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No Hiding in the Woods: Biomass Development Requires Engagement, Integration and Innovation

BY MARCUS KAUFFMAN

The use of woody biomass holds significant promise for forestry, rural communities, and domestic energy production. However, the realization of its potential has been anything but smooth. Biomass markets across the west vary significantly and fluctuate widely according to state policies, transportation networks, and ever-changing supply and demand of the wood products sector. In this overview, I will discuss trends in engagement, integration, and innovation, and how they are key to realizing the many benefits of biomass for forestry and rural forest communities.

In many places across the West, forests could provide a much higher volume of biomass material than what is currently used. As readers know, when biomass is not used it is either burned or left to decompose. Forestry managers understand the potential of woody biomass. As the stories in this issue illustrate, biomass can be a viable business proposition that adds value to forestry residuals, creates renewable energy, lowers energy bills, and provides local employment. But in most locations, both the demand and the sales price for biomass material are too low to get it out of the woods.

Engaged and seeking solutions

Many in the forestry community, faced with lack of markets, take a rather aspirational approach—as if handwringing about the shortage of markets will make them appear. But the forestry community has an important role to play in realizing the promise of biomass; as the stories in this issue make evident, most biomass use is dependent upon supportive public policy to jump-start and transform the industry.

The cogeneration industry depends on policy tools such as Renewable Portfolio Standards (RPS) that set targets for renewable energy generation. Yes, there are major problems with pricing renewable power the same as natural gas, but that fact only underscores the importance of engagement.

Recent legislation in California (SB 1122) points to the power of engagement and collective problem solving. As the piece by Tad Mason and Todd Hansen makes clear, this legislation effectively monetizes the environmental value of woody biomass use. Similarly, the national Renewable Fuels Standard 2 (RFS2) drives biofuel use and the development of liquid transportation fuels across the country. No better example exists to reinforce the need to be an engaged and active forestry community than the exclusion of biomass from federal lands in the RFS2 incentive system. If a company were to build a successful biofuel plant, they would not procure biomass from federal lands because doing so would forgo the revenue that comes with the federal incentives. The exclusion of federal lands from this legislation highlights our collective challenges in the policy arena.

PHOTO COURTESY OF MARCUS KAUFFMAN

An energy and forest management solution we can get our hands around. Biomass use provides a market for forest residuals, generates renewable energy, and helps strengthen rural economies. The creation of a robust woody biomass industry requires supportive public policy and an engaged forestry community.

Interest in biofuel development in the region has spiked, as the piece by Eini Lowell and Scott Leavengood shows. The National Advanced Renewables Alliance (NARA) has launched a Pilot Study Supply Group for western Oregon and southwest Washington. This project includes significant outreach and involvement of

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Biomass Development

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rural communities and the forestry community, illustrating the importance of being engaged at the front end of these large-scale developments.

The use of biomass for heat is the only category in which this resource competes effectively, without subsidies, against traditional fossil fuel counterparts. As the stories by Andrew Haden and Karen Petersen make clear, conversion to biomass thermal presents a strong business case when compared to heating oil and/or propane. But most new systems have not materialized without public investment. In Oregon and Alaska, public money funded much of the front-end planning and feasibility review, and project owners used grants, tax incentives, and low-cost financing provided by the public sector.

Whether the question is carbon neutrality, sustainable supply or forest health, the forestry community is well suited to contribute to the national dialogue about biomass use. Now more than ever, we need to explain how biomass and forestry work together to provide an important suite of public and private goods.

Integration makes it work

The economics of biomass utilization range from positive to challenging to prohibitive. Nevertheless, the trend of integration unites many successful biomass businesses.

Integration, like inspiration, takes many forms. Integrating new biomass energy products into existing wood products facilities, such as cogeneration, can provide an important source of revenue if the idea fits with the facilities' demands for steam, electricity, and the availability of biomass. Since the production of electricity from woody biomass is generally a low-margin proposition, the idea has to provide additional value to warrant investment. For many of the wood products facilities in the Northwest that have installed cogeneration systems, the decision was partly driven by the demand for more dry kiln capacity than the desire to get into the business of producing electricity.

At the other end of the spectrum, integrating a new woody biomass heating system into an existing fossil fuel heating system can provide significant energy savings. In this instance, the question of integration turns on how well the new heating system meshes with the old system. If the existing boiler is nearing the end of its useful life, it may be a good candidate for conversion to a woody biomass boiler. However, the new biomass boiler may not deliver energy savings if the building controls and distribution system have not been maintained and are inefficient. Just as the generation of heat and power in a lumber mill has to contribute to the bottom line of the entire enterprise, integrating biomass heat into a commercial building is an exercise in whole-systems thinking.

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Next Issue: Baby Boomers

The NARA effort to produce jet fuel from woody biomass exemplifies integration on a grand scale. This project draws from a variety of disciplines (economics, forestry, chemistry, social sciences) and weaves together the interests of disparate sectors (public, private, academic, military), forming a loose, collaborative, learning community. The effort also integrates long-term sustainability into what is essentially a market-based approach. The five-year NARA project will be informed by life cycle assessments to determine energy use and greenhouse gas emissions.

Big questions remain about the viability of producing jet fuel from woody biomass. Can it be produced economically? Researchers are getting closer but aren't there yet. How well does the proposed system integrate into the existing landscape of manufacturing, fiber flow, and business models? Integration is one key to finding a viable and sustainable role in the region.

PHOTO COURTESY OF MARCUS KAUFFMAN

Machine piles of biomass dot the landscape on a patch of industrial forestland. Prepping biomass for utilization requires paying attention to keep the piles free of dirt, rocks, and debris.

PHOTO COURTESY OF www.ashdenawards.org/winners/ncc

Kids love biomass! Elementary school students show off wood pellets for their school's biomass heat system. Biomass heat systems lower energy bills, and provide energy independence and a valuable market for mill and forest residuals.

Innovation improves the business case

Innovation is also key to success. Given the headwinds facing the industry (lingering recession, cheap natural gas, technological risk, and policy uncertainty), innovation is and will continue to be important to creating and sustaining value. Whether it is publically traded companies like Gevo and Weyerhaeuser that are pursuing conversion pathways to produce jet fuel from woody biomass, sole proprietorships like Wisewood Inc.'s community biomass heat model, or entrepreneurs bringing biochar to the market, these efforts all share one important characteristic—they are solving problems. And that creates value upon which a business can be built.

Businesses that can provide high-quality products or services at lower costs always have an advantage in the marketplace. Combine that with renewable production and carbon storage and the innovative qualities of biochar become clear. As Kelpie Wilson describes in her piece, the unique attributes of biochar support the business model for soil amendments, environmental remediation, and seed coating.

Andrew Haden of Wisewood Inc. is shaping the market for commercial and institutional biomass heat by expanding the business case. Traditionally, customers have purchased new biomass heating systems because in the long run it saves money on energy bills. The model works well but requires a customer to provide the front-end capital for construction. Wisewood recognizes that building owners want comfort and cost predictability from their buildings, but are not necessarily interested in owning, operating, and maintaining their own biomass heat systems. Borrowing from the utility model of providing electricity and natural gas, Wisewood is experimenting with a biomass heat utility model to deliver biomass heat to customers in Harney County, Ore. This financial risk shouldered by the developer, Wisewood Inc., is mitigated by extensive data gathering and deep due diligence, much of it funded by public money.

A job for all of us

Creating new and sustainable value from a dispersed, low-value product is a complex challenge. While seemingly daunting and opaque, the stories in this issue show that entrepreneurs are gaining traction through integration, innovation, and engagement. The development of new biomass energy markets and renewable products will continue to require supportive public policies and the positive affirmation of forestry's social license. New policies must be based on sound science and the engagement of the forestry community. The establishment of the biomass value proposition is a job for all of us. Let's get to it. ◆

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Biomass Power Generation in the PNW Interior: Current Situation, Challenges, and Opportunities

BY TODD HANSEN AND TAD MASON

Todd Hansen

Tad Mason

Biomass plants generate energy such as heat, steam, and power by burning fuel in a boiler. The heat is applied to water to produce high pressure steam used to spin a turbine generator to produce electricity. The overall scale of individual biomass power plants can vary widely. In today's economic environment, efficiencies of scale are achieved at a minimum of 15 to 20 megawatts (MW) of electricity production. Smaller facilities will experience higher overall costs per MW, including capital costs as well as operations and maintenance costs.

The majority of biomass power production in the PNW and Inland Empire is conducted at biomass cogeneration facilities. These facilities generate and utilize both power and heat (aka combined heat and power or CHP), and as such are typically more efficient than facilities producing only power. Some of the earliest sawmills in the Northwest utilized biomass-fired boilers to generate electricity to power the sawmill as well as homes and businesses in the local community. Fuel for the boilers came directly from byproduct of lumber production (e.g., bark, sawdust).

Cogeneration facilities require an outlet for employing heat and steam in excess of that required for the turbine generator to produce electricity. In the case of sawmills, the excess heat and steam is typically used to dry finished lumber. For veneer plants, the heat and steam might be used to condition logs in steam tunnels prior to peeling. In plywood and composite panel plants, the steam may be used to heat presses. For the pulp and paper industry, the heat and steam is employed in converting raw fiber to pulp for the paper machine(s) drying process and for the evaporators. A biomass cogeneration facility will have an energy efficiency rating (the ratio of useful British Thermal Units [Btus] recovered to Btus of heat input) of approximately 35% due to the utilization of the heat and steam, as compared to a biomass plant generating solely power (around 24% efficient). Stand-alone biomass power facilities must cool down excess steam and eventually release heat into the atmosphere, typically using cooling towers.

