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Why Biomass? Why Now?

BY JOHN PINE

The forest industry has been using woody biomass for a very long time. The largest suppliers of materials are the mills themselves, when they figured out a way to utilize their "waste" products. Now there is still a desire for the wood, but with fewer mills operating there is a supply gap. Work over the last decade has accelerated the technologies for harvesting the other "waste" that is generated from forest treatments. There are a number of mechanisms and methods for biomass harvests that make it possible to extract material from where it was never available before. It used to be that each site had to facilitate three pieces of equipment and a large truck turn-around. These days, companies are being successful with collecting slash in bins or even creating bales of slash that can be handled like logs, allowing the material to be stored easily. With state and federal interest in using renewable energy, incentives have been created to help pay for investment in innovation in biomass utilization. As this article is about forest biomass, I will not address mill residuals.

When thinking about biomass use, the first thing to do is forget what you know about sawtimber markets. The main difference to consider between sawlog and biomass is related to your goals and objectives. Sawlog harvests, either clearcut or thinnings, are profit motivated. The leading drivers behind biomass harvests tend to be related to environmental benefits and reducing management costs. Some of the environmental benefits include removing fire risk immediately and creating growing space quickly. Avoided costs tend to be about reducing the amount of slash burning, in the amount of money spent in burning, but also in freeing up the workload to do other things. Another big difference between sawtimber and biomass is the volatility of market prices. The value for quality biomass material can fluctuate daily. This is where the incentives have tried to help. It would take days to explain some of the programs that try to help biomass prices and the unanticipated effect they have had.

PHOTO COURTESY OF JEREMY TOTMAN, T2 INC.

A biomass operation on Forest Service land near Sisters, Ore., as part of a stewardship contract. The equipment pictured is a shovel loading a tub grinder. The tub grinder exit conveyor is facing the photographer who is standing on the pile.

When considering if you should harvest biomass, ask yourself: "What are my management goals?" The following sections may help to identify how likely you are to proceed with harvesting biomass of the land you own or manage.

Products

A common question is, "What will they do with the biomass?" The most publically debated concept is turning wood into electricity, yet it is one of the least common uses for forest material. Usually, if the material is consumed in an industrial setting, the goal is steam heat for a process like drying lumber. Some mills have added the capacity to capture that steam on its way to or as it is returning from the kilns and turn a turbine, which is

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where the electricity is generated. In Oregon, there are around 54 mills that use wood for steam, and of those, 14 also make electricity. These systems can be quite large, utilizing 250,000 tons a year or more. Other uses that are not often thought of include chips for particle board, bedding material for animals, products for residential heat, and mulch. There are a lot of ways to use biomass—it's just a matter of making something that someone else wants to buy. Connect with business development or biomass specialists to find out what the prevailing uses are in your area and what incentives are in place that you need to know about. In general, most users of woody biomass are looking for more supply networks, so you may have more options than you think.

PHOTO COURTESY OF STEPHEN LAWN

This photo shows the basic set up of a shovel loading a horizontal grinder that is dumping the hogfuel onto the ground until a truck shows up. Machinery can operate in the winter and material is green slash with the needles still on.

There is a lot of publicity about what can almost be done with wood. News reports, federal studies, and academia are talking about breakthroughs turning wood into liquid fuels and miracle compounds. So far the major hurdles have been economic rather than scientific. There is a race going on to be the first to convert woody biomass to liquid fuels cheaply, but it is hard to predict when that will happen. Suffice it to say no one is currently buying woody biomass for use as a liquid biofuel.

Challenges

Marketing forest biomass as a product poses numerous challenges. The easiest to address is the language. You may have heard such terms as slash, hogfuel, and chips. The difference between these products is what form the material is in. Generally, everything organic is biomass, but can also include anything from horse manure to cordwood. "To hog" is to convert larger pieces to smaller pieces. So slash is not hogfuel until it has been run through a grinder or chipper. "Chips" are the product created by debarking and creating a uniform-sized nugget of bole wood that is typically used in paper or chip board production.

A green ton is the actual weight of the material, and bone dry ton is the hypothetical weight with all moisture removed. The difference between these two comes from the perspective of selling and buying. Obviously you cannot get material bone dry in the

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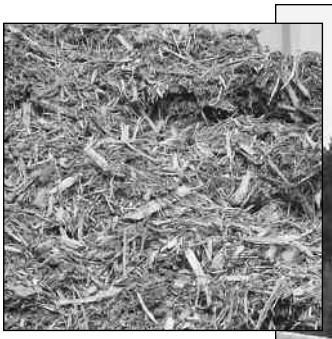
woods, but a purchaser will not pay more for material that contains water weight, which is a detriment to their use. For every 10 percent increase in moisture content a boiler needs an additional 17 percent more fuel to boil off that water. Moisture content of fresh-cut live trees can be greater than 55 percent. With the prospect of having to haul the increased moisture weight, it is understandable why purchasers have established weight measurements that remove moisture and converts it to the dry weight, which payments are based on.

Producing space heat from forest material is a fast growing field. Facilities like schools and prisons are saving money over using petroleum products, but have challenges that large industrial users don't. Typically, these facilities use less than 5,000 tons of woody biomass a year, and do not have infrastructure that large users take for granted. Schools don't have a truck dump, massive empty space for storage, or weight scales. Their handling systems are designed for optimum size and quality of material, which leads to issues involving storage and contamination from dirt and debris if the supplier does not get the specifications correct. The reason forest managers should be interested in this is that fuel used for heating is worth more than hogfuel used at a mill, simply because the difference between oil and wood is so different, and schools are willing to pay more for quality material because they are still saving money overall. If the facility can pay more, the collector may be able to pay for the raw material that better fits their needs, which gets back to being able to make a profit instead of just saving money.

Another factor that is often overlooked is transportation and scheduling. The problem is forest roads do not lend themselves to long fixed-bed trucks or low-clearance "possum belly" chip vans. Part of the planning for timber harvesting with slash removal may include a plan to widen corners or reduce grade. Even if these improvements are possible, the machinery and trucks need to fit the circumstance, just like fitting the right timber harvesting scheme to your site. Another piece of the transportation puzzle is scheduling. Power-generating facilities may not need material in the spring because they are being told not to produce electricity because the dams are flowing freely, but may want more in the fall when you are just about to close unsurfaced roads and burn piles. Make sure you are aware of when operations will take place; consider such times as rainy season, snow load, planting season, fire season, and hunting season.



PHOTOS COURTESY OF JOHN PINE

This material is forest slash ground up at the landing for the express purpose of burning at the co-gen site at Freres Sawmill.

Taken at Freres Sawmill, trucks are typical chip vans with a "possum belly." The truck in front is full and is waiting to unload; the truck in the air is on a "truck dump" that allows the entire contents to be unloaded into a chamber at once. The drivers back into the truck dump, open the doors and operate the hydraulics to lift the truck.

Environmental impact

Several long-term studies have looked at cumulative effects of biomass removal. Results indicate that the harvesting equipment has a bigger impact

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PHOTO COURTESY OF BILL MOORE

A horizontal grinder puts the hogfuel on the ground in preparation for when the hauling trucks arrive. Taken on Menasha ground in the Coos Bay, Ore., area. The operator is Godfrey and Yeager.

PHOTO COURTESY OF ROTOCHOPPER

A company photo courtesy of Rotochopper demonstrates the horsepower of one of their newest machines and the capacity to keep the infeed full without slowing down production, as it is a "horizontal" grinder versus a "tub" grinder, which has been shown in another picture in this publication.

than material removal. Soil compaction has more immediate and lasting effects than lack of nutrients, and this is when everything is removed, which is economically impossible. Common sense indicates duff will remain on site, just as the stumps and pieces that have fallen off over the life of the stand will. This is in addition to what is already being left under forest practices rules and management practices. The concept of soil compaction raises valid concerns about resource protection, but there are practices to mitigate those effects.

Fire risk and severity can be reduced when slash generated from activities is removed rather than merely "repositioned." Slash burning is one way to remove the material, but there is a risk and short windows of opportunity. It is important to consider the value of social views on extraction and use of material. Some landowners have agreements with their neighbors regarding smoke management, and some near populated areas have factored in the harvest of biomass as a normal operation to avoid smoke creation at all. To be realistic, no one I work with considers climate change or carbon neutrality as they bid their work; they are doing the work because it makes sense. There is a carbon benefit, but just like most of the work we do as foresters, there are a lot of good side effects of what we do every day.

Contracts

Everyone wants to get paid for the biomass material grown on their land. The issue here is that this market is so convoluted that there is no reputable pricing structure to follow. Check out the options with several contractors or get advice from forest agencies and consultants in your area. It is possible to receive fair payment for good quality material, although at this point it is the exception rather than the rule.

People are working to identify costs of management like never before. The age of "business as usual" is declining, and many investment firms are discovering the true costs of activities over the life of the stand. This interest has driven many biomass operations because land managers discovered biomass harvests, even when done at a cost, can be less expensive than open burning. This isn't always the case, and certainly burning is still a useful tool that will remain as the lowest cost

alternative in some places.

Keep in mind that users of wood are concerned with things like contamination. No one wants to receive gravel, mud, steel, or hydraulic fluid in a load of raw wood chips. It is important that all the people involved in the handling of forest material understand this so that you are not left with a mess, on the ground or financially.

