



**CWSF**  
COUNCIL OF WESTERN  
STATE FORESTERS

# FOREST UTILIZATION NETWORK 2020 SUCCESS STORIES

# TABLE OF CONTENTS

INTRODUCTION .....	3
MAP OF STATES .....	4
ARIZONA .....	5
COLORADO .....	6
HAWAII .....	7
IDAHO .....	8
KANSAS .....	9
MONTANA .....	10
NEBRASKA .....	11
NEW MEXICO .....	12
NORTH DAKOTA .....	13
OREGON .....	14
WASHINGTON .....	15

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*Front Cover Photo Credits: Dave Bruton, Archie Gray, Brian Caldwell - ThinkTank Design Group, MT DNRC  
Right Page Photo Credit: Katerra*





No markets, no management. That credo underpins my work and the work of my wood products and utilization colleagues across the western US. The Council of Western State Foresters—Forest Utilization Network created this series of utilization stories to highlight efforts state forestry organizations are taking to build markets. It daylights an array of projects, programs, and partnerships that often go unseen. These efforts have produced impressive results, and many others are just getting started. These stories from the field present a multi-faceted snapshot in time that reveals the ingenuity, collaboration, and creativity at work across the region.

Why market development? Markets are an important tool in forest health and management — they give landowners a way to provide the public values that come from well-managed forests. As much as we laud the power of markets, lack of markets of one form or another animates many of the efforts presented here. For example, several states have initiated efforts to commercialize biochar-based soil amendments using low-value woody biomass. The stories that follow reveal what is involved in building a foundation for future success.

Biochar represents attempts to commercialize a new class of product. Elsewhere, the work involves trying to rebuild or enhance traditional forest products infrastructure to tackle new challenges. The New Mexico vignette shares exciting progress on a new sawmill to process abundant small-diameter material in the northern part of the state. The Idaho contribution details new chip mill processing capacity that will create greater demand for small and low-value material. When the infrastructure is right-sized to the needs of the landscape, market opportunities serve the stewardship ethic.

These vignettes show how state experts are working collaboratively to solve local problems. When the problems are global, such as the need to decarbonize air travel, the stories reveal that wood products utilization can be part of the solution to pressing societal problems, including climate change.

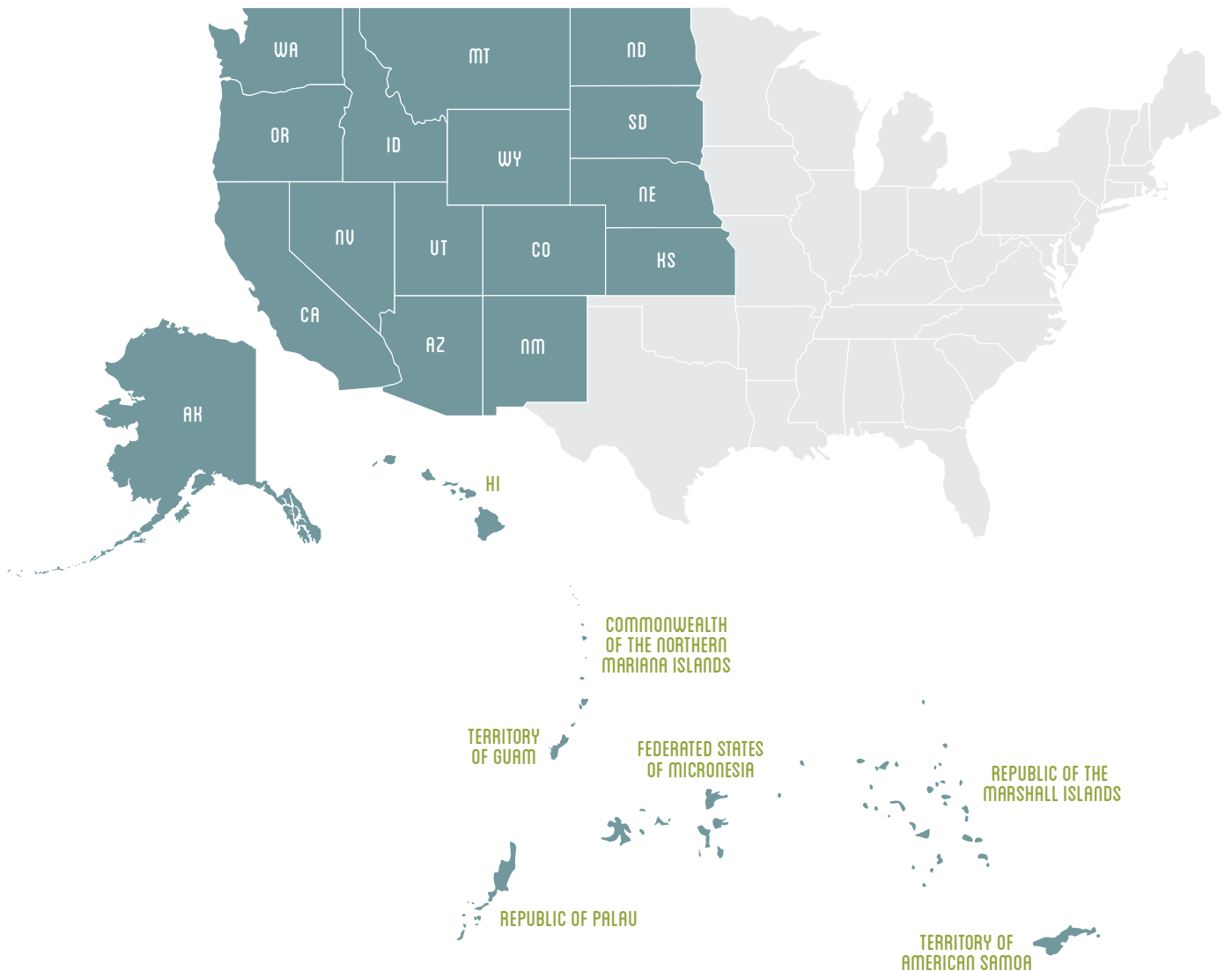
The wood utilization community works at the local, regional, and national scales. Regardless of scale, technology or product, one through line unites these stories—collaboration. By design or by necessity, these cases show how partnerships drive the work and get results. Technology and markets will continue to shift in dynamic equilibrium. Collaboration enables the wood utilization community to keep a stable footing, ready to tackle the next challenge.

