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Private Forestry

Technology
Marketing Unit



Small-Diameter Success Stories

Jean Livingston

Healthy Forest Communities

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Abstract

Public and private forests are in critical need of restoration by thinning small-diameter timber. If economical and value-added uses for this thinned material can be found, forest restoration costs could be offset and catastrophic wildfires would be minimized. At the same time, forestry-dependent rural communities—faced with diminishing timber supplies, loss of jobs, high unemployment, and declining community vitality—are looking for new ways to make a living from nearby forests. From information gathered in onsite interviews, this report describes how several businesses and community organizations are contributing to the health of the forest and their community by successfully making use of small-diameter and underutilized material.

Keywords: small-diameter timber, forest restoration, roundwood, small business

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Small-Diameter Success Stories

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Foreword

The USDA Forest Service, Forest Products Laboratory (FPL), has been researching new technologies for using small-diameter and underutilized trees since 1992. That was when several National Forest Supervisors approached FPL asking for help with the small-diameter trees that were increasingly dominating the forested landscapes and causing ecological problems, particularly increased risk from catastrophic wildfires and insect infestation. Over the years, I have visited many sites dominated by overstocked stands of small-diameter trees. At each site, the predominant concern was economics—how to achieve some economic value from these small-diameter trees so that the costs of removing them could be partially offset. The primary driver for removing these trees was always reducing the risk of catastrophic wildfires and creating more resilient forest stands.

Over the past 10 years, I have seen tremendous progress in using these small trees. However, I measure this progress not by current ecological standards but by the fact that a new industry infrastructure must be created to handle the tremendous volume of material that needs to be thinned. Although we have a long way to go to achieve the desired forest conditions, the ingenuity, commitment, enthusiasm, and dedication of community and industry leaders that I have met along the way are cause for my hope that we can solve this problem of “too many small trees.” Barriers still need to be overcome, but by working together with all interested groups, outlining what we want our forests to look like in the future, and relying on dedicated people to resolve differences and overcome barriers, we can improve our national forests and help improve the economic vitality of rural, forest-based communities.

The success stories described here are only a few examples of how forest-based communities and industries are responding to our current forest crisis. With more than 73 million acres of national forests and millions more in public and private forestlands that need some form of thinning to improve their resiliency, these success stories need to be replicated in forest communities throughout the nation—from the Pacific Northwest and Southwest, to the Southeast, the Midwest, and the Northeast. I wish we could have included all the success stories of how communities and forest industries are using small-diameter trees, but time and space forced us to choose representative examples. We focused on a variety of uses, including high-volume products, such as oriented strandboard; high-value products, such as veneer and furniture; and innovative products, such as ELWd® (large logs made from small-diameter logs and forest residuals). My apologies for the numerous examples not included. However, success stories like these exist in many of the communities where you live and work. I encourage you to seek them out.

The second major objective of this compendium is to capture the spirit and essence of the men and women who are leading the charge. As you read these stories, I know that you will marvel at their commitment, dedication, and passion. Their stories have one similar theme, namely determination—determination to find a solution, determination to help their communities, determination to improve the health of our forests, and determination to succeed. I am a better person for knowing these people, and I believe our forests will be better for their continued efforts.

Susan L. LeVan–Green

Program Manager
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Introduction

This report tells stories of successful small-diameter businesses or community organizations in the United States. To understand the importance, value, and purpose of their efforts, the overriding story must also be told—the story of how our country is striving to improve the health of our forests and, at the same time, helping the economy of rural communities that are dependent on natural resources for their livelihood.

In the West, more than 73 million acres of national forests and millions more acres of public and private forests are in critical need of restoration. Forests are declining in health because of major changes over the years in forest structure and composition. This trend has a negative impact on the growth of native trees and plants, wildlife habitat, and watersheds. Unhealthy forests present a high risk for catastrophic fires and epidemic insect infestation and disease.

As a result of past management practices and several years of fire suppression, forests are dense, have few large-diameter trees, and have an abundance of small, tightly spaced trees and underbrush. This small-diameter and underutilized material has been left in the forest because either it is not economical to remove or local capacity to process such material rarely exists. This dense material creates a ladder-type fuel that can lead to high-intensity fires,



which spread quickly. These types of fires can destroy entire stands of trees and cause major alterations to forested landscapes and watersheds.

Restoration of these overstocked stands, through mechanical thinning or prescribed burning, will remove most of the small-diameter material, thus helping the forest to recover its natural structure and ecological functions. However, forest thinning is extremely expensive and costs much more than the value of the thinned material

If new, economical, and value-added uses for this thinned material can be found, forest restoration costs could be offset and catastrophic wildfires would be minimized. Restoration thinning also offers other benefits:



- 🌲 Improved stand species and quality mix
- 🌲 Reduced risk from insects and disease
- 🌲 Increased forest resiliency
- 🌲 Healthier wildlife habitat
- 🌲 Protected and improved watersheds
- 🌲 Augmented supply of wood and fiber to our nation

The other half of the story is the forest-dependent rural communities that are faced with diminishing timber supplies, loss of jobs, high unemployment, and declining community vitality.

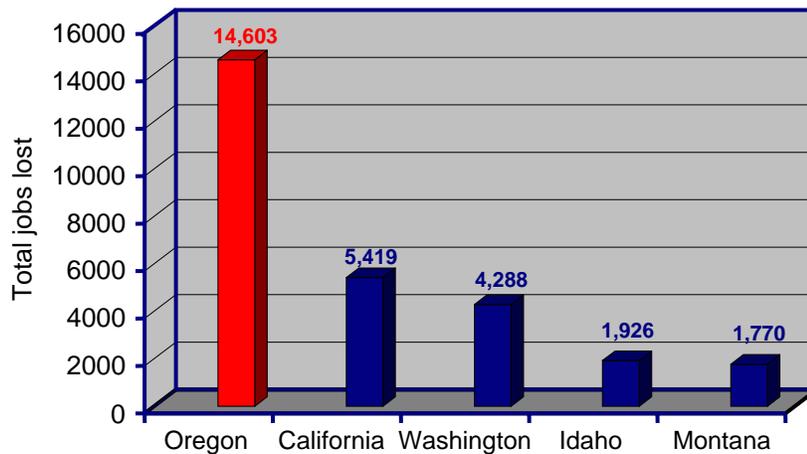
Many forest-based communities are looking for new ways to make a living from nearby forests. Several organizations across the country have programs that are exploring and evaluating new

technologies that could improve the use of small-diameter and underutilized material.

Forestry agencies and many local, forest-dependent communities are partnering—working side by side—to find new ways of collaborative forest management, adapting to the opportunities and constraints offered by the ecosystem, and developing new forest products technologies.

Restoration of our forests will persist as long as we continue working together for the ecological health of our forests and the economic health of forest-based rural communities. This report describes how some small-diameter businesses and community organizations are contributing to the health of the forest and the economy of their community by successfully making use of small-diameter and underutilized material.

Total Jobs Lost Due to Sawmill Closures 1989-2000



Bronson Log Homes



As you drive by, it looks like a typical log home business, remarkably similar to those you see by the roadside in Montana. Actually, Bronson Log Homes is a typical custom log homebuilder, but it offers much more than log homes to its customers and its community.

Bronson Log Homes is located just outside Enterprise, a rural forest-dependent community in the northeastern corner of Oregon in Wallowa County. Here, the landscape includes deep canyons, huge gorges, plateaus, river valleys, and numerous lakes, forests, and meadows. The area is often fondly called the Switzerland of America.

Owners Bill and Terri Bronson (husband and wife) and Dean Himes migrated to Oregon from Montana, where they had worked for a log homebuilder northeast of Missoula. Bill's employer asked him to temporarily relocate in Oregon to manage a branch of its Montana log home business. In 1992, the Bronsons made the decision to stay in Oregon and opened their business, Bronson Log Homes. Co-owner Dean Himes joined them shortly thereafter.

Combined, these owners have more than 40 years of experience in handcrafted log home construction, which has earned them a reputation as masters in the handcrafted log home industry. Their advertising brochure states "Quality custom hand-crafted construction for a lifetime of comfort and satisfaction."

In about 1995, Bronson Log Homes began offering hand-crafted log furniture and accessories produced from small-diameter timber that is recovered from local forests. So that they never have uniform pieces like those ordered from a mill, Bronson hand picks their wood from the forests, dries it to 6% moisture content, and peels it by hand. Each

finished piece of furniture has its own charm and identity.



Himes pointed out "We started working with small-diameter material because people wanted railings for their log homes. Our customers would have to order railings from other companies so we decided to make them; next, we made beds." Terri Bronson added, "The products were all built on the same principal, and we

just expanded from there."

Bronson tries to get its small-diameter supply from nearby national forests. However, this is not always possible. They also get some of their supply from Montana, usually lodgepole pine, but they have used white fir and tamarack.

In 2001, Bronson Log Homes joined in a venture with the Forest Service that prominently exhibited their business and the Wallowa Community at the 2002 Winter Olympics in Utah.

In an effort to assist rural communities and forest restorations throughout the West, the USDA Forest Service, Technology Marketing Unit (TMU) located at the Forest Products Laboratory in Madison, Wisconsin, has been exploring the use of small-diameter softwood and hardwood timber to build roundwood structures.

The TMU worked with national forests and rural communities to build two small-diameter, roundwood information kiosks for the 2002 Winter Olympics in Salt Lake City. Each kiosk is approximately 25 ft in diameter; they are enclosed and heated.

One of these kiosks was made from donated materials and processing by Bronson Log Homes. This kiosk is located inside the 2002 Soldier Hollow



venue (near Heber), where the biathlon and cross-country skiing events took place.

The Bronsons and Dean Himes express how they feel about their business this way: “Working in a place that’s only accessible by two scenic mountain roads, and where the elk still outnumber the humans several to one, has made us feel downright sorry for those trapped in ‘civilization.’ And so we decided to capture a bit of the Wallowa County lifestyle in our furniture and offer it to you.”

The owners of Bronson Log Homes have certainly accomplished this and much more.

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Catron County Citizens Group

New
Mexico

*

At first you may wonder if this is just a tale from the Old Western Frontier about the range and cattle wars of the 1800s. However, you will soon discover that it is a present-day story about the residents of Catron County, New Mexico. In this story, however, there is no happily ever after, at least not yet.