Parting thoughts

During the process of harvesting biomass, keep your eye on the end result. When doing any activity, whether it be logging, reducing fuel loading, or even land clearing, make sure you discuss with the operator that you may want to extract the material. Discussing this early allows room to negotiate if they should receive a higher rate for careful handling or receive a reduced rate for damage to residual. Some operators have grumbled about additional costs of piling, but then again, some operators are used to clean piles for burning and this is nothing new. The key is to talk with them before material gets crushed into the dirt or spit over the edge.

Some transactions have consisted of fees for road use, road maintenance requirements in lieu of fees, payment of predetermined value prior to haul (cash out), or payment schedule based on received quantity (scaled). Sometimes the value is so low that it just covers the costs of administration. Like I said earlier, payment depends on a robust market. If the market isn't there it may simply be a matter of spending less to do removal than other disposal methods.

The best way to think about biomass is as the byproduct of what you are doing and treat it as such. Do the forest management that is called for and look for opportunities to utilize material as you do so. Be honest with what the activities cost and do comparisons to see where biomass results in more money in your pocket. You don't know until you look into it. ◆

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National SAF & Biomass: In a Nutshell

BY ERICA RHOAD

Many lawmakers see biomass energy as a potential way to manage our forests and increase domestic renewable energy. It wasn't until the 2007 Energy Policy Act that we saw some lawmakers concerned about the sustainability of biomass energy. Unfortunately, this concern resulted in a prescriptive/restrictive definition of what constituted "renewable biomass." For example, federal lands could not contribute any biomass toward the Renewable Fuel Standard and no forestland that was "planted" after 2007 could contribute. The goal of this language will be no surprise to *Western Forester* readers: Interest groups wanted to "protect" "old growth" forests on federal lands and prevent conversion of "natural" forests to intensively managed plantations. SAF and other forestry/landowner groups were quick to point out the many problems with this definition. To name just one, we insisted that planting trees is a good thing—not something to be discouraged! We also handed out several copies of the *Dictionary of Forestry* and strongly encouraged Capitol Hill staff to look up the terms they were using *before* putting them in law.

Over the next couple of years, the biomass definition issue dominated forest policy issues on the Hill. As the prospects of climate legislation declined, renewable electricity standard (RES) prospects improved. The definition of biomass in an RES became very important—without the appropriate definition we might not see an increase and could even see a decrease of biomass energy. Worse, the definition could tie the hands of foresters that need flexibility to appropriately manage forestland. The President and Congress, not SAF, sets the agenda—and biomass energy became the top issue of importance for SAF. The biomass definition is also fundamental to forestry; had Congress defined biomass that was "good" and biomass that was "bad," where would that leave SAF to negotiate on much bigger forestry issues? At press time, Congress is close to ending its lame duck session and it's very unlikely that an RES bill will pass (i.e. the biomass definition issue will go away…for a while).

Meanwhile, EPA started the rulemaking process of regulating GHGs and proposed, contrary to previous policy, that CO_2 from biomass energy would be treated the same as CO_2 from fossil fuels. On January 2, 2011, this regulation (known as the "Tailoring Rule") went into effect. SAF has been working with senators and representatives to urge EPA to "stay" the biomass portion of the rule until EPA thoroughly reviews the science on biogenic emissions. SAF has also responded with a new task force that will look at the issue of carbon neutrality, biomass sustainability, climate, and many other related issues (see "Letting Science Guide Climate, Energy Policy" in the September *Forestry Source* at www.nxtbook.com/nxtbooks/saf/forestrysource_201009/index.php#/6). The task force is already writing chapters and the report will be completed by the end of March 2011. In conjunction, a new national position statement on biomass energy will also be completed and include the new information from the report.

Whether in Congress or in the Administration, SAF will continue to work on these important policy issues. SAF members can stay up to date via *The Forestry Source* and SAF's policy webpage (www.eforester.org/fp/policy.cfm) as well as the weekly Policy Update (www.eforester.org/fp/policy_update.cfm). ◆

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Woody Biomass Supply Assessment: Level II Feasibility Estimates Required for Progress

BY JOHN CALHOUN

Energy independence and climate change mitigation are linked as state and national energy policy objectives. Many of us realize that biomass resources must play a key role in achieving these policy objectives. Woody biomass is an attractive alternative source of energy. It is "carbon neutral"—that is, when wood is burned to produce energy it releases carbon into the air that has previously been removed from the air as the tree grew, leaving an overall neutral carbon footprint. Woody biomass can be used to produce a wide array of energy products including heat for buildings, steam or gas for producing electricity, or ethanol for transportation fuel. It is little wonder that woody biomass has begun to dominate our thinking. Certainly this is a critical time for society to be well informed by the forestry profession.

In the Northwest we have abundant biomass resources including farm crop residue, municipal solid waste, and specialty energy crops. But woody biomass from forests dominates the supply. In Washington state, for example, forest biomass makes up 66 percent of the total biomass supply. The wood processing infrastructure in the Northwest constitutes the largest biomass collection system and is easily the largest investment in renewable energy in Washington state. In addition, higher value products, such as logs, underwrite the costs associated with production and accumulation of woody debris to be used for energy production.

It seems every forest conference, publication or newsletter is filled with glowing reports of the burgeoning woody biomass "industry." Federal and state governments seem to be awash in incentive programs to encourage utilization of woody biomass for energy production. And frankly, there is a lot of hype out there, with reports of new proposals nearly every day suggesting nothing short of transforming the forest industry through increased demands for woody biomass.

Are there new opportunities for forest owners? Should forest management plans be modified to capture the biomass opportunity? How much woody biomass is out there? How do we determine sustainable supply and how much can be removed from the forest without causing negative ecological impacts? These are questions that will require sound professional forestry research and management applications.

Assessing supply of woody biomass in the Pacific Northwest has become much more important as state and federal governments provide incentives for increasing utilization of woody biomass for energy production. Large-scale energy production facilities must be assured of adequate supply, on a sustainable basis. All feasibility studies for biomass energy plants start by addressing these questions first: How much woody biomass is sustainably available and at what cost?

Woody biomass from forestlands is nearly always produced as a by-product of some primary management activity. In spite of all the hype about increased demand for woody biomass, this fundamental situation is unlikely to change. Forest managers should consider woody biomass the icing on the cake, not the cake. Harvested merchantable wood products or forest management investments such as thinning or fuels treatments are essential to carry the costs of producing woody biomass for energy production.

Proponents of biomass energy plants must ensure adequate fuel supply at the right price in order to proceed with investment commitments. Investment decisions require a Level II feasibility assessment. In most cases, this means direct measurement or assessments specific to the project being proposed. Level I feasibility studies attempt to estimate the theoretical supply based on ratios found in the scientific literature or by using common "rules of thumb." Readily available supply data is of the Level I category, and is not suitable to support investment decisions.

Level II feasibility assessments of woody biomass must consider specific data gathered from the region the biomass is to be collected from. About 50 percent of the above-ground woody biomass is in the form of tree boles, which are removed from the site as logs. The remaining residual biomass is potentially available to be collected for energy production. But the residual biomass, after logs have been removed, is never completely recoverable. Some is not recoverable because forest practices regulations or other management objectives require it be left on site, usually about 15 percent of the total. The amount of actual recoverable biomass is what is left over and is economically feasible to collect and transport. Recoverable biomass is highly variable depending upon the type of forest operation that produced it, operational constraints, associated extra production costs, and market price. Level II feasibility assessments will produce investment grade data essential to make progress toward biomass energy production goals.

At the University of Washington Olympic Natural Resources Center, we are conducting research to improve the quality of estimates of recoverable

PHOTO COURTESY OF BILL HERMANN

A biomass operation on the Olympic Peninsula.

biomass from commercial forest operations on the Olympic Peninsula including Jefferson, Clallam, Mason, Kitsap and Grays Harbor counties. Currently, landowners or those considering building biomass energy production facilities must rely on estimates of available biomass based on outdated data found in the scientific literature—Level I feasibility assessments. These estimates are called residue ratios, i.e. how much residue (woody biomass) is produced from logging an acre of forest? Residue ratios in the scientific literature are based on measurements taken from old-growth clearcut harvesting in the 1980s. This is clearly not how we are operating today. Updated density factors are being developed so that conversions from volume estimates of piles to weight are more reliable.

The Olympic Natural Resources Center is sampling woody biomass from over 1,400 harvest operations that have been conducted over the last two years in the five-county study area. We are taking direct measurement of slash piles and transects of scattered slash on over 1,000 acres of harvested forest. Ultimately, we will be able to provide a highly reliable estimate of tons of recoverable biomass per acre logged. Since the amount of recoverable biomass is highly variable depending upon the starting condition of the forest stand, the harvest type, and the logging method, we will stratify our debris ratios into these various categories. This information can be used by a forest owner to estimate how many tons of biomass might be available on a single logging operation or by an energy plant manager to assess availability through time from the expected supply area.

The amount of recoverable biomass is nearly always something less than the total available. Recoverable biomass is dependent upon many factors, but the most important ones are price and production costs. The price is determined by the demand at the energy plant, and the production costs are a function of the cost to gather, process, and deliver the woody biomass to the plant. A higher price increases the amount of biomass that can be profitably recovered from a forest operation.

