SEPTEMBER 2001, VOL. 51, NO. 9

FOREST PRODUCTS JOURNAL

USES FOR SMALL-DIAMETER TREES

THE NATURAL RESOURCE FOR THE FOREST PRODUCTS INDUSTRY

EXPLORING THE USES FOR SMALL-DIAMETER TREES

BY SUSAN L. LEVAN-GREEN AND JEAN LIVINGSTON

Appearance of the same forest area before (top) and after (bottom) mechanical thinning.

Small-diameter and underutilized (SDU) material refers to the timber that is left in the forest because it is not economical to remove, or local capacity to process it does not exist. SDU material also includes the dense, understory present throughout the forest as a result of 50 years of successful fire suppression. It has become apparent that there are many beneficial forest management reasons why this material should be removed, including reducing fire hazards, altering the stand species and quality mix to a more desirable composition, providing healthier wildlife habitat, and protecting watersheds.

WESTERN FORESTS

In the Interior U.S. West, more than 73 million acres of national forests (4) and millions more acres in forests with other ownership have lost ecological integrity because of the major change over the years in vegetative structure and composition. Over time, the elimination of fires has created forests that are characterized by significantly overstocked stands of SDU material, which are now creating substantial wildfire hazards. A dense understory in the forest creates a ladder-type fuel that can lead to high-intensity crown fires. These fires spread fast and can cause catastrophic alterations to our forested landscapes and watersheds. The western wildfires of 2000 demonstrated the devastating impact these dense, overstocked stands can have on our western forests. To restore the open, park-like settings that existed in pre-settlement times, these stands need thinning, and possibly prescribed burning.

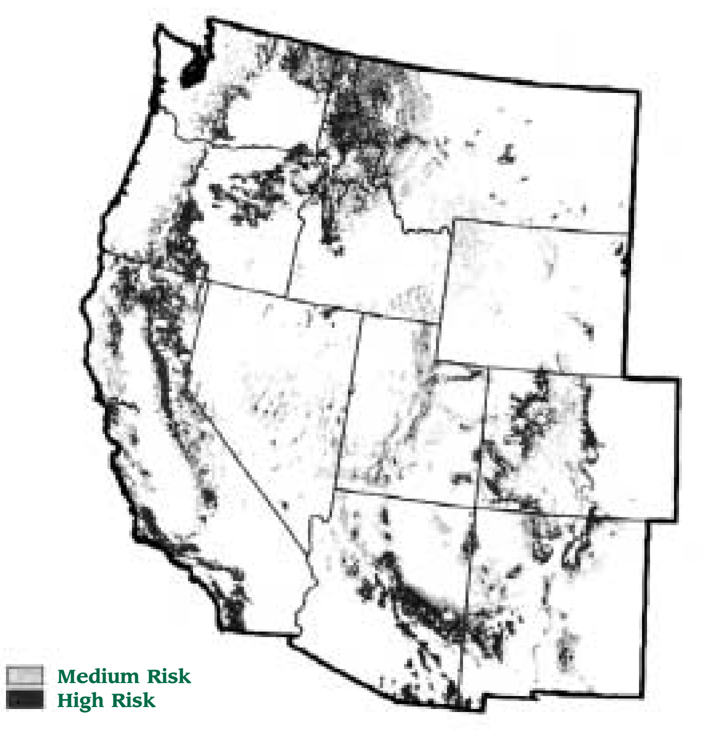
Most of the SDU material must be mechanically thinned before prescribed fire can be safely introduced. However, the cost to thin the forest, ranging from $150 to $550 per acre, is usually more than the value of the thinnings. Average costs for a Forest Service thinning is approximately $70/dry ton. Traditional markets for thinned material, namely the energy and chip markets, pay approximately $25 to $35/dry ton, respectively.

Prescribed fire can also be considered as a method of thinning and it costs less than mechanical removal. However, the Forest Service estimates that only about 10 percent of the overstocked forests can use prescribed fire without some type of prior mechanical thinning. There are also some issues of air quality and smoke associated with prescribed burning, as well as the risk that prescribed fires can turn into catastrophic wildfires, such as the 2000 Cerro Grande fire near New Mexico's Los Alamos National Laboratory.