I hope you enjoy this series. I am confident the next iteration will have more success stories and promising developments to share.

Sincerely,

Marcus Kauffman  
Forest Utilization Network Past Chair

# MAP OF STATES



## FOR MORE INFORMATION

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# Juniper Works! - Upper Verde River Watershed Protection Coalition

## ARIZONA

Juniper Works, a brand established by the Upper Verde River Watershed Protection Coalition (Coalition), was developed to promote an under-utilized species with high market potential. Designed to be the local forest product industry’s marketing and public relations arm, it brings together landowners, business owners, and citizens, as well as federal, state, and local government personnel in service of common goals to restore historic grasslands and sustainably manage and protect woodlands in the Upper Verde River Watershed.

From 2016 to 2020, the Coalition and its partners have strategically worked with private forestry consultants and marketing professionals to quantify the supply of raw material, identify forest products with the greatest market potential, acquire funding to demonstrate utilization, promote business development, build public awareness of the need for market-based solutions, and address policy constraints hindering broad-scale utilization.

Early on, it became abundantly clear that without commercial utilization of juniper biomass, the Coalition and its partners would fall woefully short of the Upper Verde Watershed restoration goal of 27,000 acres per year. Value-added products identified as having the greatest market potential are juniper chip sediment wattles, biochar, soil amendments, juniper silt dams, and landscape and playground cover.

Coalition partners support business development with on-the-ground, visible projects that demonstrate a variety of uses for value-added products manufactured from juniper biomass, including:

1. Juniper chip wattles for stormwater management,
2. Juniper chip wattles infused with biochar for filtration of contaminants at open pit mine sites,
3. Juniper chip wattles infused with biochar for filtration of contaminants in streams and creeks,
4. Biochar as a soil amendment
5. Juniper biomass to build silt dams for erosion control

Funding to support Coalition projects was provided by the USDA Forest Service, Arizona Department of Forestry and Fire Management, and Arizona Department of Water Resources. The critical next step is working with local, state, and federal legislators and policy makers to address barriers to broad-scale utilization of value-added products manufactured from woody biomass.

“Pinyon-juniper ecosystems throughout the western United States represent a significant potential woody biomass resource.”

– Biomass Feedstock Supply Availability Assessment for Yavapai County, TSS Consultants



Juniper biomass converted to biochar. *Photo Credit: Upper Verde River Watershed Protection Coalition (UVRWPC)*



Juniper wattles on the Barney York Ranch. *Photo Credit: Richard Van Demark*



Juniper silt dam installed for erosion control. *Photo Credit: UVRWPC*



**Arizona Department of Forestry and Fire Management**

<https://dffm.az.gov/>



# Forest Business Loan Fund

## COLORADO

The number of active wood products facilities in Colorado has been in decline for decades. Lack of working capital for new employees, manufacturing or harvesting equipment, raw material, and product inventory has contributed to this decline. Many of the remaining biomass businesses cannot qualify for traditional working capital loans necessary to maintain their profitability and sustain their businesses in rural communities. To address this, the Colorado State Forest Service provides financing through the Forest Business Loan Fund (FBLF). In partnership with Colorado’s Upper Arkansas Area Council of Governments, the fund helps businesses to increase production, reduce costs, improve safety, and pursue emerging biomass markets. The investments being made through our FBLF is complementing Colorado’s increasing use of Good Neighbor Authority, landscape forest restoration initiatives with partners such as the Rocky Mountain Restoration Initiative, the Natural Resources Conservation Service, the American Forest Foundation, and the National Wild Turkey Federation.