A biomass facility, whether stand-alone or cogeneration, must have a reliable, consistent supply of clean, suitable, and cost-effective fuel, as well as nearby access to the infrastructure necessary to deliver electricity to their power sales customer (usually a power utility). Biomass is defined as plant material, vegetation, or agricultural byproduct utilized as a source of fuel (or feedstock) for generating energy (thermal and/or electrical). The primary fuel sources used in biomass power production in the western US include waste wood from wood products manufacturing such as bark and sawdust, land or orchard clearing material, forest management operations byproduct, and clean construction/demolition wood (known as C&D). The biomass plant boiler manufacturer and local air district typically dictate specifications for acceptable fuel (moisture content, percent ash, fuel sizing). Some boilers can utilize a wide array of fuel sources without experiencing operational challenges, while others must utilize only very specific fuel sources. Likewise, air emissions in some states, regions, and local airsheds will influence fuel source choices to maintain regulatory compliance.

Cogeneration also requires a customer (usually internal operations or adjacent businesses) with a consistent and predictable need for heat and/or steam. While the forest products sector in the western US is most familiar with the pulp and paper and wood products industries' needs for heat and steam, there are other opportunities for co-locating the biomass cogeneration facility. Some agricultural processing facilities have a consistent need for heat, as do most cement plants (cement kiln). Cogeneration usually provides two revenue streams: one for the power and one for the heat. This can significantly improve overall financial performance of the facility.

Barriers to success

As economic fuel sources, typically the clean wood recovered from C&D material diverted away from landfills is the lowest cost fuel. Fuel generated from forest operations and processed at the landing is the most expensive fuel. The distance or haul time from the product origination point to the plant is usually the most significant cost center impacting overall fuel cost. Haul costs can exceed $90 per hour and are very dependent upon variables such as diesel fuel and labor rates. The cost of other fuel sources (wood manufacturing byproduct, log yard material, and land or orchard clearing material) will fall somewhere between C&D and forest sourced fuel. Again though, distance matters.

For existing biomass power generation facilities, the most significant factors impacting operations include:

- Stable, consistent supply of cost-effective fuel meeting fuel specifications;
- Fuel availability as needed (year round);
- Diesel costs impacting fuel processing and transport costs; and
- Qualified truck drivers, as the industry in some regions is losing drivers to job opportunities elsewhere.

For any new projects being developed, the most significant factors impacting successful project deployment include:

- Power purchase agreement with rates ensuring project economic viability over the life of the debt service;
- Financing at terms suitable for project success;
- Financial institutions may require long-term fuel supply agreements;
- Identification of existing and potential competition for fuel sources;

PHOTO COURTESY OF TAD MASON

This small-scale .5 MW biomass generation facility is owned by Phoenix Energy and located at Merced, Calif.

• Estimating annual volumes of fuel consumed by competing uses;

• Identification of available and suitable fuel sources with volumes well in excess of facility annual requirements (two to three times annual volume required for sustained operation); and

• Development of infrastructure necessary to supply adequate fuel to the facility.

California has the highest concentration of biomass power generation facilities in the US with 28 commercial-scale facilities (scaled at 7 to 50 megawatts of generation capacity). This is due to the fact that renewable energy production incentives were available in the early 1980s and California set rather high renewable energy production goals. The majority of the biomass power production capacity in California is conducted by stand-alone biomass power producers (just power generation, not cogeneration). California currently has the most aggressive Renewable Portfolio Standard of any state, with a target of 33% renewable power generation capacity by 2020.

PNW and Inland Empire states also have renewable energy standards, with the exception of Idaho, which currently has no defined target. Oregon's standards are 25% for large utilities, 10% for small utilities, and 5% for the smallest utilities, all by 2025. Washington's standard is 15% by 2020 and Montana's is 15% by 2015. The use of the term "standard" reflects mandatory targets rather than "goals," which reflect voluntary targets.

Recent innovation in small-scale biomass power generation technologies has improved financial performance of bioenergy facilities scaled at 1 to 3 MW. The use of gasification systems converting biomass material to a synthetic gas that can be used to provide natural gas-like fuel to internal combustion engine electric generators is promising. Several small-scale units (0.5 MW and 1 MW) are now operating in California. These facilities are sited in this state due to a recently implemented program (as a result of California Senate Bill 1122) targeting 250 MW of new biopower facilities. Only bio-based power generation facilities scaled at 3 MW or less of generation qualify for the new feed-in tariff program. A feed-in tariff is a policy mechanism (initially perfected in Europe) that is designed to accelerate investment in renewable energy technologies. It achieves this by offering long-term contracts to renewable energy producers, typically based on the cost of generation. It is anticipated that as more small-scale biopower facilities are deployed (in response to SB 1122), the technology will become more robust and cost effective.

California, the PNW and Inland Empire are currently experiencing very low wholesale power rates due to the overabundance of natural gas and other less expensive power sources, such as hydropower. Recent innovations in natural gas extraction methods, coupled with successful exploration of new gas fields, have resulted in extremely low natural gas prices, which have driven down the wholesale price of electricity. Without the renewable energy incentives such as energy tax credits, biomass production tax credits, and investment tax credits, the prospect for new near-term investment in commercial-scale biomass power generation would be quite bleak. ◆

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Thermal Energy from Biomass: Efficient Conversion for Maximum Value

BY ANDREW HADEN

Woody biomass from forestry operations can be utilized in a variety of energy generation processes including electrical power production, high temperature process heat for industrial applications, and low-temperature space heat for commercial and institutional buildings. The latter application is the one Wisewood, Inc. is focused intently on and is a sector that has grown steadily over the past five years to become a small yet reliable consumer of low-value woody biomass.

Benefits of biomass heat

Using woody biomass to heat and cool commercial and institutional buildings, known as biomass thermal, is gaining popularity. Customers continue to choose biomass heat because it is efficient, clean, economical, and sustainable. Modern biomass boiler systems often obtain efficiency ratings of 85% or better and are computer-controlled to achieve optimum combustion resulting in low emissions of particulates nitrous oxide and carbon monoxide. Some biomass boiler installations can pay for themselves in as little as 5-7 years, and 10-year payback periods are typical. Given that the average life of a boiler is between 25-40 years, biomass thermal systems offer a sound investment. The fact that biomass boilers can accept a variety of fuel types contributes to their sustainability. Because biomass boilers can make efficient use of widely available and generally low-value resources for which there is little competition, there is very little risk of fuel demand outstripping harvested supply or the regenerative capacity of lands supplying fuels to the heating system.

Wood fuel types

Oregon has 19 biomass-fired commercial heating boilers in operation; the vast majority of those boilers use wood pellets, a processed form of wood fuel that requires a centralized facility. Pellets are dry, compact, flow-able, and easily transportable, and are thus a great fuel to transport to small boiler systems from centralized facilities. However, the use of pellet fuel for heating introduces a number of process steps between the forest and the customer, specifically, a pellet mill, which is an industrial operation with significant capital costs.

Although there are over 10 operating pellet mills in Oregon, the other western states combined have fewer operating pellets mills (one in Alaska, two in Washington, and five in Idaho). In areas where there is no operating pellet mill nearby, or if the community simply wants to use its own wood locally, many excellent technical solutions exist for using wood chips direct from the forest in commercial boilers. Moreover, by using wood chips, an opportunity is created to develop a local business selling boiler fuel. By choosing to install a biomass-fired boiler that uses forestry residuals, a customer is choosing to directly support the financial operations of its local forestlands.

Project development

Biomass thermal energy projects take time and effort to develop. The process of developing a project begins with the identification of a suitable customer and the education of the various stakeholders that might become champions of the project. The next step is to conduct a formal feasibility study of the building or collection of buildings to determine whether they are good candidates to be converted to biomass heat. A wide variety of buildings can make use of biomass, but large, frequently used buildings in colder climates are best.

A typical feasibility study will involve the following elements: initial facility review and site investigation, preliminary cost estimating, and economic analysis. To conduct a feasibility study we typically assess the current heating system, talk with facility staff to understand their needs and capacities, assess available wood fuel resources, evaluate available space and street access for fuel storage and deliveries, consider building or site constraints, estimate the system size, and provide a conceptual layout. Once completed, a feasibility study should indicate whether the facility is a good, fair, or poor candidate for conversion. If it's a good candidate, the study should be sufficiently detailed to form the basis of a financial package for system design and construc-

tion. A properly designed and constructed biomass boiler project can reduce fossil fuel demands for connected facilities by up to 90%.

Opportunities for forest managers

If the project proves feasible and adequate financing is available, the next step is detailed design and construction. A biomass boiler must be purposely built to utilize wood fuel in the form of either wood pellets or wood chips. It is possible to switch some systems from chips to pellets (and vice versa) depending on the boiler system chosen, but a change from pellets to chips would require additional investment in equipment if the fuel feeding system was originally designed for pellets. In either case, wood fuel is stored on site, usually with enough capacity to heat the facility for a substantial length of time between wood deliveries (optimally between 2-4 weeks).

In the case of a typical high school in the Pacific Northwest, the annual wood fuel requirements vary between 100 and 300 tons per year of wood pellets, or between 200 and 600 tons per year of green forest chips. While this might not seem like a lot, the demand is steady across the winter, year after year, and even a few hundred tons of wood chips can help remove unwanted slash piles from local area forestlands. This consistent demand for forest products not tied to traditional timber markets means that these systems can support a sideline or even primary business for a local logger or land manager.