If cost-effective and value-added uses for the thinned SDU material could be found, forest management costs would be offset, economic opportunities would be created for rural forest-dependent communities, and catastrophic wildfires would be prevented or minimized.

By finding value-added uses for SDU material, we will achieve the following benefits:

- Improve stand species and quality mix
- Increase forest resiliency



Western forestlands at medium and high risk of catastrophic fire.

Overstocked stands can cause high-intensity crown fires that spread rapidly.

- Reduce risk from insects and disease as well as catastrophic wildfires
- Provide healthier wildlife habitat
- Protect and improve watersheds
- Restore economic vitality to many forest-dependent communities
- Provide a supply of wood and fiber to our nation

RESTORING OUR FORESTS

The 2000 fire season in the West demonstrated what happens if we do not actively manage our forests to reduce overstocking of small-diameter trees: more than 6.5 million forest acres were burned. The intensity of these fires was primarily related to severe drought conditions and the long-term effects of a national wildfire suppression policy, which led to an unnatural buildup of brush and small trees in our forests and range lands (7).

For example, in northern Arizona, ponderosa pine stands that once contained 50 trees per acre now contain 200 or more trees per acre. The species type has also shifted from a more fire-resistant species like ponderosa pine to a less fire-resistant species such as grand fir, Douglas-fir, and sub-alpine fir. Thus, wildfires today, "...burn hotter, faster, and higher than those of the past." (7).

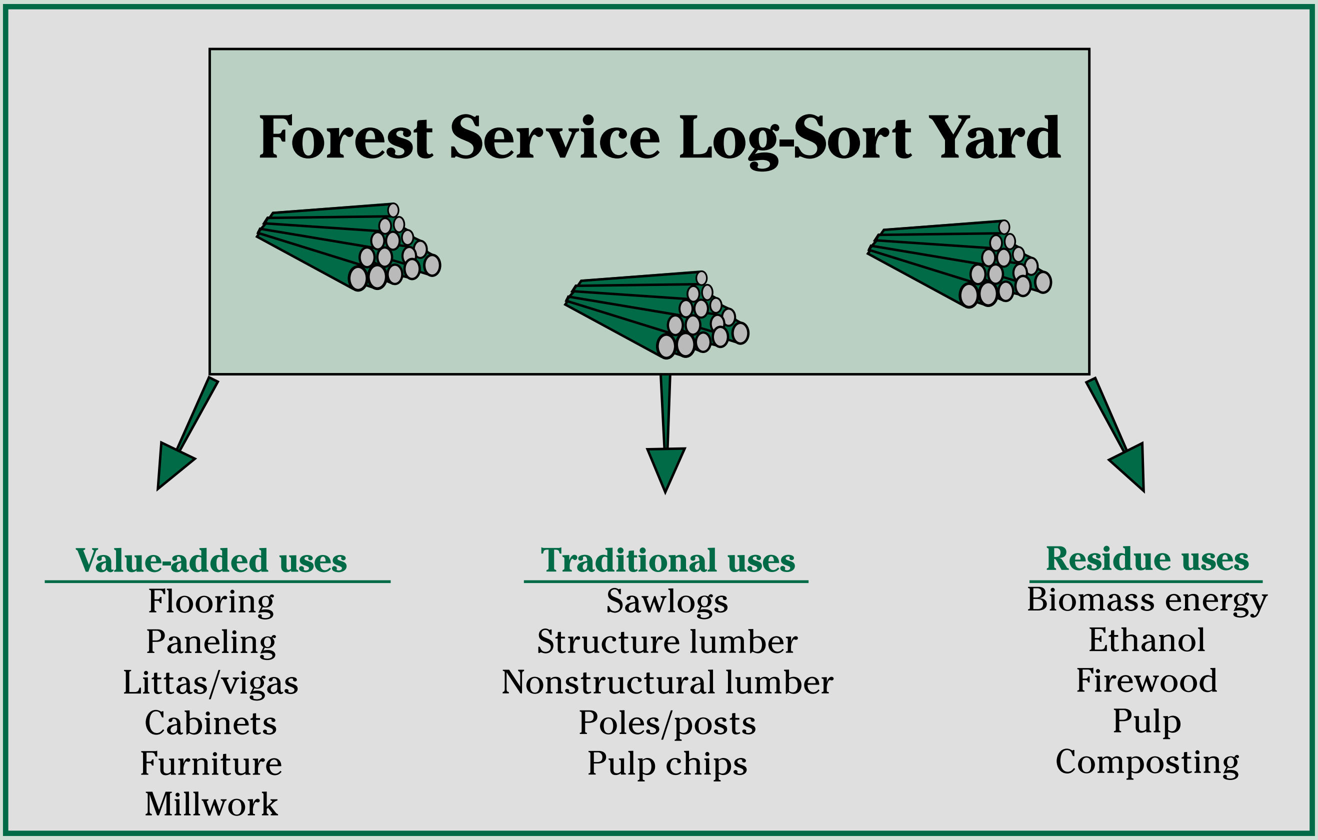
For fiscal year 2001, the U.S. Congress enacted emergency legislation that provided funding to the Forest Service to increase firefighting response, restore landscapes, rebuild communities, and reduce fire risk. As part of this legislation, some funds are to be used to work with communities and others (such as local businesses, universities, Rural Conservation and Development (RC&D) Councils, state and local government agencies, and engineering firms) to develop uses for SDU material. However, this funding is only a catalyst to begin action. For future generations, we, in forestry and forest products, need to find solutions to economically restore our forests to a healthy and productive condition, on both federal and private lands.

