
TAOS-AREA SMALL-DIAMETER WOOD PRODUCTS FEASIBILITY STUDY



Completed for:

New Mexico Energy, Minerals and Natural Resources Department, Forestry Division
& Taos County

Prepared by:



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This report was researched and written by J.R. Logan, owner of Del Medio Forestry, LLC. Page Buono also contributed to the research, interviews and writing on behalf of Del Medio Forestry, LLC. Both authors are grateful to the experts and professionals who generously shared their time and wisdom for this study.

1. Executive Summary

The urgent need to restore the ecological function of forests and watersheds in northern New Mexico has been well documented. Heavy logging, overgrazing, aggressive fire suppression, and a changing climate have dramatically shifted the structure and composition of the region's forests, creating volatile stand conditions that threaten the ecological function and related ecosystem services that these forests provide. Thinning treatments to reduce dangerous fuel loads are an important first step in restoring this landscape for the protection of watersheds, life and property.

Government agencies, NGOs and communities in Taos County and the surrounding areas recognize that this issue must be addressed as quickly and efficiently as possible. In the last 10 years, multiple collaborative groups and land management agencies in the Taos area have successfully funded hundreds of acres of thinning treatments, almost all of it paid for with state and federal grant funding. In order to increase the pace and scale of this work, there is growing interest in finding viable markets for the small-diameter wood (SDW) produced by thinning treatments. To date, the SDW produced by thinning has been informally kept by landowners, hauled off by thinning crew members for free, or donated to the elderly as in-kind match for grants. The following study assesses whether adding economic value to the current supply of SDW from local thinning projects would 1. Pay for all or a portion of the cost of thinning treatments to accelerate the pace of wildfire risk reduction and forest restoration and 2. Increase the impact of a "restoration" economy in and around Taos County.

This study examined potential benefits and obstacles to various value-added models, including the development of a cooperative structure to provide direct management control to thinning contractors in the region. However, based on interviews with experts, a review of industry literature and the results of local surveys, we do not recommend the cooperative structure. Ultimately, the potential benefits of a co-op appear to be outweighed by a needlessly complicated organizational and financial structure without helping local groups achieve their goals.

Instead, based on the research outlined below, we recommend the creation of a for-profit sort yard that will pay contractors and landowners a wholesale price for SDW products, then resell that wood in the retail market at a profit. The sort yard should focus on value-added products for which there is a known and existing market —namely firewood, latillas, posts, vigas, sawlogs, wood chips and compost — with the potential to build and expand into more complex markets, such as pellets and biomass energy generation, in the future.

We recommend that this sort yard be located in an industrial zone near Taos, and that it capture SDW from a geography not to extend beyond an approximately 30-mile radius of Taos. Research and several case studies note that haul costs for material with such relatively low value-per-pound are prohibitively expensive, and we conclude that there is sufficient supply and demand within this radius to support a successful operation that maximizes the benefits to local communities and businesses.

Given these parameters, this study estimates that the existing supply and demand for SDW will support a stand-alone sort yard operation, augmenting the pace of thinning treatments by as much as 71%, and increasing the total economic impact of the forest restoration industry on the local economy by as much as 40%.

The paired benefits of reducing wildfire risk and increasing economic activity justify the full development of an appropriately scaled business plan that: 1. further defines and develops the operating structure with input and recommendation from contractors and landowners; 2. identifies and recommends likely or potential owners/operators; 3. quantifies initial investments for infrastructure and capital investments as well as hard operating costs; and 4. designs a funding structure that includes private investment, grants, loans and other funding mechanisms to cover startup costs.

2. Introduction and Background

Increases in forest restoration activities are creating an abundance of SDW materials in the Taos area. However, much of the SDW products being produced by this work are often left in the forest, or given away to anyone willing to come pick it up. This approach is leaving dollars in the woods that could otherwise extend restoration activities and increase local economic activity. By aggregating products into a single wood lot or processing yard, small operators could generate revenue to offset per-acre thinning costs in order to accelerate forest restoration activities, add jobs in a rural and economically depressed area of the state, and eventually open new markets for agriculture products and expand the manufacturing sector to broaden the economic benefits of restoration and wildfire risk reduction in northern New Mexico.

In the last two decades, multiple national, state and local studies have underscored the importance of finding viable markets for SDW products and woody biomass produced by thinning and restoration work. For example, as far back as 2004, the New Mexico Forest and Watershed Health Plan states that: “Utilization of the by-products of restoration efforts can contribute to local economic development and help cover costs associated with restoration efforts.” The plan further recommends that the state “remove barriers, develop incentives, and provide funds to support appropriate infrastructure and encourage a viable market for utilization products,” noting that such assistance is especially needed for tribal and land grant communities. Similarly, the recently updated New Mexico Forest Action Plan (2020) recommends that partners “build and enhance current sustainable communities, businesses, and jobs” in order to accomplish much needed restoration priorities. The plan also encourages the state government and its partners to “promote sustainable utilization businesses and markets” in order to boost rural economies and reduce treatment costs. The 2016 Taos County CWPP Update, 2020 Tres Rios Watershed Forest Restoration Strategy and 2015 Taos Valley Watershed Coalition Landscape Restoration Strategy specifically note the importance of finding ways for restoration work to benefit the local economy to the greatest extent possible.

Additionally, the 2017 Taos County Comprehensive Plan notes the significant cultural and economic value of Taos County’s forests and watersheds, and it strongly encourages the county to continue its active support of local restoration efforts (such as the Rio Grande Water Fund and local watershed coalitions) in order to protect the area’s unique cultural and way of life. The plan also includes “sustainable forestry” and the “harvesting of small diameter wood products” as culturally relevant industries with economic benefits for rural residents in Taos and the surrounding forest-adjacent villages.

The 2016 Taos Regional Water Plan identifies “Forest Health and Watershed Restoration” as a key collaborative project to protect drinking water and the dozens of acequias within the county.

In May 2020, New Mexico State Forestry and Taos County signed a Governmental Services Agreement under which the Forestry Division agreed to provide funding of up to \$25,000 to the county to study the feasibility of creating a SDW products cooperative with the goal of increasing the pace of sustainable forestry and restoration efforts while providing new jobs and income sources for Taos County residents. Funding for this project was the result of a proposal approved by the Forest and Watershed Restoration Act Advisory Board. Taos County subsequently awarded a contract to develop the plan to Del Medio Forestry, LLC in August 2020.

3. Purpose and Objectives

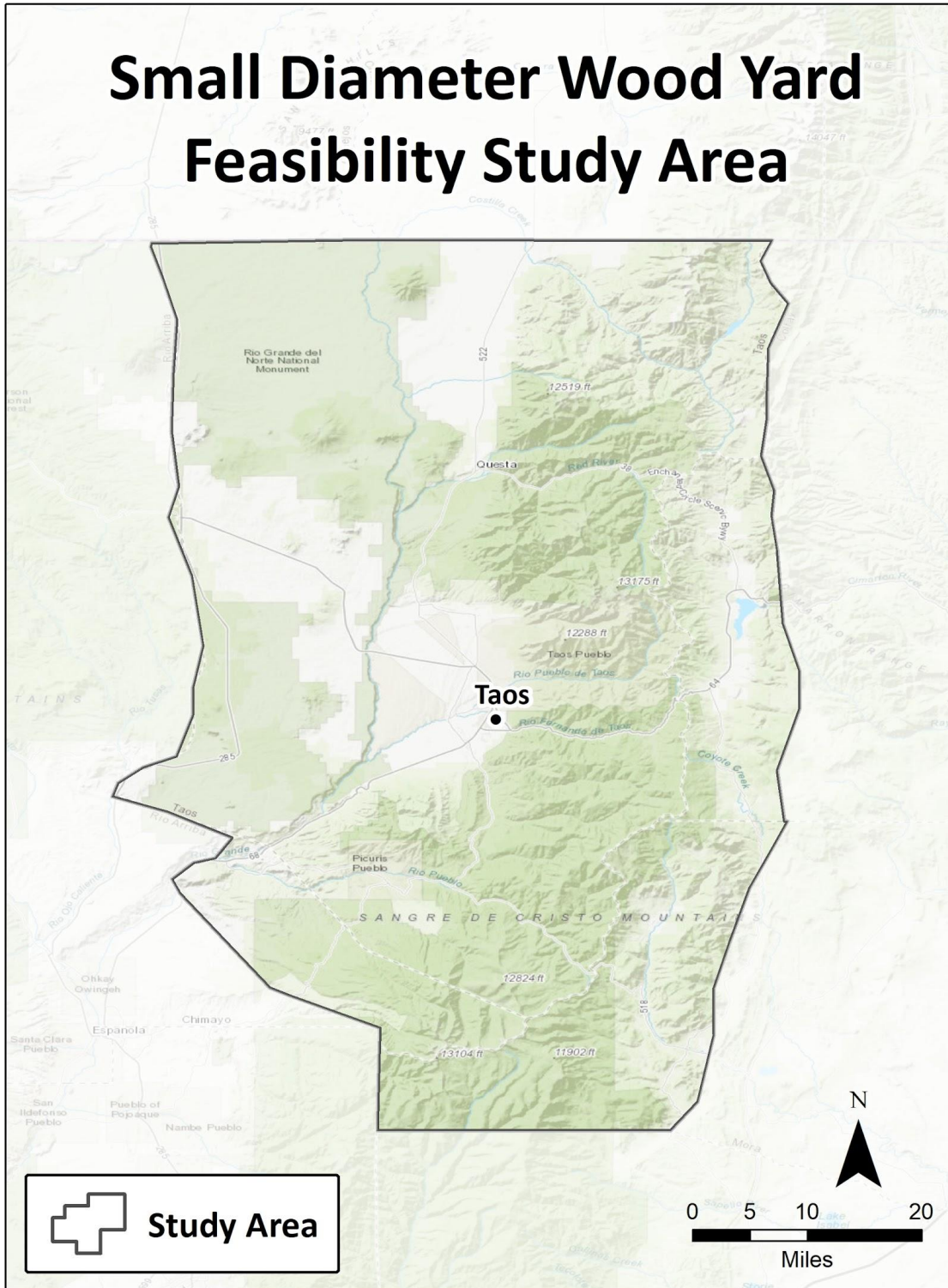
This feasibility study quantifies the current and projected supply of SDW produced by local thinning projects, then assesses whether adding value to those products would 1. Cover all or a portion of the cost of thinning treatments in order to accelerate the pace of wildfire risk reduction and forest restoration; and 2. Increase the scale and impact of a “restoration” economy in and around Taos County. The study also makes recommendations on the business model and governance structure that would most efficiently accomplish the above-stated goals.

