Appendix F – Colorado Statewide Forest Resource Assessment

Forest Industry Profile

Introduction

This document provides an overview of current trends influencing primary forest product manufacturers and service providers, timber use, products and markets. It also illustrates the economic impact of product utilization on Colorado's public and private hazardous fuels and forest health treatments; discusses direct and indirect economic contributions to Colorado's communities and forest conditions; and demonstrates the value of forest product technical assistance.

Industry Profile

Current and historical data on Colorado's forest product harvesting and manufacturing business sector have not been updated on a consistent basis. The most current information is provided by a 2006 report assessing timber harvest and forest industry data from Arizona, Colorado, New Mexico and Utah (Morgan et al. 2006), and reports by Lynch and Mackes (2001, 2002). Historical comparisons are drawn from McLain (1985) and others. Additional information is provided by the Colorado State Forest Service Forest (CSFS) products industry database.[1]

Numbers and Categories of Manufacturers

Many active sawmills have closed in Colorado over the past several decades. Since 2000, five sawmill facilities closed, with an estimated job loss of 500 employees.[2] In addition, two large sawmills have closed in Wyoming, each with more than 150 employees; these sawmills received significant timber from forest management treatments in Colorado. From 1992 - 2000, 11 sawmill closures were reported by the Western Wood Products Association (WWPA 2004).

A summary of primary forest products manufacturers identified by CSFS (2009), Morgan et al. (2006), and McLain (1985) is shown in Table 1. In the most current primary forest products manufacturers and forestry service providers directory, the CSFS lists 27 sawmill facilities (circle saw and band mills); 29 post and pole businesses; 24 house log and 20 log furniture producers; two wood pellet facilities; and a single excelsior manufacturer. The CSFS directory also reports more than 200 fee-for-service businesses engaged in non-commercial thinning, hazardous fuels reduction and wildfire risk mitigation. In addition, the directory identifies 52 service businesses that conduct tree insect and disease diagnosis and preventive spraying. The directory currently is under revision and it is likely that several of the categories, especially the service providers, are under-represented.

A report on the number of primary forest products manufacturing facilities in 2002 identified a total of 133 facilities located across 31 counties in central and southwestern Colorado; facilities included 50 sawmills, 46 house log and log home manufacturers (not distributors), 26 log furniture producers, 10 post and pole firms, and one excelsior manufacturer (Morgan et al. 2006).

By comparison, a total of 95 primary forest product manufacturing facilities were reported in Colorado in 1982, including 84 sawmills, five house log facilities, four post and pole businesses, a wood shake mill and one excelsior producer (McLain 1985).

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[1] *Under revision at the time of this writing.*

[2] *Information provided by the Colorado Timber Industry Association.*

Table 1. Historical Summary of Colorado's Primary Forest Products Manufacturers

Manufacturing/Product Category	Year		
	2009[a]	2002[b]	1982[c]
Sawmills	27	50	84
House log	24	46	5
Post and pole	27	10	4
Log furniture	20	26	N/A
Excelsior	1	1	1
Pellet	2	0	0
Other	0	0	1
Total(s)	101	133	95
Hazardous fuels/non-commercial thinning	>200	N/A	N/A
Insect and disease/preventative praying	52	N/A	N/A

[a]from the Colorado State Forest Service (2009)
[b]from Morgan et al. (2006)
[c]from McLain (1985)

Production and Processing

Current information on production volumes of Colorado's primary forest products manufacturers is limited; however, in 2002, sawmills processed the majority of Colorado's commercial timber harvest. On a cubic-foot basis, Colorado's sawmills processed just less than 11,500 MCF (thousand cubic feet), followed by 1,200 MCF by log home manufacturers, and 2,500 MCF processed by post and pole and other product producers (Morgan et al. 2006).

Approximately half of the volume processed by Colorado's sawmills went into sawn products; the remaining volume consisted of residue-based products and volume "lost" due to shrinkage. Of the volume received by sawmills, almost 100 percent is subsequently used in sawn products or wood residues. In 2002, only 1 percent of the wood delivered to Colorado sawmills remained unused (Morgan et al. 2006).

Despite these utilization efficiencies, only 35 percent of Colorado's annual sawmill capacity was being used in 2002 for the production of lumber and sawn-wood products. At the time, only 20 percent of the remaining sawmills accounted for 80 percent of Colorado's lumber production (Morgan et al. 2006). This under-capacity production explains the continuing trend of mill closures and production concentration.

In 2002, ponderosa pine and spruce were the dominant species harvested for sawlogs in Colorado; spruce represented half of the state's house log harvest, lodgepole pine was used primarily for posts and poles, and aspen and cottonwood were the dominant species for Colorado's other product manufacturing (Morgan et al. 2006).

Current Sales and Markets

Colorado's primary forest products manufacturers generated $96 million in wood products sales in 2002; the sawmill manufacturing sector accounted for almost half of all sales (Morgan et al. 2006). By comparison, consumer sales of all Colorado's wood products totaled more than $4 billion on an annual basis between 1997-2000 (Lynch and Mackes, 2001). In 2002, the majority of sales from Colorado's

sawmills were dimension lumber and studs ($25.8 million), followed by mine timbers, cants, railroad ties ($8.4 million), and board and shop lumber ($4.7 million) (Morgan et al. 2006).