One barrier to achieving this goal is that not all SDU material can be utilized for high-value uses. To overcome this problem, the material must be sorted into its best and highest-value use, a practice that has usually taken place at the log landing. Logs are sorted based on their physical quality, such as number of rings per inch, size of knots, and straightness. Estimates indicate that creating higher-value uses for 20 to 30 percent of the thinned material could improve the economics of forest management operations. Logs may be similar in size, but due to their growth history, the physical properties may be different. The logs with tight growth rings, small knots, and relative straightness would be the type of material that could be turned into value-added products. There would be another 40 to 50 percent of thinned material that would be available for the traditional log markets, such as dimension and nondimension lumber. Finally, the residues would be targeted to low-value market opportunities such as compost, mulch, and energy. Dramm (5) is developing guidelines on the procedures and economics for log-sort yards, particularly those associated with Forest Service activities.

Cost to remove and process 1,000 board feet of SDU material = $600.

If material was concentrated and sorted into its highest-value use, these costs could be offset, for example:

Use				
Value-added	20%@	$120/MBF	=	$240
Traditional	40%@	80/MBF	=	320
Residues	40%@	25/MBF	=	100
		Total		$660



Hierarchy of uses for small-diameter material.

Currently, considerable activity is dedicated to improving the economics of using SDU material. Several organizations have programs that are examining the current economics using existing technology, as well as new technologies that can improve the economics. The following are some uses being investigated for SDU material:

- Dimension and nondimension softwood lumber
- Engineered wood products
- Glued-laminated timber
- Structural roundwood
- Wood composites
- Woodfiber/plastic composites
- Woodfiber products
- Pulp chips
- Compost, mulch
- Energy

Numerous efforts are underway to address the current SDU situation in the forest. Some of these efforts involve social change. However, most rely on technology advancements, either through more effective forest operations, more efficient processing, or achieving higher value for some of the low-valued SDU material. In order to change the current situation, all efforts are essential.

SOCIAL CHANGE

Forest management agencies throughout the United States are faced with declining budgets and staff, unprecedented pressure from industry and public forest consumers, as well as vocal pro and con advocates regarding the issue of active management activities. In addition, forest-dependent communities are faced with declining timber supplies, loss of jobs, high unemployment, and the social ramifications associated with these problems. To address this situation, many local communities have begun working with forestry agencies to create new partnerships and new ways of doing business, called community-based forest stewardship.

Community-based forest stewardship is defined as “a process of scientists, government, and citizens working together to agree upon and attain goals and objectives that are environmentally responsible, socially acceptable, and economically viable.” Its success is highly dependent on the interaction of community members. It is demonstrated in many forms across the country and depends upon the resources and expectations that participants bring to their cooperative activities. Members contribute

GAO Reports Seriousness of Problems in Western National Forests

In response to a request from the U.S. House of Representatives Subcommittee on Forests and Forest Health, House Committee on Resources, the U.S. General Accounting Office (GAO) examined issues related to the health of our western national forests. In April 1999, the GAO submitted a written report that described the following:

1) The extent and seriousness of problems in regard to the health of national forests in the Interior West;
2) The status of efforts by the USDA Forest Service to address the most serious of these problems;
3) The barriers to successfully address these problems and options for overcoming them.