Only about 2,500 people live in the remote and isolated Catron County, which covers 7,000 square miles. The Federal government controls about 75% of this land, including a large part of the Gila National Forest. Economically, Catron County is very poor, with little industry except forestry and ranching. For three generations, ranchers and loggers in this county have depended on public lands to make a living.

In the 1990s, as a result of environmental pressures to restrict logging and grazing and policy changes from Federal land management agencies, the way of life for Catron County citizens changed dramatically. A seemingly insurmountable conflict was looming among ranchers, loggers, environmental groups, county government employees, and the Forest Service.

On the Gila National Forest, timber cut permitting by the Forest Service went from 30 million board feet per year in 1993, to 1 million in 1995, to literally none in 1998, because of the Mexican spotted owl being put on the endangered species list. At the same time, the Forest Service (brought on by pressure from environmentalists) began to strictly enforce the National Environmental Policy Act (NEPA) by closely checking ranchers' grazing allotments, which ultimately resulted in reducing the number of cattle that could graze on these lands. In addition, decreasing beef prices, drought, and competition from elk for forage heightened the problems for ranchers and loggers. In 1993, the only

lumber mill in the county (Reserve, New Mexico) closed, putting 30 people out of work.



In 1995, Catron County's unemployment was 10.8%. Loggers and ranchers were extremely frustrated and becoming increasingly angry with the Federal government and environmentalists. Fed up with Federal regulations, the county government passed several spiteful ordinances, such as writing its own land use

plan for the Gila National Forest, calling for the arrest of any Federal official who imposed the will of the Federal government on them, requiring every household to have a "firearm of their choice," and demanding that environmentalists register prior to doing any assessment within Catron County.

On the other hand, environmentalists felt that these public lands had been dominated too long by the ranching and logging industries, who did not have ecological preservation as their priority. In the middle of it all was the Forest Service, dealing with lawsuits from county loggers, ranchers, and environmentalists. Feeling their lives virtually being threatened, Forest Service employees hired a counselor to help them and their families deal with the situation and their emotions.



It wasn't only Forest Service employees who were suffering. There were attempted suicides by ranchers in the county. One environmentalist from the county noted that "a dangerous kind of undercurrent could erupt any time...I went to a local meeting where there were threats of using bullets and shooting."

Dr. Mark, the only physician in Catron County, began seeing more patients with anxiety, depression, drug and alcohol problems, spousal abuse, and family violence. In 1995, out of desperation for the residents of Catron County, Dr. Mark sought outside help through the New Mexico Center for Dispute Resolution (NMCDR).

As a result of the help from the NMCDR, the Catron County Citizens Group (CCCG) was born. The CCCG is a group of 15 to 20 Catron County citizens, ranging from ranchers to Forest Service employees, environmentalists, local county officials, county extension agent, clergymen, and community leaders. They meet monthly with a mission "to come together to openly and honestly discuss and deal with the diverse situations we face, finding common ground from our different points of view to ensure an economically, socially, and environmentally sound future for us all."

It sounds easy and simple, but it wasn't. The CCCG struggled with the minutest of details. For the entire first 6 months of organizing, group members educated each other on their different points of view. Eventually, the group decided to work on some actual projects within the county; some went smoothly, some did not. Forward movement was painstakingly slow, but there was progress.

Setbacks, such as the incident at Eager in 1996 and the grazing lawsuit in 1997, added tension to the controversial situation. The Eager incident involved a CCCG member asking a Forest Service employee to leave a strategy meeting that involved pursuing litigation against the Forest Service for restricting grazing permits. Because of this incident, feelings of distrust and skepticism again flared up. In 1997, an environmental group unexpectedly filed a grazing lawsuit that would compel the Forest Service to remove cattle from 70 allotments in Catron County. Ranchers were especially frustrated with the lack of notice.

Sometimes no amount of negotiation was going to change the situation. When they reached such a point, the CCCG turned its attention to areas where it could make a difference.

One of those attention-turning times was when CCCG Executive Director Bob Moore obtained a rural economic development grant from the Forest Service to conduct a feasibility study on the possibility of a small-diameter mill in the county. Remember the only lumber mill in the county that had closed in 1993? Well, the Catron County commissioners purchased that sawmill and land in hopes of sawing large-diameter logs, as the old mill had.

However, Moore says that with direction, over time, and with input from specialists like Rusty Damm of the Technology Marketing Unit (TMU) located at the USDA Forest Service, Forest Products Laboratory, the CCCG reopened the mill with plans to supply the mill using low-value, small-diameter ponderosa pine material from the Gila National Forest restoration and fuels reduction projects.

As part of the rural economic development grant, the TMU contributed technical assistance and marketing assistance to the CCCG, enabling them to determine the best use for a closed sawmill. Based on TMU's assistance, a pro forma business statement was prepared for the Catron County sawmill site. Bob Moore kindly remarked that "The assistance the TMU gives to our effort is integral to the development of our small-diameter forest products industry for Catron County. I don't know what we would do without their expert advice and connections to specialists throughout the nation."

In 1998, the NMCDR reported that the CCCG "had charted a positive course for the immediate future. The original objectives in Catron County were to reduce stress, create dialogue, and educate. The emphasis now clearly is on economic development. Signs of increasing openness are who people sit next to during the potluck meals before meetings, telling jokes and teasing each other, testimonials about how surprising it was that relationships evolved as they did."

On the current status of Catron County, Bob Moore notes, "By focusing on projects that achieve common goals, we've been able to work together to get past our differences. Unfortunately, tolerance of

different points of view is a required virtue that is sometimes lacking. However, the payoff is great when you realize gains in forest and range health and jobs for the community.”

The CCCG has definitely made progress since that first meeting with the NMCDR in 1995. County residents are slowly healing, both economically and

emotionally. In 2004, CCCG is working on several projects for the benefit of all citizens in Catron County.

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CCCG Projects

Newspaper—Made possible in part by grants from government sources, CCCG has been publishing the monthly “Catron County Citizen” newspaper since 1999. It is sent to every postal patron in Catron County and to more than 200 interested individuals and organizations outside the county. Each issue repeats the mission of CCCG and highlights the phrase “Catron County Citizen is your voice for an economically, socially, and environmentally sound future” to remind all citizens of the county that this is *their* newspaper. The newspaper is a good communication tool. It is a typical local newspaper, often highlighting a special individual who has given much to the community. It is also a way of informing residents of the status of special projects, upcoming meetings, and job opportunities.

Greenhouse—CCCG is providing assistance and opportunities to youth in the area by organizing and coordinating a small-diameter roundwood greenhouse to be built close to the middle and high schools and to be used as an agricultural learning center. This project demonstrates use of small-diameter roundwood as a structural building material, helps expand markets for a local sawmill, and uses material removed from forest fuel reduction activities.

Project Coordinator Bob Moore recently reported on the current status of the greenhouse project:

The school is charged with obtaining the appropriate construction permits based on a smaller version (30 by 36 feet) of the original blueprint design (30 by 60 feet). The school is then going to seek a contractor to assist with completing the foundation work. The school is also charged with fashioning the metal straps in their metal shop to be used in truss construction. Funds already in place will be used to compensate the contractor and pay for construction materials.

The CCCG is charged with obtaining logs that will be peeled by equipment currently being installed and coordinating the construction of the walls and trusses as modular units. These units will be built on-the-ground, horizontally at the mill site. Local talent will be hired to oversee the construction of the modular units, assisted by youth employed through our local Youth Conservation Corps Program this summer (2004). The cost of acquiring and peeling the logs and hiring local talent will be paid by funds in place.

Once the walls and trusses are constructed as modular units (by end of summer 2004), a contract will be let to transport and lift units into place on-site at the school. Installation of roof, windows, doors, etc., will be part of the contract. We believe that putting out this type of work for contract will be easier for contractors to bid on (and thus possibly attract additional bidders) than the original bid that included the construction of technically complicated trusses and fitting of logs.

The CCCG recently took on the responsibility of finding additional funds, as we are still short of sufficient funds to complete all the work. We currently have around \$47,000 in construction funds for a 1,080-square-foot structure, which are considerably less than standard construction square-foot costs. We continue to focus on instilling good communication and active participation.

CCCG Projects (continued)

Locally Based Forest Products Industry—In 2001, the CCCG entered into a 5-year agreement with the county to lease a former 22-acre sawmill property outside Reserve, New Mexico. In lieu of rental payment, CCCG contributes an average of \$10,000 per year of in-kind service and materials for improvement of rental property, a total of \$50,000 during the term of the lease. Maintaining a log-holding yard will help local logging and wood milling operators with the selling and purchasing of logs, which improves infrastructure and increases job opportunities.

In the last quarter of 2001, the CCCG started purchasing from a local logger fire-killed Douglas-fir logs from the Corner Mountain Salvage sale and storing them at the mill site for further processing. As of April 2002, about 435,000 board feet had been purchased and sorted for use by local operators. Soon, CCCG expects to purchase small-diameter ponderosa pine removed from forest restoration projects on the Gila National Forest.

CCCG's next step is to purchase used milling equipment and renovate some established buildings on this leased sawmill property. The revitalized mill will not produce lumber, as the old mill did, but will be designed to manufacture value-added products such as tongue and groove paneling. CCCG firmly believes "that every resident of the county will benefit from the investments the Citizens Group is making to the publicly owned mill site."

Elkhorn Log and Rustic Furniture



Rob Longwood, owner of Elkhorn Log & Rustic Furniture, has a special talent of taking the most gnarly-looking piece of waste wood and handcrafting it into a high-quality, elegant piece of furniture. The address of Elkhorn Log & Rustic Furniture is Darby, located in the Bitterroot Valley just south of Hamilton, Montana. This lush valley lies between the Bitterroot and the Sapphire mountain ranges.

Rob has been in the log furniture business in the Bitterroot Valley for almost 8 years. In 2001, he moved to a new location, where he bought the land and a 4,000-square-foot building.

Rob said, “At the time, I really wasn’t ready for the move but my lease was up and I needed more space. Now I’m glad it happened.” Rob has lots of remodeling to do, but he has a good start on the project. His plans include 1,100 square feet dedicated to a customer showroom.

Rob is originally from the Northwest, primarily Washington State. As a child, he visited family in Montana; he liked the area and planned to return some day. His past is more than interesting—it includes surviving a winter in a Cheyenne tepee, spending many months raising wolves and exploring Washington State’s Blue Mountains as a mountain man, working as a wilderness guide, and building a muzzle-loading rifle that he sports at the Mountain Man Rendezvous held each year in the Rocky Mountains. He says these wilderness experiences inspired him to create his rustic log furniture business.