It’s clear from our interviews and research that many people have tackled the thorny and often ambiguous economics of removing SDW (hazardous fuels) from forests that are highly departed from ecological reference conditions, especially in ponderosa and dry-mixed conifer stands in the Southwest. It’s also obvious that many, if not most, real-world business ventures that have attempted to add value to SDW have failed. This study hopes to learn from the challenges and mistakes made by others while designing an approach that recognizes the unique ecological, cultural and economic circumstances of the Taos region.

Among the initial steps in completing this study was to define a study area for a startup venture that balances market demand with the logistics of harvesting, processing and delivering SDW products. Northern New Mexico is sparsely populated, and Taos is especially isolated and hard to get to. It has no rail service and is at least an hour-and-a-half drive from any interstate. Even the state highways in and out of the area cross mountain passes or wind through narrow canyon bottoms. It is also 70 miles to the closest “urban” population center (Santa Fe). These limitations were given extensive thought when considering how best to accomplish the underarching goals of this analysis.

As such, we define the primary study area to include all of Taos County, plus all forested lands within an approximately 30-mile radius of the town of Taos. This radius includes portions of western Colfax County, western Mora County, and northern and eastern Rio Arriba County (see Map 3.1). These boundaries are based on several factors, including: 1. Feasible haul distance from project sites to Taos-based sort yard; 2. Boundaries of existing functional watershed coalitions with the capacity to supply and benefit from a SDW enterprise 3. Comparable study area boundaries from previous reports and planning documents

Map 3.1 — Study Area



that were used to quantify supply and demand, and 4. an area with similar cultural dynamics, local government jurisdictions, economic issues, land ownership patterns and forest restoration needs.

Similarly, there are a number of unproven or region-specific solutions to adding value to restoration residuals (stems, limbs and tops) such as biomass energy generation, pellet production, etc... This study relies on previous reports that have studied the potential supply and markets for those products, but we urge caution when considering what products are and are not appropriate for the conditions of the forests and markets in the Taos area. In order to more accurately describe and recommend viable opportunities and the most specific costs and revenue associated with specific wood products, this study rules out options that are not feasible in the immediate future. Specifically, we do not recommend that a Taos-based sort yard include the harvest and processing costs, and potential revenue streams associated with restoration residuals (stems, limbs and tops). Markets for such products are poorly developed, and we found several examples of projects in which complicated processing and expensive capital needs distracted from building a SDW business based on existing markets. However, biomass energy or other emerging markets should be considered when and if the basic sort yard operation is able to find a profitable niche in existing markets.

While this feasibility study is focused on the narrow supply/demand and revenue/expense of a woodlot business enterprise, it's important to put those figures in a broader context. Forest treatments that reduce the likelihood of damage caused by a major wildfire provide a massive return on investment that is enjoyed by residents, local governments, businesses, and downstream water users. Specifically, a 2016 study commissioned by the Rio Grande Water Fund assessed the return on investment for landscape-scale restoration treatments on the western slope of the Sangre de Cristo Range in Taos County. The study based its finding on two hypothetical wildfire scenarios: one with a relatively small fire (52,000 acres) near Taos Ski Valley, and the other forecasting a larger fire (155,000 acres) in the Peñasco/Pot Creek area. In these respective scenarios, the value of restoration treatments, even at the cost required to support them, resulted in a \$32.8 to \$68.2 million dollar return on investment, respectively. These scenarios accounted for many of the direct and long-term costs associated with fire, including impacts to electric transmission lines, surface water, irrigation districts, industry, tax revenues, recreation, acequias, personal use, and public health. Even so, these estimates are likely low, given that the costs (both economic and ecological) associated with fires, like the Los Conchas, are still accruing ten years later. Even if a SDW business that successfully increases the pace of thinning requires public and private investment to succeed at the outset, the cost of that investment is certainly dwarfed by the costs that come with a major fire.

At the moment, most of the fuels reduction work in the Taos-area — even on Forest Service and BLM lands — is paid for with grants secured by the agencies and their local partners (i.e. Joint Chiefs, CFRP, CFLRP, Non-Federal Lands and WUI grants). These funding sources have helped propel thinning work forward, but require substantial investments of time in drafting proposals and administering grants. This is not likely to change. However, this study examines whether it's possible to reduce per-acre treatment costs by adding value to SDW in order to extend grant dollars and complete more acres more quickly.

Finally, this feasibility study is not a business plan. It provides a “best-case” reasonable assessment of supply and demand, but it does not delve into the specific start-up and operational costs for running a sort yard business. The “Next Steps & Recommendations” section at the end of this report clearly details the information that will need to be gathered as part of a full-fledged business plan.

4. Methodology

The assumptions described in this feasibility study are in line with industry standards for costs and revenue. To the extent possible, actual figures were used to define the existing wood supply produced by restoration and fuels reduction work, and to quantify the demand for firewood and other wood products.

Data for the SDW supply is based on acres available for treatment and corresponding per-acre SDW harvest estimates. We rely on previous studies and assessments, as well as an inventory of current or planning thinning projects that have funding and necessary environmental clearances. This information was provided by collaborative groups, local government agencies and land managers within the study area. Data for market demand are based on surveys with local contractors and wood sellers, permit sales data from federal land managers, and census data for tracts within the study area.

To assess feasible and desirable mechanisms for adding value to SDW, we reviewed relevant studies, extension documents, academic journal articles, and interviewed numerous experts and practitioners to better understand the opportunities and obstacles associated with value-added propositions, to affirm feasibility findings, and to validate the study’s recommendations.

Expert interview subjects included:

- Brian Cottom, State Forester, Utah Division of Forestry, Fire and State Lands, formerly Southern Utah Forest Products Association
- Wayne Harrington, Community Forestry Sort Yards Coordinator, Boulder County, Colorado
- Matt King, Renewable Energy Program Manager, Wallowa Resources Community Solutions, Inc.
- Kim Kostelnik, Owner, SAKAK Consulting
- Tad Mason, Owner, TSS Consultants
- Marcus Selig, Vice President of Field Programs, National Forest Foundation
- Ryan Temple, President, Sustainable Northwest Wood, formerly Forest Trust in New Mexico

All references, including academic articles, studies and reports, and other documents, are listed in the References section as an appendix to this study. Hyperlinks to all sources (when available) are included in that section.

5. Analysis of Current and Future Supply

Taos County itself occupies approximately 1.4 million acres in north central New Mexico, and more than half of the county (57%) is made up of forested lands. Approximately 148,000 of those acres

are ponderosa/dry mixed-conifer forest type, with another 222,000 acres of piñon/juniper woodlands. The Carson National Forest is the primary forested land manager in the area, overseeing 440,000 acres of forest in Taos County, most of which is located on the western slope of the Sangres.