The report also contained a recommendation to the Secretary of Agriculture for development of a cohesive strategy to address the growing threat of catastrophic wildfires to national forest resources and nearby communities.

The following is an excerpt from the GAO report:

> *The most extensive and serious problem related to the health of national forests in the Interior West is the overaccumulation of vegetation, which has caused an increasing number of large, intense, uncontrollable, and catastrophically destructive wildfires. According to the Forest Service, 39 million acres of national forest in the Interior West are at high risk of catastrophic wildfire. Past management practices, especially the Forest Service's decades-old policy of putting out wildfires on the national forests, disrupted the historical occurrence of frequent low-intensity fires, which had periodically removed flammable undergrowth without significantly damaging larger trees. Because this normal cycle of fire was disrupted, vegetation has accumulated, creating high levels of fuel for catastrophic wildfires and transforming much of the region into a tinderbox. The number of large wildfires, and acres burned by them, has increased over the last decade, as have the costs of attempting to put them out. These fires not only compromise the forests' ability to provide timber, outdoor recreation, clean water, and other resources, but they also pose increasingly grave risks to human health, safety, property, and infrastructure, especially along the boundaries of forests where population has grown significantly in recent years.*

in a range of ways, such as knowledge of ecology; funding in the form of grants, cost-shares, matching funds, and in-kind services; project administration and consultation; technical assistance; facilitation; and field coordination. A contribution can be as simple as having knowledge about local forests and communicating this information to others.

Community-based forest stewardship is growing in the United States, and the ongoing activities are teaching us about collaborative forest management. Although there are still issues to resolve, such as those highlighted in *Communities and Forest Management in Canada and the United States, A Regional Profile of the Working Group on Community Involvement in Forest Management* (19), the movement is definitely impacting how we do forestry and what forest products technologies need to be developed. Today, there are more than 50 formally organized community-based stewardship programs.

TECHNOLOGY ADVANCEMENTS

During the past 5 to 7 years, there has been tremendous activity within universities, federal research institutions, nonprofit groups, rural communities, and others to explore and evaluate the potential of SDU material, both for traditional lumber and value-added uses. The following sections discuss some of these potential uses.

Dimension and Nondimension Softwood Lumber

> **Community-based forest stewardship is growing in the United States, and the ongoing activities are teaching us about collaborative forest management.**

There is a perception that because material is from small-diameter trees, the wood is inferior in terms of quality. This is not necessarily true. Preliminary research results have shown that much of the Douglas-fir that occurs as understory is suppressed growth and contains a large number of rings per inch and small, tight knots. The same may be true for other species.

There are three use categories for softwood lumber: 1) yard lumber, which is primarily dependent on appearance; the higher grades are used for trim, siding, flooring, and paneling and the lower grades are used for shelving, sub-flooring, and concrete forms; 2) structural lumber, which is evaluated for its relative strength and stiffness (e.g., 2 by 4's, joists, I-beams, timbers, glued-laminated timber); and 3) factory and shop lumber, which is usually cut into smaller pieces for manufacturing into secondary products.

Efficiency and economical operation are necessary to utilize SDU material. As companies foresaw the change in the forest resource, the equipment available for processing SDU material increased during the past decade. However, many companies continue to process SDU material through conventional sawmills. Barbour (1) examined some of the technical constraints associated with processing SDU material in conventional sawmills and demonstrated the impact of small changes in diameter on the volume, piece size, and piece count of end products. A study by Wagner et al. (22) compared the potential economic value of small-diameter sawtimber delivered to a conventional random-length sawmill, a studmill, and a high-speed small-log sawmill to produce 2 by 4's. Of the three mills, only the high-speed sawmill equaled or exceeded harvest and delivery costs.

Several research institutions have conducted grade yield and recovery studies to determine the best appropriate grades for SDU material based on a particular species. SDU material is a nontraditional resource, and until the properties and characteristics are assigned, the appropriate use cannot be determined. There are geographic differences, but the following summarizes the findings of some of these research studies.

