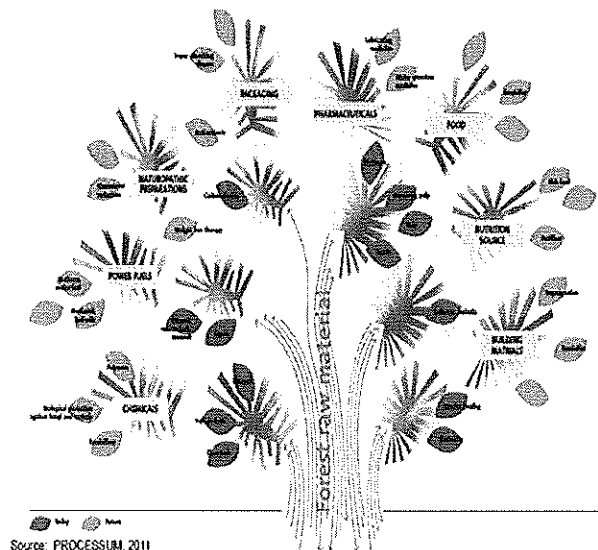
in cars with cellulose-based products would reduce the global consumption of plastics by 15 percent; replacing some of the metals with carbon-based fibers could save 25 million tons of metals per year (based on estimated production goals for 2030). Lighter materials also mean lower fuel costs and fewer emissions.

- Lignin, which holds individual fibers of wood together, is being considered as a replacement for carbon black, a petroleum product used to manufacture the rubber needed for products such as car tires.
- When nanotechnology becomes more accessible, it could open large opportunities in the fields of health and medicine. Unlike many synthetic products, nano-cellulose is bio-compatible with human cells, and advanced products from wood or other plant sources could have important applications in surgery, wound care, and regenerative medicine.

According to Nilsson, viable options already exist for converting forest biomass to bioenergy, biochemicals, and biomaterials, and for integrating production of these materials with the traditional forest industry. However, he acknowledged that the industry would need a large amount of investment capital and subsidies to add the necessary capabilities, and those resources are admittedly scarce in the current global economy. But the possibilities seem intriguing, and the potential markets are huge. If you would like more information:

The Phase II report of the Bio-Pathways project is available on line at <http://www.fpac.ca/publications/BIOPATHWAYS%20II%20web.pdf> While the report focuses on the Canadian forest sector, the opportunities described are worldwide. You can watch Nilsson's presentation on line at http://www.youtube.com/watch?v=dUBtP8CFu68&list=PLEZhFf8-cpoQNAD6WCwYsLQeff_aHyRa&index=79

The Confederation of European Paper Industries has published a report titled *Unfold the Future: The Forest Fibre Industry 2050 Roadmap* to a low-carbon bio-economy:
<http://www.unfoldthefuture.eu/uploads/CEPI-2050-Roadmap-to-a-low-carbon-bio-economy.pdf>



BEECH BARK DISEASE, A PRIMER

By Bill Guenther, Windham County Forester

Trees in New England show their age in several ways. One determinant is related to the outer skin or bark. As trees get older, their bark texture changes and they get more gnarly, with deep plates and/or furrows (similar to our wrinkles) forming. Bark texture often can give clues about the age of a tree. One caveat is that trees on poor quality sites may show lots of older looking bark texture even though the trees may be considerably younger. The ubiquitous beech tree of New England has a unique characteristic of all of the hardwood species. As it ages, its bark will still stay smooth and not break into the typical bark plates. But we rarely see large beech with perfectly smooth bark because of Beech Bark Disease (BBD). Rough, blistered and pitted bark texture is observed when a tree is infected with this disease.

BBD is quite complex as it also involves a “predisposing agent.” The disease is caused by two fungi in the *Nectria* family, but the windborne fungus needs a way to invade the tree. The agent that predisposes the tree to this pathogenic invasion is the beech scale, a tiny insect that was accidentally introduced into Nova Scotia around 1890. It feeds on the bark, providing an entry point for the fungal spores to invade the tree’s inner tissues. The actual scale insect is very small. It secretes a white wax, often the first sign of the disease. Isolated dots of white “wool” appear on the bole of the tree on roughened areas of bark, beneath mosses and lichens, and below large branches. Eventually the entire bole of the tree may be covered with the secretion as the insect population increases. In heavy infestations, the trunk of the tree can look like it is covered by a very fine white snow.

As the *Nectria* spores develop and the disease progresses, cankers form and that nice smooth bark shifts to the complete opposite. The cankers can be raised lesions and in more advanced stages, shift to sunken lesions that tend to infect the wood at a much deeper level. Another possible symptom shows up in the crown when some of the leaves turn yellow very early in the growing season, with eventual dying of whole branches. This is due to the tree’s vascular system being compromised; less food is reaching the upper portion of the tree. As the fungus grows, it feeds off the woody tissue and changes the wood structure so that it becomes discolored and decayed.

Over time, the disease will greatly weaken the structural integrity of the tree. With 24 years of observations in my home woodlot, I have found that while BBD can certainly kill a tree, it takes quite a few years. What I see more often is that the tree fails due to an abiotic stress. With the main trunk weakened, all it takes is a big wind, heavy snow or thick coating of ice adding more weight than the tree can handle and it breaks, causing what is referred to as “Beech snap.” If you have beech in your woodlot and look closely, you probably can observe this phenomenon.

BBD has certainly impacted our forests’ beeches, but beech has a vegetative reproductive characteristic in its root suckering that sends up multiple new shoots when the parent dies off. It is unlikely that we’ll see the species wiped out thanks to its prolific way of reproducing. Some trees exhibit resistance to either the disease *or* the scale. However, it is a very rare beech that has neither, but I do come across more trees that have obvious scale and do not appear to have any *Nectria* cankers.

Beech is not a very high value species as a wood product, given its limited use as lumber. It is often used in pallets and industrial flooring, but it can be tricky to dry and often can split when nailed. If the BBD has not gone into the deep, sunken cankers, the wood may still be useable for lumber. In Barbara Burns’s master’s degree work on BBD, she followed 200 beech trees from the woods to the tracking and examination of every single board in a sawmill to determine the extent of BBD impact on the wood. From her research, we learned that a tree can look pretty bad, yet most of the cankered portion will come off in the initial slab, leaving some good lumber to be sawn under the cankers. One of beech’s best uses is as fuelwood. It has more BTUs than sugar maple and also has excellent coaling qualities.

Beech is very important for wildlife; its beechnuts provide a hard, very high calorie mast. Black bear health is directly related to the size of the nut crop. The fall forage prior to hibernation may determine whether the female gives birth to cubs at the end of winter. While BBD is here and impacts the bulk of our beech trees, I think that we’ll continue to see beech in the northern hardwood forest.

WOODLAND OWNERS ASSOCIATION

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Upcoming Programs

(See inside for details.)

Saturday, March 23, 2013 at 10 a.m.

Annual Sugarhouse Tour:

Can Syrup be Made With Veggie Oil?

Dan Crocker's Sidelands Sugarbush in Westminster makes syrup fueled by used veggie oil.

Save This Date! Saturday, June 8

Strolling of the Heifers

WOA booth once again at the Stroll all day!

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.