Example system

Biomass thermal technologies have been implemented in a variety of settings in the Northwest. One example is at the Prairie City Schools in Prairie City, Ore. The school district wanted to replace their five aging fossil fuel boilers, which were located in three mechanical rooms across the campus. After Wisewood managed the successful installation of a biomass heating system in neighboring Grant Union School District, the superintendent was ready for Wisewood to help Prairie City also make the switch.

The multi-building campus used both hot water and steam heat distribution systems, so the biomass system had to be designed to handle both. The solution was a single, central steam boiler house situated between the two main school buildings, with underground piping sending heat (half as steam, half as hot water) out to each. This is also a great example of how centralized boilers can serve multiple buildings (and customers); in a denser business district or town center, there is great potential for third party-owned biomass thermal energy systems to provide heat to upwards of a dozen facilities. Prairie City School District joins the growing community of biomass thermal energy users in the John Day area, now including the regional airport, hospital, two schools, and the pellet mill that produces the fuel locally.

Ochoco Lumber Company owns and operates the Malheur Pellet Mill located in John Day, which sources much of its timber from forest stewardship contracts on the Malheur National Forest. The mill not only produces wood pellets and bricks for its customers, but also fuels its own boiler and wood-drying systems with stewardship materials. Grant County has become a model for how a biomass fuel producer can change the energy landscape in small communities, redirecting fuel expenditures back into the local economy, sustaining and creating jobs, lowering fuel costs for customers, and supporting forest health.

New business models

In many European countries, boiler systems that heat community facilities (such as schools, hospitals, and local government buildings) are often owned by a small cooperative group of landowners that come together to finance the design and construction of the system, and often operate and maintain the system and supply it with fuel. This has been a great success in rural areas where there is a base of actively managed forestland available to generate the wood chips necessary to supply fuel to the system.

Wisewood is working to bring a similar model to the western US in addition to the conventional model of each individual customer owning, operating, and procuring fuel for their biomass boiler system. "Thermal energy contracting" (as it's known in the US) is a procurement mechanism by which the customer purchases heat from a biomass boiler that is owned, operated, maintained, and fueled by a third party, which could be a cooperative of forest owners, a municipal government, or a group of investors. Wisewood is actively pursuing this model in partnership with communities in Oregon, Idaho, and California, and believes it holds great promise to help biomass thermal energy grow even faster. ◆

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Biochar: A Rediscovered Forest Product Generates a New Industry

BY KELPIE WILSON

Biochar is the term used by soil scientists for charcoal that is applied to soil. While forest managers have long considered commercial charcoal production to be an option for rural economic development, the science of biochar extends the beneficial use of charcoal way beyond the BBQ grill and promises to become the foundation of a new approach to soils management for agriculture, forestry, and restoration. Many of the leaders in this new industry are quietly building the foundation here in the Pacific Northwest.

Biochar has recently emerged as part of the ferment of ideas and projects to develop a "bioeconomy" conceived in the face of looming climate change and fossil fuel depletion. Biochar is especially interesting because the production process can also result in net energy recovery in the form of heat and either gas or oil.

But biochar as a soil amendment is nothing new. Ancient Amazonians used it to build up fertile fields around their rainforest settlements where acid soils are the norm, creating thousands of acres of the black soil known as *terra preta*. Other traces of "anthropogenic" charcoal-amended soils can be found around the world in Asia, Africa, Europe, and even the United States where 19th century agricultural journals extolled the virtues of "vegetable charcoal."

Biochar is also a natural component of soils. The fertile, black soils of Iowa owe their carbon to frequent grassland fires. Fire-adapted forest soils are also high in charcoal and researchers are now starting to look at the impact of fire exclusion on the natural biochar content of forest soils.

What does biochar do for soils? Its highly porous carbon structure retains water and nutrients and supports the growth of mycorrhizal fungi and other soil microorganisms. Biochar is stable and lasts for hundreds of years in soil without breaking down. That means biochar can transfer carbon from the constantly cycling biomass pool to the long-term stable soil pool, with profound implications for climate change. Biochar also has activated carbon-like properties making it useful for remediating soil and water contaminated with metals or other toxics.

The Pacific Northwest Biochar Working Group was inaugurated in November 2012 to take the promise of biochar to market. Sixty people representing biochar researchers, producers, users, consultants, environmental groups and state agencies (Washington Department of Natural Resources, Washington Department of Ecology, Oregon Department of Forestry) met in Olympia, Wash., to chart a path for the biochar industry.

Erin Rasmussen of TR Miles Technical Consultants helped to organize the meeting. She said, "This meeting was important because it brought together a lot of professions that normally don't get to work together to talk about using biochar to solve problems in storm water pollution, ecosystem remediation, forestry, and agriculture. Biochar isn't a panacea, but it can be used strategically to improve our local quality of life, provide some valuable jobs, and reduce atmospheric carbon."

One outcome of the meeting was a preliminary road map showing where work is needed to develop markets and address knowledge gaps, including the need for more scientific research.

Most of the major universities in the Northwest have ongoing biochar research programs looking at the physical, chemical, and biological properties of biochar materials and how these impact different soils and crops. Nationwide, the USDA Agricultural Research Service has biochar programs at multiple sites, including several in the Pacific Northwest. The US Forest Service Rocky Mountain Research Station (RMRS) has done extensive work on biochar in forestry applications. This work ranges from experiments using biochar to increase water-holding capacity in forest soils to the use of biochar as a substrate for tree seedlings in nurseries.

RMRS researchers are also looking at the financial feasibility of systems to produce biochar and bioenergy from forest biomass. Research Forester Nathaniel Anderson is building economic models of biochar production systems, looking at everything from alternative technologies to biomass supply chains to markets. "The best biochar economics result when we can utilize waste streams," he said. "While sawmill byproducts are ideal, woody biomass residues from fuel reduction thinning and other restoration treatments are a waste stream that is currently disposed of by open burning and can be used as raw material for biochar production." He said that consideration of non-market environmental values that are not currently monetized, like clean air, watershed protection, and carbon sequestration, can help improve the economics, but biochar will really "pay its way out of the woods" if consumers are willing to pay a price premium for renewable, low-carbon bioenergy and bioproducts like biochar.

Getting more value out of waste biomass is the motivator for Oregon State University extension agent Frank Burris. Burris works with small woodland owners on the Oregon south coast. The way he sees it, biochar can solve at least two problems. It can provide another income stream to woodland owners and timber mills, and dispose of the fuel load without pile burning and the pollution it causes. Burris also sees possibilities for using biochar to control sediment from logging roads. "One of the limitations for keeping road berms vegetated is drought," he said. "All the vegetation dies and the swales wash out in the fall rains. If you can incorporate biochar into road stabilization, you have a better chance of success."

Remediation is one of the top existing markets for biochar. Portland-based Sunmark Environmental has been using biochar for five years now in its Permamatrix hydroseeding product. "We really like the results we are seeing with biochar and we are projecting an exponential growth rate in our use of biochar," said partner Robin Cook.

Howard Boyte is the founder of Walking Point Industries, a veteran-owned business that supplies blended fertilizers to the government and other purchasers. Always on the look for new opportunities, Boyte discovered biochar while working on a project with the US Forest Service to use biosolids in a fertilizer blend. Boyte saw the potential to use biochar as a seed coating to improve the germination of expensive native seed used in ecological restoration projects, which he says will save the Forest Service and other agencies a lot of money. Walking Point Industries, Umatilla National Forest, Rocky Mountain Research Station, Oregon State University, Walla Walla Community College, and Oregon Department of Forestry have now formed a CRADA (Cooperative Research and Development Agreement) to develop the biochar seed-coating technology.

Louis Miller is approaching the biochar business from the production end of things. His South Fork Wood Products company near Boise, Idaho, started as a trail clearing business and moved into hazardous fuel reduction. Miller devoted himself to finding uses for the low-grade material and started selling firewood and poles. Looking for higher value products, he found biochar and bought a biochar production kiln from Biochar Solutions in Colorado. The kiln makes good biochar, he said, but the process is slow. To extend the biochar further, he is selling it in soil blends. Miller would like to invest in a larger kiln, but is not sure if the market is there yet.

Securing markets is a top issue for Three Dimensional Timberlands (3DT), an Oregon startup company. 3DT is commissioning an advanced thermal biomass processor at the old Tamco Mill site in Gold Beach, Ore., that can produce large volumes of biochar. The company is looking for product off-take agreements as they complete their financing rounds. Chip Weinert, a founding partner, said, "The great thing about our process is our diversified line of products. We make biochar and several liquids that can be refined into fuel and other products. We utilize every bit of the carbon with no discharge and no flare."

The issue of markets is one that consultant Tom Miles has pondered a great deal. One of the founders of the PNW Biochar Working Group, Miles is attentive to niche opportunities that can begin to build biochar larger markets. One such opportunity is storm water treatment. "Rain washes the copper from brake linings into streams and kills young salmon fry," he said. "Adding biochar to rain gardens can clean up urban storm water and save fish by trapping nutrients and heavy metals. But we need to do more work to prove these applications." Miles is helping researchers at Washington State University test the use of biochar in the filter media of bioretention structures to verify that it can improve retention of copper and other metals. Verification could lead to the adoption of biochar as a best management practice by agencies responsible for preventing storm water pollution. Miles said, "Once we have biochar accepted as a BMP—that will open the door to a new market for biochar."