Since 2015, agencies and organizations in Taos County have successfully scaled up fuel reduction and restoration efforts, thanks largely to the creation of Taos Valley Watershed Coalition and the support of statewide networks like the Rio Grande Water Fund. Increasing collaboration, coordination and capacity building has led to multiple CFRP grants within the study area, as well as three Non-Federal Lands Grants and a Joint Chiefs award. The Tres Rios Watershed Coalition was formed in 2019 (based on the Taos Valley model) and hopes to achieve similar success at fundraising and implementation. At the same time, large private landowners are increasingly aware of the risk posed by wildfire, and are taking proactive steps to implement thinning work, with some paying for this work out of pocket. As a result, it is likely that thinning and restoration in the study area will, at the very least, continue at the current pace and scale. This study will use those figures as a baseline estimate for project thinning and restoration work over the next 10 years.

The following table describes in detail the current thinning and restoration projects within the study area, along with estimated wood products to be produced as a part of those projects. Data for this table were provided by local and federal government sources, the Taos Valley Watershed Coalition, and survey responses from private landowners.

Table 5.1 — Current Thinning/Restoration Projects and Estimated SDW Production

Project Name	Total Treated Acres	Total Cords Piñon/Juniper	Total Cords Mixed Conifer	Total Count Latillas	Total Count Cedar Posts	Total Count Vigas
Cerro Negro Forest Council CFRP*	250	750	0	0	1,250	0
Gallina Canyon NFL	102	306	0	0	510	0
NMAC Cerro Property	13	39	0	0	65	0
NMFIA San Cristobal Unit 1	130	390	0	0	650	0
NMFIA San Cristobal Unit 2	70	210	0	0	350	0
RCCLA FHI	10	30	0	0	0	0
RCCLA NRCS	52	156	0	0	0	0
Rio Lucero Watershed Restoration Project (El Salto)	90	270	0	0	0	0
Rio Lucero Watershed Restoration Project (Taos Pueblo)	100	300	0	0	0	0
Taos Land and Cattle Company (Northside at TSV Property)*	800	0	10,000	0	0	0

Taos Ski Valley, Inc.*	100	0	1,000	2,000	0	0
Taos Soil and Water Conservation District Fire Prevention Program	50	150	0	0	250	0
TOTAL	1,767	2,601	11,000	2,000	3,075	0

*Figures were provided by respondents to the Phase 1 Taos Wood Products Cooperative Survey (see References)

Table Assumptions:

- WUI treatments in piñon/juniper forests produce, on average, 3 cords of fuelwood and 5 juniper posts per acre.
- Table does not assume or describe ownership or transfer of ownership of SDW.
- Table shows acres for which funding has been secured (in some cases multi-year projects), not annual production

According to Table 5.1, funded projects in the area are expected to produce an ample supply of SDW materials suitable to be sold as firewood (piñon/juniper and mixed cords) as well as juniper posts and latillas. These numbers represent gross production figures, not the amount of wood that is available to be immediately directed to a sort yard operation. Rather, this table is intended to give a sense of the overall amount of SDW currently being produced, and which is potentially available to SDW sort yard operation.

For a comparison, Table 5.2 provides another baseline estimate of the total number of acres being treated per year in the study area. This table has been adapted from the 2017 Wood Utilization Study commissioned by the Rio Grande Water Fund to determine the viability of adding value to restoration residuals (stems, limbs and tops). The geography for that study included the West Zone of the Carson National Forest and other peripheral communities. Those areas have been excluded from the table below in order to arrive at the most reliable estimate possible for this study.

Table 5.2 — Forest Restoration and Fuels Treatments Activities and Product Estimate

Landowner/Program Source	Avg. Treated Acres/Year
Carson National Forest - East Zone	1,285
Rio Costilla Cooperative Livestock Association	15
Taos Pueblo	30
Angel Fire Private Lands	13
NRCS Projects	138
NM Forest Health Improvement Program	200
Taos Soil and Water Conservation District Projects	25
Taos Ski Valley Private Land Thinning Projects	25
New Mexico State Land Office Projects	350
TOTAL	2,081

The discrepancy in the amount of treated acres between tables 5.1 and 5.2 is largely due to the underperformance of thinning work being accomplished on the Carson National Forest recently. Work on National Forest lands in Table 5.1 accounts for just 450 acres (all of which are on multi-year projects) — 835 acres short of the Wood Utilization Study’s estimate for annual production on just the East Zone of the Carson National Forest. This shortfall is, in large part, due to the Mexican Spotted Owl injunction, which halted most commercial timber activities on National Forests in New Mexico for more than 12 months starting in September 2019. With the injunction lifted in October 2020, it’s reasonable to assume that the figure in Table 5.2 (around 2,000 acres/year) is more representative of a baseline pace of thinning in the study area overall.

Our analysis finds that thinning treatments in this area are more or less equally balanced between two primary project types, each of which tends to produce different species, volumes, and varieties of SDW products:

- **Restoration Projects** — Thinning work typified by the removal of SDW from the understory of fire-dependent ponderosa and dry-mixed conifer stands. These projects produce a diversity of SDW, including piñon/juniper fuelwood, aspen and mixed conifer fuelwood, latillas, and few juniper posts and vigas.
- **WUI Projects** — Thinning work typified by hazardous fuel reduction in areas adjacent to homes and other infrastructure, which are generally located in piñon/juniper woodlands or in the transition from piñon/juniper to ponderosa. These projects generally produce an abundance of piñon/juniper fuelwood.

By applying a reasonable multiplier to estimate the SDW to be produced per acre in the study area according to the project type, we make general predictions as to the annual volume of SDW to be produced in the study area.

Table 5.3 — Estimated Annual SDW Production

	Acres/Year	Total Cords Piñon/Juniper	Total Cords Mixed Conifer	Total Count Latillas	Total Count Cedar Posts
WUI Projects	1,000	3,000	0	0	5,000
Restoration Projects	1,000	1,000	10,000	20,000	0
TOTAL	2,000	4,000	10,000	20,000	5,000

Table Assumptions:

- *WUI Projects produce, on average, 3 cords of piñon/juniper fuelwood and 5 juniper posts per acre.*
- *Restoration Projects produce, on average, 1 cord of piñon/juniper fuelwood, 10 cords of mixed conifer and 20 latillas*

The figures in Table 5.3 represent a reasonable baseline estimate of the average gross SDW production of products for which there is a known market within the primary study area. The next section of this study will estimate the size of that demand and corresponding market for SDW products.

6. Analysis of Demand and Market Potential

As mentioned above, the primary reason for undertaking this study was the observation that a significant amount of SDW currently being produced as a result of WUI and restoration products is being left in the forest, gathered by landowners, contractors and the public, or donated by contractors and nonprofits. Very rarely is the value of this wood considered as part of the overall cost of treatments, or as a way to reduce those costs. As a reminder, the primary purposes of this study aims are to assess the feasibility of adding value to SDW in order to:

1. Cover all or a portion of the cost of thinning treatments in order to accelerate the pace of wildfire risk reduction and forest restoration; and
2. Increase the scale and impact of a “restoration” economy in and around Taos County.

While many of our interview subjects from other regions in the United States described little to no demand for SDW in their respective regions, Taos County and the surrounding areas already enjoy a market that has a long history of SDW utilization. Culturally, residents of north-central New Mexico rely heavily on fuelwood to heat their homes, and on small wood products for building materials such as latillas and juniper (“cedar”) fence posts.

The most recent data from the U.S. Census Bureau (2018, American Communities Survey, 5-Year Summary) found that 29.1% of occupied housing units, or 6,157 Taos County homes, rely on wood as their primary source of heat. If the average Taos home burns two cords of firewood per winter, then the total estimated demand for firewood in Taos County alone is about 12,314 cords per year for homes that use wood as a primary heat source. If data for Census tracts that include northeastern Rio Arriba County and western Colfax County are added (areas that make up the remainder of the study area), the total estimated demand for firewood is just under 14,000 cords/year. The following table shows estimated firewood demand for the study areas based on Census figures.

Table 6.1 — Homes with Wood as Primary Heat Source

	Total # of Households	% with Wood Heat	# of Households with Wood Heat	Est. Cords/Year
Taos County	21,158	29.10%	6,157	12,314
Colfax County (Cimarron)	1,463	20.80%	304	609
Rio Arriba County (Chimayo)	983	35.40%	348	696
Rio Arriba County (Dixon)	655	28.40%	186	372

Totals	24,259	28.43%	6,995	13,991
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Source: U.S. Census Bureau, American Communities Survey, 5-year Average, 2018

Table Assumptions:

- The average household in northern New Mexico that relies on wood heat will burn 2 cords of firewood per year

It’s worth noting that the percentage of homes that use wood as a primary heat source in northern New Mexico is well above the statewide average (6.7%), suggesting a stable and relatively high local demand for firewood within the study area itself.