He has been in the woodworking business for 30 years and learned his craftsmanship from a German master cabinetmaker. When Rob first began his business, he would take on just about any job to survive. He built entire homes, was a cabinetmaker for 1-1/2 years, and worked for a furniture company for 6 months just to learn the retailing end of the furniture business. He has always used the money

from his extra jobs to buy additional furniture-making equipment.

When he worked as a building contractor for log and conventional homes, Rob felt little satisfaction. He explains that people seem so unappreciative of the quality and craftsmanship of an entire house built of wood compared with their reaction of extreme pleasure in receiving

one truly well-crafted piece of furniture, such as a table or chair. Rob says that he would “much rather be known and remembered as a starving artist than a starving carpenter.”

Rob gets most of his supply of wood from following a horse logger. Anything the

logger doesn’t take is up for grabs for Rob. Most of what he collects is small-diameter lodgepole pine. Although this wood supply is at no cost to Rob, he will often build the logger a piece of furniture in appreciation.

Rob also builds furniture for landowners in order to be able to go in and clean up after their land has been logged. For example, in return for the privilege of hauling away 15 big truckloads of wood material, Rob built a table and two benches for the landowner. Rob says “It works out good for everyone. The material is much more than the landowner could use as firewood, the landowner gets his land cleaned up, and I get a free supply of wood.”

Another place Rob acquires wood is from log home companies, where he can buy a bundle (4 feet in diameter by 16 feet long) of their waste slabwood for about \$30. Half that bundle is made into furniture; the rest is waste, which is burned for heat.

Rob has the details all laid out for how his purchased shop will operate. As we walk through the shop, Rob explains the production flow and the assembly space needed to make the furniture. Most walls are lined with log racks where wood pieces are shelved while they continue to air dry and wait for further production. He has already installed



most of the insulation and drywall; he has also re-wired the building so that each machine is on a separate circuit.

An outdoor burner that burns wood chips and scrap wood provides his heat source; heat is blown into the building through the ductwork. Eventually, Rob explained, they will have too many chips to burn in one day so he plans to build a shed outside to stock the chips until needed.

His inventory of wood is stacked outside to air dry; plans are to build sheds to cover the stacks of wood. Rob also envisions a small park-like display outside that includes a gazebo, picnic table, and other items for sale that might catch a customer's eye as they drive by.

Rob has approximately 38 furniture-making machines. He is a master at modifying the machinery to cut something it shouldn't or saw a little differently than it was built to do or make several cuts when it is supposed to make only one.

For example, Rob took an antique piece of machinery that had been used to build Hudson car parts and modified it to cut railing spindles as large as 6 inches or as small as ¼ inch in diameter. He added a square wooden box that works in conjunction with a power saw. With this modified machine, diameter changes on the spindles are simple and cost nothing. In a machine built to make these kinds of cuts, it would cost \$1,100 each time diameter heads are changed. Rob admits that he "has a good mechanical aptitude but not an engineering degree. I want a finished look that appears to be totally hand finished. I have to modify most of the machinery to do what I want it to do."

He offers customers a process called "skip peeling," where you peel the log but keep some of the bark on. Log homebuilders do a lot of skip peeling. Rob says, "The bad thing about skip peeling is that no matter how well you finish it, the bark will continue to peel off."

Rob's high-end products have dovetailed drawers; quality hardware and a full bottom of solid wood are used in all his furniture pieces. After working for a furniture company, he believes that, in general, middle-of-the-road furniture made in the United States is poorly manufactured. Rob says, "I'd rather go broke making quality furniture than

make a million dollars from selling poorly made pieces."

Not all of Rob's work is for profit. One example of his generosity is when he donated to handicapped children several wooden toys that he had built entirely from waste wood. Each toy actually worked (for example, the crank on the crane, the controls on the outrigger). The steamroller toy was large enough for a child to sit inside the control booth. He made each toy look as authentic as possible; even the tires were made of wood.

Rob markets his furniture all over the United States, and although most of his customers are local, they aren't necessarily local people. Rob explains that many of his customers come to the Bitterroot Valley to build their second or third homes and word gets around about his furniture. One of his marketing tools is to provide to local restaurants free placemats that advertise his business. He is trying to branch out by producing a catalog and price list on his computer and hopes to soon have a website for ordering.

Rob admits that he has done little marketing of the fact that his business is based on using forest thinning material, basically waste wood. However, he is proud that small-wood business owners can make a big difference in cleaning up the forest. He especially enjoys finding the most unusual, gnarly pieces of wood. He says, "No one wants those weird pieces—it isn't even good for firewood because you can't stack it."

Rob's business is continually expanding. He is developing new ideas for products all the time, and he is seeing a big increase in the market for value-added products.

Rob says, "I like to learn something new each day—I figure if I haven't learned something new that day, the day was wasted." There is no doubt that with Rob's ingenuity, he will be around for a long time, learning and teaching his customers something new every day.

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Forest Concepts, L.L.C.



Jim Dooley, President and CEO of Forest Concepts, LLC., says “At times we behave like a large corporation, and the rest of the time we operate like three guys with a chainsaw.”

Forest Concepts “develops, manufactures, and markets innovative products from small-diameter wood for habitat enhancement, erosion control, and water restoration.” Their habitat products are used in rivers, streams, wetlands, ponds, lakes, and parks. The company also provides natural resource services that support sustainable rural communities. Headquartered in Federal Way, Washington, Forest Concepts was formed in 1998 by mostly former Weyerhaeuser employees who were interested in creating truly innovative forest products. Their business is built around “completing the watershed cycle.”

More than \$2 billion is spent each year in North America on habitat enhancement and watershed restoration. Of that amount, about \$300 million goes for materials that could be made from small-diameter timber. Dooley explains that an “under-appreciated outlet for small-diameter roundwood is in watershed restoration and environmental and habitat enhancement programs. Products manufactured from forest thinnings and subsequently placed back in the watershed complete the watershed cycle and at the same time provide income for forest landowners, woods workers in rural communities, and environmental restoration contractors.”

In the Pacific Northwest, loss of large woody material in streams and rivers has been identified as a leading cause of the steady decline in the salmon population. Salmon, along with bull trout and steelhead fish, need woody structure in their habitat to survive. The woody material provides cover and shelter and helps in gravel sorting for spawning



beds. Natural restoration would take decades to improve the salmon population. An alternative is to help nature along by bringing in large woody material and placing it back

into streams until nature can catch up and other solutions can be found. However, it is difficult to purchase the large-diameter logs that are needed, and transporting and installing the logs are expensive.

Dooley left Weyerhaeuser in 1995 and shortly after

began working to make salmon restoration more practical. At the time, he said, the endangered listing on Puget Sound salmon had just come out, and Federal and State funds for restoration were targeted for citizen volunteers and programs like Jobs in the Woods, Americorps, paid conservation crews, and other conservation-type programs. However, much of these funds were being spent on logistic costs and equipment. Big logs, 24 to 30 inches in diameter, were prohibitively expensive, or the logs were not available. If such a log could even be obtained in King County (Washington), the average cost of placing each log in a creek was \$1,000 because of the need to rent a crane, helicopter, or other large equipment to place the log.

At the time, it was extremely difficult to do salmon habitat restoration in the Puget Sound Basin, Dooley explained, and yet “there was this big citizen demand that people be involved in doing it.” Simultaneously, Dooley had been working on making it more practical to do forest operations and early commercial thinning. “So, we had this problem of how to generate revenue and find uses for small-diameter material that needed to be thinned from forest plantations. There was no pulp market, and thinned forest material was either being left in the woods or it was burned. There was no revenue to offset the cost of forest management. The Forest

Service and Bureau of Land Management faced similar forest health issues in the mid-1990s.”

In 1996, Dooley began working with University of Washington researchers, who said that more wood and large-diameter wood were needed to increase the salmon population. But Dooley and others felt that by combining disciplined engineering and fisheries biology technology, they could use small-diameter thinning material from the forest and create a product that not only was aesthetically pleasing but would also facilitate salmon habitat restoration.

The first product idea, said Dooley, was to make big logs out of small logs. “It took about a year to get the idea worked out into what we call ELWd[®] [pronounced el-wood]. ELWd[®] logs are made from small-diameter logs, usually 5- to 6-inches top diameter, and forest residuals. ELWd[®] structures are held together by round mortise and tenon joints. Spars (a type of dowel connection) join opposite poles into an interlocking all-wood structure. No bolts, nails, or other fasteners are needed. ELWd[®] structures can be built almost anywhere using simple tooling, assembled by untrained volunteers, and the structures decay naturally in the environment.”

Research at the University of Washington compared ELWd[®] structures to large, solid-wood logs. Results showed that ELWd[®] structures were at least as good as solid-wood logs, and it appeared that they could

provide a good bridging solution for salmon restoration.



So, in 1998, Dooley and others got together to decide “if they had a possible business here,” and their advisors concluded this was definitely a good business opportunity. Forest Concepts was born, and ELWd[®] structures for stream restoration were their first products.

With the success of ELWd[®] structures, Forest Concepts expanded into other habitat structures, such as engineered log jams, floating rafts for turtles, nurse logs (good foundation for tree seedling establishment), and other animal living quarters. The design of ELWd[®] products as kits provides easy installation with minimal impact on the environment. ELWd[®] logs are lightweight for transportation, tools are usually not required to assemble the ELWd[®] structures, and assembly is easy for volunteer workers and conservation crews.

Steve Thorson, Director of Business Development, explained that Forest Concepts

is organized around outsourcing everything and has only a few employees. However, their outsource partners provide new jobs and economic growth in forest-dependent and rural communities. Their office and shop area at Federal Way is only about 2,000 square feet, “and yet we have a virtual production plant that is several acres in size,” explained Thorson. “Our customers license the technology from us and then they use their forest resources, their people, and their funds to manufacture and sell the products. They pay as they use our technologies and trademarks.”

When their reputation with the ELWd[®] concept reached a national level, Forest Concepts moved into other areas where there was a need for a wood alternative. They developed FlowCheck[®] structures, or manufactured log erosion barriers, using small-diameter logs that are ideally suited for use in fire rehabilitation areas. FlowCheck[®] structures can be easily manufactured year-round and can be stockpiled, making them quickly available for use prior to heavy rainfall.

In cooperation with the Forest Service Rocky Mountain Research Station in Moscow, Idaho, Forest Concepts is researching and testing WoodStraw[™], an erosion control product. Based on preliminary results, they are confident that a wood-based straw material can be as good as or better than agricultural straw mulch.