The FBLF partnership fills a niche in a high-risk lending arena with affordable loans to forest products and biomass utilization businesses that cannot qualify for traditional financing. Often, the forest products and biomass utilization community faces challenges that significantly impact their profitability and ability to qualify for business loans. Biomass supply and availability, availability of workforce, weather, globally competitive markets, and past financial performance make traditional sources of lending unavailable to these businesses due to real and perceived risk. Traditional lenders have limited comfort levels when lending to businesses they may have little to no knowledge about and may assume higher risk lending when financing forest products or biomass utilization.

The partnership provides needed investment capital to the forest products business community so they can “retool” to help address landscape scale forest restoration, forest health, and hazardous fuels reduction needs. Businesses that receive financing through the FBLF increase their utilization of biomass from forest management treatments, lower their cost, become more competitive and profitable, develop new products, hire new workers, and, in many cases, provide safer work environments for their employees. The FBLF acts as a revolving lending program where businesses that successfully pay back their loans, with interest, can support other biomass utilization businesses with program financing.

This partnership approach to lending is also attractive in cases where a single partner approach can result in not being able to provide the entire financing needed for an applicant and/or where the risk associated with an applicant makes a single lender hesitant. The collaborative lending approach allows lenders to finance larger investments and share risk. While this approach may result in increased administrative costs, partner lenders take on these added costs so they do not need to be passed on to businesses receiving the financing. The collaborative lending approach takes the traditional lender-applicant relationship and opens it up to a positive collaboration of community-based advocacy, one that is applicant-centered and shares both the risk and return. With additional investment, more loans could be issued to deserving forest products businesses in Colorado.



L to R: Kristina Hughes, Tim Reader, Jeff Ollinger and Randy Johnson of the FBLF and Biomass Fellow Team (not pictured Melissa Simmons and Andra Thaden). *Photo Credit: Colorado State Forest Service*



CO Forest Business Loan Team on a site visit in SW Colorado. *Photo Credit: Colorado State Forest Service*



Wood straw product being hand applied for erosion control. *Photo Credit: Colorado State Forest Service*



**Colorado State Forest Service**

<https://csfs.colostate.edu/cowood/forest-business-loan-fund/>





# Innovating New Pathways to Utilize Plantation Species

## HAWAII

To help strengthen the wood products supply chain and incentivize local manufacturing, the Hawai'i Wood Utilization Team has put together a cross-sector group of industry experts. One of their recent projects includes the design and build of an accessory dwelling unit (ADU) prototype. The ADU will demonstrate innovative uses of Hawaii's fire prone plantation species and serve as a catalyst for overcoming the economic and legal barriers to building with Hawai'i-grown wood. Local milling and prefabrication will intersect with an exploration of innovative wood technologies to retool and streamline the project delivery process. The demonstration aims to inspire Hawai'i designers and contractors to build with underutilized forest resources in future projects.

The Hawai'i Wood Utilization Team (HWUT) is a group of experts from various wood-related industries creating innovative ways to expand Hawaii's wood product markets. The team was established in 2018 following an award by the USDA Forest Service Wood Innovations Grant. A keystone project is the design and construction of a 400 ft<sup>2</sup> ADU made from Hawai'i grown plantation timber. The demonstration is an important step in showcasing the potential for underutilized tree species as a solution to environmental and economic sustainability.

Different species of tropical timber plantations were planted throughout the islands of Hawai'i. Unfortunately, a market for these species has yet to materialize. As a result, a number of these non-native plantations have grown into dense, fire-hazard forests in need of proper management. Additionally, Hawaii's dependence on imported building materials, along with an affordable housing shortage, are correlated problems which require local solutions. To address these challenges, HWUT aims to incentivize the removal and use of plantation species by building the ADU prototype in compliance with county building codes and publicly displaying the structure in downtown Honolulu. This project highlights the value of innovative and place-based architecture. By intersecting elements of vernacular design with prefabrication efficiencies and modern wood technologies, the ADU prototype retools the traditional project delivery process.

One of the first steps towards using Hawai'i grown timber is to ensure the wood product is accurately dried. In partnership with the Hawai'i Division of Forestry and Wildlife and the USDA Forest Service, HWUT curated a dry kiln training course led by wood science experts to enhance local kiln operator knowledge about the proper drying of Hawai'i-grown wood. HWUT found that demonstrating these skills contributed to an increase in local wood product output and a decrease in Hawaii's dependence on imported building materials.

The HWUT ADU is scheduled for completion by the end of 2020. The prototype will be displayed at a Hawai'i state government facility to elevate public awareness and demand for the plantation species. It will demonstrate a viable construction material, while celebrating a beautiful living space, made from locally grown and ethically sourced wood. The ADU will provide Hawaii's communities with an affordable and sustainably constructed housing option and support the local economy by creating job opportunities and improving forest management in the state.