- In the Pacific Northwest, grade recovery was better for Douglas-fir/larch than for lodgepole pine, with 47 percent of the Douglas-fir/larch recovered as Select Structural (14) compared with 29 percent for lodgepole pine. Results indicated that volume and grade recoveries for lumber sawn from SDU trees were comparable to those from larger trees. In addition, machine grading appeared to offer an economic benefit to lumber sawn from small-diameter trees (15).
- In Northern Idaho and Montana, studies on lodgepole pine and grand fir (7- to 11-in. diameter at breast height [DBH] and approximately 45 years old) and ponderosa pine obtained by "thinning from below" showed that grand fir and lodgepole pine yielded over 65 percent No. 1 or Select Structural, and less than 7 percent Economy (8). This high yield was attributed to the small knot size. However, the ponderosa pine thinning, with larger knots, yielded approximately 50 percent Economy grade lumber. Machine grading of lodgepole pine produced a $27/MBF increase in value above visual grading, and the grand fir produced a $15/MBF increase in value.
- A similar study evaluated ponderosa pine from second-growth stands from the Boise National Forest near Emmett, Idaho, and a stagnated ponderosa pine stand located on the San Juan National Forest near Dolores, Colorado (8). The ponderosa pine from central Idaho yielded 70 percent No. 3. However, the stagnated ponderosa pine from south-

west Colorado yielded 82 percent No. 2 and better and only 17 percent in the No. 3 and lower grades.

- Ponderosa pine logs from Flagstaff, Arizona (6- to 16-in. DBH and approximately 100 years old) had a recovery of structural dimension lumber that was slightly greater than the cubic recovery of appearance-grade lumber (14). For appearance lumber, grade recovery of No. 2 Common and better was about 25 percent, with 66 percent graded as No. 3 Common. For structural lumber, visual grading indicated about 50 percent graded as No. 2 and better. However, very little graded as Select Structural or below No. 3. Wane on the edges of the pieces and warp due to drying degrade were the two most common grade-limiting factors for dimension lumber.
- Douglas-fir from Hayfork, California (4 to 10 in. DBH and between 60 to 80 years old) yielded over 60 percent Select Structural (9). More than 80 percent made No. 2 and better. Again, results indicated that small-diameter, suppressed-growth Douglas-fir can produce some high-quality lumber that offers significant opportunities in products such as trusses, glued-laminated timbers, and I-beams.
- Another ongoing processing study found that production of cut stock material from Douglas-fir, western larch, and lodgepole pine from northern Idaho might yield enough value to move into secondary manufacturing, although sorting by width and grade would be necessary (15).
- Some researchers are investigating the use of nonstructural joints to create long, clear pieces from ponderosa pine (20). The joints are designed to be undetectable under clear or light finishes.

Although there has been some effort to characterize the engineering properties of wood from SDU trees, we need to continue these efforts to fully understand the resource. We need to evaluate the grades and recovery that can be obtained from this material, both for structural and nonstructural markets. We need better low-cost drying techniques to improve recovery without significant losses in the kiln. This will allow a greater percentage of SDU trees to enter into existing high-value markets.

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ENGINEERED WOOD PRODUCTS

Production of engineered wood products continues to increase. During the past decade, engineered wood products have experienced rapid growth and acceptance in the marketplace. A primary reason for the growth is the abundance of second- and third-growth timber, as well as the abundance of species that were not considered commercial four decades ago (e.g., aspen) (10). Today, as old-growth timber becomes increasingly scarce and second-growth plantation species experience some performance difficulties, low-cost fiber is being put into high-strength engineered wood products (24). Species such as aspen and yellow-poplar are now being used in laminated veneer lumber, wood I-joists, oriented strandboard, and glued-laminated timbers. SDU material from the right species can be ideal for engineered wood products. However, the capital costs of an engineered wood products manufacturing facility are high, and unstable timber supplies in the West have resulted in a shift to reliance on resources from industrial and nonindustrial private lands in the U.S. East and South.