Additionally, this Census tract data aligns with the estimated demand based on known Forest Service wood permit sales, estimated on-the-books business sales, and estimated underground firewood sellers. Table 5.2 shows those figures, as well as estimated figures for latillas. We did not include figures for posts and vigas, as sales and permit data are very limited.

Table 6.2 — Estimated Annual Demand

	Firewood	Latillas
CNF Permits*	11,698	67,680
Olguins (Est. Sales)**	600	10,000
Other sellers***	600	10,000
Total Estimated Demand	12,898	87,680

*Data provided by the Carson National Forest

**Based on interviews with Olguin’s Sawmill and Firewood

***The underground market for firewood is very hard to quantify, and this is likely an underestimation

We define the “underground’ firewood and latilla market as those wood cutters who harvest their own wood (typically from the National Forest, though not exclusively) and sell it through informal markets, whether to friends and family, through word of mouth, social media, or out of the back of a pickup on the side of the highway. This market is very hard to quantify. Anecdotal evidence indicates that wood is regularly poached from federal lands, making it hard to quantify the amount of harvested firewood and latillas not reflected in permit sales.

Within the study area, Olguin’s Sawmill and Firewood is the most established and largest retailer of firewood. The company sells about 600 cords of firewood per year, according to interviews with the business. We attempted to pull gross receipts tax data to quantify the volume of firewood sales in the study area, but this data does not break out fuelwood as an independent category. Rather, firewood sales are included in the “Fuel Dealers” category (NAICS code 454310), which lumps firewood with propane and heating oil retailers.

For the purposes of this study, we can say with a reasonable degree of confidence that the annual average demand for firewood within the study area is around 13,000 cords per year. The market for latillas is harder to quantify with the same degree of certainty, but we conservatively estimate that 75,000 latillas are sold within the study area per year.

The following table simplifies our estimated SDW supply (from Table 5.3) produced by thinning projects in the study area in order to compare it with our estimated annualized demand.

Table 6.3 — Annual Local Supply and Demand

	Est. Supply (annualized)	Est. Demand (annualized)
Firewood (cords)	14,000	12,898
Latillas (count)	20,000	87,680

Using these figures, we can apply the average market rate for SDW products and assess the potential economic impact of adding-value to SDW produced by thinning projects in the area.

Again, as the primary local retailer, Olguin’s Sawmill and Firewood provides a reasonable indicator for fuelwood prices. In 2020, Olguin’s was selling a cord of seasoned and split piñon/juniper (delivered) for \$325/cord, with a minimum 3-month wait time between order and delivery. Social media firewood listings for piñon/juniper in the “underground” market in Fall 2020 showed a range from \$340 to \$375 per cord of piñon/juniper. For mixed conifer and aspen, the price per cord was between \$250 to \$275 per cord, both from established retailers and in the “underground” market.

For latillas, the retail price was between \$3 and \$6 per latilla at local material yards and in the “underground” market. Juniper (known locally as “cedar”) posts are less commonly found in the retail and online markets, but there is considerable word-of-mouth demand by farmers and ranchers where cedar posts are preferred for fence posts. Leñeros on the Cerro Negro Forest Council project have been selling fresh cut posts (generally 8’ long and 6”-10” at the butt end) for between \$20 and \$40 each.

The table below estimates the potential gross value of SDW produced by thinning projects to the local economy, based on conservative market prices per unit as described above.

Table 6.4 — Estimated Gross Value of SDW from Thinning Projects

	Total Cords Piñon/Juniper	Total Cords Mixed Conifer/Aspen	Total Count Latillas	Total Count Cedar Posts
Units	4,000	11,000	20,000	5,000
Value Per Unit	\$325	\$250	\$3	\$20
Total Gross Value	\$1,300,000	\$2,750,000	\$60,000	\$100,000
Total Retail Value				\$4,210,000

Table 6.4 shows that finding a retail market for restoration SDW products could result in a considerable economic impact in the Taos area. It’s important to note that the table does not account for fluctuations in the local market (i.e. drops in the price per cord) that would likely occur if the local supply

increased by thousands of cords per year. The business plan being recommended by this study would focus on meeting the demand of this local market as a necessary first step, and it would need to account for potential drops in local prices caused by an apparent increase in supply. In interviews, Olguin’s and other wood sellers all said they’ve struggled to keep up with the local demand for firewood. Olguin’s regularly sells out of seasoned firewood before Thanksgiving every year, and owner Dan Barrone said he has noticed no impact on the demand side, despite the harvest of about 400 cords of piñon/juniper off of the Cerro Negro Forest Council project, which introduced a new supply of wood into the local “underground” market beginning in 2018.

However, that study should at least consider the eventual possibility of expanding marketing and sales beyond the study area where there may be adequate demand to justify transporting SDW further if the local market does become saturated.

In order to demonstrate the existence of regional markets (outside of the state), the following table shows the current rates for cords of piñon in select Texas markets. While prices per cord are significantly higher in these areas, any business plan for a Taos-based enterprise would obviously need to consider whether higher retail prices cover the cost of longer haul distances.

Table 6.5 — Regional Piñon Retailers and Prices per Cord

Retailer Name	Location	Miles from Taos	\$/Cord Piñon
Indian Head Firewood	Houston, TX	893	\$899
We Have Piñon	Hudson Bend, TX	725	\$480
Freedom Firewood	Lubbock, TX	350	\$550
Amarillo Firewood	Amarillo, TX	292	\$485

Based on this analysis, we conclude that the local demand for firewood and other SDW products is sufficient to successfully market at least a portion of the SDW being produced by thinning projects to customers within the study area. In the following section, we assess the extent to which adding value to SDW can reduce per acre treatment costs in order to successfully accelerate the pace of restoration in the study area.

7. Cost/Benefit of Value-Added SDW

To establish the current per acre cost of thinning, we rely on known contract prices on private and federal lands, state purchasing agreements, and input from local thinning contractors. We found that \$1,500 per acre was a reasonable estimate, though prices vary significantly from federal land (\$650/acre) on the low end to private land (\$2,200+) on the high end. These figures match previous studies in the area, which found average per-acre prices between \$600 and \$2,150.

To simplify our calculations, we first rely on \$1,500 as a reasonable mean thinning price per acre to consider the landscape scale impacts of adding value to SDW. Further in this section, we offer alternative methods of calculation that can be adjusted on a project-by-project basis. The following table

was adapted from Table 5.3 to apply our market prices, by product, to the estimated annual production volumes.

**Table 7.1 — Value Added Impact
WUI Project Costs**

Gross Cost/Acre	\$2,000
Gross Value SDW/Acre	\$1,075
Net Cost/Acre	\$925

Table Assumptions:

- Gross value SDW per acre includes 3 cords piñon/juniper (at \$325/cord) and 5 cedar posts (at \$20/post)

**Table 7.2 — Value Added Impact
Restoration Project Costs**

Gross Cost/Acre	\$1,000
Gross Value SDW/Acre	\$2,885
Net Cost/Acre	-\$1,885

Table Assumptions:

- Gross value SDW per acre includes 1 cord piñon/juniper (at \$325/cord), 10 cords mixed (at \$250/cord) and 20 latillas (at \$3/latilla)

The numbers above are rough estimates meant to show the discrepancy between WUI and restoration projects when it comes to per acre treatment costs and the potential SDW value per acre. But if we accept the general assumptions behind these calculations, we can comfortably assume that there is enough SDW being produced in both types of projects to at least reduce the per acre thinning costs, if not actually realize a per-acre profit in some instances. It’s worth noting that the 10 cords of mixed firewood per acre figure is actually half the estimated volume of firewood per acre to be harvested in and around the Taos Ski Valley, according to survey responses from professional foresters in phase 1 of this project. We have reduced that figure to 10 cords per acre to account for areas where actual per acre harvests are close to 5 cords per acre.

In practice, the cost/SDW value will vary considerably on a project-by-project basis. Two recent thinning projects on Forest Service land have tested the market for SDW and the economics of using SDW value to reduce per acre thinning costs or reinvested in future treatments:

Example 1: The Cerro Negro Forest Council CFRP project has been testing a community forestry model between San Cristobal and Valdez since 2018. In two years of project work, the council estimates an average gross thinning cost of \$525 per acre, while leñeros (local woodcutters) have been harvesting around \$2,085 worth of SDW (5 cords of piñon/juniper and 20 posts) on each acre. Leñero surveys show that most of that wood (>75%) is going to personal use, though an increasing number of leñeros have started selling excess wood on the “underground” market. In response, the council has been looking for ways to help make more money off of the harvested SDW. The council, in collaboration with the San Cristobal Neighborhood Association, recently received a \$10,000 grant from the LOR Foundation to buy a small firewood processor. The council is planning to open a community woodlot in San Cristobal where leñeros can sell freshly cut green wood to the council, and the council can process and store that wood, then sell it at a retail price. A portion of any profits from that program are intended to go toward paying for more thinning treatments. The council has expressed interest in being part of a larger SDW program as long as leñeros are fairly compensated and there is sufficient profit to continue paying for a portion of future thinning work.