Hawai'i Wood Utilization Team design rendering of plantation species ADU  
*Photo Credit: Hawai'i Wood Utilization Team*



Plantation species being milled for the HWUT ADU at Kalani Hardwoods.  
*Photo Credit: Hawai'i Wood Utilization Team*



**Hawai'i Department of Land and Natural Resources, Division of Forestry and Wildlife**

<https://dlnr.hawaii.gov/dofaw/>

**Hawai'i Wood Utilization Team**

<https://hawaiiwoodproducts.com/>



## New Mill Creates Transportation Efficiencies to Maximize Utilization

### IDAHO

Jack Buell Trucking is a diverse company in North Idaho that focuses on the forest products industry. They operate a fleet of trucks that haul logs, chips, hog fuel, rock, machinery, and lumber. In addition to trucking, they also manage and operate log yard activities for several mills, providing equipment and manpower to load and unload trucks, store logs, and feed the mills. Essentially, they specialize in material handling and transport in the forest products industry. They are headquartered in St. Maries, Idaho, a traditional logging town in the heart of a productive wood basket, but there was some missing infrastructure in the area. While there are many sawlog mills, there has not been a consistent outlet for pulp products or non-sawlog products. Instead, most of this material has historically been piled and burned. Buell recognized the issue and aimed to fill this void.

The inland northwest region of eastern Washington, northern Idaho, and western Montana has a vibrant forest products industry that includes dozens of sawmills, a few panel producers, and three paper mills. The paper mills are Inland Empire Paper Company located in Spokane, Washington, Ponderay Newsprint Company located in Usk, Washington, and Clearwater Paper mill located in Lewiston, Idaho. Inland Empire and Ponderay Newsprint are relatively small paper mills that focus on newsprint production; Clearwater Paper is a large facility that makes a variety of consumer paper products. These mills need clean wood chips to make paper products. The bulk of their chips are provided by the local sawmills as residual products, but there is a need to subsidize the supply of chips by chipping cull and pulp logs to generate additional chips, especially when sawmills reduce hours during down lumber markets.

Pulp logs are material that will not make sawlogs or other higher value products but can still be chipped and used to make pulp for paper products. They can be low value logs, larger dead and cull logs, or very small top wood pieces that contain useful fiber. Pulp is a relatively low value product compared to other traditional log products. It can only be trucked a relatively short distance and still remain an economically viable product. However, if it is chipped, a chip van can haul considerably more volume than a log truck, making the transportation more efficient and increasing the range in which a paper mill can acquire material. To this end, Buell started using the Swan Lake log yard, centrally located in St. Maries, to stockpile locally produced pulp logs that would be run through portable diesel-powered whole log chippers to debark and chip the logs so they could be loaded into chip vans and delivered to the paper mills. The portable chippers served as a viable option for the past few years, but because of their portable nature and diesel fuel requirements, there are more efficient systems out there. In 2018, Buell purchased, dismantled, and trucked a used chipping mill from Texas to St. Maries, where they reassembled the mill and started running it in 2020.

Pulp logs are loaded into the infeed where they are first debarked, to keep as much bark out of the chips as possible, and then sent into the chipper. The chipper takes logs up to 30" in diameter and reduces them into wood chips that are only a couple inches long in a matter of seconds. The chips are then piled at the back of the facility where they wait until the next truck is ready to be loaded. The bark is also collected and shipped to be used as hog fuel to run boilers that provide steam and cogeneration at the paper mills.



The electric motor (foreground) and chipper (background). *Photo Credit: Archie Gray. Header Photo Credit: Archie Gray*



Buell's new chipping facility with infeed decks and debarker on the left and output conveyor on the right. *Photo Credit: Archie Gray*

The mill started in March and by early April, it was already capable of creating 5 van loads of chips per hour. Currently, the logs being chipped have been stored for Clearwater Paper, so all of the chips and hog fuel are making the 100 mile trip south to Lewiston. Other mills that rely on chipped or ground wood could also benefit from this new facility in the future. One of the benefits of this chip mill being located in St. Maries is that it creates a great opportunity for landowners in the area to market materials that in the past would have been piled and burned. With increasing scrutiny around fire danger and air quality concerns, any reduction in open burning is welcome.

The location of the new chip mill substantially increases the area from which pulp logs can be acquired and processed, making it more cost effective to utilize undersized, dead, and cull material.



**Idaho Department of Lands**

<https://www.idl.idaho.gov/>





## Biochar Innovations on the Plains

### KANSAS

With increasing interest in soil health and carbon management, the Kansas Forest Service and Nebraska Forest Service collaborated to establish the Great Plains Biochar Initiative (GPBI). The GPBI received funding in 2017 through the USDA Forest Service's Wood Innovation Grant Program. The goal of the GPBI is to facilitate a greater understanding of biochar and to explore opportunities for using and producing biochar from low value and non-merchantable timber resources and wood waste.

The Great Plains Biochar Initiative (GPBI) was established in 2017 and awarded funding to advance biochar education and use through the USDA Forest Service's Wood Innovation Grant Program. Kansas and Nebraska are the specific area of focus for this initiative. While the production, use, and benefits of biochar date back thousands of years, knowledge about the subject was mostly lost until relatively recent times in favor of modern and commercial farming practices. However, there has been a dramatic realization over the past several years about the importance of soil health and the need to sequester carbon from the atmosphere. Forests and forest products, including biochar, can play a vital role in removing carbon from the atmosphere while also addressing the issues of soil health and water holding capacity necessary for sustained agriculture and food production.