Agricultural straw is currently widely used for erosion control, but it does have limitations (such as agricultural straw can be a source for noxious weeds in forested watershed, dust from the straw can be a respiratory irritant to workers, and it decomposes too quickly).

In addition to the University of Washington and the Rocky Mountain Research Station, the USDA Forest Service, Forest Products Laboratory (FPL), in Madison, Wisconsin, has been a good resource for them, Dooley mentioned. One example he gave was their development of a wildlife-friendly fence. At issue was the question of treating the wood with a solution that would make the fence fire resistant. With past research in this area, FPL was able to



help Forest Concepts with their questions. He said that “employees at FPL have the ability to take the current knowledge base that has accumulated for 90 years at their laboratory and apply it to a context of our technical needs.” When Forest Concepts was initially working on their connector system for ELWd[®] structures, “we watched FPL’s wood connector research closely because there’s a lot to learn from them.” Another area that has been most helpful to them is the log sort information published and made available by FPL. “We very much appreciate the professional peer support at FPL.”

Forest Concepts is looking to expand their product base into the Midwest and Mid-Atlantic areas. Ottawa National Forest (Michigan/Wisconsin) was their first major customer in the upper Midwest, using ELWd[®] structures for watershed restoration.

Thorson said that as Forest Concepts develops licensee and partner arrangements, they will continue to focus on product development. They try to come out with one significant product each year. They currently have about 18 standard models from their 10 different products. Their wood resource comes from various places and wherever it is available, including National Forests, state forests, local forest owners, or wood brokers.

Dooley added, “We are always looking for other product applications, bringing together our biology and engineering expertise. We currently have a list of 10 products that people want us to develop or find a solution to something that is currently not



ecologically acceptable. People bring us problems and opportunities all the time.”

Forest Concepts is an entrepreneurial business that we will all enjoy watching as it continues to succeed. They are well aware that “cookie cutter” solutions will never answer the problems that they are trying to solve. But these owners have an extraordinary, innovative spirit that will help them develop the best solution. More importantly, they are strong believers in “community solutions for community-based problems.”

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Plummer Forest Products



Not only is Plummer Forest Products a model saw mill, they are the only mill in Idaho that saws exclusively small-diameter logs. Todd Brinkmeyer owns Plummer Forest Products, which mills stud lumber—2 by 3s, 2 by 4s, and 2 by 6s in 8- and 9-foot lengths, recovering some 5-, 6-, and 7-foot lengths.

Just 34 miles south of Coeur d'Alene (Benewah County) is Plummer, Idaho, which has a population of about 800 and is located within the Coeur d'Alene Indian Reservation.

Todd grew up in the lumber mill business—his father owns Riley Creek Lumber in Laclede, Idaho, 92 miles northwest of Plummer. Aspiring to follow in his father's footsteps, yet wanting to diversify, Todd purchased the sawmill in Plummer. This mill is located on the site of the old Rayonier mill that burned in 1998. After the fire, the Coeur d'Alene Tribe purchased the mill, and Todd purchased it from them through a 7-year contract. The section of land used to store the mill's logs was not part of the sale, although the Tribe has given Todd a 100-year lease on that section.

Todd must have had a premonition of sorts, knowing that the wood supply in this country was undergoing a change, and if he wanted to continue in the lumber manufacturing business, his business would have to change along with the future of the wood resource. Before investing, Todd completed mill feasibility studies, which indicated that a profit could be made by operating a small-log mill.

"But," Todd said, "it has been a lot harder than I thought it was going to be. Getting the business off the ground took an entire year. We started production with one shift on June 16, 2002." Adding to what already existed on the site (a planer, cogeneration plant, and other support buildings, such as the

office, rail spur, and shop), Todd purchased new small-log mill equipment.



Todd has the advantage of sharing Riley Creek's Sales Department, which has expanded since the Plummer mill opened. They also share Riley Creek's Resource Department, which procures logs for both mills. In 2003, Plummer Forest Products employed 76 people. Monday through Friday, they run two shifts in the sawmill and one 9-hour planer shift. "The mill

could easily add a third shift in the sawmill if the wood was available," noted Alan Harper, Resource Manager, who has been at Plummer Forest Products since day one.

The mill buys logs from various places, such as northeast Oregon, Canada, and the Coast of Washington. It primarily processes Douglas-fir, larch, white fir-hemlock, lodgepole pine, and cedar logs.

Loggers truck in both large- and small-diameter logs to Plummer. The logs are divided, and those larger than 11 inches in diameter are sent on to the Riley Creek mill. This helps both mills keep their trucking costs down.

Alan says, "The best logs to work with are 4 to 5 inches on the small end and 7 to 8 inches on the big end. Logs larger than this are remanufactured to 16 feet and either sent to the Riley Creek mill or sold to somebody else." The maximum log length that Plummer accepts is 37-1/2 feet.

Plummer Forest Products processes about 750 loads of logs per month, with only about five loads per month coming from National Forests; fewer than 30 loads per month are from State land. National Forests cover 73% of the land in Idaho.

Alan explains, "It actually takes more room to store little logs than big ones. They don't stack well or as high. There's a lot more work to them. Last July,

we started to deck logs and watered them all summer long until about October when it started to get cold.”

In the summer, they take in about 60 loads of logs per day. In March 2003, they processed about 5,000 tons of logs per week. Their annual production was 60 million board feet of lumber, or 230,000 tons of logs. Currently, they have roughly 39,000 tons of small-diameter logs in the yard.

They buy logs by the ton and measure recovery by the ton. Every week they weigh three loads of logs, send them through the sawmill, and weigh the product that comes out. That’s how they figure recovery rate, which they estimate at 50%. On average, they process 20,000 logs into 60,000 pieces of lumber every day.

Alan says it’s a pretty simple milling process. “Logs in, lumber out.” It begins by a hydraulic heel-boom loader (crawler track mounted) that lifts the small logs onto the live deck. Then, the logs are fed into the ring debarker. From the debarker, the logs are machine drawn into the bucking station where a person-operated machine determines the length each log is to be cut. Then, variable saws cut the log in either 8- or 9-foot lengths. From the bucking station, the log drops into a bin. From there, the log is scanned by a computer.

A computer automatically scans each log and makes an analysis and visual graph of the log on the screen monitor. The computer evaluates how much the log needs to be rotated to get out the maximum product from that particular log. The sawing equipment interprets the computer’s analysis, and the log is automatically rotated appropriately and cut into studs. The scanning and analysis process takes place very quickly. The computer is set so that no more than 1½-inch curve is allowed in an 8-foot board.

This state-of-the-art computer technology reduces the cost of log processing at the sawmill and maximizes recovery. Todd said, “This computer technology makes sawing small logs viable; it processes small logs fast. Five years ago, this technology would not have been available at a cost-effective price.” (See sidebar on Best Opening Face.)

After the log has been sawn, the studs mechanically proceed to the stacker and are separated according to species by an automatic lumber sorter. The studs

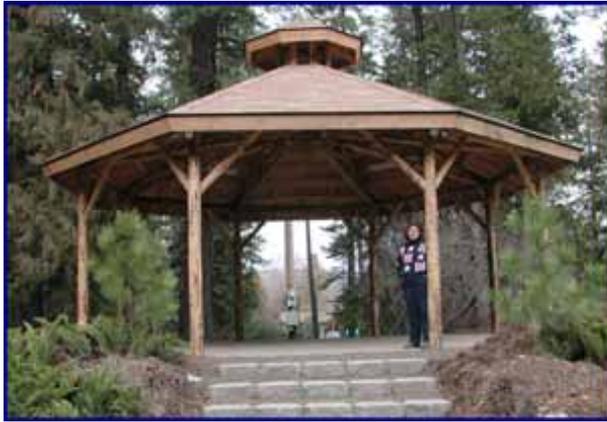


are then sticker-stacked and put into the dry kiln. From the dry kiln, the studs are taken to the planer, which provides a uniform finish thickness. The final product is then stacked, banded, wrapped, labeled, and put on rail cars for shipment.

A 5-megawatt cogeneration plant, which operates 24 hours per day, 7 days per week, was part of the existing Plummer Forest Products mill purchase. The cogeneration plant provides steam to operate the mill's dry kiln and enough electricity for about 4,000 homes.

“Small-diameter trees do not produce as much bark as large-diameter trees, so our mill doesn't have enough hog fuel to run the cogenerator; we buy four to five semi-loads of hog fuel per day. We do make money from operating the cogeneration plant but not a large profit.” The cogenerator's boiler has a 1956 turbine, which, Alan adds, “just seems to run every day with almost no maintenance.”

Todd says that the mill has few opportunities to get involved in community projects. However, they have worked with University of Idaho researchers on some small-diameter lumber studies. They helped in a local stream restoration project by



offering the use of their equipment and provided the logs to build a small wooden bridge. In the nearby town of St. Maries, they donated the material to build a 25-foot-diameter small-log pavilion in the town's park through a project sponsored by the Chamber of Commerce.

As the tour came to an end, Todd commented that their biggest problem is the low price for lumber. “The lumber market is absolutely the biggest challenge to everybody in this business.”

Plummer Forest Products has been not only a huge economic asset to this community but one that is an outstanding example of small-log processing. It is obvious at this mill that speed and automation, without sacrificing quality, equal

revenue. So far, Todd's premonition has played out—he continues to work and profit in the business he grew up in by adapting to the new wood resource.

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Best Opening Face & Sawmill Improvement Program

(John Rusty Dramm, Forest Products Utilization Specialist, USDA Forest Service, Technology Marketing Unit, Forest Products Laboratory)

In the 1960s, the USDA Forest Service predicted a timber shortage in the United States by 2000. To meet increased demands for improved conversion efficiency, the Best Opening Face (BOF) system was developed at the Forest Products Laboratory (FPL) to extend the Nation's timber supply. FPL researchers developed the BOF computer sawing simulation model for maximizing lumber volume recovery from small logs. In the 1970s and 1980s, this FPL-developed technology aided the retooling and automation of the sawmill industry in adapting from large old-growth to small-diameter second-growth timber.

The adoption of BOF by industry was made possible by the highly successful national technology transfer effort of the National Sawmill Improvement Program (SIP). The SIP, led by the State & Private Forestry Unit at FPL, worked closely with FPL researchers and the National Wood Products Extension Program (NWPEP) in transferring BOF technology. This national SIP team developed sawmill assessment tools to increase lumber recovery.