Environmental engineer John Miedema of BioLogical Carbon, LLC, agrees with this approach. He also sees the need for more work on testing and characterizing biochar materials. He said, "We need to get to the point where we have biochars that a civil engineer can spec for use just like any other material. Once we have that, we will have an industry." ◆

Kelpie Wilson is owner of Wilson Biochar Associates in Cave Junction, Ore. She can be reached at 541-592-3083 or kelpiew@gmail.com.

Forest Biomass and the Federal Energy Policy Disconnect

BY JAY O'LAUGHLIN

As our nation seeks to replace fossil fuel energy with renewable sources, foresters should remind people that biomass is not only the largest source of renewable energy, it is the most versatile. Like other renewables, biomass can produce electricity; unlike hydropower, wind, and solar, biomass provides thermal applications and transportation fuels. Forest biomass should be part of a cohesive "all-of-the-above" energy strategy. Some changes in federal policies could help make that happen.

Although wood bioenergy provides two percent of all energy consumed in the US, the hodgepodge of laws and regulations that substitute for a cohesive all-of-the-above energy policy does not treat woody biomass as favorably as other renewables. When biomass is mentioned in policy circles, it generally follows wind, solar, and geothermal on the renewables list, despite the fact that it provided more energy than all of the others combined until generous subsidies for wind power boosted production past woody biomass in 2011.

Two specific examples illustrate the policy disconnect.

Biomass definitions. Fourteen different biomass definitions appear in federal statutes enacted since 2004, with a couple more in the tax code. Biomass policy discussions tend to be dominated by how producers are going to meet the quantity of advanced transportation fuels mandated by the Renewable Fuels Standard (known as RFS2 to differentiate it from the 2005 version) in the Energy Independence and Security Act of 2007. That policy, however, defines qualifying renewable woody biomass as limited to planted forests on non-federal lands. Biomass from the national forests that dominate our western landscapes cannot be used to meet the RFS2 mandate.

Is wood bioenergy "carbon neutral?" Our atmosphere holds more carbon dioxide (CO_2) today than at any time in the past 400,000 years. Burning fossil fuels that have been buried for millions of years is why. If we wanted to reduce the amount of CO_2 in the atmosphere, we don't need to invent a new technology because we already have one. It's called a tree. Forests absorb or uptake CO_2 from the atmosphere and store it, releasing the oxygen we need to breathe. When trees die the stored carbon is released back into the atmosphere. The US Environmental Protection Agency (EPA) website states that burning biomass does not cause a net increase in atmospheric CO_2, leading some to say that wood bioenergy is carbon neutral.

Some scientists and green advocacy groups, however, feel that emissions from burning wood should be treated the same as fossil fuel emissions. As the EPA implements the "tailoring rule" to trim back CO_2 emissions from large stationary sources such as cement factories and coal-fired power plants, the agency is considering whether burning wood to create energy should be treated the same as fossil fuels. A decision is expected before the end of the year, with final regulations next year. Before then a federal appellate court will decide whether the EPA has the authority to treat biomass emissions differently than fossil fuel emissions.

Many green groups have a sense of urgency about reducing atmospheric CO_2 emissions, regardless of the source. Some worry that because it takes decades before wood harvested from forests and used for bioenergy will be replaced, there will be more carbon in the atmosphere than if the trees had not been cut and used as fuel. Wood residues are not the issue, but rather a concern that wood bioenergy will lead to forest clearing and a reduction of forest resources.

The carbon neutrality issue affects

the forestry sector. To meet their emission targets, several European nations have created a huge demand for wood pellets to replace or co-fire with coal in power-generating stations. New pellet plants have sprouted up in the southeastern US to supply the export market and more are planned. As southern feedstock supplies become more costly, demand will shift to the Pacific Northwest. Eyeing both the European and Asian markets, pellet exporters have begun scouting the region for available biomass and partnership opportunities.

Whether wood bioenergy is carbon neutral depends on many factors, including the type of biomass feedstocks and sustainable forest management. If forests are converted to urban areas or agricultural fields, then land use change argues against sustainability and carbon neutrality. European sustainability standards are currently under development, and the outcome could perhaps hinge on the EPA's decision and will affect the US pellet fuel industry one way or the other. The SAF has formed a response team to address these issues, and your correspondent is privileged to be part of that effort.

Biomass as a byproduct

A coalition of green groups has an ongoing "Our Forests Aren't Fuel" campaign. Western foresters, however, know better than anyone else that forests are fuel for wildfires. Record-setting wildfires are now commonplace as a result of federal land management policy. Through political and policy processes, society has a choice: a) allow forest fuel to burn in the woods; or b) harvest wood, make useful products from it, and use the leftover "residuals" as a renewable energy source.

For several years some foresters have been talking about the "triple win" from active forest management. Maybe you should, too. First, active management can improve forest conditions, especially wildfire resiliency and wildlife habitat. Second, because active forest management puts people to work in the woods, on the roads, and in mills making useful consumer products, the vitality of our rural communities can be rejuvenated. Third, forest biomass is a renewable energy feedstock byproduct of active forest management. Using forest biomass for energy has the additional benefit of reducing particulate matter emissions by burning wood in a boiler rather than in the woods.

Furthermore, the ability of forests to uptake and store carbon is a function of management decisions. Young trees do not store as much carbon as old trees, but young trees grow faster and uptake more CO_2. These facts argue for a mix of age classes across the forest landscape. But unless forest managers can demonstrate that there will be a sustainable supply of woody biomass available, financiers will not provide the funds for new bioenergy facilities. Economically sustainable wood bioenergy is a natural partner of sustainable forest products manufacturing.

What is being done to develop a "cohesive policy?"

Some parts of the energy policy hodgepodge are currently being debated in the nation's capital. The Farm Bill has several titles that would advance not only forestry but also wood bioenergy development. A bill for a new "BTU Act" supporting biomass thermal applications by giving them parity with other renewables has been introduced and deserves support. So does a bill that would make the tax advantages of master limited partnership business organizations available for renewable energy facilities.

How can SAF members help?

SAF members can help with these issues by talking about the environmental benefits of biomass utilization, as well as the economic benefits of putting people to work in our rural communities. Later this year a new National Cohesive Wildland Fire Management Strategy will be put into place. It will focus on three key areas: restoring resilient landscapes, creating fire-adapted communities, and enhancing responses to wildfire. Embrace the cohesive strategy! The Inland Empire and Intermountain SAF have a joint position statement that is focusing attention and resources on restoring resilient landscapes via active fuel management that will also help communities and wildfire response. Argue for active forest management and the triple win. ◆

Jay O'Laughlin is professor of Forestry and Policy Sciences and director of Policy Analysis Group for the University of Idaho College of Natural Resources in Moscow. He can be reached at 208-885-5776 or jayo@uidaho.edu. *He thanks Marcus Kauffman and Reid Miner, chair of the SAF's Biogenic Carbon Response Team, for helpful comments on an earlier draft.*

From Wood to Wing: NARA Works to Harness Woody Biomass for Aviation Biofuel

BY EINI C. LOWELL AND SCOTT LEAVENGOOD

Eini Lowell

Scott Leavengood

The Northwest Advanced Renewables Alliance (NARA) is a USDA-funded project being led by Washington State University to produce bio-based jet ("biojet") fuel and co-products from forest residuals and other softwood biomass resources such as construction and demolition debris. NARA is an alliance of over 50 researchers from public universities, government agencies, and private industry, as well as interested stakeholders, and is part of a broader national strategy to reduce the country's dependence on fossil fuels. Another USDA-funded project in the Pacific Northwest, led by the University of Washington, is known as Advanced Hardwood Biofuels Northwest (http://ahb-nw.com/). This program is exploring the use of plantation-grown hardwoods (hybrid poplar in particular) for the production of liquid transportation fuels such as gasoline, diesel, and jet fuel, and is working in parallel with the NARA project.

"Why jet fuel?" is a common question of project leaders when discussing NARA's efforts with stakeholders. Aviation fuels are an attractive end-product because liquid fuels are anticipated to be required for commercial and military aviation and other turbine-powered vehicle uses for the foreseeable future; biofuels are more easily implemented in the aviation sector (as compared to other transportation modes); and major aviation purchasers have made commitments to use biofuels. For example, the US Air Force has set a goal to procure half of its US-based jet fuels from bio-based sources by 2016 (about 400 million gallons of aviation biofuel per year) and the US Navy has a goal of procuring 336 million gallons annually by 2020. Boeing, Alaska Airlines, and the three largest airports in the Northwest joined forces in 2010 to create the Sustainable Aviation Fuels Network, whose goal was to design a plan to, "...develop a safe, sustainable, and economically viable aviation biofuels industry in the Northwest."

It is widely recognized that collaboration across the supply chain is key for stimulating renewable energy development, including production of renewable biojet fuel from wood-based feedstock. NARA is identifying three to four Pilot Supply Chain (PSC) coalitions throughout the four-state area of Idaho, Montana, Oregon, and Washington, and is creating a roadmap for implementation. In simple terms, the NARA project must address a wide array of topics including:

1. Economically extracting, densifying, and transporting forest residues;
2. Converting these residues into biojet fuel and co-products;
3. Evaluating the sustainability of the overall effort including environmental impact, social acceptability, and economic viability;
4. Developing the required workforce for this new industry; and
5. Engaging a wide array of stakeholders such as community leaders, industry professionals, policy makers, and others as this new industry is developed.