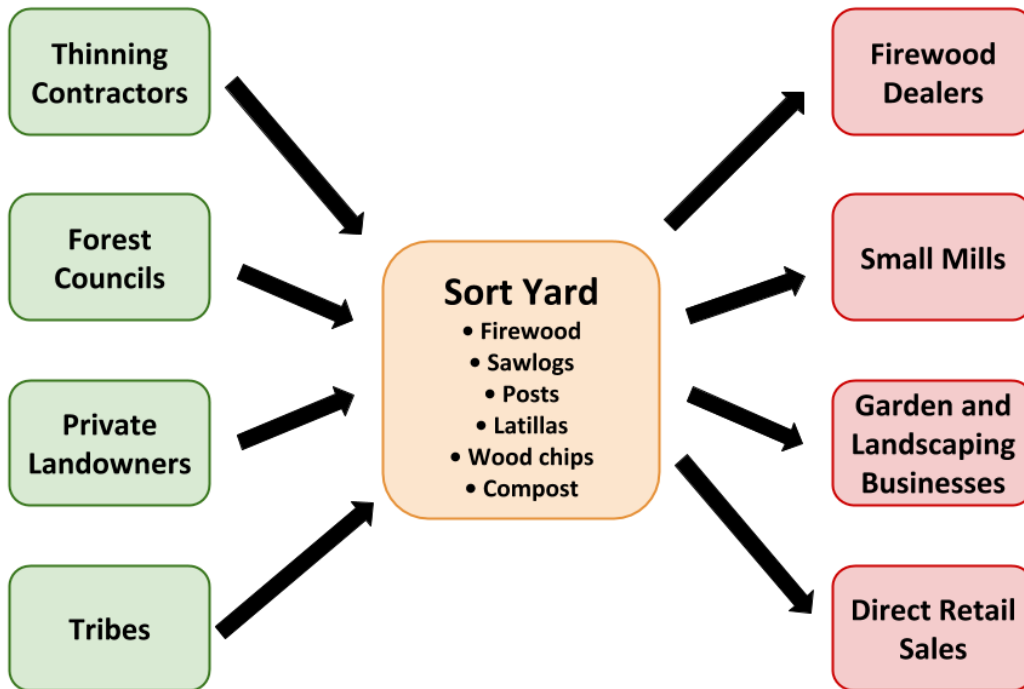
Example 2: The New Mexico Forest Industry Association (NMFIA) signed a Supplemental Project Agreement with the Carson National Forest in spring 2020 to hire local contractors to thin 200 acres north of Taos. The prescription for that project requires that the contractors remove all wood >3" in diameter. Three local contractors were awarded work on the project. Two contractors are keeping the project SDW to sell on their own, or giving it away to friends and nearby residents. The third contractor has entered into an agreement with Olguin's to sell green wood by the cord. Because of bureaucratic challenges and inconsistency in supply, Olguin's has preferred to not rely on harvesting wood from federal lands, especially for firewood. Instead Olguin's has harvest agreements with private landowners and purchase agreements for logs with other logging companies in the region. But beginning in October 2020, Olguin's began purchasing green piñon/juniper in 4- to 6-foot lengths for \$125/cord delivered to his yard off the NMFIA project. The contractor, Mark Scheutz of Watershed Dynamics, says this is the first time that he has considered the value of the wood as part of the overall project cost, but the arrangement made it possible for him to reduce his bid price on the project acres by approximately 25%. The arrangement with Olguin's represents a success in connecting restoration projects with the local wood market, but it comes with limitations: Olguin's will buy only wood that is >4" in diameter (which excludes about 25-35% of SDW from the NMFIA project), and Olguin's expects to run out of cash that it can front to buy green wood without waiting for the wood to cure so it can be sold for a profit. Olguin's may continue to buy SDW from thinning projects, but it is not a central part of its business model.

Based on expert interviews and reviews of industry literature related to SDW businesses, wood cooperatives, woodlots and sort yards, we believe that the Cerro Negro and NMFIA examples represent the most efficient way to add value to SDW in a way that best accomplishes the paired goals of increasing the pace of forest restoration in the Taos area while simultaneously increasing the overall economic impact of restoration activities.

Hypothetically, a sort yard would make it possible for those who do the cutting or own the felled SDW to sell it to an entity at a wholesale price. That entity would then have the dedicated facility, staff and contractor/landowners agreements necessary to aggregate SDW from various sources, process and store SDW products, then sell those products at a retail price. Diagram 7.1 is a simplified example of how a single entity could be established to harvest, process and store SDW from public, private and tribal land projects. By aggregating products in a single, specialized location, the entity could then become a supplier of SDW, selling directly to customers or to other retailers. The introduction of a new enterprise would no doubt impact the dynamics of the local wood market and be perceived as a competitor at first. However, interviews conducted for this study elucidated several examples of ways a singular aggregator focused on SDW products, originally seen as a competitor in the market, actually benefited existing mills and other local businesses by increasing the volume and easy availability of SDW materials.

Diagram 7.1 also described the aggregating entity as a "Sort Yard." Based on our research, we believe this model would accomplish the goals described in this study most effectively. More detailed explanation on our rationale, as well as recommendations on how this enterprise should be structured

Figure 7.1 — Model for aggregation of SDW and potential local markets



— including its legal status, governance, relationships to existing businesses and opportunities to subsidize equipment and startup operating costs — are described in later sections of this study.

8. Business Model, Legal Structure and Governance

When this study was originally proposed, the concept was centered on the idea of creating a SDW products cooperative. Much has been written about the potential for cooperatives to solve the problem of reaching economies of scale and providing maximum returns for SDW in forests across the country, including sources cited in the original proposal. However, subsequent research, survey responses and interviews for this feasibility study almost universally and resolutely discouraged the development of a cooperative. Especially telling was the challenge of finding a single cooperative success story related to SDW in the region. Experts and forestry professionals working in the industry today repeatedly said a true, member-owned cooperative would likely succumb to the same challenges that sank many prior cooperative attempts.

Below are the key takeaways from four experts with practical experience who were asked about the cooperative model, and other alternatives or hybrid approaches to add value to SDW to accelerate thinning work and augment the economic impact:

- **Brian Cottam, State Forester, State of Utah**

Cottam started his career straight out of graduate school as director of the Southern Utah Wood Products Association (SUFPA). The association was a cooperative formed in Wayne County, Utah in the late '90s in order to make small mills in the area more competitive when bidding on Forest Service timber sales. Cottam said in an interview for this study that he remains a huge believer in the cooperative model in certain instances. And he said the idea of collective action and benefit was a good fit culturally among the predominantly Mormon logging families. But he said there was a fatal lack of interest in SUFPA from those who preferred to spend their time in the woods rather than in meetings going over the minutiae of cooperative financing, governance and administration. "If I were to do it again, it would not be through a co-op," Cottam told us. Instead, he strongly urged us to pursue a for-profit business model that starts by matching the products being produced by restoration to known, local markets.

"You need to work backward from the supply end and restoration needs, then connect those products with existing markets that can support them." -Brian Cottam

- **Matt King, Wallowa Resources Community Solutions, Inc. (CSI), Enterprise, Oregon**

Wallowa Resources CSI is a for-profit subsidiary of the nonprofit Wallowa Resources, which has been a trailblazer when it comes to building a sustainable restoration economy in a rural community in the West. In an interview for this study, King said Wallowa Resources experimented for decades with different SDW products, business models and governance structures before landing on a system that works for them. Under the current model, Wallowa Resources (the nonprofit) manages education, outreach, and science and innovation programs to build support for restoration and job creation in their area. The organization also participates in collaborative restoration efforts to coordinate restoration work. Wallowa was key in standing up Integrated Biomass Resources — a for-profit SDW mill that has several concurrent stewardship contracts with the Forest Service, which provide a supply of wood for the business operation. Before Integrated Biomass, King said the Forest Service wasn't doing any real "restoration" projects because no companies were willing to bid on them. Originally, the nonprofit tried running the business, but King said having a nonprofit board try to decide business decisions related to a mill operation was not effective. Rather, the nonprofit and stand-alone business enjoy a symbiotic relationship wherein the nonprofit chases down grants for equipment or new programs, and advocates for more stewardship projects. In turn, the for-profit steps up to do the thin-margin projects no other mills are willing to take on, and it keeps people employed and money circulating in the local economy. Integrated Biomass has about 50 full-time employees and is making a profit. The success to date, according to King, is because the business has focused on fitting into existing markets, rather than chasing "big, shiny energy plants."