In conducting and analyzing SIP study data, BOF was used to predict potential lumber recovery for a sawmill under a given set of manufacturing conditions. This theoretical maximum recovery was compared with actual lumber recovery, and areas for improvement were identified. Recommendations for specific mill improvements were reported to each of the participating mill owners. NWPEP also provided educational programs to aid mill operators in making these mill improvements.

The SIP conducted more than 2,000 lumber recovery studies and reached more than half the U.S. softwood lumber sawmill production capacity. Nationally, SIP was responsible for an improvement in lumber recovery of about 4% of the total U.S. softwood production. This is more than a billion board feet annually, or enough wood to build all the houses in Madison, Wisconsin, each year.

The sawmill industry recognized the importance of and potential gains in lumber recovery by adopting BOF technology. Commercialization was accomplished by industry as they incorporated the BOF sawing model with optical log scanners and

computerized sawing systems to maximize recovery of softwood dimension lumber. Today, most softwood dimension lumber in the United States and around the world is manufactured using BOF-based sawing optimization technology pioneered at the FPL and brought to industry by the Sawmill Improvement Program.

The following publications on BOF and SIP are available through FPL's website (www.fpl.fs.fed.us):

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Hiram Hallock, Philip Steele, and Richard Selin. 1979. Comparing Lumber Yields From Board-Foot and Cubically Scaled Logs. Res. Pap. FPL-RP-324. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 16 p. (www.fpl.fs.fed.us/documnts/fplrp/fplrp324.pdf)

Hiram Hallock, Abigail R. Stern, and David W. Lewis. 1978. Is There a "Best" Sawing Method? Res. Pap. FPL-RP-280. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 12 p. (www.fpl.fs.fed.us/documnts/fplrp/fplrp280.pdf)

Frank Freese. 1974. A Collection of Log Rules. Gen. Tech. Rep. FPL-GTR-1. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 65 p. (www.fpl.fs.fed.us/documnts/fplgr/fplgr01.pdf)

Hiram Hallock and David W. Lewis. 1971. Increasing softwood dimension yield from small logs—Best Opening Face. Res. Pap. FPL-RP-166. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 11 p. (www.fpl.fs.fed.us/documnts/fplrp/fplrp166.pdf)

Porterbilt Post & Pole



Ron Porter, owner of Porterbilt Post & Pole, has helped operate this Montana family-owned business for more than 30 years. Ron is lucky in that he makes a profit from one of the last surviving post & pole businesses in the Bitterroot Valley. He has done so by constantly adapting his business to take advantage of the available resource. Ron calls it “turning a liability into an asset.”

Porterbilt is located just south of Hamilton, Montana, in the Bitterroot Valley, which is known as the Banana Belt of Montana. This valley—lying between the Bitterroot and the Sapphire mountain ranges—is 25 miles wide and 96 miles long, about 2,383 square miles.

Unfortunately, the Bitterroot Valley was the worst hit in the forest fires of 2000.

In the beginning, a family member suggested buying out a local post & pole plant. Ron says, “This was about as smart as hauling salt into Salt Lake City, because we weren’t aware that everyone made their own fence posts at that time. People couldn’t afford to buy posts.”

Initially, Russ and Alta Porter (Ron’s parents) and three of their sons started the business. Times were tough for the Porterbilt family. They often worked at other jobs just to make ends meet. At one time, Ron worked full time for the telephone company, doing inside and outside installation.

Only 14 months after the family started the business, one of Ron’s brothers left to pursue other interests. Because they couldn’t get out of their contract, the family continued on. Ron said, “We just kept on with the business the best we knew how.” With the death of Russ Porter and the physical limitations of his other brother, Ron purchased their interest in the business in the 1990s.



It wasn’t until the late 1970s that the business started to pick up. New people moved into the area and began buying fence posts. Little by little the business started to grow. Initially, Ron did all the logging for the family post & pole plant. He cut the

raw timber from Forest Service timber sales and hauled the logs to the plant. There, his father and three other workers processed the logs. They would get all their timber in long lengths in the summer, then spend the winter processing it.

Ron said at one time there were five post & pole businesses in the area, and the Forest Service offered post & pole sales or sawlog sales to help supply these businesses. Eventually, there

were fewer and fewer of these sales. Porterbilt was the only post & pole company that had their own logging equipment, which kept them going at the time. Eventually, Porterbilt also discontinued logging.

At present, their raw material is purchased from loggers who deliver to their plant. The logger drives onto the Porterbilt scales, and the material is weighed by the ton. The price is negotiated, which varies depending on transportation costs and how it was logged.

Most of the material Porterbilt buys is small-diameter lodgepole pine. As in previous years, their entire 1-year inventory is purchased within 3 months. The other months of the year are spent processing the wood. Ron explains that “you have to have a huge inventory on hand because you can’t work with wet wood; it has to air dry for at least a year before they can process it into a final product.”

Porterbilt runs an efficient and mechanized operation. After the raw material is purchased from the logger, it is machine-stacked on one end of their



land. Later on it moves to a log processor that cuts it to a specified length. Next, the bark is removed using a log peeler; then another machine sorts the logs by diameter according to end-product use.

Ron preservative-treats his posts & poles using a cold soak of copper naphthenate “until it takes.” He treats outdoors, only in the summer, in a huge tank-type container, using diesel fuel and wood chips to heat the chemical. Ron notes that they are gradually getting out of the fencing business and more into the value-added product area. Although he knows that the profit is in the value-added products area, he will continue to sell posts & poles to satisfy his long-term customer base.

Between 1975 and 1980, the log home business started to pick up. Log homebuyers wanted some of the interior parts of their log homes to blend with the exterior. However, log homebuilders initially built only the basic log home, no extras. Thus, some of the local log homeowners came to Porterbilt for items such as balcony, banister, and railing materials, which could be made using fence post material. Shortly thereafter is when Porterbilt invested in a rounding machine that cost about \$100,000, in

order to make precision connections so that the wood has a good “fit” into the end product. As word spread, Porterbilt began doing business with log homebuilders all over the United States.

Ron sees his future in value-added wood products. To survive in this business, he explains that you need to make it economically feasible to get the small wood to a plant, be able to make something out of it that is value-added, and effectively market that product. Ron said “Every year I see more of my friends going out of this business. My future is definitely in value-added products.”

Over the years, Porterbilt has invested in several wood processing machines. Ron says “We have mechanized our plant to where there is little hand work except in the value-added products.” He is quick to add, “We have never laid off anyone, using only attrition to cut down our workforce.”

Ron’s most recent value-added product is furniture—such as chairs, nightstands, towel racks, magazine racks, bed frames, and tables—manufactured using small-diameter material. Currently, word of mouth is his only marketing tool. He

has been building various pieces of furniture for about 5 years, developing a few good quality products. Ron intends to refine his product line before he starts a heavy marketing campaign. “We want to be ready to meet the market demand and produce a quality product. We think we are ready for the next step—marketing,” noted Ron.

You won’t see any wood waste at Porterbilt. Every scrap of wood is used in some way—even the wood shavings are put to use. Ron has worked out a business deal with a local person who buys and picks up the short, unusable pieces that have been cut from longer poles. This person re-packages this wood and sells it as firewood to customers all over the United States. Some of the wood shavings are used for bedding under playground equipment in local schools; most of the shavings are used for animal bedding.

Ron tries to fine-tune his business everyday. His next project will be to investigate installing a dry kiln. Currently, he uses sticker-type air-drying.

Ron is very much involved in and part of the Bitterroot community. He has been on the local school board and proudly displays in his office a picture of himself with the local volunteer

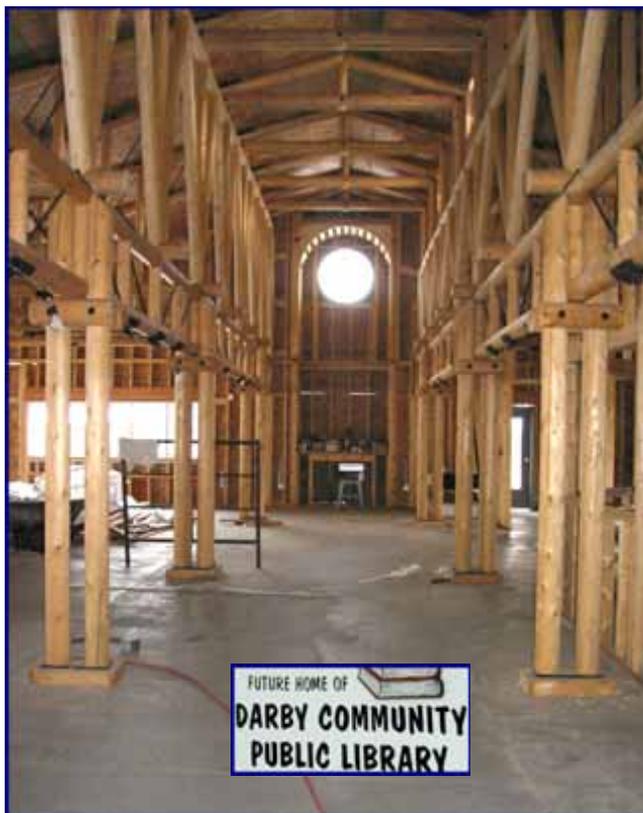
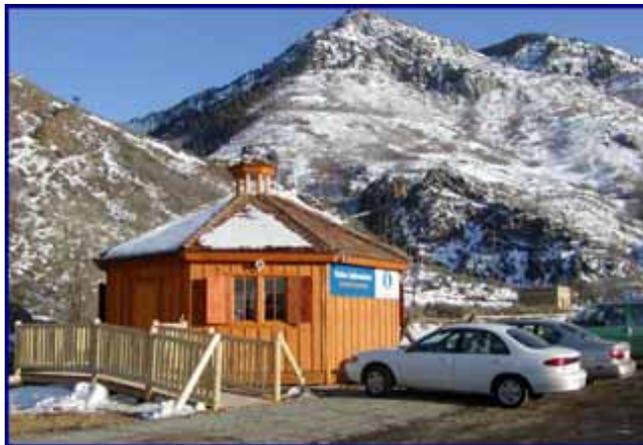
fire department. In 2001, he joined in a venture with the Forest Service that prominently exhibited the Bitterroot Valley and his business at the 2002 Winter Olympics in Utah.