The NARA project is organized into five teams focused on addressing each of the topics described above.

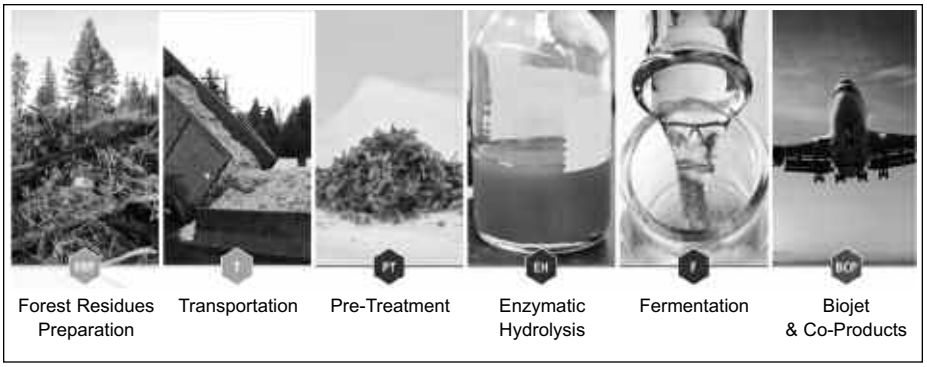
The **Feedstocks** team is researching both logistics and development. The logistics component involves identifying the optimal methods to process and transport forest residuals from harvest sites and the development team is examining site productivity and identifying tree species with the best characteristics for biojet fuel production.

The **Conversion** team is conducting research required to convert softwood biomass to liquid fuels and co-products. The team currently estimates that 1 bone dry ton (BDT) of wood will yield approximately 59 gallons of isobutanol, which is then converted into 42.7 gallons of biojet fuel. In addition, the conversion processes yield approximately 1,400 lbs. of residual solids, including lignin, for use in co-products, a necessary economic component of the overall effort being addressed by researchers.

The **Sustainability Measurements** team is evaluating the environmental, social, and economic viability of the overall biojet fuel supply chain. The team is using key tools such as life cycle assessment (LCA), market analysis, supply chain analysis, and social science research methods to gauge the attitudes, perceptions, and current understanding of biofuels by the public and policymakers. The researchers will develop LCAs comparing petroleum and biojet fuel along a variety of environmental attributes, including energy use, greenhouse gas emissions, and other environmental measures. The assessments will include a variety of feedstocks and harvesting options, the biojet fuel conversion process, and the impact of the integration of biojet fuel manufacturing into existing forest product industries and infrastructure.

The **Education** team is working to meet the workforce needs of an emerging bio-energy economy by providing hands-on educational opportunities for high school, undergraduate, and graduate students, and tools and training to K-12 educators and the public.

Key to all these efforts is the work



The NARA Supply Chain. SOURCE: CHARLES BURKE, NARA COMMUNICATIONS AND PUBLICITY DIRECTOR

being conducted by the **Outreach** team whose role is to facilitate communication and disseminate information among teams and stakeholders. These activities will be carried out via a variety of communication mechanisms, including social media, newsletters, briefing papers, extension publications, workshops/seminars, conferences, field trips, and stakeholder meetings.

Developing regional pilot supply chain coalitions requires key stakeholders to be involved from the onset. Stakeholders are needed to identify what information is already available and what is needed for a variety of assets required in modeling the supply chain. More specifically, exploring a pilot supply chain begins by identifying seven broad categories of assets or "capital" in a region:

- Natural—biomass supply, water resources, wildlife;
- Physical—infrastructure such as available industrial sites and transportation networks;
- Economic—regional economy, available assistance, costs of doing business, competition;
- Human—demographics, education, workforce;
- Cultural—regional collaborations, historical perspective;
- Social—community perceptions, support or resistance for biofuels industry development; and
- Political—elected officials' and policymakers' support for biofuels; federal, state, and local policy implications for biofuels.

For example, state and federal land management agencies are asked to assist with obtaining data on available biomass supply in a region. State economic development personnel serve as key information resources on available industrial sites and other forms of physical assets. The team then develops a plan to obtain information on assets that may not yet be available such as community perceptions on the biofuels industry.

Following identification of the key assets in a region, the Sustainability Measurements team will use Geographic Information Systems (GIS) to create maps with overlays of the assets. Analysis of these maps and associated data by the Education team and its students will serve to identify communities with high potential to serve as a component of the biojet fuel supply chain. For example, adequate supply of logging residues combined with a skilled workforce and transportation infrastructure may lead to identification of one community (or more specifically, an x-mile radius around a community) as having high potential to serve as one of the "feedstocks" components of the supply chain. An idled pulp mill with good local rail and/or access to a pipeline might lead to identifying another community as having good potential to serve as a "conversion" component of the supply chain. The PSC model is not limited by geographical confines of a community or town. In most cases, numerous towns or communities in a region will serve as depots for the different links in the chain. The models will look different in each of the identified regions.

With PSC regions identified, the NARA outreach team will organize a series of targeted focus group meetings in these communities. The goal of the focus groups will be to engage community leaders in two-way dialogues about the project and seek to add detail to the list of assets. Stakeholders will continue to play an advisory role throughout the entire process as data are analyzed and communities that appear to have high potential for serving as a link in the chain (e.g., biomass supply, conversion, distribution) are

(CONTINUED ON PAGE 21)

NARA Resources

- For more information on NARA, visit the project website at www.nararenewables.org.
- To receive NARA progress updates and notices, connect at www.nara.renewables.org/or.
- To subscribe to the NARA monthly newsletter, visit www.nararenewables.org/news/newsletter and click on "subscribe to our newsletter."

An Overview of Biomass in the State of Alaska

BY KAREN PETERSEN

The Alaskan Brewing Company in Juneau claims to be the first brewery in the world to heat their facility using 100% biomass. They are using the spent grain from their brewing process, and their conversion to biomass heat is a sign of the times. In Alaska, the conversion to biomass has not happened as quickly as in other parts of the United States, partially because of an economy of scale—in a low populous state—and partially because of forestry sustainability concerns. According to Devany Plentovich at the Alaska Energy Authority, "The state of Alaska has over 200 isolated villages that are not connected to a power grid or a road system. Electrical generation and heating needs are met with diesel fuel barged or flown into the communities during the summer months. Some communities are paying up to $10 per gallon for diesel. These costs and logistical challenges make locally sourced biomass an immense opportunity for heating and electrical generation solutions. Nineteen biomass heating projects are now operating in the state and at least 50 other communities have expressed interest in pursuing biomass."

In a recent article in the *Anchorage Daily News*, the Mat-Su School District in the Matanuska-Susitna Valley announced that it was "...the latest Alaska school district to embrace wood-burning for heat." Their conversion to woody biomass comes on the heels of the very successful conversion of the Tok School in the Alaska Gateway School District to woody biomass.

The Tok project began as a way to utilize the small diameter wood that was being removed around the community to lessen fire danger. According to Jeff Hermann, forester for the State of Alaska, most of the trees were junk, no bigger around than three inches DBH, and not even useful for firewood. The community of Tok sits in the middle of the state, surrounded by over 40,000 acres of state forest. In the past 25 years, over 2 million acres in the region have burned costing more than $60 million in fire suppression dollars.

In 2008, Hermann learned about another school in the state that was heating with biomass and thought it would make a great model for Tok. His first task was to show the community they had enough fuel to feed the project indefinitely. Hermann estimated the Tok school project would use about 40 acres of wood annually, only a small percentage of what would need to be cleared on a yearly basis for fire suppression. He worked with the school district and the community on a plan for a biomass project and applied to the Alaska Energy Authority (AEA) for funding. Because there is no timber production in the region, the plan for the school included buying a chipper to process the wood.

PHOTO COURTESY OF KAREN PETERSEN

These two units are heating the Thorne Bay School and are prototype GARN cord wood boilers mounted on skids. They come fully assembled in a shipping container-style building. They are designed to be shipped on a barge and can be towed by any piece of large equipment into place.

In 2010 the Tok School fired up their 5.5 million Btu/hr Messersmith wood boiler and began heating the school—saving over $150,000 annually and displacing 55,000 gallons of heating oil. Tok then began looking at a combined heat and power project. By adding a low-speed steam turbine system to the boiler, the school district was hoping to replace some of the 530,000 kWh of electricity that they use. The project started up in 2012 and is working fairly well. Since the available biomass is all a byproduct of fire mitigation, the resulting energy is a win-win.

Biomass is nothing new—the AEA estimates Alaskans use over 103,000 cords of wood per year to heat their homes. As the price of #1 heating fuel ranges from $4 to $10 per gallon, more folks are returning to their wood stoves. Heating costs at $5 per gallon of heating oil costs nearly $45 per million Btus of energy while the heat from a $200 cord of firewood costs $13 per million Btus. The cost differential is highly favorable toward biomass, and Alaskans are savvy consumers.

The low cost of cord wood has resulted in some significant challenges for the community of Fairbanks. Commercial and large municipal biomass burners such as the Tok project are regulated by the EPA and the State of Alaska's Department of Environmental Conservation (DEC) for air quality and emissions, but there are no such regulations on privately owned burners. Unfortunately, that puts air quality into the hands of the municipality. The Clean Air Act (CAA) requires the EPA to set National Ambient Air Quality Standards (NAAQS) for six specific pollutants: ozone, particulate matter (PM), sulfur dioxide, nitrogen oxide, lead, and carbon monoxide. As a result

of monitoring, the EPA has designated several areas in the Fairbanks North Star Borough as "non-attainment for 24 hour PM," which means air quality is reduced because of Particulate Matter—due mostly from improper combustion of wood. Problems arise from people burning green wood using inefficient combustion devices.