The second part of our research project will develop cost/supply curves for various potential utilization centers in the study area. We will use updated debris ratio data from the first phase of our research to estimate how many tons and at what cost per ton is available for delivery to Forks, Wash., for example. We will produce this data for five-mile radius circles radiating out from the delivery point. Within the first five miles there will be so many tons of biomass available at a certain cost. Within 10 miles the amount available will likely increase, but so will the cost. Theoretically, the further out from the delivery point, the greater the cost per delivered ton, but the greater the supply.

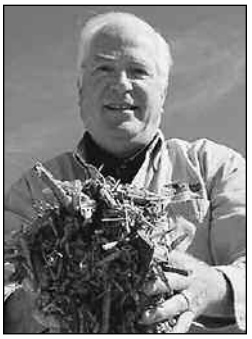
In reality, any financially viable wood-to-energy plant must assume a zero, or almost zero price to be paid to the landowner for the woody biomass. Production costs associated with gathering, processing (grinding), and trucking woody biomass from a forest operation to a power plant and total supply is nearly always the limiting factor that determines the financial viability for a woody biomass power plant. Energy value of woody biomass is relatively low compared to its bulk density. A pile of logging slash is mostly air—usually about 80 percent. Grinding at the logging site increases density and reduces cost per ton to transport. Still, there is usually so much cost associated with accumulating, grinding, and hauling forest debris that there is little margin to pay the landowner any significant amount per ton to purchase the material.

Preliminary estimates for recoverable woody biomass from a clearcut operation in second-growth coastal forest of the Olympic Peninsula indicate that between 20 and 40 green tons per acre may be recoverable. Most forestland managers in the Olympic Peninsula of Washington state are making woody biomass available as a by-product of otherwise viable forest management operations—the fact that biomass collection is occurring on the Olympic Peninsula does not tip the scale of financial viability for a forest operation. Most forest managers view providing biomass as a way to avoid cost that would normally be associated with slash disposal. Some may expect a token "stumpage" for the biomass—usually about $1 per ton. Still, as slash disposal options become less available, having someone take care of the slash by way of woody biomass collection can be an important way to avoid land management costs. ◆

At the time of this writing, John M. Calhoun was director, UW Olympia Natural Resources Center, in Forks, Wash. He retired December 31, 2010, and can be reached at jcalhoun@centurytel.net.

Forest Biomass Markets: Economics and Policy Primer

BY JAY O'LAUGHLIN



A market is simply where the owner of a good or service interacts with someone who wants it and a price is determined. Biomass is any organic material derived from plant and animal growth. Forests can supply woody biomass, which is defined differently in various government agency reports and public policies, creating some confusion. Forest biomass consists of logging slash (tops and branches) and precommercial thinnings (small trees with no value). Forest biomass is what most people mean when they talk about woody biomass. The boles of sawtimber-sized trees are wanted by facilities that manufacture lumber and other wood products, but who wants forest biomass? Can foresters help turn slash and trash into cash? Not likely, but if you could find someone to haul away this "waste wood" to an energy production facility, you would avoid the cash outlays and environmental impacts associated with slash burning.

What opportunities for forest biomass utilization exist? The closer a forest is to a facility that uses wood to generate heat, power, or combined heat and power co-generation ("co-gen"), the more likely it is that forest biomass will have cash value. If you work with private landowners you should know whether any biomass conversion facilities are operating or being planned within a reasonable hauling distance from their property. Some examples follow.

Lumber producers already have enough sawmill trimmings to provide an energy source for mills and dry kilns. Some mills also burn these residues to generate electricity (biopower). A sawmill will have little interest in forest biomass unless they are producing biopower, too. Many mills plan to install co-gen facilities, and several stand-alone, wood-fired biopower plants are also in the planning stage comparable to Avista Corp.'s 46-megawatt facility in Kettle Falls, Wash. Public buildings that burn wood for thermal or heat energy are also a possibility. The University of Idaho has been heating the main campus in Moscow with residues from nearby sawmills for more than two decades, saving taxpayers upwards of $2 million per year by burning more than 20,000 dry tons of wood per year instead of natural gas. More than a dozen school buildings in Idaho and Montana have converted to burning wood, using subsidies from the U.S. Forest Service "Fuels for Schools" program. Public schools operate seasonally, and few will consume much more than 1,000 dry tons per year. By comparison, electricity generation takes considerably more wood, roughly 10,000 dry tons per megawatt of electricity, enough for about 1,000 homes.

How much is forest biomass worth? Not much. The price for forest biomass is generally negative, as it often costs more to collect, harvest, and transport waste wood to a biomass conversion facility than the value of energy that can be made from it. Electricity costs 10¢/kWh or more to produce from forest biomass, and the retail price for electricity in the region is less than 9¢/kWh. We enjoy the nation's lowest rates because hydropower costs about 3¢/kWh to produce, and electricity from burning coal only slightly more. If there is a biomass conversion facility within 50 miles of a forest site someone may be willing to collect and transport forest biomass. Beyond 50 miles, the conventional wisdom is that biomass cannot pay its way out of the woods. State and federal subsidy payments extend that range somewhat, and consider the "producer" of biomass to be entity that delivers it.

Biomass transportation subsidy programs. The state of Oregon provides tax credits of $10 per green ton and Washington $5 per green ton to move biomass from the woods to an energy production facility. (A rule-of-thumb is green wood is 50 percent moisture content, so on a wet-wood basis it takes two green tons to make one dry ton.) Federal subsidy payments are available to support the collection, harvest and transportation of forest biomass. The federal BCAP (Biomass Crop Assistance Program) was authorized in the 2008 Farm Bill to provide matching cash payments of up to $45 per green ton. When it operated between November 2009 and March 2010, BCAP paid out more than $200 million across the country, but due to some problems, including diversion of some sawmill residues from composite panel production facilities to bioenergy plants, BCAP was suspended between March and October 2010 while new rules were written to redefine eligible biomass and qualified biomass conversion facilities. Mill residues are no longer considered eligible for the BCAP subsidy. All facilities that previously were qualified must reapply for that status. The current list of qualified facilities can be found on the Farm

Service Administration's BCAP webpage, along with most everything else you should know about BCAP: www.fsa.usda.gov/FSA/webapp?area=home&subject=ener&topic=bcap. Another source of information is available at farmenergy.org/tag/bcap.

Because wood can be converted to synthetic gas ("syngas") or ethanol, shouldn't forest biomass be worth more? During World War II more than one million trucks ran on wood in Europe because other fuel was unavailable. Burning wood in a small water-cooled furnace in the truck bed produces gases that are routed into a conventional internal combustion engine. This is not a practical alternative to petroleum-based transportation fuels. Cellulosic ethanol is an advanced technology that has been, according to some pundits, only five years away from becoming a commercial reality for the past 20 or 30 years. Despite government policy mandates and grant monies, converting wood to ethanol or other liquid fuels still seems years away from producing a viable transportation fuel.

How much, or little, material is needed to enter the market? In some areas biomass markets are well established; in others, a market may be developing. Forest biomass is more of a waste management problem than a money-making opportunity.

Northwestern states require slash disposal to various degrees depending on circumstances, so after a timber harvest landowners may need to get rid of branches, tops, and other debris considered a fire hazard. Biomass collection therefore should be viewed more as a waste disposal service than a money-making opportunity. There are tradeoffs to think about for soil productivity purposes. Foresters should be able to tell if there is a sufficient quantity of forest biomass to make it worthwhile for someone to haul it away and thereby relieve landowners from the costs of slash burning, and a close working relationship with logging contractors will provide the information needed. Foresters need to inform landowners not only about potential damage to soil productivity from biomass harvest, but also the cost of collecting forest biomass. Foresters should be up-to-date on potential opportunities to collect and transport forest biomass waste wood along with merchantable timber, and know about subsidy payment opportunities.

How does the government encourage forest biomass markets? About two percent of the energy consumed in the U.S. is produced by burning wood, which currently rivals hydropower as the largest source of renewable energy. Most wood bioenergy is from sawmill and pulpmill residues used to produce heat and/or electricity. Currently, there are more barriers than opportunities for additional energy production from woody biomass, with coal and natural gas still relatively inexpensive by comparison. Woody biomass-to-energy will likely continue to function mostly as a byproduct of value-added wood use. New opportunities for utilization of forest biomass will depend on government subsidy programs to encourage the construction of new facilities as well as reducing collection and transportation costs. Using forest biomass for energy production provides additional benefits to society from improved forest conditions and reduced wildfire risk, and from the jobs necessary to move this material from the woods to a biomass conversion facility. This "triple win" from forest biomass utilization—improved forest conditions, energy feedstocks, and jobs—creates a rationale for state and federal subsidy programs.

Future outlook. In their 2008 outlook report, the U.S. Department of Energy's Energy Information Administration (EIA) foresees average annual growth of almost five percent per year in the utilization of woody-biomass-for-energy production between now and 2030. The most rapidly growing segment of the biomass energy sector is expected to be cellulosic ethanol, rising from zero output today to 0.43 quadrillion Btus (British thermal units) in 2030. However, I expect forest biomass will not be as significant a feedstock source as switchgrass and short-rotation woody crops such as willows and poplars. The EIA also projects significant growth in co-firing wood with coal as well as stand-alone wood-fueled biopower plants, which by 2030 are both expected to produce more energy than cellulosic ethanol (0.8 and 0.6 quadrillion Btus, respectively). These forecasts imply not only increasing demand for forest biomass, but competition for it. ◆

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Biomass Harvesting from a Contractor's Perspective: Taking a Risky Proposition to Market

BY MARK STANDLEY

In December of 2007, a large windstorm hit the Northwest and thousands of trees were knocked down in the process. Twenty years ago, these trees would most likely have sat and been allowed to decompose back into the ground. Instead, crews were taking this otherwise worthless wood and converting it into useful biomass.