In an effort to assist rural communities and forest restorations throughout the West, the USDA Forest Service, Technology Marketing Unit (TMU), located at the Forest Products Laboratory in Madison, Wisconsin, has been exploring the use of small-

diameter softwood and hardwood timber to build roundwood structures.

The TMU worked with national forests and rural communities to build two small-diameter roundwood information kiosks for the 2002 Winter Olympics in Salt Lake City. Each kiosk is approximately 25 feet in diameter, enclosed, and heated.

One of these kiosks was made from donated materials and processed by Porterbilt Post & Pole. Located at the mouth of Ogden Canyon, this kiosk served as an information center for the Bonneville Shoreline Trail System, the Ogden River Scenic Byway, and other recreation opportunities on the Wasatch–Cache National Forest and within Weber County and Ogden City. After the Olympics, this kiosk became a permanent structure and is continuing to be used by the community.



In addition to the Olympic kiosk, Ron has built a similar kiosk at the Lewis & Clark Traveler's Rest site in Lolo, Montana, and the trusses and round-wood supports used in the new Darby Library in Montana.

Because of his creativity, progressive nature, and adaptability, not only has Ron Porter survived in the family post & pole business but he is thriving. Porterbilt is open Monday through Friday. Stop in—even though Ron might be heading out

somewhere in his 4×4 extended cab pickup, his daughter, Ronda, or other employees will be on hand to help you out.

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Potlatch Corporation



In October 2003, Todd Smrekar, Plant Manager for Potlatch Corporation, gave me a tour of their 165-employee oriented strandboard (OSB) plant, which is located just outside the very small community of Cook, Minnesota.

OSB is a high-strength engineered wood composite product that is easily adaptable to a changing resource. It is manufactured from thin, geometrically shaped wood strands that are bonded together using a water-resistant resin under heat and pressure to form panels of various thicknesses; it is used extensively for roof, wall, and floor sheathing in all types of construction.

The Potlatch Corporation is a diversified forest products company with more than 1.5 million acres of timberlands in Arkansas, Idaho, and Minnesota, and has been in business since 1903. Since then, it has merged with other companies and has changed its corporate name three times. Potlatch manufactures lumber, OSB, plywood, particleboard, wood chips, bleached paperboard and kraft pulp, and consumer tissue. They have OSB plants in Bemidji, Cook, and Grand Rapids, Minnesota. Most of their OSB is sold within the United States.

Todd noted that “their Cook plant produces about 430 million board feet (3/8-inch basis) of OSB annually. We are considered a mid-sized plant within the U.S. forest products industry.”

Aspen is the primary species used in Minnesota for Potlatch’s OSB mills. In an effort to use the forest as it grows, Todd says they are incorporating up to 25% alternative species, such as pine and birch, for use in their OSB mills.

OSB can utilize a variety of wood-based raw materials. Emphasis at their plant is not just use of

small-diameter timber but using alternative species. Right now they are focusing on other underutilized species, such as tamarack, maple, and birch, which they have in abundance.

Recently, Todd said, they have been looking at the pine species. Problems here include getting the bark off without shattering the wood. Through trial and error, they have discovered Norway and Jack pine can be used for OSB.

Todd says that “They are not using these species just because it benefits Potlatch, but because it is a benefit to the forest.”

Potlatch forest lands in Minnesota provide approximately 10% of the fiber used in the company’s wood product mills. Additional fiber is purchased from public and private lands.

Todd says they try to maintain a strong relationship with the community. “Potlatch owns a lot of the forest land here. The people who work here live here, and we care what happens to the environment. We take pride in what we do. We try to build relationships among all the people living in the community.”

Although mining has driven the economy in Cook for the past 100 years, wood is now the main economic factor in northeastern Minnesota.

The OSB plant in Cook is very efficient. They burn their hog fuel (bark and trim waste) at the mill to provide heat for their press, dryers, and buildings. In fact, Todd says they generate more waste than they can use, but they have a market for the excess bark and sell it to Hill Wood Products in Cook. “This way, it’s not going to a landfill and we save the transportation costs to haul it there.”

Logs that range from 3 to 22 inches in diameter come into their OSB mill. These logs are cut into



100-inch lengths and run through water ponds. The primary purpose of the ponds is to condition the logs in the winter time. The logs are then debarked and flaked into strands—about 5 inches long by 1 inch wide, with a target thickness of 0.028 inch—which then go to the dryer. Typically, moisture content of the wood strands is about 35% to 50% coming in to the dryer and about 4% after drying.

The strands are stored in dry bins until they go through the blending process where the glue is applied as a liquid spray. As they go through the panel forming line, the flakes are oriented in four layers and pressed at about 400°F and 2,000 pounds per square inch. The final result is an 8- by 24-foot master panel, which can be sawn into many sizes but primarily 4- by 8-foot panels. “Our process emits no VOCs [volatile organic chemicals]. What you see coming from the stacks is only water vapor.”

OSB panels are tested daily by their quality control system. Their OSB panels must meet or exceed the industry’s stringent requirements and are put through 24 rigorous performance tests.

In 2004, Potlatch became the first public company in the nation to be certified by the Forest Stewardship Council. The certification applies to their 670,000 acres of forests in Idaho. The certification is like an environmental seal of approval. It assures consumers that they are not buying lumber made from old growth trees.

OSB is an ideal use for small-diameter material and for the many species that were not considered commercial 40 years ago, such as aspen. However, the capital investment in an OSB plant is substantial and requires a long-term assurance of supply.

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SBS Wood Shavings



She came to New Mexico from western Texas in 1995; he was born and raised in New Mexico. Together, Glen and Sherry Barrow not only are passionate about being good stewards of the land but are actively participating in restoring the health of the forests in southeastern New Mexico, primarily the Lincoln National Forest.

Located in Lincoln County, just outside Ruidoso on Highway 70, the Barrows have a 5-year lease from the county for the previously vacant Glencoe Rural Events Center. This is the site where they have set up their wood shavings operation, using material from forest thinning projects.

The USDA Forest Service has identified a need for thinning a third of the 270,000 acres in two ranger districts (Smokey Bear and Sacramento) within the Lincoln National Forest. Estimates are that the Lincoln National Forest will grow 30 to 40 million board feet per year, with a loss on average of 7 million board feet to insects.

In 1996, Sherry started a firm called Sherry Barrow Strategies, doing mostly long-range strategic planning for local companies. Her mission is to “Reinvest people in their own communities with the history, culture, and quality of life we share.” Her business led her to do a public audio tour of the Billy the Kid National Scenic Byway. A regional National Public Radio (NPR) affiliate then asked her to do a series of audio tours for the local station, and this series turned into a syndicated radio show. For 11 years, Glen worked for Hubbard Enterprises, a racetrack owner and benefactor of Hubbard Museum of the American West. Glen has also been a commercial building contractor since the early 1980s.

The mission of Sherry’s firm conveniently dovetailed with the couple’s long-time interest in forest

restoration. Eventually, they decided it was time to fit it all together and build a company—SBS Wood Shavings. Their hopes are that this company will

benefit the community by increasing job opportunities, assisting in forest restoration, and creating an ecologically sound byproduct.

In 2001, SBS Wood Shavings applied for \$330,000 in Federal grant funds through the USDA Forest Service National Fire Plan.

Through this Plan, the U.S. Congress provided funds, starting in 2001, for forest health and fire hazard reduction. After receiving the grants, the Barrows forged full-steam ahead with their plan to produce wood shavings for animal bedding, a product that is in demand and one that no one else is producing in the immediate area. Glen said, “We decided on this product [wood shavings], because it is currently somewhat under produced.”

To gear up for operation, the Barrows spent considerable time researching the right product and finding the appropriate equipment for their business. They have hauled in equipment to make wood shavings from as far away as Wisconsin, Maine, and even Canada. Some of their equipment is new and some used.

As they were gearing up for operation, Sherry and Glen became aware of and submitted a proposal to participate in a National Small-Scale Biomass Energy demonstration project co-sponsored by the U.S. Department of Energy through the National Renewable Energy Laboratory (NREL) in Golden, Colorado, and the USDA Forest Service, Technology Marketing Unit (TMU), located at the Forest Products Laboratory (FPL), in Madison, Wisconsin. The project involved installing biomass equipment that is a prototype gasification unit that burns waste wood to create electricity (15–20 kilowatts). In May 2002, SBS





Wood Shavings was selected to receive one of the demonstration units, which was installed October 29, 2002.

Before opening, SBS Wood Shavings had already begun to stockpile material to be used. They produce wood shavings from pine, pinyon, spruce, and fir. The trees, from 4 to 12 inches in diameter, need to be cut in 100-inch lengths. The 100-inch logs are fed into the shaving machine, which leaves fine sawdust that is screened and carried by an air handler to a 12-million-Btu/hour burner. This burner heats a 26,000-pound rotary dryer that sterilizes the wood shavings.

Their operation requires about 12-1/2 cords of wood per day, 5 days per week. They expect it to eventually increase to 25 cords per day, 5 days per week. Contractors are paid between \$40 and \$50 per cord to deliver material to their business site. And, SBS keeps track of where the material originated (thinning contract name, map of site, Forest Service contracting officer). Glen says, "One of our biggest constraints is getting the logs delivered to our business."

Sherry noted that "We plan to employ about four people the first year and if all goes right; about six to eight employees into our second year. We plan to run an 8-hour, 5-day-per-week shift plant."

Potential customers include horse trainers from the Ruidoso Racetrack, which is located nearby. So far, Glen and Sherry have done little formal advertising but already have many customers interested in buying their product. SBS Wood Shavings expects to be fully sustainable in about 5 years, although it could be less if all goes well.

National Small-Scale Biomass Energy Demonstration

At the same time that the USDA Forest Service, Technology marketing Unit (TMU) was providing opportunities to rural communities and businesses to diversify and expand their economies by turning wood into energy, the National Renewable Energy Laboratory (NREL) was working on new technologies that produce distributed power (generation of power at or near points of consumption with or without connection to the existing power grid). These technologies include the use of small, modular biomass systems that produce less than 5 megawatts of electricity using biomass, such as forest residue.

TMU & NREL merged their efforts into a cooperative national project aimed at demonstrating the use of small-scale biopower units to produce electricity using wood chips. The project involved first designing and building a small (up to 15 kilowatts peak power) biopower demonstration unit, then demonstrating the unit in communities/groups for up to 2 years each, depending on the requirements and conditions at each site.