- **Ryan Temple, Sustainable Northwest Wood, Portland, Oregon**

Sustainable Northwest Wood is a spin-off business that is wholly owned by the nonprofit Sustainable Northwest. The company buys products from about a dozen small mill operators across the area, then aggregates the materials in a single yard, which supplies builders and premium markets at a markup. Rather than organizing those mills into a co-op, the for-profit model made more sense, Temple said. “The word ‘cooperative’ sounds nice, but people just want to fill their niche,” Temple told us in an interview. “They aren’t interested in the governance structure. That’s why we decided we’re going to behave as a cooperative (looking out for the common good), but we’re going to avoid the complications of a cooperative.” The nonprofit created the spinoff because it argues that a market-based solution is the best way to encourage sustainable restoration in their area. Before moving to Oregon, Temple worked for the Forest Trust in New Mexico where he was part of an effort to organize residents in Truchas as a cooperative. Temple echoed Cottam’s comments that, despite the cultural relevance of the cooperative idea — working for the greater good of the community — the project never really got off the ground. Governance became a point of contention, and the program got mired in local politics and community in-fighting.

- **Kim Kostelnik, SAKAK Natural Resource Consulting, Albuquerque, New Mexico**

Kostelnik is an expert in the New Mexico forestry industry, having spent a career at New Mexico State Forestry where she participated in several statewide and regional efforts to find viable markets for SDW products. Kostelnik said forming a cooperative would be “a waste of time, money and energy,” largely because it takes too much effort to organize and there are too many personalities to manage, all of which distracts from the fundamental challenge of trying to make a margin off SDW. Like every other expert we interviewed, Kostelnik recommended a for-profit business, specifically the creation of a “sort yard” — a facility of that was large enough and outfitted with the right equipment to be able to drop, organize, store and sell three or four SDW products. “You want to use all of that tree, but you don’t want to touch that tree too many times,” Kostelnik said. “A sort yard lets you bring everything to the lot, do what you can with the rounds, the posts and the poles. If there are products that other vendors want (chips, slash, compost, etc...) the sort yard is a place to store it and where it can be picked up.” Kostelnik said a lot of work has been done to study and lobby for policy changes to support more advanced markets, namely biomass energy. And while those markets may someday emerge, a startup sort yard should be strictly focused on making a profit off material that’s accessible and for which there is a known market.

“A sort yard should have three or four end products and diverse supply sources to be successful.” - Kim Kostelnik

Based on these interviews, feedback from local contractors and landowners, and additional research, we are strongly recommending that a SDW venture in the Taos County area not adopt the co-op structure. The need and objectives described in this study are such that a cooperative is not necessary. Instead, forming a cooperative would likely be an unnecessary investment of time and money at the outset, and be far less likely to succeed over the long term.

We did, however, find that the value of the wood produced through restoration activities in Taos County is sufficient to support the standalone operation of a sort yard where SDW products are collected, sorted, and sold to distinct and existing markets (see Figure 7.1). Sort yards are a proven mechanism for adding value to otherwise discarded slash or byproducts through existing markets, and the presence of a sort yard can help incentivize defensible space and spur restoration work. When evaluating the appropriate structure for owning and operating a Taos-based sort yard, we considered the following options:

- *Government Operated:* Boulder County Community Forestry Sort Yards were established in the mid-2000s. The county now operates two sort yards as a free service to incentivize landowners to do their own defensible space and other private land thinning by offering them a convenient place to bring residuals. Residents and thinning contractors can drop off rounds, slash, bagged invasive weeds and other non-construction waste woody material for free. Most of the material is chipped and used to feed biomass boilers at the Boulder County Jail and public works building. This model is essentially a public service, paid for by Boulder County and subsidized with occasional grants to purchase heavy equipment.
- *For-profit subsidiary of a non-profit:* Sustainable Northwest Wood (see Ryan Temple interview above) is essentially a “benevolent (cooperatively minded) business” that returns profits to Sustainable Northwest (a local nonprofit) to support the nonprofit’s conservation work while helping small mills in rural communities reach larger markets. By working directly with mills, Sustainable Northwest Wood boasts that it offers products at a competitive price, bolsters sustainable economic development and job creation. The model through which Sustainable Northwest Wood communicates and coordinates with local mill operators has parallels to a cooperative, but without a complicated governance structure. The greatest success of this model is improved efficiency of treatments, and investment from the business back into conservation work. According to Temple, simplicity is key: “We’re a lumber yard, there’s nothing that fancy about what we do.” The most recent publically available tax return for the nonprofit Sustainable Northwest shows that the nonprofit is a 100% owner of the for-profit lumber yard, that the lumber yard had almost \$900,000 in assets, and that it made a \$50,000 profit that was returned to the nonprofit that year.
- *For-profit business with nonprofit affiliation:* Integrated Biomass Resources is a standalone, for-profit sawmill focused on value-added, small diameter wood products based in Wallowa,

Oregon. (see Matt King interview above). The business was formed specifically to create a demand for much-needed restoration projects and stewardship contracts on Forest Service land in eastern Oregon. The business gets support from the nonprofit Wallowa Resources, which dedicates staff time and some grant funding to exploring new markets and improving efficiencies in harvesting, processing and marketing. Wallowa is also an active member of area watershed and restoration collaboratives, and advocates for projects and agreements that will supply IBR with wood products. Matt King with Wallowa Resources Community Solutions, Inc. made clear that, after unsuccessfully trying to have a nonprofit board make business decisions for a SDW mill, the stand-alone business was a preferable option.

After considering these options carefully, we recommend a for-profit hybrid of these three models that takes into account the unique economic, political, and ecological circumstances in Taos County. In practice, the proposed model will function much like the Boulder County Community Forestry Sort Yard in terms of intake and processing of products. However, a government-run option is not viable simply because, compared to a far more affluent community like Boulder County, local governments in Taos County don't have the necessary resources. Plus, state laws that restrict public-private partnerships and procurement issues in New Mexico would almost certainly create unnecessary headaches.

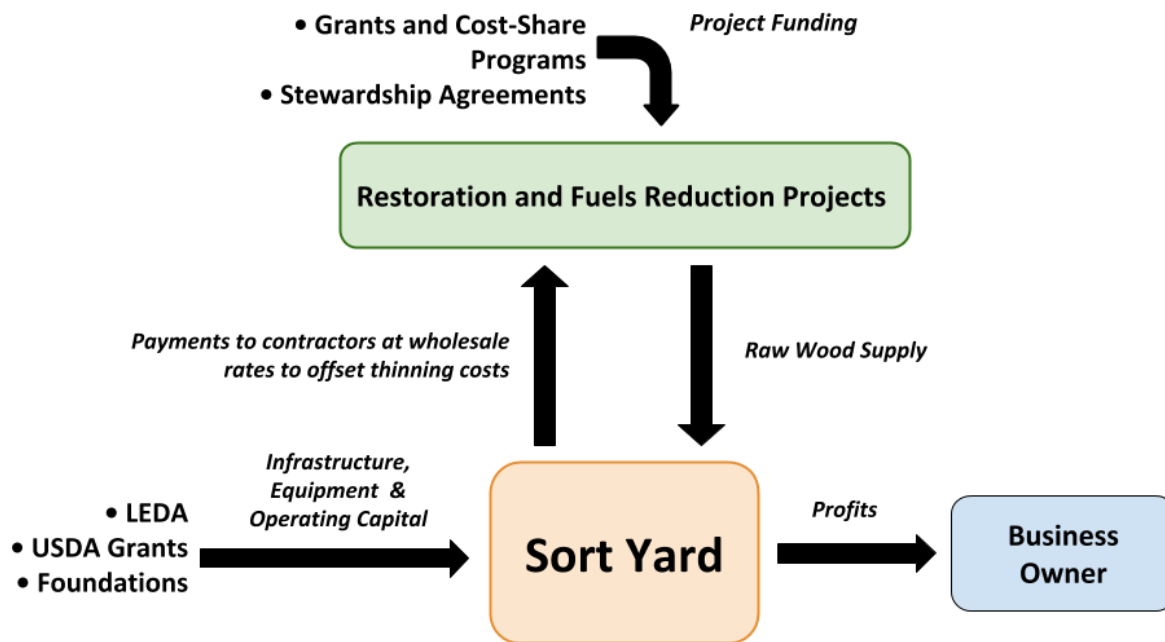
The second option, a for-profit subsidiary of a nonprofit, might make sense if there were an obvious nonprofit organization to take the project on. However, we are not convinced that there is a nonprofit in the area with the capacity and mission to assume this role. Further, we believe that involving a nonprofit board in the management of a SDW sort yard would be marred with the same complications and potential downfalls as a cooperative.