Biomass seems to be the new buzzword in the timber industry. After logging for almost 15 years, I can be honest by saying that when I first heard the idea of harvesting biomass, I thought it was risky. I am currently the operations manager for Bighorn Logging, which has been in the business for over 30 years in northwest Oregon. When I first heard about us branching out in to biomass, I never thought it would go anywhere past an idea. Trying to make money off of brush? We'll try anything once. Flash forward three years and I am now also operations manager for Biomass Harvesting, LLC.

We started off buying a Peterson 4710 grinder and a few trucks with trailers; we worked by trial and error and had several challenges in the beginning. The first was just finding drivers that could handle a 48-foot chip van on logging roads. It takes a special driver to do this: Not only do you need to know how to maneuver around the corners, but you need to know how to load your truck on steep slopes so that your trucks are legal when they hit the highway. Another challenge was learning how to stagger the trucks so that the grinder runs at its full capacity. Our grinder burns 25 to 30 gallons of diesel an hour. At that rate, it is crucial that it is running precisely. Every minute counts and a lot of different things can go wrong: trucks can get tied up at the mill, stuck on a logging road or even break down.

We finally got our trucking situation figured out to where it worked best for us, but we still faced challenges. The next problem was figuring how to keep enough material in front of the grinder to keep it constantly running. It takes 15 to 20 minutes to load a trailer, which translates to producing 15 to 20 loads per day. Each load in the trailer equals about 27 green tons. These figures were important for us to learn, but then immediately led us to another problem. We have found that we can produce more than markets can bear right now. We are optimistic that new and enhanced markets will come online in the future.

There are several things to consider when getting ready for biomass harvesting. I think the most important thing is that landowners need to prepare for biomass harvesting in their plans while harvesting timber. Even if you aren't considering harvesting biomass in the near future, it is much easier to be well prepared if you change your mind later on. For instance, when putting in road systems, think about adding turn-a-rounds and making the road a little wider than you normally would. It's also important to think about slash piles when crews are finishing jobs. When the timber harvest is complete, consider placing the piles 40-60 feet off of the road, if practical. By placing them in these locations, it will be easier for the chip vans to access and it will save money in the end. Additionally, it makes it possible to replant if you need to, but save your biomass for good weather or better markets. These biomass areas can be replanted at a later date. The cost for replanting will be minimal and easy to plant, being so close to the road.

Yes, biomass is useful for creating energy, but I think it is more helpful for the landowner in another way. By cleaning up the slash piles, it creates a bigger area in your unit that can be replanted. This really makes you think about the positive effect of harvesting biomass once you start adding up the amount of space that each pile's 'footprint' takes up and each acre that you can gain back to plant new seedlings. These replanted trees will be the cheapest to log when it is time to harvest. Also, landowners don't have the added worry that burn piles bring; they don't have to worry about a wildfire getting out of control.

I foresee more challenges with biomass harvesting in the future as well,

PHOTOS COURTESY OF MARK STANDLEY

A before and after photo of a biomass harvest.

but I am confident that solutions will be found for them also. For example, I imagine that there will be an issue created because by taking away the rotting wood, some will say we are also taking away nutrients for the new seedlings to be planted. I also see a possible solution to that would be finding a way to transport the ash, which still contains nutrients, back to the forests once it has been used to create energy.

Some people say that biomass harvesting will never get off its feet. I went from thinking this was a risky idea to where we are today: that this is one of the best management practices to hit the timber industry in a long time. Once new markets come online I think biomass harvesting will become profitable for small landowners. I would strongly suggest that landowners put it into their future timber management plans. If the actual product isn't profitable, the value of the trees planted in place of the slash is worth it. I also think that the extra carbon that is sequestered from harvesting the slash, rather than leaving it in piles, makes for a better tree farm. The biomass harvesting industry is new, but will be a big part of the timber industry in due time. ◆

Mark Standley is operations manager for Biomass Harvesting, LLC, in Banks, Ore. He can be reached at jrstandley@comcast.net or 503-324-2422.

Is Woody Residue Part of Your Plan for Sustainable Forestry?

BY DEBORAH PAGE-DUMROESE

The answer to the title question should be "yes"!

Currently, there is a lot of chatter about sustainable forestry and alternative fuels, including conversion of wood to bioenergy. At first glance it may seem like there is a conflict—how can removal of woody biomass be sustainable? Whether you are a small woodlot owner doing sustainable harvesting, looking for rotational forest products, chasing bioenergy products, or looking to use forest "waste" left from thinning or harvesting, one question I am repeatedly asked is "How much woody material should I leave on my forest site?"

First, let's look at the role of woody residues in forested ecosystems. Woody material basically comes in two forms: coarse woody residue (> seven inches in diameter) and all the smaller materials (fine woody residue). Understanding the ecological role of each component can help you form Best Management Practices (BMPs) for your particular site(s) and understand not only how much woody residue to leave, but why.

Coarse woody residues. Coarse woody residue is defined as wood greater than seven inches in diameter and is usually laying on the soil surface, but can still be standing as a snag. Coarse wood can be added to a site during logging or when the snag falls.

Ecologically, coarse woody residues function as habitat for a variety of organisms, including fungi, mosses, liverworts, insects, amphibians, reptiles, small mammals and regenerating plants. In cool climates, downed logs act as nurse logs for seed germination and establishment, and their absence could significantly alter natural regeneration patterns. Birds forage, nest and hunt in and on dead wood. Coarse wood affects ponding, sediment trapping and aeration in streams. In addition, coarse wood can alter site water balance and water quality, both through storage and release of water, and by reducing runoff and erosion. Coarse woody residue is commonly used during harvest operations to protect wet soil areas from compaction and rutting, and is used post-harvest to help limit runoff and erosion from skid trails and forest roads. Coarse wood amounts on any given site are naturally regulated by local climatic regimes, which determine decomposition rates. As woody debris decays, it eventually forms soil wood (covered by mineral soil and forest floor material), where it helps to improve cycling and increases water-holding capacity. This slow incorporation of woody material into the mineral soil may improve soil properties over the long term and influence tree growth over time. However, many sites in the western U.S. have a short fire return interval that can consume a portion of the coarse woody debris along with other surface fuels, and therefore you may need to adjust the amount of residues left based on recent fire activity.

Fine woody residues. Fine woody residues are usually defined as that portion of harvest residues that is less than seven inches in diameter and often is less than three inches in diameter. Ecologically, it adds soil cover that can reduce soil erosion, moderate soil temperatures, and on some sites it may increase soil nutrients. However, there are few long-term studies on the role of fine woody residues and their importance in a variety of forest types and soils. The scattered results that are published indicate that in general, intensive harvesting and removal of small-diameter residues do not universally reduce site productivity. However, on some sites, repeated harvest cycles that remove all of the fine woody residue can cause substantial growth declines if not mitigated. On some Pacific Northwest forest sites, nitrogen (N) is limiting, but often have an adequate supply of other nutrients, so that even repeated intensive removals of fine woody residues will not induce nutrient deficiencies. Therefore, in dry or cold forests where N cycling is slow due to climate, N losses in harvested materials may substantially reduce productivity by lowering decomposition and N mineralization rates. In addition, for sites with little slope and little compaction concern, there will likely be sufficient woody biomass on the soil surface to mitigate erosion and compaction concerns. This general lack of site-specific information is a topic for continued research to identify particular forest and soil types where potential nutrient deficiencies may be exacerbated by biomass harvesting or how forest residues might influence local site productivity.

Strategies to help offset biomass use or nutrient losses should also be developed on a site-specific basis. For instance, fertilization is a common treatment used primarily to increase forest growth, but can also be used to mitigate nutrient removals from biomass harvesting. Based on the ecological- and productivity-related roles of woody residues and the constraint that some landowners may not want or be able to fertilize to lessen potential productivity losses from biomass removals, some level of woody material (large and small) should be retained to protect these functions.

"How much should I leave?" One good rule of thumb is to retain the same amount of coarse and fine woody residues that is there pre-harvest. However, because dead wood is important for many ecological functions and the amounts of residue needed to perform these functions varies widely across climatic, geologic and vegetation gradients, a single retention percentage or amount should not be used as an actual guideline; actual retention guidelines should be developed at the local level. It is relatively easy to determine how much coarse and fine woody residues are present on the soil surface before harvesting. If a site has been heavily impacted or is not subject to a short fire-return interval, than leaving additional material behind could help improve long-term soil quality.

Best Management Practices. There are numerous reasons to develop BMPs for site-specific land management objectives, but the bottom line

PHOTO COURTESY OF DEB PAGE-DUMROESE

Large material can remain on the soil surface for decades, depending on local climatic regimes.

still comes down to "How much should I leave?" Opportunities for BMPs are mostly common sense: limit logging when the soil is wet, match equipment to the site, use winter logging to minimize ground disturbances, leave the stumps in place, and don't create large slash piles for burning. Minimizing the size of slash piles to < 15 percent of the total land area harvested will also help keep soil impacts confined. Long-term research indicates that the key to sustainable forestry is to keep the surface organic horizons (fresh and decaying organic matter) intact so you can maintain nutrient cycling and moisture retention, and prevent erosion.