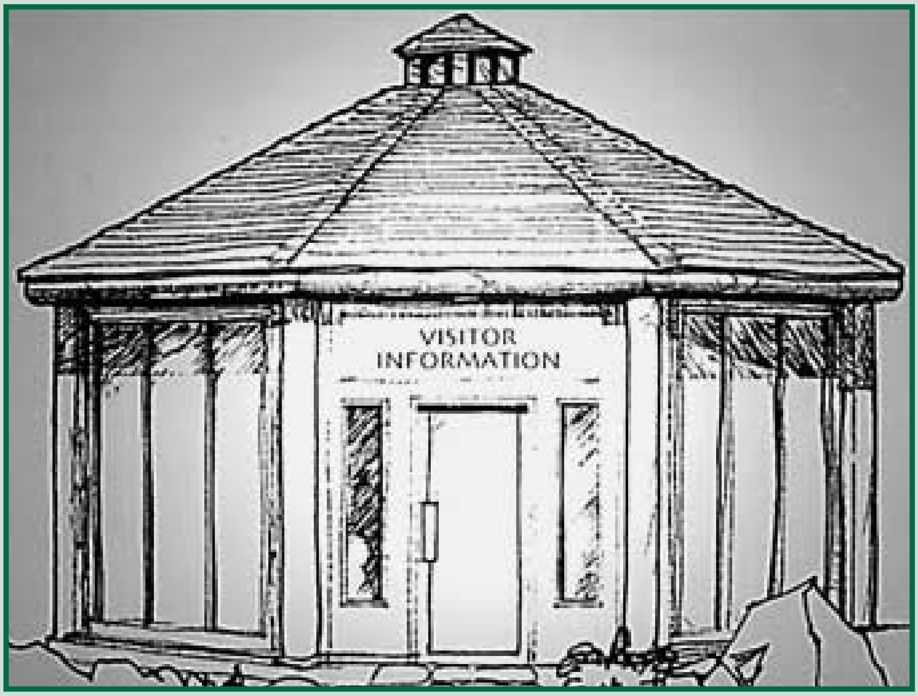
In the research arena, several studies have focused on the quality of veneer produced from Douglas-fir, western larch, white fir, and ponderosa pine logs ranging in diameter from 8 to 14 inches. Between Douglas-fir and western larch, no difference was found in the amount of veneer recovered. Recovery for white fir was slightly less than for Douglas-fir and larch. Veneer recovery for ponderosa pine was significantly less than for the other species. Research results concluded that veneer recovery for these small-diameter logs was comparable with that obtained from second-growth logs in previous studies (2).

Glued-laminated (glulam) beams also offer a good opportunity for SDU material. High quality lumber is required only for the outer laminations and lower quality lumber can be used in the core laminations when the laminating stock is “E-rated,” a method of nondestructively determining the stiffness of the laminating stock. This method is used extensively for Douglas-fir rather than using a visual grading system.

Currently, design properties for glulam beams made of ponderosa pine are determined using properties of the species grouping called Western Woods. However, if strong, high-valued ponderosa pine beams can be graded using the more efficient E-rating method used for Douglas-fir, rather than the visual grading system that assigns ponderosa pine into the Western Woods category, there is potential for improving the utilization of ponderosa pine in glulam beams. Engineers from Imperial Laminators, Inc. of Eagar, Arizona (a member of American Institute of Timber Construction), are working with the Forest Products Laboratory to evaluate and verify the E-rating method for ponderosa pine (12).

There is ample opportunity to use SDU material in engineered wood products. However, better nondestructive and species-independent grading standards would help remove the inherent bias against SDU trees and create more opportunity for some of this material to be used in engineered wood products such as laminated veneer lumber and glulam timbers.

Recent engineering research involving unique connectors has led to the development of a variety of structural uses for SDU logs.



This information kiosk will be used at the 2002 Olympic Games in Salt Lake City, Utah. It is an example of the type of structure that can be built using SDU material.