Thus, a for-profit model with an informal affiliation with local NGOs, tribes, community groups and government entities (similar to Integrated Biomass) is the most viable option within our study area. This model encourages entrepreneurship and has the best chance of long-term success if it is able to find a niche in the local SDW market. This model also supports a symbiotic relationship whereby the sort yard as a business helps watershed coalitions in the area accomplish more work by extending the value of grant funding while improving profits for local contractors. In turn, existing watershed coalitions serve as advocates for projects that make the sort yard successful and advance the ecological and economic goals of these collaborative groups.

Figure 8.1 below demonstrates how funding for projects would continue to be used to support thinning work in the study area, how those projects would produce a wood supply for a sort yard, which would make payments directly to contractors (or landowners and/or tribes) who wanted to sell some or all SDW produced from projects to offset their thinning costs. In turn, the sort yard could raise funds through grants and other programs to support the operation, especially during the start up phase, and any profits would remain with the sort yard and its owner.

The following sections of this study offer a more detailed look at what the potential expense/revenue of the operation could be based on projected supply and demand, and suggest specific ways to subsidize the creation of a sort yard operation.

Figure 8.1 — Flow of Product and Money Into and Out of Sort Yard



9. Potential Expenses/Revenue and Direct Economic Impact

As described in Section 5 and Section 6, the type of project, the cost of treatment, and the type of SDW wood to be harvested on that project will all determine the extent to which value added SDW can help reduce treatment costs and increase the scale and pace of thinning within the study area. This section combines the figures and estimates we presented in the supply and demand analyses and applies them to the business structure shown in Figure 8.1

To demonstrate how these pieces fit together, we created the SDW Project Calculator ([click this hyperlink to access an interactive/downloadable spreadsheet](#)) to serve as a tool to assess the potential benefits to thinning contractors/landowners and the larger goal of supporting more thinning work. The tool also provides projected margins between wholesale and retail SDW material costs in order to better assess whether those margins are sufficient for a new entity to form to fill this niche. Users can input the actual or anticipated wholesale and retail values of various SDW products, the amount of grant funding for a specific project, and the number of acres to which that grant funding is tied. The tool will then calculate SDW value for that project, the total acres that could be treated if the project maximizes the wholesale value of SDW, the potential gross profit margin for retail sales of SDW produced by the project.

Tables 9.1 and 9.2 below demonstrate the Project Calculator Tool features and functions using inputs from the Cerro Negro Forest Council and NMFIA Projects, respectively.

Table 9.1 — SDW Project Calculator Tool - Cerro Negro Forest Council CFRP

SDW Variables	
Cords PJ/Acre	5
Wholesale PJ Value/Cord	\$125
Retail PJ/Cord	\$325
Cords Mixed/Acre	0
Wholesale Mixed/Cord	\$100
Retail Mixed/Cord	\$250
Latillas/Acre	0
Wholesale Latilla/Each	\$1
Retail Latilla/Each	\$3
Cedar Posts/Acre	10
Wholesale Cedar Post/Each	\$10
Retail Cedar Post/Each	\$20

Treatment Calculations	
Grant Funding for Treatments	\$165,000
Total Acres	250
Treatment Cost per Acre	\$550
Wholesale Wood Value per Acre	\$725
Net Cost/Acre*	-\$175

**Negative means SDW value exceeds treatment costs*

Sort Yard Expense/Revenue		
Total Wholesale Cost	\$181,250	Amount paid to contractors/landowners for SDW
Total Retail Value	\$456,250	Potential revenue from SDW sales
Gross Margin	\$275,000	Break even budget for processing/sales

Cumulative Restoration and Economic Impact			
	Without Sort Yard	With Sort Yard	% Increase
Acres Treated	250	No Budget Limit	No Budget Limit
Economic Activity	\$165,000	\$621,250	277%

Using actual figures from the Cerro Negro CFRP, and using a wholesale purchase price of \$125 per green cord of piñon/juniper, the Project Calculator shows the wholesale value of the wood alone exceeds the actual cost of thinning by \$175. If Cerro Negro and other emerging forest councils could sell some of their wood to a sort yard, that revenue could be used to continue paying leñeros and the mayordomo when funding from the CFRP is exhausted. Additionally, based on the wholesale and retail price inputs, the Project Calculator Tool shows that a stand alone sort yard could expect a gross margin (gross retail revenue minus wholesale SDW costs) of up to \$275,000.

Table 9.2 — SDW Project Calculator Tool - NFMIA Carson National Forest SPA, Unit 1

SDW Variables	
Cords PJ/Acre	3
Wholesale PJ Value/Cord	\$125
Retail PJ/Cord	\$325
Cords Mixed/Acre	0
Wholesale Mixed/Cord	\$0
Retail Mixed/Cord	\$0
Latillas/Acre	0
Wholesale Latilla/Each	\$0
Retail Latilla/Each	\$0
Cedar Posts/Acre	20
Wholesale Cedar Post/Each	\$10
Retail Cedar Post/Each	\$20

Treatment Calculations	
Grant Funding for Treatments	\$200,000
Total Acres	200
Treatment Cost per Acre	\$1,100
Wholesale Wood Value per Acre	\$575
Net Cost/Acre*	\$525

*Negative means SDW value exceeds treatment costs

Sort Yard Expense/Revenue		
Total Wholesale Cost	\$115,000	Amount paid to contractors/landowners for SDW
Total Retail Value	\$275,000	Potential revenue from SDW sales
Gross Margin	\$160,000	Break even budget for processing/sales

Cumulative Restoration and Economic Impact			
	Without Sort Yard	With Sort Yard	% Increase
Acres Treated	200	381	90%
Economic Activity	\$200,000	\$475,000	138%

Using actual inputs from the NFMIA SPA and reasonable wholesale and retail prices, the Project Calculator shows the net cost of thinning per acre could be reduced from \$1,100 to \$525. Were the SDW produced by this project to be sold to a sort yard, the current thinning budget could almost double the number of acres treated — from 200 acres to 381, or a 90% increase in scale. In addition to keeping thinning contractors and their employees working longer, the impact of the original \$200,000 in agreement funding on the local “restoration” economy could be more than doubled.

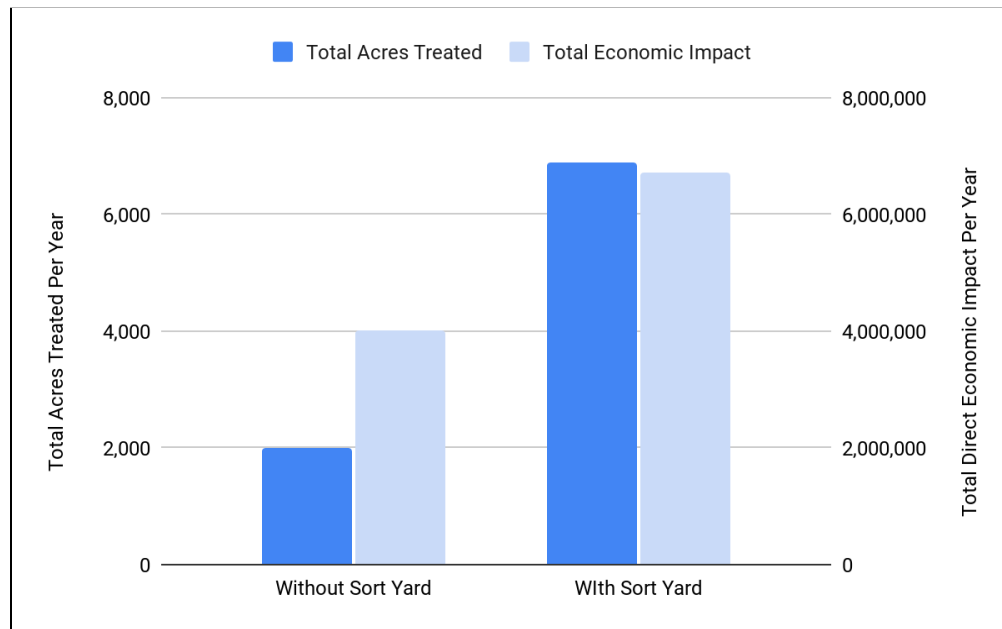
While the tool is helpful in establishing the parameters for a specific project and the potential benefits for both treatment production and SDW sales, it can also be used to extrapolate the impact a sort yard would have at the landscape scale within the study area. Table 9.3 shows the bottom line outputs of the SDW Project Calculator Tool when production data from Table 5.3 were used as inputs, along with corresponding data on retail prices from Table 6.4.

Table 9.3 — Comparison of Annual Acres Treated and Economic Activity with Sort Yard

	Without Sort Yard	With Sort Yard	% Increase
Acres Treated (WUI Projects)	1,000	1,270	21%
Total Economic Activity (WUI Projects)	\$2,000,000	\$3,075,000	35%
Acres Treated (Restoration Projects)	1,000	5,634	82%
Total Economic Activity (Restoration Projects)	\$2,000,000	\$3,635,000	45%
Total Cumulative Acres	2,000	6,904	71%
Total Cumulative Direct Economic Impact	\$4,000,000	\$6,710,000	40%

As shown in Table 9.3, the creation of a relatively basic sort yard dedicated to SDW products could drastically increase the scale of WUI and restoration projects while generating significant additional economic activity in the local forest restoration sector. The chart below combines these figures to demonstrate the overall benefits a sort yard could have to both thinning work and economic development each year.