Fairbanks is trying to tackle these air quality issues with programs such as the EPA-sponsored "wood stove trade out" or a firewood exchange. There has been intensive community education—coupled with an interesting barrage of legislation designed to either ban hydronic boilers entirely or outlaw government intervention in personal burning devices. The fact of the matter is: as long as firewood is significantly cheaper than heating fuel, people will continue to use it.

Clean burning pellets are one solution for Fairbanks. Superior Pellet Fuel LLC, located in North Pole just outside of Fairbanks, is the first large pellet plant to be built in Alaska. While the plant is capable of producing 50,000 tons per year, they are finding it difficult to market their product and are only operating at half capacity, with few large commercial customers.

Superior Pellets has also been challenged by finding a source of raw material for their plant. While they are able to buy the waste stream from local sawmills, as well as debris left over from land clearing projects and the cutting of fire breaks, the biggest glitch they found in their production was that birch wood, which is the predominant tree species in the north, does not make good pellets. Birch pellets provide good Btus when burned, but create a lot of ash, which is undesirable.

Alaska is investing in energy

Large conversion to burning biomass requires capital investment, and the State of Alaska has been at the forefront of providing this capital. The Renewable Energy Fund at the AEA has led the way with funding biomass projects and conversions for schools, libraries, tribal halls, and other municipal buildings across the state. The AEA has invested over $20 million in biomass projects across the state in the past five years.

The community of Tanana has tackled its biomass conversion one small step at a time. In 2007, Tanana installed two small cord wood boilers to heat their washeteria. In rural Alaska many communities do not have running water in winter months due to extreme freezing temperatures. As a result, communities only keep water flowing to centrally located shower and laundry facilities called a washeteria. With the success of the first cord wood boilers, Tanana continued by installing eight more, including two that were to heat the municipal water system to keep municipal water flowing year round. Biomass for Tanana comes from logs floating down the Tanana River. In fact, the installation of so many cord wood burners has spurred a small cottage industry of firewood cutters to supply the boilers, and last year the Discovery Channel produced an entire season of reality TV called "Yukon Men" including episodes showing the Tanana River loggers.

Meanwhile, the rest of the state is slowly converting to biomass. The State of Alaska is offering low interest loans to businesses interested in converting to biomass. Military bases are converting, and most notably, the US Coast Guard base in Kodiak—the largest in the United States—is planning a biomass conversion of their central steam plant, which annually burns 1.3 million gallons of #2 heating oil. They will use nearly 10,000 tons of pellets when they are up and running. Since their budget for fuel is a single line item, whether they are buying heating fuel for the base, or fuel for their boats and helicopters, it makes sense to switch to a cheaper fuel to heat buildings so they can focus more of their energy dollars on fueling Search and Rescue and other vital missions. ◆

Karen Petersen is a program assistant with the University of Alaska, Fairbanks, Cooperative Extension Service. She is based in Thorne Bay, Alaska, and can be reached at 907-821-2681 or khpetersen@alaska.edu.

Strategic Planning a Focus of Council Meeting

BY JOHN WALKOWIAK, BOB ALVERTS, AND JOHNNY HODGES

SAF President Joann Cox led a two-day SAF Council meeting at the National Conference Center in hot and humid Leesburg, Virginia, just outside of Washington Dulles Airport on June 1-2.

Strategic planning and ensuring SAF financial stability continue to be Council's focus. The Strategic Planning Committee is working to incorporate the 2013-2017 SAF Strategic Plan into the new Brand Framework by developing measurable Key Performance Indicators (KPIs) and improving the tracking of member requests to the National Office. EVP Michael Goergen is leading the National Office staff on some Council-approved experimental projects over the next 18 months that will improve membership benefits and services. Council is also working on several projects to examine the best options for restructuring SAF to be more nimble and reactive to the needs of our members—"Don't think hedgehog—think Navy Seal."

SAF membership grew in 2012 by 125 new members. The 2012 audit was clean and SAF is operating within the approved 2013 budget. The deficit budget we have operated under for the past four years continues to decline, and the Finance Committee is working hard to offer a balanced budget for 2014, the first in the past five years. The Finance Committee and National SAF staff is working hard to improve accounting, control costs, and review the financial feasibility of not only "new" projects, but also all existing programs. To date, SAF has received $2.5 million from the property sale with a final balloon payment due in May of 2014. The Finance Committee is working with investment advisors on revising our strategy to help minimize risk and maximize asset value to SAF. The committee is also looking at smart use of funds, including proposals to address immediate capital needs: 1) a major update of the SAF website; and 2) an architectural study of the SAF headquarters building to address deferred maintenance and improvement needs.

Left to right: Council representatives John Walkowiak, Johnny Hodges, and Bob Alverts.

The Founders Circle effort, where members pledge $1,900 over a four-year period, has raised over $72,000 to date and efforts continue to expand program fundraising within SAF membership.

A new Executive Committee Charter was approved by Council to improve transparency, and the President's Committee on Committees is finalizing recommendations on which SAF standing committees should be retained, modified, or dropped.

Council and the National Office staff heard about concerns from SAF Student Chapter advisors regarding the 2012 National Convention that involved the Quiz Bowl, National Student Congress, student field trip needs, and ways to improve communications between Council and student members. Carlin Starr, a recent graduate from the University of California at Berkeley, and now on the National SAF staff, will work closer with students and their advisors. She noted that changes in student activities are being planned for the 2013 National Convention in North Charleston, SC. Council also approved a motion that student members who graduate from SAF Accredited Forest Technician programs will receive SAF graduate rings, just as four-year graduates do.

The Certification Review Board (CRB) is recommending a new pathway for SAF members with two-year Forest Technician degrees from SAF-accredited programs to acquire Certified Forester status. With eight years of experience, plus completion of selected 15 credit hours in upper level undergraduate classes, then passing the CF exam, these members could earn CF status under the proposal. The CRB will complete some fine-tuning and membership will see additional information in the *Forestry Source*.

The theme of the 2013 National Convention is Silviculture Matters. The convention program has been released and registration is open (www.safconvention.org) for this event set for the week of Oct. 23-27 in North Charleston, SC. A fine convention center, nearby hotels, and other features make for an excellent convention setting, as well as the proximity to outstanding field trips. Come experience some fine southern hospitality and see what is going on in the southeast this fall.

Council approved two position statements, one on Conservation Easements and another on Public Regulation of Private Forest Practices. They also approved two emergency position statements addressing concerns involving funding for FY 2014 Interior, Environment and Related Agencies Budget, and comments on the 2012 USFS Planning Rule Directives. SAF policy staff members continue to have excellent relationships and reputations with Congressional and federal agency staff.

Finally, Council approved the following SAF members in our region as Fellows for 2013:

District 1: Terrie Jain and John Walkowiak;

District 2: Lori Rasor and Brian Schlaefli;

District 4: Gerald Gottfried, Cary Green, John Lavin, John Roberts, Franklin Roth III, John Twitchell, Craig Wilcox, and Beverly Yelczyn. ◆

This Council report is a joint effort between SAF District 1 Council Representative John Walkowiak (253-320-5064; jewalkowiak@harbornet.com); District 2 SAF Council Representative Bob Alverts (503-639-0405; balverts@teleport.com), and District 4 Council Representative Johnny Hodges (970-218-3394; jah.16@live.com).

We Remember

John C. Sherrod
1937-2013

John C. Sherrod was born in Knoxville, Tennessee in 1937. He was a newspaper boy, Eagle Scout, and poetry enthusiast who would become a soldier, a forester, a dad, a patriot, and a granddad. He graduated from Robert Fulton High School in Knoxville in 1955. After graduating he started his employment with the US Forest Service, attended the University of Tennessee, and received his Bachelor of Science degree from the University of Georgia.

On June 18, 1960, he married Bobbie Carol in Atlanta. He served in the US Army from 1961-1963 and is recognized as an "Atomic Veteran." John then returned to the Forest Service where he would be employed for the next 47 years. He received his Master in Science degree from the University of Idaho in 1980. He was elected SAF Fellow and was a Golden member. He also received the Silver Beaver award from the Boy Scouts of America, the highest honor bestowed to a volunteer. In 1988 he moved to Sitka, Alaska, where he was an active member of the Presbyterian Church, Kiwanis, Rotary Club, American Legion, Sitka Chamber of Commerce, and the Sitka Assembly.

He passed away at the age of 75 from cancer on May 26 at his home in Sitka. He will be remembered as a man of integrity, a man of the outdoors, and a man dedicated to his family and friends. He is survived by his wife Bobbie of Sitka, his sons Steven and David, his sister Charlotte, and two grandkids.

In lieu of flowers, donations can be made to the Camp Pellissippi Fund, Great Smoky Mountain Council, Boy Scouts of America in Knoxville, Tenn., or the National Museum of the Forest Service History in Missoula, Montana.

Joe Desjardin
1930-2013

Joseph "Papa Joe" DesJardin was born September 26 in Calumet, Michigan. He was one of 13 siblings, with four brothers and eight sisters. After graduating high school in Lake Linden in Michigan, he served in the Naval Reserves and took off to Alaska where he worked on the Alaskan Railroad and then joined the Army during the Korean Conflict.