STRUCTURAL ROUNDWOOD

Another potential use of SDU logs, particularly in the range of 4- to 6-inch DBH, is for structural applications such as roundwood trusses, beam-column elements for post and frame building systems, pile foundations for residential structures, space frame building systems, and a variety of other structures. Advantages of leaving SDU material in the round include the following:

- Less susceptible to warp, more dimensionally stable, and stronger than most of the lumber that would be sawn from it
- Natural taper makes it suitable for use in column applications
- Processing costs are low

Research is addressing some technical issues revolving around the structural use of roundwood. A mobile test machine was built to evaluate the material properties of roundwood logs in the field. Additional testing is underway. Several connection systems have been tested and are still being evaluated (23). Five field studies on air-drying of round logs have been established in Arizona and New Mexico (21). A demonstration structure using roundwood trusses has been constructed at the Forest Products Laboratory in Madison, Wisconsin. In addition, Beaudette Engineering from Missoula, Montana, has developed engineering designs for two temporary structures that will be used as informational kiosks at the 2002 Winter Olympic Games in Salt Lake City, Utah. New design procedures and connection systems are needed to reduce the cost and create opportunities to use SDU material as a building component, such as trusses and I-beams.

Juniper, an underutilized species, is being mixed with plastic to produce exterior signs at P&M Signs in Mountainair, New Mexico.

Another application for roundwood is in highway structures such as guardrails, posts, and poles. Results from a survey suggested favorable market potential for roundwood used in highway structures. The only unfavorable comments from the survey stated that roundwood was more susceptible to splitting and cracking and that steel posts are more durable and easier to install than roundwood. For wood to be competitive with steel, there has to be a cost advantage (18). In addition, roundwood for guardrails and signposts needs acceptance by highway engineers. If accepted, this could open a significant market for SDU material.

WOOD COMPOSITES

Wood composites assembled from small pieces of wood provide a technology that is easily adaptable to a changing resource base. These products can utilize a variety of wood and wood-based raw materials, including fibers, particles, flakes, and strands. Many different species can be used in wood composites such as particleboard, medium density fiberboard, oriented strandboard, and oriented strand lumber. These technologies lend themselves to using SDU material; however, the initial investment in such technologies is usually substantial and requires a long-term assurance of supply (16).

WOODFIBER/PLASTIC COMPOSITES

A recent technology development focuses on woodfiber/plastic composites that utilize low-quality species such as juniper, pinyon pine, and insect-killed white fir. As a result of research and development efforts, P&M Signs in Mountainair, New Mexico, is successfully producing commercial highway signs from juniper fiber mixed with plastic (6).

WOODFIBER PRODUCTS

Woodfiber filters can be used to remove water pollutants. These filters absorb pesticides, herbicides, toxic heavy metals, oil and grease, phosphorus, and toxic organic compounds. Fiber mats made from wood can also be used for erosion control. Such products can be made in small, rural enterprises, using SDU material, and utilized locally to clean up pollution sites and help control erosion (11).

SMALLWOOD 2002: Community & Economic Development

Opportunities in Small Tree Utilization

The USDA Forest Service Forest Products Laboratory will be sponsoring a conference "SmallWood 2002" in Albuquerque, New Mexico, April 11-13. The objective of this conference is to provide state-of-the-art information on small-tree utilization and to foster peer-to-peer learning. The conference will include an international slate of speakers, including researchers, material and equipment suppliers, manufacturers, and end-users.

SMALLWOOD 2002 will feature technical and poster presentations, discussions, tabletop exhibits, and working equipment demonstrations of the following:

- Smallwood Harvesting Systems
- Processing of Smallwood
- Markets for Products Produced from Smallwood
- Supply and Availability of Smallwood Material

The conference will also include a day of tours of local processors (e.g., millwork, roundwood, preservative treatment, post and pole, small woodworking, and pellets) in the Albuquerque area, followed by live demonstrations of harvesting and processing equipment for small trees.

SMALLWOOD 2002 will be of interest to timber harvesting enterprises; rural development professionals; forest products business owners; leaders within timber-dependent communities; forest land managers; financial lenders; vendors of smallwood harvesting and processing equipment; researchers; local elected officials; conservation groups; local architects, builders, and engineers; resource advisory committee members; and tribal enterprises interested in small-tree utilization.

For more information, contact the Forest Products Society, 608-231-1361, ext. 208; Fax 608-231-2152; conferences@forestprod.org.

SmallWood 2002

PULP CHIPS

Chips for pulp have always been a use for SDU material. Even with new value-added uses, chips for pulp will remain an outlet for SDU logs and primary manufacturing residues. There have been concerns about using the chips from SDU material because of problems related to juvenile wood, compression wood, and the cost of harvesting trees and delivering wood chips to the pulpmill. Recent studies on the pulp quality from small-diameter Douglas-fir, western larch, and lodgepole pine have shown that, in general, with kraft pulping procedures, these species behaved similarly to kraft pulp made from traditional sawmill residue chips. However, there can be some problems if certain species are mixed with traditional sawmill residues.