Figure 9.1 Potential Cumulative Annual Impact of Sort Yard



As shown in Figure 9.1, cumulative annual acres treated could jump from a baseline of 2,000 per year to more than 6,000 acres per year. And total direct economic impact within the study area could increase by 40% (“direct economic impact” is the total amount of grant funding for treatments plus the retail value of the SDW). Research has also shown that the economic impact of adding value to wood that might otherwise be given away, burned in piles or left to rot in the forest extends far beyond the money that goes to thinning and is generated by retail SDW sales. For example, a 2006 study on the benefits of community forestry that was commissioned by the Ford Foundation found that, in Wallowa County, Oregon, coordinated restoration and value-added SDW businesses would create economic impacts that ripple beyond the agricultural sector, into professional services and beyond, not to mention increased property tax and sales tax revenue. The report found that, for every dollar that the nonprofit Wallowa Resources brought into the county for its programs and projects related to value added wood products, it created another 75 cents in direct and indirect economic activity across all sectors of the rural economy.

Also, the same inputs into the SDW Project Tool result in a cumulative gross margin (gross retail revenue minus wholesale SDW costs, or the break-even operations budget) for the sort yard of more than \$1.6 million. A more detailed analysis of SDW capture and harvest rates as part of the creation of a dedicated business plan will identify the balance between the hard costs of operating a sort yard and the corresponding volumes of SDW necessary to support such an operation.

To be sure, the data shown in Figure 9.1 represent a reasonable best-case scenario in the sense that they assume that all of the SDW produced by thinning projects in the study area would flow into the sort yard and become a value added product. This is certain to not be the case, whether because contractors or landowners chose not to sell some SDW, or because some SDW is simply too hard to access to be financially viable. However, our best-case scenario figures are in line with the purpose of a SDW feasibility study, and they do represent the potential landscape-scale impact that a value-added enterprise could have on restoration in the area, especially over the long term. Further, any successful effort to establish a SDW sort yard would not only have a clear benefit to increase the pace and scale of thinning while bolstering the rural economy in northern New Mexico, this work will almost certainly mitigate the costs of fire suppression, post-fire restoration and rehabilitation, not to mention the impacts a major wildfire would have on traditional communities, and the tourism and outdoor industries in the area.

The final sections of this study offer suggestions for specific grants and other programs that could help a SDW sort yard business become established, as well as recommendations for next steps in the planning process for the development of a Taos-based sort yard.

10. Grants, Subsidies and Other Support

Given the relatively low margins on SDW products and significant upfront investment that a sort yard business would require, the following list of programs is intended to guide any future business planning or business development phases. This list was informed by research into local, state and federal programs along with recommendations and examples offered by experts during the interview process.

Many of these programs are not mutually exclusive and they could be combined to maximize the support to a startup sort yard. This list is also not exhaustive, and additional research into programs should be part of a startup's due diligence. While we believe such support is necessary, especially at the outset, we also believe that a sort yard operation ultimately needs to be self-sustaining in order to be viable over the long term.

- [Local Economic Development Act](#) — The Local Economic Development Act allows county and municipal governments to enter into Joint Powers Agreements to support regional economic development projects. A for-profit SDW sort yard business clearly meets the requirements to be eligible for support under this program. The Taos County LEDA ordinance allows for a SDW business to submit a proposal to the Taos County Commission which, if approved, would give the county the ability to donate land and help construct utilities and other infrastructure necessary for a sort yard. The current Taos County Manager told us in Fall 2020 that Taos County would entertain a LEDA proposal to find a location for a sort yard and assist with infrastructure needs. In addition, a SDW business meets the state Economic Development Department's criteria to use Capital Outlay to reimburse Taos County for expenditures made to support a sort yard. The value of the LEDA investment in a sort yard operation could potentially be counted as non-federal match for federal grants described below.
- [Collaborative Forest Restoration Program](#) — The U.S. Forest Service administers this program, which provides grants of up to \$360,000 for, among other things, projects that emphasize small-diameter tree utilization and creation of forest-related local employment. A 20% non-federal match is required for any awarded grant. Funding can be used to pay for labor, supplies, equipment, machinery, materials, training, and travel. Private, for-profit businesses are eligible to apply for these funds, and this program is designed to support exactly the kind of utilization projects being proposed in this study. It's important to acknowledge that this program has struggled with administrative issues over the past two funding cycles, which has resulted in long delays in the review of proposals and uncertainty about the availability of funding for projects that were recommended for approval. However, we strongly urge anyone seeking to start a SDW sort yard to submit a proposal to the program.
- [USDA Wood Innovations Grants](#) — The U.S. Forest Service administers this nationwide program which seeks to “reduce hazardous fuels and improve forest health on National Forest System and other forest lands; reduce costs of forest management on all land types; and promote economic and environmental health of communities.” Allowable uses of grant funding include “developing manufacturing capacity, other necessary wood products infrastructure, and markets for wood products that support forest ecosystem restoration.” Awards usually do not exceed \$250,000 per grant, with a 1:1 non-federal match requirement.

- [USDA Value Added Producer Grants](#) — USDA Rural Development administers this program, which provides working capital grants worth up to \$250,000. Grant funds may be used for expenses related to producing and marketing a value-added agricultural product, including forest products. Processing costs, marketing and advertising expenses, and some inventory and salary expenses are allowed under the program. A 1:1 non-federal match is required. The program specifies that it is open only to “harvesters” — those entities that actually harvest raw material from the forests, not an entity that follows a felling operation to collect residuals — so the applicant may be a thinning contractor or contractors working in collaboration with the sort yard business owner.
- [USDA Rural Business Development Grant Program](#) — USDA Rural Development provides support to emerging rural economic development efforts, including funds for acquisition or development of land, construction, and machinery, as well as the capitalization of revolving loan funds, including funds that will make loans for start-ups and working capital. Award amounts depend on available funding, but can range from \$10,000 to \$500,000. There is no match requirement. However, this program does not allow private businesses to apply, meaning a sort yard business would need to find a local government or nonprofit partner to be the primary applicant.
- **Private Foundations** — Philanthropic organizations are increasingly focused on balancing charitable investment in conservation and environmental causes with support for rural, underserved and otherwise marginalized communities. Within the study area, foundations such as the [Taos Ski Valley Foundation](#), the [LOR Foundation](#), the [McCune Charitable Foundation](#), the [National Forest Foundation](#), and others have made grants to support forest health, watershed protection and/or rural economic development and job creation. Again, foundations almost exclusively make grants to 501(c)(3) nonprofits, meaning a for-profit venture would need a nonprofit partner, similar to the Wallowa Resources/Integrated Biomass Resources symbiotic relationship described in Section 8 and suggested as a model for the Taos-based sort yard.

11. Recommendations for Next Steps

While this study clearly makes a case for the feasibility and myriad benefits of establishing a sort yard in the Taos area, the specifics of how to design and operate the optimal sort yard business aren’t yet known. From articulating a clear mission (building a right-size industry with proportional goals for acres treated per year) to expanding beyond the best-case assessment of supply and demand provided in this study, a full-fledged business plan is an obvious next step, and a necessary endeavor to completely and accurately understand the opportunities and barriers. In order to determine the appropriate scale for a startup sort yard, the business plan should at least, examine and specify:

- Products to be harvested, processed stored and sold
- The availability of SDW products produced by current or future restoration projects in the study area necessary

- Price points (wholesale and retail) that reflect current market rates and revenue requirements
- Yard layout and design, including minimum size of property and potential locations
- Permitting and other regulatory requirements
- Staffing needs for management and operation
- Equipment and machinery needed for receiving/scaling, unloading, transport/spread, merchandising, grading, decking/reloading
- Direct production costs, fixed costs and overhead costs for at least the first two years of operation
- Sources of capital (loans, investment, grant funding, public/private partnerships)
- SWOT (Strengths, Weaknesses, Opportunities and Threats) assessment and strategy and implementation plan to mitigate risks and avoid barriers to entry

Given the heightened awareness and public support for wildfire risk reduction and forest restoration, and the increasingly urgent need to find long-term, sustainable solutions to ecological challenges while bolstering rural economies, we strongly recommend moving into the next phase of this project with the creation of a business plan specific to a Taos-based sort yard as a means of spurring increased investment in thinning and restoration in the Taos area to protect and enhance cultural ways of life, economic stability and ecological health in northern New Mexico.

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