This small biomass unit holds tremendous opportunities for both offsetting some local energy needs and using forest residues. However, this technology is still in the pre-commercial phase. To bring down the cost of this technology and to gain a better understanding of the operation and maintenance of these pre-commercial units, additional evaluation is necessary. Also, assessment is needed to determine the potential market for this technology.

To address some of these issues, NREL and TMU are conducting a nation-wide demonstration program. The primary objectives of this program are to

- evaluate the capability of a small biopower unit to offset energy requirements for a single operation, such as a business, community center, school, or some other local group;
- assess the potential of using wood chips as the fuel source;
- determine operating and cost parameters;
- demonstrate this technology to a wide variety of potential users; and
- recommend modifications and procedures for more efficient operation.

The immediate future for Glen and Sherry involves getting their business completely operational.

Eventually, they will look into the possibility of producing other wood products using material removed from forest restorations, but for now they are concentrating on wood shavings.

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Timber Products Company



Bill Turner, Log/Timber Procurement Manager, has worked at several other mills in California but has been at the Timber Products Company Yreka plant for the past 10 years. Timber Products is a privately held company and the second largest hardwood plywood producer in the nation. Bill says, "It is a great company to work for and I especially enjoy the wonderful employees that I work with at our Yreka mill."



Timber Products Company owns and manages nine manufacturing facilities. For more than 10 years, Timber Products Company has been an importer of commodity and specialty wood products. They also operate a trucking fleet, with more than 150 company-owned or owner-operator trucks in the 48 contiguous states, and a brokerage division. Timber Products owns and manages on a sustained yield basis approximately 130,000 acres of timberland in northern California and southern Oregon.

Their main sales offices are located in Springfield, Oregon, and Memphis, Tennessee. They offer several panel, veneer, and solid-wood products:

- Hardwood lumber
- Hardwood veneer
- Softwood veneer
- Hardwood plywood
- Pre-finished hardwood plywood
- Softwood plywood
- Decorative overlays and value-added products
- Particleboard
- Imported panel products
- Imported specialty products
- Medium-density fiberboard (MDF)

The Timber Products facility in Yreka produces primarily softwood veneer. It has 110 employees

and operates three shifts. Ten percent of their log supply comes from public lands, 30% from their

own forestlands, and 70% from the open market. Bill notes that "10 years ago, we purchased about 80% of our supply from public lands."

The Yreka plant produces Douglas-fir, white fir, and pine veneer cores in 4-, 8-, 9- and 10-foot lengths and ships it to their softwood and hardwood plywood plants in Oregon. They

attribute the softwood veneer produced in their Yreka plant as a key factor in being able to produce a high-quality hardwood plywood panel. Bill explained that as hardwood veneer skins have become increasingly thinner, the quality of the softwood inner plies under the veneer face and back becomes increasingly important to the quality of the panel. "A smaller, more uniform, second growth log provides this consistently better veneer."

The facility in Yreka has been there since the 1960s, and Timber Products purchased it in the early 1970s. About 5 years ago, they installed new high-speed rotary veneer equipment.

"We run through about 70 million board feet of logs per year at this site. Our small 4-foot lathe handles 8-inch-diameter and smaller logs. We can go down to 4-1/2 inches but would prefer to keep the range between 5- and 8-inch diameter. Financially, it doesn't pay to use logs less than 5-inch-diameter. Logs larger than 8-inch diameter are peeled on our big lathe. The ideal log size is 14 inch diameter." According to Bill, up to 32-inch diameter on the big end is as large as they can go; their debarker is the limiting factor for this size.

They do not dry the veneer in Yreka because they have no natural gas on site, which makes drying costs prohibitive. The veneer is shipped and dried at

their softwood and hardwood plywood plants in Oregon. The veneer requires 8 to 20 minutes for drying, depending on species and the thickness of the peel.

Bill is aware of only one other company that produces small-diameter softwood veneer cores. “The technology and equipment to produce softwood veneer using these small diameters didn’t exist 7 years ago.” As far as Bill knows, Timber Products was the first to install the equipment and begin producing small-diameter veneer. Bill added that “the last 6 months have been great for us because of the increase in demand for plywood, but the 3 years preceding that was financially tough.”

Timber Products Company has an 83-year history and has become one of the most diversified wood products companies in the United States. On their 130,000 acres of timberlands in northern California and southern Oregon, they plant about 400,000 trees each year from seed collected from their lands. Timber Products was the first hardwood plywood manufacturer in the world authorized to carry the SFI (Sustainable Forestry Initiative®) program label.

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Sustainable Forestry Initiative®

The Sustainable Forestry Initiative® (SFI) program is a comprehensive system of principles, objectives, and performance measures developed by professional foresters, conservationists, and scientists, among others, that combines the perpetual growing and harvesting of trees with the long-term protection of wildlife, plants, soil, and water quality. More than 136 million acres of forestland in North America is currently enrolled in the SFI® program, making it among the world’s largest sustainable forestry programs.

To ensure forests are protected, the American Forest & Paper Association (AF&PA) developed the SFI program to document the commitment of their members and the program’s licensees to keep our forests healthy and practice the highest level of sustainable forestry. The SFI program was adopted by AF&PA in 1994, and as a testament to the association’s strong commitment to the goal of sustainable forestry, participation in the SFI program is a condition of membership for AF&PA. Since 1994, AF&PA has asked 17 members to leave the association for failing to meet the SFI standard.

The SFI program is overseen by the Sustainable Forestry Board (SFB), an independent 501(c)3 organization responsible for maintaining and enhancing the SFI standard and verification procedures. The SFB has 15 members, two-thirds of which come from a wide range of non-industry interests, including environmental/conservation organizations, public officials (state and/or Federal agencies), professional/academic groups, logging professionals, and non-industrial landowners. The remaining five representatives on the SFB are AF&PA members.

Wallowa Resources



Those familiar with Wallowa Resources are proud to tell the story of how this successful organization came about. It happened in the back room of the local Cloud 9 bakery as a direct result of meetings among county officials and concerned citizens.

Wallowa Resources is a community-based, non-profit organization dedicated to sustaining the county's economy and ecosystems. Based in Enterprise, Oregon, its mission is to

- promote community, forest, and watershed health while creating family-wage job and business opportunities and
- broaden understanding of the links between community well-being and ecosystem health.

To comprehend the significance of Wallowa Resources, you need to understand the background of this community. Enterprise lies within Wallowa County of the Blue Mountain region in the north-east corner of Oregon. It includes rock-walled canyons, river valleys, many mountain lakes, and forests. Only about 7,200 people live in Wallowa County. Timber, ranching, agriculture, and tourism provide jobs for the local economy.

Wallowa County's economy is ranked almost last in the state. In February 2001, their unemployment rate was 19%. From 1991 to 2001, the wood products sector in this county lost more than 350 jobs. From 1985 to 1995, the volume of timber sold annually from the Wallowa-Whitman National Forest decreased from 504 million board feet to 18 million. Those timber contracts represented an important funding source for this county, which received 25% of the proceeds from Forest Service timber sales. Needless to say, the decrease was a



severe shock to the county's \$9 million budget. Instead of the \$1 to \$2 million received annually in the 5 years preceding 1990, the county received only \$86,000 by 1995, forcing deep cuts in county services. Having few logs to process, the local economy lost two sawmills, representing 120 jobs. All these events caused a domino effect, resulting in a 22% decrease in construction jobs and a 13% decrease in manufacturing jobs in Wallowa County.

In 1996, the community established Wallowa Resources to study the forest health and community health situations and, in turn, help local leadership provide sustainable employment in their county.

In 2001, Wallowa Resources had an annual budget of more than \$600,000, with more than \$450,000 paid out to 25+ local contractors for field work and project supplies. Some of their bigger projects included aspen restoration, Wallowa Lake Basin fuel reduction, Upper Joseph Creek vegetation assessment, and noxious weed management.

In 2001, Wallowa Resources had a 6-person staff and a 12-member board, which is very active in the organization. The Board is responsible for overseeing the administrative operations of the organization and ensuring that the actions of Wallowa Resources reflect the mission of the organization. Membership is open to anyone who wants to participate. Wallowa Resources publishes a quarterly newsletter and holds open bi-monthly board meetings.

Wallowa Resources provides an annual program of speaker forums and field tours to introduce local as well as outside people to innovative ideas and opportunities. Programs focus on resource management and rural economic development issues.



This operation provides marketing and business plan writing courses to existing and new businesses. In addition, Wallowa Resources works with Wallowa Forest Products, Boise–Cascade, the USDA Forest Service, Oregon Economic Development District, Department of Environmental Quality, and the U.S. Environmental Protection Agency to pursue opportunities for creating jobs, improving local industry competitiveness, and increasing land productivity.

Wallowa Resources asserts that they are working to unite the public, conservation and industry groups,



and government agencies in a common goal of restoring the forest ecosystem and the economic health of Wallowa County. By all accounts, they are making great strides in accomplishing these goals.

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Watershed Research & Training Center and Jefferson State Forest Products



It would be rare to find a more dedicated, civic-minded couple than Lynn and Jim Jungwirth, who live in Hayfork, California. Although Lynn is Executive Director of the Watershed Research and Training Center and Jim is President and owner of Jefferson State Forest Products, it's almost impossible to separate their stories, because they, like these two businesses, work together hand in hand.



Hayfork, population 2,000, is located at an elevation of 2,300 feet in the center of very rural Trinity County. Trinity County covers the lower part of the Cascade Range in California, midway between Redding in Shasta County and the Northern Redwood Coast. Trinity County is approximately 3,200 square miles of alpine magnificence. The area's economy is based primarily on timber and recreation activities. Trinity County includes 2.1 million acres of forests, of which the USDA Forest Service manages 1.6 million acres.

When I visited Jim Jungwirth in Hayfork, we ate breakfast and lunch at Irene's Café, the only restaurant open for those meals in Hayfork. After breakfast, Jim showed me some of the beautiful countryside in Trinity County. As we drove in his pickup, along with his dog, Pepper, he told me the story of how he and Lynn had returned to Hayfork for the second time and what they were doing to help this small, economically deprived forest community.

Jim grew up in Hayfork; his family has been in logging in Hayfork since 1956. Lynn was also born into a milling and logging family but in southern Oregon. When Lynn attended college at the University of Oregon, she met and married Jim, who was in graduate school at the same university.

In 1973, after Jim served in the U.S. Army, he and Lynn moved to Hayfork. However, in 1979, they left Hayfork and moved to Portland, Oregon, where they ran an alternative energy company for the next 10 years. Their move away from Hayfork was largely due to a hotly contested and defeated referendum over a community investment in a biomass unit that would have

produced 15 megawatts, enough energy to provide electricity for the entire Trinity County as well as enough waste heat for 9 acres of greenhouses.