Through workshops and field events hosted throughout the region, the Great Plains Biochar Initiative has made great strides in expanding general awareness and education around the subject of biochar. As part of this effort, grants of up to \$5,000 (\$20,000 per state per year for a two-year period) were awarded to individuals to help promote the utilization and production of biochar. Kansas awarded 8 of these grants, and Nebraska awarded 11.

Forests and forest products, including biochar, can play a vital role in removing carbon from the atmosphere.



Moving forward, there are many exciting biochar related opportunities on the horizon. A char and livestock feeding study approved through the University of Nebraska-Lincoln and an exploration of the potential for large scale production capabilities in Kansas are just a couple examples. Additionally, a regional carbon management workshop is scheduled to be held in 2021. The region of focus for this conference is Nebraska, Kansas, Oklahoma, and Texas, but it is open to all having an interest in the subject of carbon management, of which biochar is one component.



ROI Carbonator 500 being loaded with wood waste during the demonstration held near Haven, KS. *Photo Credit: Dave Bruton*



First biochar workshop held in Lawrence, KS. Participants standing around an "Oregon kiln," designed to produce batches of char on a small scale. *Photo Credit: Dave Bruton*



Char produced from waste tree material as part of the ROI Carbonator 500 Demonstration held near Haven, KS on Nov. 20, 2019. *Photo Credit: Dave Bruton*



**Kansas Forest Service**

[kansasforests.org](http://kansasforests.org)



## Wood Products Program

### MONTANA

The Montana Department of Natural Resources and Conservation (DNRC) identified several key partners to form the state wood promotion team to support the state's priority of retaining forest industry and forest product businesses to ensure restoration work can be conducted in the state. The team identified an ambitious goal of increasing demand for locally made wood products. The objectives are: to increase public understanding of the linkages between wood products, rural economies, and forest management, to encourage the public to enquire about where their wood comes from, and to increase efficiency and revenue capture for industry by increasing direct sales to wholesalers.

The DNRC is contracting with an independent marketing firm to develop a media campaign and web-portal to increase the public's ability to source local wood products. This effort weaves together stories of forest managers, loggers, industry, and the forest to showcase the important role the sector plays in maintaining the Montana way of life.

Through an online wood product directory, consumers can identify needed building products for direct sourcing from local manufacturers. Users can also access information about wood construction, societal benefits, and resources for building with wood. These resources are designed to increase interest in wood construction and enhance sourcing of local wood products. This builds off state efforts to increase proficiency of architectural and engineering professionals with mass timber construction.

A social media campaign will drive traffic to the web-portal. Specific tactics of the campaign include creating a Montana wood brand that can be shared across the industry. Short video interviews with foresters and loggers will put a face on the local wood supply chain and identify commonality between producers and end users. Architect features will showcase projects and share inspiration. Longer videos will take the consumer on a journey from the woods, to the mill, to construction and capture the entire supply chain for a powerful story linking sustainability and forestry. The project also distributes technical resources on wood construction produced by leaders in the field, ThinkWood and Woodworks.



DNRC challenged the marketing firm to develop a brand logo that could be transferred into a lumber stamp. Lumber stamping was identified as a future step should the public be responsive to the messaging and demonstrate the strong demand for locally sourced wood that is anticipated. Lumber stamping would provide an easy way for consumers to rapidly assess the source of their wood.

The project is modeled on the success of the local food movement. It aims to increase connection of the general public to their forests, to build social license, to highlight the importance of the forest industry and wood products in funding restoration, and to increase the ability of wood consumers to source from local producers.



Restorative silviculture yielding merchantable sawlogs for Montana wood products.  
*Photo Credit: MT DNRC*



Mass timber construction in Bozeman, MT. *Photo Credit: Brian Caldwell, ThinkTank Design Group*



Montana Department of Natural Resources and Conservation

<http://buymontanawood.com/>





## Biochar Shows Promise in Mitigating Climate Change

### NEBRASKA

While not a heavily forested state, Nebraska experiences significant tree and forest threats including persistent wildfires, invading insect pests, extreme weather exacerbated by climate change, and woody plant encroachment. The management of these challenges creates another dilemma—how to dispose and utilize tree and forest management residues. The Nebraska Forest Service (NFS) is working with partners at the University of Nebraska-Lincoln (UNL) to research opportunities to incorporate biochar (a wood-based charcoal product) into Nebraska's livestock production industry. Specifically, the NFS is working with the UNL Department of Animal Science to research the use of biochar as a cattle feed supplement to mitigate the environmental impacts of livestock production while increasing the health and productivity of the animals.

NFS routinely partners with UNL to conduct wood product research and development to address key issues in Nebraska. Since 2016, the NFS has collaborated with UNL's Animal Science Department to evaluate the reduction of greenhouse gas emissions from cattle when fed a small amount of biochar as a part of their daily diet (0.8% by volume). International research has demonstrated this benefit, but domestic studies confirming this benefit appear minimal.