Leaving coarse woody residues will likely not increase tree growth per se and fine woody residue removals can be altered relatively easily, so the ecological, long-term forest sustainability and state forest practices acts are probably the most important considerations for how much residue to leave behind. Several states have released guidelines that address the functions of both coarse and fine woody residues. Most of the guidelines were developed for general timberland conditions, with some additional restrictions for special areas such as critical plant or animal habitat, shallow soils or steep slopes, riparian areas, or other ecologically sensitive areas.

For example, Maine requires all coarse woody material existing prior to harvest to be retained after harvest, and at least 20 percent of the finer-sized logging residues less than three inches in diameter should be retained.

PHOTO COURTESY OF CAROLYN NAPPER

The most important role of fine woody residue may be to limit mineral soil compaction by providing a mat to drive on.

Minnesota requires 20 percent of the logging residues to be retained and scattered throughout the harvest tract. Pennsylvania's guidelines call for 15-30 percent of the harvestable biomass to be retained, while Missouri calls for 33 percent retention. Sensitive sites and soils are protected similarly. Minnesota suggests avoiding biomass harvesting in areas with threatened, endangered or otherwise sensitive plant or animal habitats, from within riparian management zones, on certain organic soils, and on shallow soils with aspen or hardwood cover types. In general, indications are that retaining 30 percent of fine woody residues on slopes less than 30 percent and 50 percent retention on steep slopes is a reasonable and conservative estimate of the amount of material needed to maintain biodiversity, prevent erosion and compaction, and build soil organic matter where possible. Overall, the trade-offs to consider are the potential for wildfire, erosion, invasive weeds and planting spot quality vs. the potential for nutrient-pool limitations induced from removing too much biomass.

On many sites before harvest operations begin, you can develop your own BMPs based on soil nutrient levels, depth of the mineral soil, amount of rocks, and local climatic regimes (rainy, cool, hot, dry, etc.). Bole-only harvesting removes about five percent of the N pool (above- and below-ground biomass and mineral soil), whereas total tree harvesting removes about 10 percent of the N pool. As the amount of N removed increases, the risk of a negative impact on nutrient supply and tree growth also increases. Removing the bole only poses little risk for productivity losses, while the risk of removing total-tree biomass depends on how much of the nutrient pools is removed relative to the initial pool level, which is soil-type dependent. Ecologically, it is important to leave both coarse- and fine-woody residues after harvest operations, but you should understand why leaving this material on your site may or may not increase the inherent productivity of the soil or change tree growth during the current rotation. Knowing if your soil is limited in N or other nutrients can help you determine how much fine or coarse woody residue will benefit your land. ◆

Deborah Page-Dumroese is a research soil scientist for the Rocky Mountain Research Station in Moscow, Idaho. She can be reached at 208-883-2339 or ddumroese@fs.fed.us.

For Further Reading

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Page-Dumroese, D.S., M.F. Jurgensen, T.A. Terry. 2010. Maintaining soil productivity during biomass harvesting in western forests. WJAF 25(1):5-11

Austrian Biomass Trading Centers Might Show Promise in the U.S.

BY BOB PARKER AND SCOTT BAGLEY

Bob Parker

Scott Bagley

Forest biomass presents opportunities and challenges for private and public woodland owners here in the U.S. and other places around the world. We certainly have a lot of it, but figuring out a way to extract and utilize a product that currently has limited marketability and low economic value is so far a mostly elusive goal for many of us. However, while traveling in Austria this past June prior to attending the IUFRO 2010 conference in Bled, Slovenia, we learned how several small woodland owner cooperatives are successfully forming and operating enterprises that provide wood heat systems for municipal buildings, businesses and private residences. There are, of course, significant differences between their circumstances and ours, but we also have much in common and therefore it may be beneficial to review their model and consider whether it would make sense to adopt some of those concepts.

The enterprises we visited are called *Biomassehofs* or biomass trading centers (BTCs) and are the result of the genuine grassroots bootstrapping efforts of small woodland owners and woodland owner cooperatives. You can learn more about BTCs at http://nuke.biomasstradecentres.eu/.

The BTCs all use the same logo and cooperatively fund a branding and marketing campaign. The BTCs have strongly focused on building and marketing an image as a reliable, trustworthy provider of high-quality fuel. Their chips aren't the cheapest available on the market, but their customers know they will be taken care of very well and are willing to pay a premium price for the guarantee of a consistent and reliable supply of a high-quality product, and first-rate service.

And it is not an overstatement labeling the BTCs as grassroot efforts. The first center we visited near Hartberg began with the efforts of Walter Reithmayer, a single woodland owner who on his own researched wood heating systems, knocked on doors and convinced people to switch to wood heat, and organized a local woodland owner cooperative enterprise to build and operate a Biomassehof.

Here's how the cooperative model works at the Hartberg and other BTCs. Members of the cooperatives each contribute cash to the enterprise, and the amount contributed depends on the number of members, but varies from a couple thousand to 10,000-20,000 € (Euros) each. The members' cash buys them shares in the cooperative at 500 € per share and each share gives the purchaser rights to sell 10 m^3 to the biomass trading center, so larger landowners can buy more shares, smaller landowners buy fewer as meets their needs. When profitable, profits are returned to cooperative members through higher log prices than are paid to non-members. As an example, members currently receive 18 € per m^3 while non-members receive only 12 € per m^3.

One of the facilities we looked at cost around $600,000 in U.S. funds, which was financed fairly equally through membership investment, government grants and bank loans. The facilities sell about 10,000 m^3 of chips per year at approximately 22 Euros per m^3 and 1,000-1,500 m^3 of firewood blocks per year at roughly an average of 64 Euros per m^3. That works out to around 186,000 Euros/year gross revenues or $225,000.

All the cooperatives we looked at manufacture wood chips and firewood blocks only, not pellets or other more highly processed products. Chips have the advantage of requiring minimal processing, are easy to manufacture and dry, easy to deliver, and by all accounts work flawlessly in systems that require no work on the part of the customer. The customer just sets the thermostat and the system does everything; any required maintenance is performed by the cooperative. Wood chip heating systems are growing rapidly in popularity, which is a good indication as to how well they work and their cost competitiveness against other fuels.

Wood delivered to the biomass trading centers includes material from the size of branches up to fairly large (24") logs. The cooperatives rely on machine sharing for the chipping process, so rather than own their own chipper, a local contractor provides the service.

PHOTO COURTESY OF BOB PARKER

Log inventory at one of the biomass trading centers—everything from logs to branches.

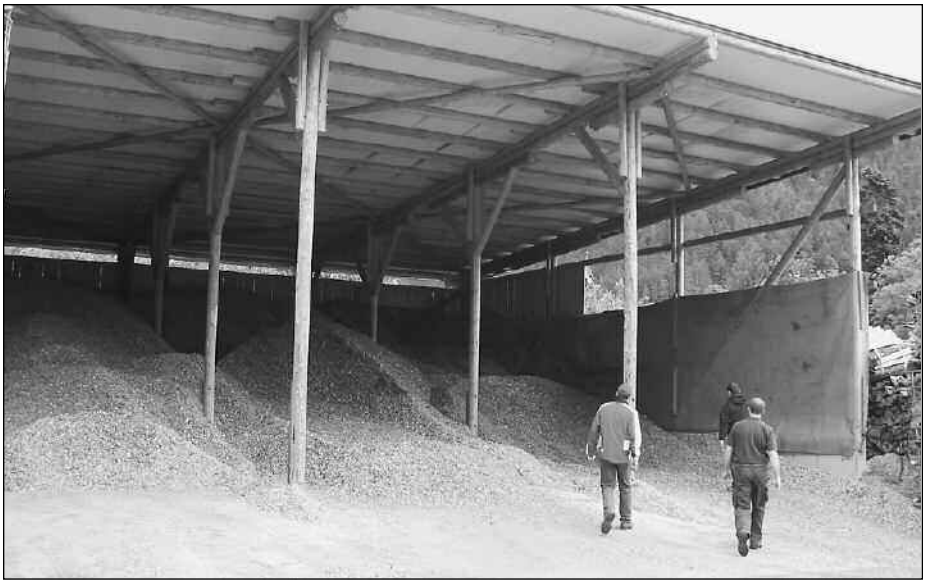

PHOTO COURTESY OF BOB PARKER

Chips are dried and stored in bays.

The chips are blown into bays, which have grates in the floor, and ambient air is blown up through the chips, drying them to an acceptable moisture content in just two to three days.

The cooperatives generally own the furnace and related equipment, then leases the cellar or outbuilding space where it is housed from the customer purchasing the energy. A key component for acquiring additional financing is the ability to secure 15-year supply agreements with the customers. The cost of heating with wood chips compares favorably with using fuel oil and the customers' bills include a comparison between what they paid for chips versus what the same energy would have cost using fossil fuels.

The installations we visited utilized a centralized wood chip fuel boiler heating system with underground piping of hot water to three or four individual customers. In these instances, the expense of installing the underground piping represents a substantial initial capital cost, but has proven to be profitable when the amount of piping is kept modest. There are other examples of bigger systems, known as "district heating," but we did not have a chance to visit any of the more substantial and complex systems. However, Austria has well over 1,000 such facilities.