Lynn and Jim made their second move back to Hayfork in 1989. This time, Jim ran a small gold mining company, and Lynn spent time doing community volunteer work, serving on the local school board, and starting a chapter of the Human Response Network (domestic violence assistance).

In 1990, as a result of Federal laws passed to protect the northern spotted owl, the National Forests in Trinity County, almost 80% of the land, instantly became unavailable for harvesting. Prior to the spotted owl position, this community had harvested 250 million feet of lumber per year. In 3 years, production dropped to 13 million feet per year, which devastated the community.

The new Federal laws resulted in more than 30 logging families in Hayfork being out of work. Eventually, more than 150 families were affected when the largest sawmill operation, Sierra Pacific, closed its doors and left Hayfork in 1996.

Jim and Lynn were well aware of the ensuing declining economy and poverty-stricken community. However, it really struck home the day Lynn, who had been invited to attend career day at the local high school, spoke to 19 seniors. Twelve of these seniors had no idea what they were going to do

when they graduated; 6 of them wanted to stay another year in high school!

Lynn was shocked and said to Jim, “These kids have no hope. Before, when times were good, our community had plenty of employment from the seven local sawmills plus Sierra Pacific. Three generations of Hayfork families had grown up on Sierra Pacific paychecks. But now these graduating students can no longer depend on making their livelihood from the woods or the sawmills. Society is basically telling them that working in the woods and the sawmills is bad. They don’t know what to do; they don’t want to leave home; they don’t want to go to the city. We *have* to instill hope in these kids; there has to be a way.”

Two weeks later (1993), the Watershed Research and Training Center (WRTC) opened its doors in Hayfork, with Lynn Jungwirth as its Executive Director. WRTC is a community-based, nonprofit organization that promotes healthy communities and sustainable forests through research, education, training, and economic development. WRTC’s work “centers around the belief that the relationship between local communities and the public forest must change so that the economy can rebuild itself based on an ethic of land stewardship.”

Shortly after the opening of WRTC, the owners of the gold mine that Jim managed decided to shut it down. Jim then worked on special projects for WRTC. Jim had also been working on a project for a company in Redding that wanted to develop a line of survey tripods. He was having some problems with one particular saw cut, so he called his friend, Greg Wilson, for some help. Greg is a 25-year master wood craftsman from Weaverville, a small town close to Hayfork. After much conversation, they decided to team up and start a secondary wood manufacturing business. Thus, Jefferson State Forest Products was born.

As they continued to seek a consistent wood resource and to refine their business plans, Jim and Greg spent their spare time making prototype items. One day Jim got a call from a person in the San Francisco Bay area who had been involved in the demolition of the Stanford football stadium. He asked Jim if he would be interested in the stadium’s demolition wood, so Jim hauled out 17 truckloads of demolished Port Orford cedar. From that Port Orford cedar, Jim and Greg designed and built a



line of English garden furniture and eventually sold it back to Stanford Alumni Association for a fundraiser.

In the beginning, there was no place to store the demolition cedar; they needed three-phase electrical power to operate their machines, and they required space to build the product. The only possible location was the Trinity County Fair Grounds, which was located in Hayfork. Jim was granted use of the Fair Grounds and allowed to install three-phase power, but the agreement was that the entire business had to move out during the County Fair. This being the only option, Jefferson State Forest Products moved into the Fair Grounds November 15, 1995. On December 1, Jim and Greg produced their first English garden furniture product, and they continued to build 20 units a day for 1½ year until they ran out of wood.

During this same timeframe, Jim had traveled to New York City to attend a seminar on Socially Responsible Investment. Unfortunately, it turned out to be about stockbroker investments, not exactly the type of “social responsibility” Jim was hoping to learn about. However, on the second day of the conference, the Executive Vice President of Whole Foods Market gave the keynote presentation. Whole Foods Market is the world’s largest retailer of natural and organic foods, with 139 stores throughout the United States.

At table conversation later, the Whole Foods executive and Jim struck up a conversation. Apparently, they had a mutual friend, Walter Robb, the Western Regional President of Whole Foods from San Francisco. The executive told Jim to call Walter and possibly he would have some woodworking

opportunities for Jefferson State Forest Products. Jim followed up on the lead by contacting Walter, who initially ordered from Jim some wooden boxes for a special apple display. Having no wood to complete the project, Jim got permission to tear down “barnwood” from a friend’s abandoned buildings. This first order went well. Then, Whole Foods ordered some outdoor furniture, and before anyone realized it, Jefferson State Forest Products was up and running again and making a profit.

Jefferson State Forest Products is the only secondary wood manufacturing company in Trinity County. In addition to the Whole Foods product line, Jim’s company manufactures cider presses, kitchen wares, cremation urns, wood flooring, retail displays, and cafe seating. Jim also sells specialty wood boards on E-Bay. He says selling on E-Bay produces “good profits but it requires a lot of prep work.” Jim’s business office is located next to the WRTC’s office. Jefferson State Forest Products employs two office personnel, one (Monique) who designed a product line of kitchen wares.

Jim explained that Jefferson State Forest Products is “committed to purchasing raw material, whenever possible, from small, independent sawmills that produce low volumes of lumber harvested from private lands. We believe that the new forest management ethic that recognizes biodiversity and overall stewardship responsibility for the forest is more easily achieved by rural land managers and small producers. Material purchased from these sources supports our continued success in responsible forest management as well as supporting the rural communities in which we live.” Jefferson State Forest Products also uses recycled wood whenever possible.

Another unique quality of Jefferson State Forest Products is that they offer a variety of items made from suppressed Douglas-fir and ponderosa pine, material that is generated from thinning overstocked stands in the forest. In the past, this thinning material would probably be burned or chipped for use in pulp mills. However, Jim’s company has successfully shown that suppressed Douglas-fir can be made into high-quality wood flooring, and the ponderosa pine works well for specialty wood items.

In September 2002, Jefferson State Forest Products moved from their 3,000-square-foot shop at the fair



grounds into a recently completed 10,000-square-foot building. This facility, called the Trinity County Business Incubator, was built through grants and with local and regional partners through the WRTC. Jefferson State Forest Products is WRTC’s first tenant. Waste wood produced from the Jefferson State Forest Products manufacturing plant is burned to heat the entire Incubator facility.

The Business Incubator is helping to “share the risk.” In other words, WRTC is able to provide a lease, office equipment, appropriate power sources,



and other services to new businesses at a much lower cost than if each individual business were to purchase these items. The Incubator will make it easier for businesses to get started, and it will encourage new forest-related businesses in Trinity County.

Jefferson State Forest Products purchases most of its wood resource, western hardwoods, from southern Oregon. Jim says he does this only because he can't depend on a wood supply from the National Forests in Trinity County.

Jim and Greg have had to train every person that works for them. Jefferson State Forest Products started with a \$25,000 investment and two employees. Since its first year, business income has increased more than 350% and the staff has increased to 20 full-time and about 3 part-time employees, all from the local community.

The Watershed Research and Training Center (WRTC), with a staff of 15 to 18, helps to develop the capital and economic infrastructure necessary to build a healthy forest and a healthy community. WRTC has become a model for other community forestry programs across the country. During the past 6 years, WRTC has helped develop a skilled workforce and has contributed \$750,000 to \$1,000,000 each year to the local economy. The following is only a small sampling of WRTC activities:

- Provides training for dislocated workers for new jobs in areas such as fire hazard reduction, erosion control, and wildlife habitat restoration
- Educates and employs local workers in advanced field skills, government contracting practices, and forest survey and management techniques

- Tests markets for small-diameter wood and explores markets for small-diameter roundwood
- Promotes projects that foster good land stewardship while providing living wage, career-based jobs for local workers
- Works with harvesters and land managers to identify and survey species being harvested and develops sustainable harvest guidelines for their area
- Sponsors numerous workshops and field trips to share information and build cooperation
- Tracks the social and economic health of the communities in Trinity County
- Supplies community-based self-help activities by providing meeting space, photocopying, materials, labor, staff support, and fiscal sponsorship
- Purchases machinery, equipment, and facilities to make it easier for businesses to get started and to encourage new forest-related businesses

Jim mentioned that another example of "sharing the risk" is the Forest Products Laboratory (FPL) in Madison, Wisconsin. Jim feels that "*the* most positive thing that the Federal government has done for small, rural communities is to give us access to the FPL." Following are some of the ways that FPL resources have helped both Jefferson State Forest Products and WRTC:

- Evaluated a new preservative system that is environmentally friendly and could be used for grape stakes, opening up a new market for post & pole operations
- Provided technical assistance on drying Douglas-fir for flooring products and steaming madrone for furniture products, thus improving utilization, reducing processing costs, and increasing profitability
- Showcased small-diameter Douglas-fir products made by Jefferson State Forest Products in the FPL Research Demonstration House and provided information to visitors on the benefits of buying products made from small-diameter material
- Developed low-cost log sorting equipment that sorts logs by diameter and length, helping to improve the bottom line

- Provided engineering plans for building a small-diameter pole and lumber air-drying shed
- Developed engineering plans for a pedestrian bridge that will be located in the Hayfork community

Jim said, “With FPL’s help, it drastically shortens our process of problem solving.”

Jim and Lynn are also actively involved in several organizations that promote socially responsible use of natural resources. WRTC is a co-founder of The Healthy Forests, Healthy Communities™ Partnership, which is a rural community collaborative for using the by-products of ecosystem management and forest restoration. Jefferson State Forest Products is also a member of the Northwest Wood Products Association, an organization of secondary wood products manufacturers that helps firms grow and become more profitable; and Sustainable Northwest, a private nonprofit organization dedicated to promoting environmentally sound economic development in the Pacific Northwest.

Not all the problems have been solved for the community of Hayfork. Lynn says, “Despite the

numerous activities of the WRTC and its partners, Hayfork residents are still struggling. We realize that forest-based livelihoods will not solve all the economic and social problems of towns such as Hayfork. However, this approach can be a viable form of economic development because it builds on the existing talents and resources found in forest communities.”

After visiting this community and experiencing their accomplishments firsthand, I would assert that with the leadership and assistance of Jim and Lynn Jungwirth, the probability for the residents of Hayfork to succeed at improving the health of their economy and the health of their forests has increased immeasurably.

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