Pulp chips will always remain a viable use for SDU material, but not in the Interior West. The need for large amounts of water is the primary factor that dictates the location of pulp plants, which eliminates most of the Interior West as a potential site. The cost of producing chips and transporting them to distant pulpmills makes pulp chips uneconomical for the Interior West (2,6,17).

COMPOST, MULCH

Use of woody residues as compost or mulch is another potential option for SDU material. Even when other uses for SDU material become common-place, a certain portion will end up as woody residues. Traditionally, this material has been burned or allowed to accumulate in huge piles. However, tighter environmental regulations designed to reduce the runoff of organic residues into the groundwater have necessitated the development of different disposal systems. Composting transforms this material into a value-added product that increases soil fertility and can be sold to consumers. Large-scale commercial composting operations are expensive, but small-scale alternatives provide an economic option for a small business. The primary technical problem to overcome in composting is increasing the efficiency. Passive aeration systems are being explored (6).

ENERGY

To use wood as fuel, requirements are less demanding than for most other uses. Some residues of SDU material and wastes generated in manufacturing various products are suitable for fuel with minimal processing, such as chipping. Fuels may be further refined through drying, pelletizing, or manufacturing charcoal. Possible pathways for using more wood for energy include power-generating plants, industrial applications of co-generating systems to produce heat and electricity, institutional heating facilities, or home heating.

Electrical generation is much in the news these days due to the energy crisis in California. Interest in co-generation for electricity is high. The price of wood for use as fuel is extremely variable. Sometimes when there are surplus supplies of wood residues at forest products manufacturing plants or municipal solid-waste facilities, the cost can be very low or even negative. In these situations, the cost is mainly for transportation from the supply site to the wood combustion or wood-processing unit. At other times, wood fuel at a plant may be quite costly because large volumes of fuel are needed to have a dependable and consistent supply, and other operations (e.g., papermills) may be competing for the same wood supply. However, wood power plants can and do maintain a fairly low price and consistent fuel supply when adequate quantities are available. There are several scales of electrical generation, each with different associated costs.

In general, wood combustion system costs are $50,000 to $150,000 for a 2 million BTU/hr. (0.6 MW) system, $100,000 to $350,000 for a 2 to 5 million BTU/hr. (0.6 to 1.5 MW) system, and $250,000 to $500,000 for a 5 to 10 million BTU/hr. (1.5 to 3 MW) system. Installation cost is highly variable because of the different types and capacities of equipment as well as whether equipment is new, used, or in-place and ready to convert to burn wood (3). Using wood for fuel in its simplest form, such as solid-wood chips, firewood, and sawdust, is often the least costly approach. However, it also may not be the highest and best use of the resource.

Residues from SDU material can be converted into fuels and chemicals through saccharification and fermentation. Saccharification is the process of making sugars out of wood carbohydrates. Fermentation is a biological process that converts hydrolyzed sugars into ethanol, lactic acid, succinic acid, or various other high-value products. Yeast- and bacterial-based technology can ferment xylose and other hemicellulosic sugars to produce high yields of ethanol. These products are useful in that they provide an alternative outlet for the use of low-grade wood feedstocks, they displace petroleum, and they add value to the total mixture of products that can be made from SDU material (13).

PUTTING THE FUTURE IN BALANCE

Dale Bosworth, our newly appointed Forest Service Chief, summed up the challenge that lies ahead (4):

“A key task before us is to balance the need for a healthy environment with the need to use some of our natural resources in intelligent ways......we need to accomplish our land stewardship goals by looking for creative new ways to get needed work done on the land, get products from it, and build communities together.”

There are no quick fixes, but the balancing process has begun and many local communities are now working side-by-side with forestry agencies to create effective partnerships. Social change and technology advancements are helping to open the doors for communities to develop rural enterprises that add value to SDU material. New jobs will be created, and the economic diversity of forest-based rural communities will be improved. Researchers and others will continue their strong efforts to find valued-added uses for SDU material. At the same time, forest restoration goals will be accomplished. In the end, everyone will benefit.

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