The Austrian Biomassehof model seems to be working well for them and that model, or parts of it, might also work here at home. We certainly have a lot of folks with the necessary entrepreneurial drive and commitment to work together. And we sure have no shortage of biomass that if utilized economically would provide much needed jobs, income and land management benefits. But determining what kind of enterprise model will work for us requires a careful analysis of:

- Organizational structure—cooperatives, LLCs, other types of corporations, public-private partnerships, or something else?
- Stand-alone BTC or combine with other related forest enterprises, such as post and poles, small-scale sawmilling, electrical generation, or other?
- Potential raw material supplies—availability, ownership, volumes, harvest schedules, distances, etc.
- Customer preferences.
- Total cost analysis of processing, transporting and utilizing hog fuel vs. chips, vs. pellets vs. something else?
- Financing options.

The best final model will be one that fits all the unique circumstances of a community, but whatever it looks like, the bottom line is that each forest community will have to roll up their sleeves and jump in with both feet to be successful. Fortunately, there are sources for funding and technical expertise we can tap into—as well as best practices examples to learn from—but success will only come through dedicated and sustained grass-roots community efforts. ◆

Bob Parker is an OSU extension forester in Baker and Grant counties in Baker City, Ore. He can be reached at 541-523-6418 or bob.parker@oregonstate.edu. Scott Bagley is program director for the National Network of Forest Practitioners in Athens, Ohio. He can be reached at 740-593-8733 or scott@nnfp.org.

Alaska Community Benefits from Wood Energy Project

BY MAGGIE ROGERS

The remote Alaska community of Tok is located within a dense forest of flammable black spruce trees, where wildland fire is at the heart of the boreal ecosystem and poses a constant threat to homes and the town. The community has made big strides to reduce this fire risk through implementing Firewise-related fuels reduction projects, and turning the harvested biomass into energy for heating the Tok School. Alaska winters are cold, but the children going to school in Tok are now warmed by the very trees that were removed to protect them from summer wildland fires, and they are wiser about the immense boreal forest in which they live.

On October 29, 2010, the woodchip-fired boiler at the Tok School was lit for the first time. If the school's heat wasn't coming from woodchips, it would be coming from burning 65,000 gallons of costly fuel oil each year. Three years ago, the price of fuel in Alaska skyrocketed to over $3.00/gallon, and it remains high. Money that would otherwise be put toward the kindergarten-12th grade education in Tok was being used for oil-fired boilers to provide the school's heat and hot water. The high cost of fuel oil weighed heavily on Tok residents and created the incentive to integrate community-based forest management with hazard fuel reduction to create a local energy source.

In 2006, several entities in Tok worked together and developed a Community Wildfire Protection Plan (CWPP). In the CWPP, the school was identified as the community evacuation center, but it turned out to be one of the most dangerous places to send people because of the dense forest surrounding it and there being only one access road. The school board recognized that something had to be done and approved the thinning of 50 acres around the school.

The forest does not end where Tok begins; the dense trees continue through even the most developed parts of town, totaling almost 40,000 acres of continuous fuels that are ready to burn. Human-caused fires also pose a threat. Recreational fires, off-road vehicles, open burning, and a range of other human activities serve as potential sources of ignitions, especially in the wildland urban interface. Developing a use for the hazardous forest fuels helps offset the cost of fuel reduction projects, enabling more acreage to be treated.

PHOTO COURTESY OF ALASKA DEPARTMENT OF FORESTRY

Students from the Tok School hold up woodchips that are used to fire the boiler.

PHOTO COURTESY OF ALASKA DEPARTMENT OF FORESTRY

A new tree has been added to the Tok school grounds.

The Division of Forestry worked with the Alaska Gateway School District, the Alaska Energy Authority, and CTA Architectural and Engineering to submit a successful application for a $2.5 million renewable energy grant from the State of Alaska for the woodchip boiler for the Tok School. In 2008, the Tok Community Umbrella Corporation obtained a $500,000 grant for a Rotochopper horizontal grinder to process the trees into burnable woodchips. Most recently, the Tok School received $345,000 from the Alaska Legislature for a reciprocating steam-piston engine. The piston will be powered by steam from the boiler to generate electricity to run the boiler and other processing equipment. Additional electricity will be used to help meet the school's needs, and work is being done with the local utility company to establish a power purchase agreement.

Now that the woodchip boiler has been lit, it will produce 4.5 million Btus/hour. It almost completely replaces the two oil-fired boilers; however, the oil-fired boiler system is fully intact and is set to come back online if the woodchip-fired boiler goes offline. The oil-fired boilers may also be required for limited heating on some of the coldest days of the year when temperatures can reach minus 60 degrees F or colder. The woodchip-

fired boiler will displace 90-95 percent of the oil usage and the money will be used for other purposes within the school district. This year, the school will save approximately $125,000 in the difference between the fuel oil and woodchips. The biomass transportation and processing also puts money directly into the local economy.

In a town as small as Tok (population of roughly 1,500), the school is also a community center. The project has created the opportunity to further educate students and community members about Firewise concepts and fire. The school is now a visual example of defensible space. Students are also learning about community/urban forestry concepts, healthy forest management practices, and forest science. "We have made a concerted effort over the past four years to educate kids about the science of forestry—how a forest grows, how fire plays a role in the ecosystem, what we use wood products for. We live in the midst of one of the largest forests in the world. Fires threaten our homes regularly," Jeff Hermanns, the area forester said. "Taking kids outside to put their hands in the soil and plant trees helps them to understand the process. Forests grow back, and the kids have a sense of ownership because they planted those trees."

Tok School's woodchip-fired boiler is a model for using local resources to reduce utility costs while supporting the area's economy. It has also paved the way for additional projects to begin. After all, who wouldn't be motivated by saving millions of dollars over the course of the next 30 years, protecting a community and its school children, employing local residents in the process, and promoting healthy forest practices and management? The once dangerous liability of the local fire-prone spruce forests is now the power of Tok's future. ◆

Project Cooperators

- Alaska Division of Forestry (Patricia Joyner, Community Forestry/Roger Burnside, Forest Health Protection)
- Alaska Energy Authority (Ron Brown, Project Manager)
- Alaska Gateway School District (Scott MacMannus, Project Manager/ Todd Poage, Superintendent)
- Owner's Representative (Rex Goolsby, Construction Administrator)
- Tok Community Umbrella Corp. (Kathy Morgan, President)
- Tok School (LeAnn Young, Principal)
- University of Alaska Fairbanks (Dr. Jingjing Liang, Asst. Professor Forest Management/Tom Malone, Research Forester)
- U.S. Fish and Wildlife Service Tetlin Wildlife Refuge (Peter Butteri, Fire Management Officer)
- USDA Forest Service PNW Research Station (Hans Andersen, Forest Inventory and Analysis)

Maggie Rogers moved to Alaska in 1999 to attend the University of Alaska, Fairbanks, and study Natural Resources Management. While attending the university, she began a career with BLM Alaska Fire Service in Public Affairs, until accepting a job with the Alaska Division of Forestry. She has spent four years working for Forestry as an information officer. She can be reached at maggie.rogers@alaska.gov. For information on the wood energy project, contact Jeff Hermanns, area forester, at 907-883-5134 or jeffrey.hermanns@alaska.gov.

We Remember

Ed Hartley

Ed Hartley, 84, SAF Admiralty Inlet Chapter member, died on October 14. He was born in Baltimore, Maryland, and served in the Army Air Corps and graduated from Yale University School of Forestry. He worked for Scott Paper Company from 1952 until his retirement in 1959.

Mr. Hartley had a passion for singing and channeled it through the four-part harmony of barbershop singing. He was a 57-year member of S.P.E.B.S.Q.S.A. (Society for the Preservation and Encouragement of Barbershop Quartet Singing in America). He directed the Anachords of Anacortes, Wash., and the Kennebec Valley Chordsmen of Kennebec Valley, Maine. He also sang with the Windjammers of Everett, Wash., and the Kitsap Chordsman of Bremerton, Wash.

He will live on in the hearts of all who knew and loved him and those fortunate enough to have crossed paths with him. Donations in his memory may be made to Harmony Foundation International, www.harmonyfoundation.org, or National Parkinson Foundation, www.parkinson.org, or a charity of your choice.

John Malone 1935-2010

John Malone, 75, passed away at his home November 10, following an extended illness.

He was born in Astoria, Ore., and spent his formative years near Portland and graduated from Sandy High School in 1953. He received a B.S. in Forestry from Oregon State University in 1958. He was then drafted into the U.S. Army and served in various locations, including Iceland. In 1960 he received his honorable discharge and started working full time for the U.S. Forest Service. He began his new career stationed at the Spirit Lake Ranger Station, at the base of Mount St. Helens.

In 1961 he married Patricia Ann Chilton and they split their time seasonally between a new home in Longview, Wash., and the ranger station at Spirit Lake. John was transferred frequently working in the Forest Service. In 1969, he and his growing family were transferred to the Sweet Home Ranger Station in Oregon. Finally, the family moved to Wenatchee in 1973. After a career of 33 years working for the Forest Service, John retired in 1993, and started a business as a consulting forester.