In Alaska he married Rita McClafferty in 1957, and then went to Michigan Tech University where he graduated with a Bachelor of Science in Forestry. He started work with the Forest Service in Darrington, Wash., in 1960 and had two sons, Michael and Patrick, and a daughter Ramona. In 1974 he moved the family to John Day, Ore., where he served on the Bear Valley Range District until 1983. He was an officer of the Knights of Columbus of St. Elizabeth. He was an SAF member for 50 years.

He was a long-time supporter of the NRA and loved to hunt. He had hunted moose, caribou, bear, deer, elk, mountain goats, rabbits, pheasant, and waterfowl, and killed his last elk when he was in his mid-70s. He raised black labs for bird hunting and was an expert logger who loved to share the outdoors with his family. He was also an avid huckleberry picker, gardener, downhill skier, and woodworker.

In lieu of flowers, donations may be made to Lions International through LaFollette's Chapel, P.O. Box 488, Burns, OR 97720.

Paul Lynn Mortenson
1945-2013

Paul Mortenson was born in The Dalles, Ore., and spent a portion of his childhood in Mosier. In 1954 he moved with his parents to Hood River, which is where he would stay until graduating from Wy'east High School in 1963. He then enlisted in the US Army, where he earned the good conduct award. He served in Vietnam for one year and then spent the rest of his tour in Germany, an experience that fostered a connection to the German people and their language. When he came home to the states he earned a degree in German from the University of Oregon and then returned to Europe, where he taught English for two years to German school children.

In 1974 he returned to work in the woods with Starker Forests, a company that he would spend 38 years with until his retirement in 2012. Paul met Genie Sanderson in 1975 and they married a year later. They built their first home together and had two children, John and Laura, and he was dedicated to his family. An outdoorsman at heart, he enjoyed fishing and hunting, as well as camping, hiking, and waterskiing.

Paul was active in various community groups such as the Philomath Youth Activities Club, Society of American Foresters, American Legion Post 100, Veterans of Foreign Wars, Oregon Hunters Association, and the Forest Patrol program of Benton County.

He is survived by his wife Genie, son John, daughter Laura, and grandchildren, sisters, brothers, nieces, nephews, colleagues and friends. Contributions may be made to the Philomath Youth Activities Club, American Legion Post 100, or Benton Hospice.

Roque Nalley
1955-2013

Roque Nalley was born December 18, 1955, in Oceanside, Calif., and passed away May 13 in Spokane, Wash. He was 57 years of age.

Roque was a 1973 graduate of Enid High School and received his Bachelor's Degree in Forestry and Agriculture from Oklahoma State University in 1977. He obtained his Master's Degree in Forest Resources from the University of Idaho. He was a chief forester for the Colville Indian Tribe and an environmental scientist for the Washington State Department of Ecology. He was a member of the Selkirk SAF Chapter.

He liked to do anything outdoors such as fishing and hunting, and was a nature conservationist. He enjoyed music, his family and friends, and Gonzaga basketball.

Memorials may be made to the University of Idaho, Department of Forest Resources, 875 Perimeter Dr., MS 443147, Moscow, ID 83844-3147 or to the Oklahoma State University Department of Forestry, Stillwater, OK 74078. ◆

Calendar of Events

Forest Insect and Disease Field Day, Aug. 2, St. Maries, ID. Contact: UI Extension Forestry, Chris Schnepf, 208-446-1680, cschnepf@uidaho.edu, www.uidaho.edu/extension/forestry/content/calendarofevents.

Western Forest and Conservation Nursery Association Meeting, Aug. 6, Olympia, WA. Contact: WFCA.

8th annual Oregon SAF Foundation golf tournament, Aug. 23, Trysting Tree Golf Course, Corvallis, OR. Contact: Mike Tucker, 541-915-2264, mike@giustina-land.com.

Forest Products Forum: Portland, Sept. 17, Portland, OR. Contact: Greg Lewis, 978-469-6335, glewis@getfea.com, www.getfea.com/component/content/article/210.

Who Will Own the Forest?9, Sept. 17-19, Portland, OR. Contact: Sara Wu, 503-488-2130, swu@worldforestry.org, http://wwotf.worldforestry.org/wwotf9.

PNW Reforestation Council: Forest Herbicides, Sept. 24, Vancouver, WA. Contact: WFCA.

Forest Tech: Improving Wood Transport and Logistics, Oct. 9, Portland, OR. Contact: WFCA.

SAF National Convention, Oct. 23-27, North Charleston, SC. Contact: National SAF, 866-897-8720, http://www.xcdsystem.com/saf/site13/.

Inland Empire SAF annual meeting, Nov. 15-16, Cheney, WA. Contact: Steve McConnell, 509-477-2175, smcconnell@spokanecounty.org.

Sixth Annual Western Native Plant Conference, Dec. 9-11, Vancouver, WA. Contact: WFCA.

Contact Information

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 at rasor@safnwo.org by August 5, 2013, for the September/October issue.

Members and Cooperators Honored at OSAF Annual Meeting

BY TIM KEITH

The following members and forestry cooperators were honored for their contributions to the Society of American Foresters and forestry in Oregon at the Oregon SAF annual meeting awards banquet, which was held Thursday evening, April 25, at the Wildhorse Resort and Casino near Pendleton, Ore.

Forester of the Year: Ted Reiss, Seneca Jones Timberlands, was recognized for his work on the OSAF Foundation by chairing the highly successful 2012 fundraising golf tournament, playing an active role in SAF chapter affairs, church and civic activities, and his work at Seneca as their silviculture program manager.

Chapter Achievement Award: Emerald Chapter. The award was accepted by Dale Claasen, chapter chair, and Tash Shaheed, past chapter chair, and recognized the chapter for their continuing outstanding activity including letters to the editor and oped pieces, chapter newsletter, membership maintenance and growth, and strong chapter meetings.

Forestry Appreciation Awards (co-honorees):

• Talk About Trees (TAT), sponsored by Oregon Women in Timber. The award was accepted by Joan Mason Ruud. TAT is an interactive science-based program for pre-school through eighth-grade students that encourages awareness and appreciation for forests and the need for protection, management, and conservation of this valuable renewable resource. TAT reached 140,000 students and adults in just the last year.

• Forests Today and Forever. The award was accepted by Steve Cafferata, a long-time volunteer and board member; FT&F's mission is to promote forest stewardship through education. They sponsor the Forest Field Day for sixth and seventh grade students in the Eugene area, educating students and teachers about forest stewardship.

OSU Outstanding Student: Gary Batliner, a senior in forest management who is currently co-chair of his chapter, has been active for years in the chapter and is known as an "all-around great person!"

Inaugural Community College Outstanding Student (co-winners):

• Rachelle Hedges, Central Oregon Community College, served as co-chair of her chapter and past chair, outstanding student and a litany of superior accomplishments at her college and in her work assignments while in school.

• Katya Davidson (formerly Kitt Jennings), Mt. Hood Community College, an outstanding student who helped form the new chapter at the college, also served as its first chapter chair.

Lifetime Achievement Award: Frederick C. Hall is a long-time forest ecologist with the USDA Forest Service, and is renowned for his work in eastside forests and the author of countless articles, publications, and books.

OSAF Honorary Membership: Wayne Giesy was recognized as a long-time supporter of active forest management starting with his service in the Oregon Legislature from 1955 through 1958 and continuing on today and into the future. ◆

Tim Keith serves as co-chair of the Oregon SAF Awards Committee along with Glenn Lahti. Tim can be reached at 503-779-7760 or tkeith@odf.state.or.us.

PHOTO COURTESY OF PAUL BARNUM

OSAF Chair Ron Boldenow (left) congratulates Ted Reiss on being named OSAF's Forester of the Year.

PHOTO COURTESY OF PAUL BARNUM

Left to right: Tim Keith, Glenn Lahti, Ted Reiss, Joan Mason Ruud, Fred Hall, Wayne Giesy, Rachelle Hedges, Tash Shaheed, Dale Claassen, Gary Batliner, and Ron Boldenow. Not pictured: Katya Davidson.

WSSAF Annual Meeting Update

BY DON HANLEY

During the first week of April, the WSSAF had their annual meeting attended by foresters, spouses, and friends. It was held along the shores of Lake Chelan at Campbell's Resort.

The program focused on dry forest restoration strategies and treatments with an outstanding cadre of speakers from the US Forest Service, Bureau of Indian Affairs, Washington Department of Fish and Wildlife, a non-governmental organization, and a consultant from British Columbia. These presentations were excellent and provided ample time for questions and answers.

A highlight of the meeting was the Thursday evening banquet where WSSAF Chair Ellie Lathop presented the Chapter of the Year award to Paula Hopkins, chair of South Puget Sound Chapter. Adrian Miller, Longview Timber, was selected the Forester of the Year. Three members were awarded 50-year Golden memberships: James Hertel, Richard Pierson, and Bob Wiggins. We were very fortunate to have Bob Wiggins in attendance. He shared some of his history and thoughtful words of wisdom, including: maintaining the status quo means being left behind; different approaches can get similar results; the phrase: "I'll believe it when I see it" really means I'll see it when I believe it—you choose to believe; and we cannot predict the future, but we can sure help create it! Congratulations to all.

The after-dinner speaker was Jack Nisbet, the Author of *The Collector* and *David Douglas—A Naturalist at Work* amongst other works. Mr. Nisbet delivered a wonderfully inspiring talk on David Douglas the early botanist. His focus was Douglas' work in the Pacific Northwest.