In a pilot project,<sup>1</sup> researchers found that including biochar as a cattle feed supplement did not negatively impact the amount of feed consumed. In some cases, it increased the animal's daily feed intake. This could indicate an increase in beef productivity as a result of feeding biochar to cattle, increasing the efficiency of producing beef. Additionally, when feed was supplemented with biochar, methane production from the cattle decreased by nearly 11% per day. If this were applied to Nebraska's 6.5 million cattle, the reduction in methane would be equivalent to taking 150,000 cars off the road each year. Developing this biochar market would create an annual demand for 500,000 tons of low-quality, low-value wood to supplement Nebraska's cattle industry alone. This has obvious implications for monetizing wood resources that are often discarded because of a lack of markets.

While this exciting wood product opportunity could have significant economic and environmental impacts, it is not without its challenges. According to the US Food and Drug Administration (FDA), wood charcoal (biochar) is not approved for inclusion in commercial feeds due to fears regarding possible contaminants including dioxins, furans, and heavy metals. The project team worked for nearly 2.5 years to receive an exemption from the FDA to expand the pilot study. This included completing 3rd party testing of biochar products to demonstrate that the biochar being fed to the cattle was free of chemical contaminants. This represents a significant regulatory barrier to the adoption of biochar as a commercial dietary supplement, one that must be addressed before this biochar market can be fully developed.



Biochar markets could provide an important outlet for hazardous fuels residues in Nebraska. *Photo Credit: Adam Smith, Nebraska Forest Service*

The project team received a Wood Innovation Grant in 2019 to expand the size of the study, further evaluating the animals' weight gain and reductions to methane emissions. This project also includes the evaluation of several biochar products to address the concerns related to the potential for chemical contaminants in biochar.

<sup>1</sup> Winders, Thomas M., et al. "Evaluation of the effects of biochar on diet digestibility and methane production from growing and finishing steers." *Translational Animal Science* 3.2 (2019): 775-783.



Using these "head boxes," methane emissions data was collected and compared between cattle which had been fed biochar supplements and those that had not. *Photo Credit: Heather Nobert, Nebraska Forest Service*



**Nebraska Forest Service**

<https://nfs.unl.edu/forestproducts>



## Forest Products Firm Will Boost Economy of Northeast New Mexico

### NEW MEXICO

The State of New Mexico is investing \$350,000 in a new sawmill venture to help boost the state's economy, improve forest health, and reduce wildfire risk in northeast New Mexico. With funding from the New Mexico Economic Development Department, Lance Forest Products will be relocating its sawmill operations from Redding, California to Cimarron, New Mexico with plans to be up and running by mid-2020.

The State of New Mexico is banking on a new sawmill to help reinvigorate the timber industry in the northeast corner of the state while also boosting the local economy, improving forest health, and reducing wildfire risk.

The New Mexico Economic Development Department (NMEDD) is utilizing the Local Economic Development Act (LEDA) grant to invest \$350,000 in Lance Forest Products LLC. The company will be relocating its sawmill operations from Redding, California to Cimarron, New Mexico with the expectation of hiring up to 40 new employees for the operation. Additional hiring will take place through contractors who will cut timber from private lands and transport them to the sawmill.

Improving the agricultural, forestry, and value-added business sectors is a priority for Governor Michelle Lujan Grisham as the state moves to diversify its economy.

"This company will revitalize the forest restoration economy in Cimarron, restoring confidence in the community, bringing needed jobs, and improving forest resilience to climate change," Governor Michelle Lujan Grisham said (in a December 2019 press release).

"Every job in New Mexico is important, especially in small communities," State Forester Laura McCarthy said. "The addition of this sawmill in Cimarron is a testament to the sustainable management of the large private forest land holdings in this area and will provide a critical incentive to restore forests across ownership boundaries."

Lance Forest Products currently has timber harvesting agreements in place with local ranches and plans to be up and running by mid-2020. Following in their father's footsteps, owners John and Art Lance have been working in the wood products industry for decades, including 25 years' experience buying and selling timber in Northern California, Southern Oregon, and Colorado.

"There is a lot of demand for studs in the housing market," John Lance said (in a December 2019 press release). "Because of the location in northern New Mexico, we will be closer to many of the larger markets being serviced off the West Coast, thereby giving us a distinct advantage in freight costs. That's a big benefit."

The move by Lance Forest Products comes as New Mexico is faced with the fallout surrounding a court-ordered injunction halting timber harvesting in Mexican spotted owl habitat on the five National Forests in the state. However, in this case only a small portion of the forested land in Colfax County is National Forest, making the new sawmill a timely investment for the local community and the state.



Cimarron Group (L to R) Tim O'Neill, Shawn Jeffrey, John Lance, Art Lance, Roger Hoyt, Alicia Keyes, Julie Phillips Puckett, Landon Newton, Leo Martinez, and Terry Brunner. *Photo Credit: Arnie Friedt, EMNRD/NMSF*

*Header Photo Credit: Arnie Friedt, EMNRD/NMSF*

Excerpts from this story were pulled from a December 11, 2019 press release from the New Mexico Economic Development Department titled "State invests in Timber and Sawmill project, Forest Products firm will boost economy of Northeast NM".