John had a passion for forestry and encouraged forest stewardship through his business and educational activities. He reached out to the community through his associations with the Society of American Foresters and as the president and founding member of the North Central Chapter of the Washington Farm Forestry Association. John's interests were varied. As a young man, he excelled at sports and these interests followed him throughout his life. Having grown up in a small town next to Mount Hood, John spent his early years working at a golf course, skiing, playing basketball, and fly fishing. As his children grew older, he liked to spend his free time coaching Little League baseball and basketball. He also enjoyed the challenges of bicycling as he toured Italy and completed a ride across the U.S. from Seattle to the New Jersey coast in 1997. At the age of 50, John competed in the Ridge to River Relay race as an Iron Man. In his golden years, John's interests included traveling and sports of all types, especially golf, tennis and cross-country skiing. Throughout, and particularly after retirement, John spent his free time enjoying, managing and protecting his private forestland. He received the Washington State Outstanding Tree Farmer Award in 2005.

Memorial donations are suggested for the John Malone Forest Stewardship Education Memorial Fund at the Family Forest Foundation, P.O. Box 1364, Chehalis, WA 98532, or the charity of your choice.

Ted W. Nelson 1931-2010

Ted W. Nelson is in Heaven sailing on calm seas with fair winds. He passed away November 8, 2010. He was born in McCloud, Calif., June 22, 1931. Though he had sailed since he was 12, his other love was forestry.

After two years at Pomona College, Ted transferred to the University of California at Berkeley, where he met his wife Sharlene, and graduated in forestry in 1954. He then spent two years in the U.S. Army at Fort Benning, Georgia, where he commanded a company as a First Lieutenant. Ted received a master's in Forest Business at the University of Michigan in 1957, joined the Society of American Foresters, and then began his forestry career. He and Sharlene moved to Lyman Springs, a remote logging camp in northern California, where Ted worked for Diamond Match Company marking timber and fighting fire. He later became the resident forester, managing thousands of acres of old-growth sugar pine. Both his son and daughter were born while the couple lived at the camp. Sharlene made it to Red Bluff's hospital in a car. Ted arrived later in a logging truck.

In 1964, Ted joined Weyerhaeuser Company and moved to Tacoma. He became involved in long-range planning and selling logs and lumber to Far East countries. He also helped set up a logging camp in Borneo. Ted made several moves in the U.S. as raw materials manager. While living in Longview, Wash., Mount St. Helens erupted and he helped the company's recovery after losing thousands of acres of timber in the blast. His last move brought him to Federal Way, Wash., in 1982. Here he continued his association with the Far East and retired in 1990 as a Weyerhaeuser Company vice president.

Still wanting the stimulation of an active mind, he and Sharlene began researching and writing nonfiction books. They wrote books about sailboat cruising, West Coast lighthouses, and children's books covering regional history. Ted served on The Forest History Society Board, took his grandchildren backpacking, joined the Tacoma Yacht Club and Tacoma Banjo Club, skied, and spent many happy days sailing.

Donations suggested to the Forest History Society, www.foresthistory.org, or U.S. Lighthouse Society, www.USLHS.org. ◆

Calendar of Events

Oregon/Washington State SAF Leadership Conference, Jan. 21-22, Hood River Inn, OR. Contact: Shaun Harkins, 541-267-1855, shaun.harkins@plumcreek.com.

Biomass as a Renewable Energy Source, Jan. 26, Portland, OR. Contact: The Seminar Group.

Forest Stand Dynamics Short Course, Jan. 31-Feb. 4, Pack Forest, Eatonville, WA. Contact: Barbara Ruth, 203-432-5117, barbara.ruth@yale.edu.

Mechanized Harvesting, Feb. 1-2, Corvallis, OR; March 22-23, Coeur d'Alene, ID; April 14-15, Boise, ID; May 5-6, Kamloops, BC. Contact: FEI.

Timberland Appraisal Seminar, Feb. 3, Beaverton, OR. Contact: Atterbury.

Basic Road Design Workshop, Feb. 8-11, Las Vegas, NV; April 18-21, Boise, ID. Contact: FEI.

TimberValue Seminars, Feb. 15 or April 12, Beaverton, OR. Contact: Tom Hanson, 503-201-4428, TJHanson@forestmgt.com.

Intensive Silviculture of Planted Douglas-fir Forests, Feb. 15, Portland, OR. Contact: WFCA.

Streambank Soil Bioengineering, Feb. 23-24, Portland, OR; March 9-10, Spokane, WA. Contact: WFCA.

Oregon Logging Conference, Feb. 24-26, Eugene, OR. Contact: Rikki Wellman, rikki@oregonloggingconference.com, www.oregonloggingconference.com.

Unit Planning and Layout, Feb. 28-March 3, Corvallis, OR. Contact: FEI.

Using ArcPad in Forestry, March 9, Beaverton, OR. Contact: Atterbury.

Professional Timber Cruising with SuperACE, March 10-11, Beaverton, OR. Contact: Atterbury.

Tree School Clackamas, March 19, Oregon City, OR. Contact: OSU Extension, 503-655-8631, http://extension.oregonstate.edu/clackamas.

Small Log Conference 2011, March 23-25, Coeur d'Alene, ID. Contact: 406-529-3353, janraulin@gmail.com.

Helicopter Logging Workshop, April 1, Coeur d'Alene, ID and April 22, Boise, ID. Contact: FEI.

Washington Farm Forestry Association annual meeting, April 14-16, Vancouver, WA. Contact: Bob Brink, 360-686-3524, farmerb@pacifier.com.

Carbon Credits, April 21, Seattle, WA. Contact: The Seminar Group.

Western Forest Economists annual meeting, May 11-12, Welches, OR. Contact: WFCA.

OSAF/WSSAF joint annual meeting, May 11-13, Portland, OR. Contact: Bob Deal, general chair, 503-808-2105, rdeal@fs.fed.us.

Contact Information

Atterbury: Atterbury Consultants, 3800 SW Cedar Hills Blvd, Suite 145, Beaverton, OR 97005, 503-481-4191, dsandefur@atterbury.com, www.atterbury.com

FEI: Forest Engineering Inc., 620 SW 4th St., Corvallis, OR 97333, 541-754-7558, office@forestengineer.com, www.forestengineer.com.

The Seminar Group: P.O. Box 523, 18850 103rd Avenue SW, Suite 123, Vashon, WA 98070; 800-574-4852, info@theseminargroup.net, www.theseminargroup.net.

WFCA: Western Forestry and Conservation Association, 4033 SW Canyon Rd., Portland, OR 97221, 503-226-4562, richard@westernforestry.org, www.westernforestry.org.

Send calendar items to the editor, *Western Forester,* 4033 SW Canyon Rd., Portland, OR 97221; fax 503-226-2515; rasor@safnwo.org.

Oregon and Washington Join Forces to Bring Together Joint Annual Meeting

BY MIKE CLOUGHESY

Keeping Forestlands in Forest is the topic of this year's joint OSAF/WSSAF annual meeting.

Foresters understand the importance of keeping forestlands in forests, and we also have a lot of ideas on how to make this happen.

The meeting, hosted by the Portland and Longview chapters, will be held at the Jantzen Beach Red Lion in Portland on May 11-13.

Wednesday, May 11 will start with OSAF and WSSAF Executive Committee meetings in the morning. The afternoon general session will feature keynote presentations by Matt Donegan (Forest Capital Partners), Sally Collins (USDA Office of Ecosystem Services–retired), Dave Cox (Mason, Bruce & Girard–retired), and Michael Goergen (SAF National Office).

Wednesday concludes with an evening ice breaker reception. A full array of forestry and wildlife vendors will be featured at the reception and breaks, as will a poster session. A raffle benefiting the Foresters' Fund, OSAF Foundation and WSSAF Foundation will take place throughout the meeting.

Thursday, May 12 opens with an Alumni/Pep-up Breakfast and features four half-day concurrent sessions and a full-day symposium. The morning concurrent sessions will focus on "Maintaining Forests through Improved Forest Production" and "Developing Ecosystem Services Markets." The afternoon concurrent session covers "Enhanced Forest Products Markets" and "Crafting Public Policies to Prevent Land Conversion." Speakers from both states will address these topics. The full-day symposium on Wildlife in Managed Forests examines the importance of working forests as wildlife habitat. The symposium is cosponsored by the Oregon and Washington Chapters of The Wildlife Society in addition to the OSAF and WSSAF. All concurrent talks will be held in adjacent rooms and timed to allow participants to move from session to session.

The joint Awards Banquet will be held Thursday evening.

Friday, May 13 opens with breakfast business meetings for OSAF and WSSAF, followed by field trips. Participants will have a choice of four field trips that will focus on 1) forest management; 2) forest products; 3) forests and wildlife; and 4) ecosystem services.

For more information, including a detailed program, visit www.forestry.org. Look for registration information in February.

You won't want to miss this opportunity to join hundreds of natural resource professionals to exchange ideas, share professional expertise, and learn about the latest technologies and research, all with an eye on keeping forestlands in forest. ◆

Mike Cloughesy is program chair for the joint OSAF/WSSAF annual meeting and chair of the Oregon SAF. He can be reached at cloughesy@ofri.org.

Membership Campaign and Finances on Council Agenda

BY CLARK SEELY

Since our last report to you, under the leadership of President Mike Lester, the SAF Council has met twice—once at the national convention in Albuquerque in late October and most recently December 4-5 at the national headquarters in Bethesda. All Council members and officers were present at both meetings. This report will include information from both meetings.