PHOTO COURTESY OF DON HANLEY

Chair Ellie Lathrop (left) presents the Chapter of the Year award to Paula Hopkins, South Puget Sound Chapter.

PHOTO COURTESY OF DON HANLEY

Chair Ellie Lathrop presents a Golden Member certificate to Bob Wiggins.

Before the meeting, the WSSAF Executive Committee met. The committee is working on two important policy statements addressing Working Forests and Forestry Education. Please watch for other communications on these two topics.

On Friday, Dale Swedberg, Sinlahekin Wildlife Area manager, led a superb field trip addressing prescribed fire benefits to wildlife. The Sinlahekin is an exceptionally well-managed wildlife area and a hidden "gem" in the dry forests southwest of Loomis, Wash.

We wish to thank Michelle Ellis, Terry Orton, and Andy Perleberg for all their work making this meeting a success.

We would also like to acknowledge financial support from: Bureau of Land Management; Green Crow Company; Green Crow Timber, LLC; Hancock Forest Management, Inc.; Tom Hanson; Longview Timber; Merrill & Ring; Plum Creek Timber Company, Inc.; Port Blakely Tree Farms, LP; West Fork Timber Company; Weyerhaeuser Company; and Green Diamond. ◆

Don Hanley is the WSSAF communications chair. He can be reached at dhanley618@gmail.com.

Aviation Biofuel

(CONTINUED FROM PAGE 13)

identified. We rely on our stakeholders to inform us of new assets, additional interested stakeholders, and opportunities to engage in dialogue. In return, stakeholders receive an analysis of the steps necessary to build the biofuels/bioenergy market based on realistic point of view with data and high-level analysis and the ability to help shape the future of their region's economic development.

One and a half years into the project, the first pilot supply chain study area has been identified as the northern Rocky Mountain ecoregion being referred to as the Western Montana Corridor, and a second region including northwest Oregon and southwest Washington is being explored.

At the conclusion of the project, each pilot supply chain coalition will have a regional "Atlas" articulating supply chain assets, a regional "Praxis" document outlining the supply chain analysis including initial strategies, and design concepts for potential production sites and linkages within the supply chains. This work will provide readily adoptable and timely development opportunities and can serve as a national model. ◆

Eini C. Lowell is research scientist with the USDA Forest Service PNW Research Station, Portland, Ore. She can be reached at 503-808-2072 or elowell@ fs.fed.us. Scott Leavengood is director of the Oregon Wood Innovation Center at Oregon State University in Corvallis, Ore. He can be reached at 541-737-4212 or scott.leavengood@oregonstate.edu.

NARA is led by Washington State University and supported by the Agriculture and Food Research Initiative Competitive Grant No. 2011-68005-30416 from the USDA National Institute of Food and Agriculture.

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.*

Myriad Policy Activities in WSSAF. In an effort to raise awareness of WSSAF, we held a legislative reception in Olympia. State policy makers received personal invitations from members. We were delighted that 30 state legislators or staff, the Lands Commissioner, and the State Forester were among the 100-plus attendees. Special thanks to WSSAF State Chair Ellie Lathrop who organized the effort, and those WSSAF members who attended.

WSSAF is in the process of updating position statements on Working Forests and Professional Forestry Education. An effort is underway to make these joint position statements with the Inland Empire SAF. Consolidation of several other WSSAF position statements into the Working Forests position statement is also being discussed.

State Chair Ellie Lathrop, Past Chair Tom Hanson, and Policy Chair Harry Bell met with Tom DeLuca, director, and B. Bruce Bare, dean emeritus, of the University of Washington School of Environmental and Forest Science. Discussions ranged from current and future forestry education to forestry for the 21st century.

WSSAF members Peter Heide and Mark Teply are attending Board of Natural Resources and Forest Practices Board meetings, respectively. The WSSAF objective is to become better informed to provide informed testimony regarding the management of state trust lands and forest practices regulations on private forest lands. When approved, the updated Working Forest position statement will likely be the basis for WSSAF testimony.

WSSAF Policy Chair Harry Bell met with Congressman Doc Hastings and newly elected Congressman Derek Kilmer to present and discuss the current WSSAF Working Forests and National Timber Harvesting position statements.

For more information on these policy activities, contact WSSAF Policy Committee Chair Harry Bell at harry@greencrow.com.

Exporting Natural Gas. Two articles herein mention the dampening effect that the low price of natural gas (NG) has on potential new wood bioenergy facilities. Vast supplies of NG locked in shale and other geologic formations now can be extracted using new technologies, including hydraulic fracturing. A study report on the environmental effects of "fracking" will be completed by the US Environmental Protection Agency in 2014, which could underpin new regulations. In mid-2008, the wellhead price of NG was about $13 per million Btus, a sharp but largely unexplained price spike comparable to that caused by Hurricanes Katrina and Rita in 2005. By September 2009 the shale gas boom had driven the price down to $2.18, but by January 2010 it was back up to $6.50. By early 2012 it had fallen to $2.40. Drilling activity has tapered off and the price is at about $4 today. Some analysts expect that price to hold steady for quite some time, but others expect it to rise higher if and when liquid natural gas (LNG) export

terminals are approved by the federal government.

Overland shipping of NG is done most economically in pipelines, but NG must be liquified before overseas shipment becomes feasible. Prior to the shale gas boom, to meet domestic demand energy companies built terminals along the US Gulf Coast for importing LNG from the Persian Gulf and elsewhere. Thanks to the shale gas boom the US now is in a position to export its NG wealth, and the LNG-to-NG facilities are rusting. Investors are awaiting federal approval of NG exports so they can retrofit these facilities to convert NG to LNG.

Under an arcane 1938 law, NG exports to countries that do not have a free-trade agreement with the US must be approved by the Department of Energy. Of the 22 export applications filed in the past 29 months, only two have been approved. The new energy secretary has put the others on hold and will review new applications case-by-case. The US is now the world's largest NG producer, and despite protests about NG exports from several domestic manufacturing industries as well as green advocacy groups concerned about fracking, it seems inevitable that the US will be exporting large amounts of LNG in the near future. As that happens the domestic price of NG is likely to rise. Contact: Jay O'Laughlin, Inland Empire SAF, 208-885-5776, jayo@uidaho.edu.

20 Years Later in Northwest Federal Forests. The still-extraordinary "President's Forest Summit" in Portland marked its 20th anniversary this spring with little public recognition, despite its key role in the evolution of the FEMAT (Forest Ecosystem Management Assessment Team) analysis and the Northwest Forest Plan (NWFP) that followed. A similar anniversary for the NWFP next spring is likely to receive more attention, perhaps including some pointed reflection and analysis of the changes in forest management and resource conditions that have resulted on federal lands after two decades of the NWFP and related policies for east-side forests. Hopefully, with such public discussion of the extended results of the NWFP, SAF members both within and outside federal agencies will offer their professional perspective, drawing from their unique expertise and experience as well as the greatly expanded science base of the past 20 years. And in providing such input, SAF members should keep in mind the many resources available, including position statements, articles from SAF publications, and letters and testimony to Congress and agency leaders. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu.

OSAF Salvage Harvest Position Update Approved; More Updates to Follow. The OSAF Policy Committee updated the position statement on "Salvage Harvesting on Public Lands" and it was approved by the OSAF Executive Committee. Notable changes include adding "on Public Lands" to the title to reflect the primary focus of concerns, as well as updating the reference list and background discussion. Salvage has not been a major issue in Oregon in recent years due to fewer large wildfires, but a single, big burn could easily renew the controversy.

The Policy Committee is now reviewing and updating two other OSAF position statements that are scheduled to expire this year: Clearcutting; and Active Management to Achieve and Maintain Healthy Forests. Both positions remain important given ongoing concerns related to wildfires and forest health, and persistent negative perceptions of clearcutting. The latter issue was renewed by the recent western Oregon BLM's pilot projects that include "regeneration harvests." All members are encouraged to review OSAF's position statements (www.forestry.org/oregon/policy/position/) and use them to articulate a professional perspective when discussing forest resource issues with people outside the profession. Contact: Paul Adams, OSAF Policy chair, 541-737-2946; paul.adams@oregonstate.edu. ◆

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THE LASER TECHNOLOGY SURVIVAL GUIDE TO FIELD WORK

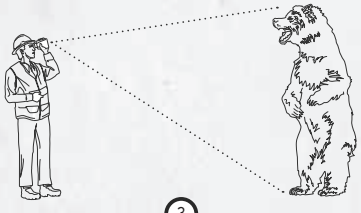
SURVIVING A GRIZZLY BEAR ENCOUNTER

1

Use your TruPulse laser, in distance mode, to see how far away the bear is.

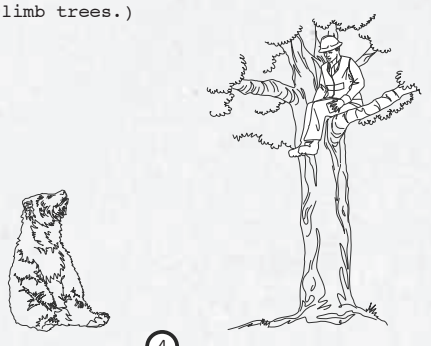
2

From that data, decide if you should run, or if you need to climb a tree. (NOTE: Make sure it's a grizzly. Other bears climb trees.)



3

If you chose to climb, measure the bear's height using your TruPulse's height routine.



4

Climb a tall enough tree and hang out until the bear gets bored and leaves. (NOTE: To pass the time, measure the height of other surrounding trees.)

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