**Energy, Minerals and Natural Resources Department, Forestry Division**

**Lance Forest Products**

<http://www.emnrd.state.nm.us/SFD/>





## Windbreaks Find New Life Below Ground

### NORTH DAKOTA

Aging windbreaks have left the state of North Dakota with an overabundance of wood residues from windbreak management. These wood residues are not suitable for traditional forest product uses, but the North Dakota Forest Service (NDFS), in partnership with the USDA-Natural Resources Conservation Service, Soil Conservation Districts, state and tribal colleges, farmers, and others worked to turn wood waste from windbreak renovations into carbon-sequestering soil amendments in the form of biochar. To do this, NDFS expanded upon the work of surrounding states in the Great Plains Biochar Initiative to promote biochar production and utilization.

A monumental shelterbelt planting effort was initiated throughout the Prairie Grasslands Region following the Dustbowl of the 1930s. An estimated 18,670 miles of trees and shrubs were planted to protect soil and valuable cropland. The original shelterbelts are now more than 75 years old. Over-maturity, droughts, flooding, storm damage, and a variety of insect and disease threats have caused these important resources to decline. Many are in need of immediate renovation. The landscape of the Great Plains is changing and so too are conservation priorities and farming practices, including shelterbelts.

Today, shelterbelts are commonly referred to as windbreaks, and they continue to serve a role in the 21st century. Through research and field trials, the intended functions, design, and implementation of windbreaks are evolving. An important, and increasingly apparent, consideration in windbreak management is how to restore them and what to do with the volume of wood produced when trees are removed or pruned.

Wood residues from windbreak management and fuels reduction efforts are often not suitable for the manufacture of traditional wood products. The North Dakota Forest Service contracted with Wilson Biochar Associates of Cave Junction, OR to determine the feasibility of converting wood waste from windbreak renovations into biochar using on-farm equipment. Biochar is a form of stable charcoal with a wide range of potential applications, including use as a carbon-sequestering soil amendment.

Biochar is a form of stable charcoal with a wide range of potential applications, including use as a carbon-sequestering soil amendment.



The feasibility study laid the groundwork for a Conservation Collaboration Grant (CCG) from the Natural Resources Conservation Service (NRCS) for the expansion of the Great Plains Biochar Initiative to North Dakota. The project built on the excellent work already done in Nebraska and Kansas. The partnership resulted in the fabrication of nine biochar kilns from surplus agricultural and oilfield materials, the distribution of 72 cubic yards of high-quality biochar for biochar research, nine days of public workshops covering biochar production and application, and publication of a guidance document for registering biochar-based products with individual states.



Loading trees and branches with a wheel loader into an oil tank biochar kiln. *Photo Credit: Kelpie Wilson*



Moving half a surplus oilfield tank to be used as a flame-cap biochar kiln. *Photo Credit: Kelpie Wilson*



Converting wood into biochar in a kiln fabricated from a hopper bin bottom. *Photo Credit: Kelpie Wilson*



**North Dakota Forest Service**

[www.ag.ndsu.edu/ndfs/biochar](http://www.ag.ndsu.edu/ndfs/biochar)




# From Wood to Wing—Biojet Production Takes Off in Oregon

## OREGON

From wood to wing—jet fuel from woody biomass lowers the airline industry’s carbon footprint. Demand for forest residuals increases forest resilience and helps sustain rural communities. Jet fuel from wood contains 60 percent less greenhouse gases (GHG) than fossil-based jet fuel. Red Rock Biofuel’s \$300 million liquid biofuel facility, under construction in southeast Oregon, will provide 42 new family-wage jobs to produce 15 million gallons of bio-jet, renewable diesel, and naphtha. Each year the facility will consume 166,000 bone dry tons of forest residuals—helping keep nearby fire-prone forests safer from wildfire.

Airline travel contributes a significant share of global carbon emissions. By recent evaluation, airline travel accounts for as much as two percent of global human-caused carbon emissions. In the US, the transportation sector contributes 29 percent of GHG emissions—air travel makes up nine percent of the transportation emissions. <sup>1</sup>

The airline industry recognizes the need for emissions reductions. It has crafted an ambitious plan that calls for cutting CO2 emissions in half by 2050, using a 2005 baseline. The plan relies heavily on airlines switching to sustainable aviation fuels as well as increasing efficiencies. To date, the US EPA has approved five pathways for sustainable aviation fuel including woody biomass conversion using a Fischer-Tropsch process. <sup>2</sup>



Each year the facility will consume 166,000 bone dry tons of forest residuals—helping keep nearby fire-prone forests safer from wildfire.

The airline industry has found a strong partner in the forestry sector. Red Rock Biofuels is building a state-of-the-art woody biomass to liquid fuel facility in Lakeview, Oregon. The \$300 million facility will create 42 new family-wage jobs in this remote ranching community near the California border. The new plant will take 166,000 bone dry tons of forest residuals from local forests each year and convert it to aviation jet fuel, renewable diesel, and naphtha. FedEx and Southwest Airlines have already stepped up to buy 100 percent of the product once the facility enters production.