Membership and financial status continue to be at the forefront of Council and staff concerns. The Council and officers attended the two-day House of Society Delegates meeting in Albuquerque to listen to the discussions and thoughts about membership, dues, and other revenue ideas, and to receive input from this important governing body of SAF regarding possible future dues rate changes. Subsequent to the HSD meeting, these topics were the primary discussion topics of Council at both the October and December meetings. Considering the input of HSD, input gained from members by individual Council representatives, and further analysis by staff, Council wants to continue to provide information to members regarding revenues, costs, and the overall financial situation of SAF, and wants to continue to explore membership and other revenue opportunities, and thus did not take formal action on dues rate changes. Look for continued information and opportunities for dialogue in early 2011.

Given the current membership situation in SAF, national staff is proposing a targeted membership campaign beginning in 2011. The campaign is intended to meet the needs of membership recruitment and retention at the chapter, state, and national levels. Initial concepts have been reviewed by Council, but additional discussion and review by a short-term task force will be done in early 2011. Input from membership chairs from around the country will be important to craft a meaningful set of efforts. Once again, the Northwest Council representatives urged the re-formation of a national membership committee to help guide this and future efforts, and Council will also consider that idea in 2011. Two elements of the campaign were approved by Council to get the ball rolling: (1) a new membership recruitment incentive program for 2011, where a current member will receive $10 off their annual dues for every new professional member recruited; and (2) a national survey of prospective and current SAF members on values, member needs, and satisfaction with SAF services to help shape further membership efforts and program delivery.

The new national membership database system will go live the first week of January with training available by webinar to chapter and state society leaders and membership chairs. The new system is web-based, and will greatly enhance individual members' ability to see and manage their own SAF membership information, including CFE program information. It will also provide SAF leaders with valuable tools for membership planning, reporting, and communications, including the ability to integrate with email systems for targeted or mass communications with members or committees/working groups.

Forest policy work at the national level continues to be intense and very comprehensive given the national debates and discussions around biomass utilization, biogenic CO_2 emissions, climate change, the USFS revised planning rule and stewardship contracting regulations, the Clean Water Act lawsuit in Oregon and other current topics. National policy director Erica Rhoad and the national policy committee continue to do outstanding work on our behalf, and clearly, our voice is heard amongst decision makers.

With input gained by a work session at the October HSD meeting, Council has revised the national strategic plan and strategic actions for 2011 as part of its annual planning process. This is an important step to keep the national strategic planning effort as a "living process" that is current and vital. Continued emphasis is given to membership needs, outreach and communications, financial stability, policy efforts and science-based credentialing, and member services. The revised plan should be available online by early 2011.

The 2010 national convention in Albuquerque was a significant success, both from an attendee satisfaction perspective as well as a financial perspective. Survey feedback indicates that the program, activities, and venue were well received by the nearly 1,500 attendees, and on the financial side, revenues were higher than forecast and expenses were less than budgeted.

Council reviewed and endorsed changes to how the national student representation process works to better engage student leaders at the national level. The changes will be important for developing student leadership in SAF in the coming years, and encouraging better coordination of student activities with national convention efforts and the efforts of Council over time.

On a personal note, this is my final Council update to you as I complete my three-year term. It has been a true honor and privilege to serve and represent you over these past three years, and I very much appreciate all the feedback, discussion and support that I've had from you. Your involvement in the profession is vital for our long term well-being, and I encourage you to stay active and engaged in the forestry issues of the day and the needs of the profession. I've thoroughly enjoyed working closely with all the national officers, staff and Council members, but particularly with my "Northwest" District 1 counterparts Kirk David and Chuck Lorenz. And of course, I'm pleased for Bob Alverts as our incoming District 2 representative, who will do an outstanding job on our behalf. As always, if you have any questions or concerns relating to national SAF operations or governance, please contact District 1 Council Representative Chuck Lorenz or District 2 Council Representative Bob Alverts at any time. They, as I, look forward to serving you. ◆

Clark Seely, CF, can be reached at 503-999-3475 or cleeoregon@comcast.net. District 1 Council Representative Chuck Lorenz can be reached at 360-951-0117 or c_4str@yahoo.com. Bob Alverts can be reached at 503-639-0405 or balverts@teleport.com.

Policy Scoreboard

Editor's Note: To keep SAF members informed of state society policy activities, Policy Scoreboard is a regular feature in the Western Forester. *The intent is to provide a brief explanation of the policy activity—you are encouraged to follow up with the listed contact person for detailed information.*

Old-growth Position Statement Revision Anticipated. Adoption of an updated OSAF position statement on "Managing Mature and Old-growth Forests" is expected, perhaps by the time this is printed. A key objective was to streamline the original statement, which was aided by the wider recognition now of the need for active management of public forests, particularly in drier forest types with high fire and health hazards. However, both existing and proposed policies for public forest management still often include individual tree diameter and/or age-based harvest constraints that confound the application of sound silviculture by forestry professionals. All OSAF position statements are available online at www.forestry.org and draft updates may be posted in the "members only" section. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

Federal Laws and State Forest Practice Policies. Questions and concerns recently were raised about state vs. federal policies and authority over forest practices on state and private lands. Both federal agencies and private parties challenged Oregon's forest practices rules in their adequacy for meeting requirements under the federal Coastal Zone Management Act and the Clean Water Act. Among the responses have been steps by the Oregon DEQ to develop Total Maximum Daily Load (TMDL) allocations for nonpoint source pollution (primarily sediment) for coastal watersheds. Although the outcomes are not yet clear, including clarifying the roles of various state and federal agencies, they could include greater restrictions for riparian buffers and forest roads on some state and private lands. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

WSSAF Approves Biomass Position. Washington State SAF ratified its biomass position paper with a 95 percent approval vote. Both Harry Bell and Tom Swanson from the North Olympic Chapter, gave a presentation to the Port Angeles Chamber of Commerce on both the position paper and current research by the PNW Research Station on biomass harvest. Contact: Harry Bell, WSSAF Policy chair, harry@greencrow.com. ◆

North Olympic Chapter Holds Successful Biomass Tour

The North Olympic Chapter of Washington State SAF hosted a biomass tour for over 80 community leaders from the Port Angeles-Port Townsend area. The tour was led and organized by Chapter Chair Harry Bell, along with chapter members John Calhoun, Cam Field, Martha Hurd and Tom Swanson. Hermann Bros. contributed the necessary funds for bus transportation. Tour stops were made at the Evergreen Fibre chipping and biomass processing facility and then to view Hermann Bros. field operations. Participants learned about biomass production and transportation, benefits of biomass harvesting, and efforts to minimize site impacts.

PHOTO COURTESY OF JOHN WALKOWIAK

Harry Bell discusses soil productivity after a biomass harvest at the North Olympic Chapter's biomass tour.

PHOTO COURTESY OF JOHN WALKOWIAK

Bill Hermann explains the operational logistics of a biomass harvest to tour participants.

One local Historical Society member commented, "This biomass operation looks good for the environment." Another local businessman stated that before the tour he had concerns about the soil impacts of biomass harvesting, but now that he sees the operation in action, he is supportive. ◆

Columbia Gorge Chops Firewood for a Good Cause

BY NATE PUTNAM

In a world of deskwork and bureaucracy there are still a few things that old-fashioned foresters hold near and dear to their hearts—things like "slinging paint" and cutting wood. Building on the success of the Vernonia woodcut, members of the Columbia Gorge Chapter decided that if nothing else, they could have fun putting on a woodcut of their own.

They found a worthy cause in the Larry Hoffman Scholarship Fund, which commemorates the life of Larry Hoffman and provides scholarships to Oregon State University College of Forestry undergraduate students studying in Wildland Fire or closely related fields of Ecosystem Health. Larry was an active SAF member, wildland firefighter, and Oregon Department of Forestry forest unit supervisor at The Dalles, Ore. In 2004, working at the profession he loved, Larry passed away while taking his annual Pack test. He is remembered and admired by all those who knew him.

Sam Grimm, chapter chair, played a lead role as he organized logistics, arranged support with local businesses, and sold the wood in advance through the internet. SDS Lumber Company allowed the chapter to hold the event in one of its yards and provided equipment to handle the wood.

PHOTO COURTESY OF NATE PUTNAM

Jeremy Grose, Lindsay Cornelius, their son Lyle, and dog Aldo partake in the Columbia Gorge Chapter woodcutting fun.

PHOTO COURTESY OF NATE PUTNAM

Columbia Gorge Chapter Chair Sam Grimm is loaded up and ready to deliver firewood.

Longview Fibre permitted the group to cut out of a cull deck. Mt. Adams Fruit Growers donated a number of old fruit bins, which were useful in stacking, measuring, and handling the wood. Finally, chapter members provided the tools, equipment and sweat equity to deliver five cords of wood on a Saturday in November. The chapter made $870 on the woodcut (including some private donations to the effort). Since their goal was exceeded, the group contributed $200 toward the upcoming leadership conference.

The project proved to be a great success, and members convened afterward to check out the Full Sail Brewery, a local establishment known for being on the itinerary of the OSAF/WSSAF Leadership Conference. ◆

Nate Putnam is a forester and engineer for Hancock Forest Management in Glenwood, Wash. He also serves in several leadership positions for the Columbia Gorge Chapter. He can be reached at nputnam@hnrg.com.

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