This new source of demand for woody biomass is already having an important effect on local forestland owners. According to Tad Mason of TSS Consultants, a firm that analyzed the availability of forest resources for Red Rock Biofuels, local landowners have “Put down the drip torch.” Rather than face the risk of an escaped slash pile burn and the expense of open pile burning, landowners now chip their slash piles and sell it as raw material for jet fuel.

Red Rock’s presence is having other knock-on effects on forestry. Local industrial landowners, such as Green Diamond Resource Company, can now afford to invest in more pre-commercial thinning operations because they have a market for the byproducts. Demand for biofuel helps landowners create and sustain healthier, more vigorous forests. The byproducts of their work create a product that displaces fossil carbon in a global airline industry.

<sup>1</sup> <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

<sup>2</sup> [https://en.wikipedia.org/wiki/Fischer%E2%80%93Tropsch\\_process](https://en.wikipedia.org/wiki/Fischer%E2%80%93Tropsch_process)



Community leaders join Red Rock Biofuel executives at the July 2018 ground breaking ceremony for the woody-biomass to liquid fuel facility in Lakeview, OR. *Photo Credit: Marcus Kauffman, ODF*



Forest residuals from thinning and fuels reduction will become jet fuel at the new woody-biomass to liquid fuel facility. *Photo Credit: Marcus Kauffman, ODF*



Red Rock Biofuel renewable jet fuel facility in construction. *Photo Credit: Red Rock Biofuels*







## Wood Pellet Boiler Provides Public Heat

### WASHINGTON

An energy-efficient wood pellet boiler provides heat for students and staff at a school in rural Northport, Washington thanks to a bioenergy pilot project supported by the Washington State Department of Natural Resources (DNR), the Washington State Department of Commerce, and the Washington State University Energy Program. The boiler was installed in 2018 on Northport's preschool-through-12th grade campus. It is the first time the state has funded the installation of a wood pellet boiler in a public building. It is also part of a larger effort to support industries in Washington that have the promise of turning forest restoration byproducts into useful items like wood energy and cross-laminated timber.

Northport School District Superintendent Don Baribault had an expensive problem on his hands: an old diesel boiler in the preschool-through-eighth grade building on the Northport elementary/middle/high school campus was failing. It needed constant maintenance, but the district did not have the budget to upgrade its heating system.

Then the district got a call from the Washington State University Energy Program, asking if it wanted grant money to install wood energy through a state-funded bioenergy pilot program. It would be the first time the state installed a wood pellet boiler in a public building.

"It was not only greener, but it was a long-term cost savings," Baribault said. The district agreed, and crews installed the boiler in the fall of 2018.

It was installed in a shipping container and placed alongside a 24-foot-tall silo that can hold 30 tons of wood pellets. Building and installing the new boiler, and integrating it into the backup system, cost about \$400,000.

It is estimated that the pellet boiler will save at least \$10,000 a year at the campus, which serves about 200 students.



Using wood pellets or wood chips to displace oil for heating is one of the best, carbon-reducing examples of modern wood energy. In its first year, the boiler went through approximately 50 tons of wood pellets – the energy equivalent to 5,755 gallons of distillate home heating oil.

Baribault estimates the pellet boiler will save at least \$10,000 a year at the campus, which serves about 200 students.

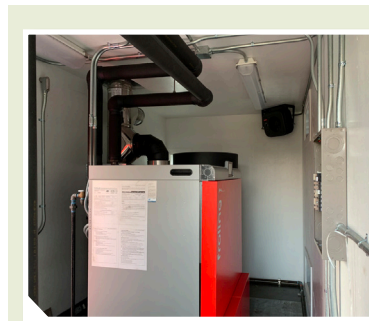
Across the United States, pellet mills create jobs in heavily forested areas, often serving rural communities in need of sustainable jobs. Northport's wood pellets come from Hauser, Idaho, but Baribault and many in the Northport community have hopes for local sourcing in the future.

As the Washington State Department of Natural Resources (DNR) accomplishes its 20-Year Forest Health Strategic Plan to restore natural wildfire resilience to its forests, an economic opportunity is emerging for smaller-diameter trees – a byproduct of forest restoration that, until recently, was not viewed as commercially viable.

Wood heating is one such industry being encouraged in Washington state; another is cross-laminated timber.

CLT – or mass timber – are cutting-edge building panels that can be made from smaller, thinner trees. They have been used to build classrooms and office buildings in Washington state and could be a less expensive and more sustainable way to address the state's affordable housing problem.

So far, Washington state has two CLT mills – a Vaagen Brothers mill in the town of Colville and a Kattera factory in Spokane Valley.



Northport School District's new boiler is expected to use 50-70 tons of wood pellets a year, saving the school from burning about 8,500 gallons of fuel oil annually. *Photo Credit: Wisewood Energy*

*Header Photo Credit: Kattera*





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