Comparatively, Morgan et al. (2006) identified $28 million in sales from Colorado's expanding house log and log home construction industry. Log furniture producers exceeded $20 million in 2002, with post and pole sales of $2 million.

In 2002, 44 percent of Colorado's lumber, log home, post and pole, and log furniture sales were to in-state markets (Morgan et al. 2006). Out-of-state markets for Colorado's forest products sales included Arizona, New Mexico, Utah and southern states. The north central region, western and northeast states were strong markets for Colorado's excelsior and residue product sales (Morgan et al. 2006).

Significantly, sales contributions of Colorado's sawmills relative to other production facilities are considerably lower than the contributions of sawmill production to total wood products sales in Arizona, New Mexico and Utah. In those neighboring states, sawmill sales represented at least 75 percent of the total wood products sales in their respective states (Morgan et al. 2006, and Keegan 2001).

Colorado's spending on wood products greatly exceeds sales from the state's primary forest products manufacturers; from 1997 to 2000, Colorado imported 90 percent to 100 percent of the wood products sold within the state, depending on the product line (Lynch and Mackes, 2001). While no studies have been published on the subject, we know that significant amounts of money are transferred from Colorado's local and statewide economies to the other states and countries that are supplying most of the wood products that Colorado consumers purchase.

As Colorado has moved to forest management priorities that emphasize forest fuels and restoration treatments, which typically involve the removal of smaller-diameter, lower-quality material, utilization opportunities may not be fully explored. In their follow-up report to the 2001 wood use study, Lynch and Mackes (2002) identified existing product opportunities for Colorado's current manufacturing infrastructure, as well as new product opportunities. Firewood, mine props, post and poles, house logs, rough-sawn lumber and timbers were identified as current product opportunities for Colorado's primary wood products manufacturers, while structural roundwood, energy applications (pellets and chips) and wood pulp represented potential new, near-term product and market opportunities.

Energy applications for woody biomass have seen tremendous growth in the past several years. Rising costs for propane and natural gas, private and public renewable energy initiatives, and the need to provide a product and market outlet for unused components of forest management treatments have resulted in several facilities that use biomass for energy and proposals for several additional systems. The Governor's Energy Office (GEO) identifies 30 current and near-term heating and combined heat and power facilities using forest biomass in Colorado[3]. Estimates project that, in total, these facilities can use up to 50,000 green tons of woody biomass annually. Biofuels remain of interest but, due to the scale of their supply needs and sensitivity to conventional fuel prices, these facilities remain long-term opportunities.

Near-Term Market Strategies

[3] *Information provided by the Colorado Governor's Energy Office.*

Selling forest products can be challenging with our current economy, low timber prices and formidable out-of-state and international competition. However, significant opportunities exist in Colorado to sell local wood products to local communities and markets. Colorado, like many other states, is experiencing a sustainability movement where people buy products that benefit the environment. These potential consumers make purchasing decisions based on perception, not necessarily price. Marketing strategies that address this movement revolve around telling a story; thus positioning a product to create a favorable image in the customers' minds. The product is seen as reducing wildfire, enhancing wildlife habitat, inhibiting insect and disease infestation, reducing our carbon footprint and increasing the overall health of Colorado's public and private forests.

Forest product suppliers in the United States are thus becoming increasingly specialized and are catering to more affluent customers. The opportunities in Colorado do not lie exclusively in the commodity market, but require increased manufacturing infrastructure investment in the value-added specialty market that specifically targets Colorado's educated population, which can make the connection between forest management and the forest products industry. People increasingly are becoming aware that a healthy forest economy, which supports forest health and restoration efforts, is necessary. Also driving purchasing decisions is a growing demographic that understands how buying local products supports in-state economies and rural communities, reduces the carbon footprint and benefits the environment.

Although substantial out-of state competition exists, markets for regional specialties also exist. Companies realize that other businesses in their region may not be competitors; they may be producing a completely different product. These companies are encouraged to form "strategic alliances" with others who may be producing different forest or wood products; by working together, these micro-businesses can make referrals, collaborate on projects and pool resources to market to and educate consumers.

Commercial Timber Harvest

The percentage of national forest contribution to Colorado's commercial timber harvest was almost 75 percent during the 1970s and 1980s (Setzer and Shupe, 1997 and McLain 1985). Currently, private ownerships provide the majority of Colorado's commercial timber harvest. In 1999, Colorado's commercial timber harvest included 58.3 MMBF from state and private lands, 51.5 MMBF (a little less than half) from national forest system lands (Lynch and Mackes 2001).

In 2002, Colorado was a net exporter of commercial timber; , 9 MMBF was exported to neighboring states and 5 MMBF was imported from neighboring states, the Pacific Northwest and Canada (Morgan et al. 2006). The recent closure of Big Horn Lumber in Laramie, Wyo. had a substantial impact on the log export market from north-central Colorado.

Nearly 30 years ago, only 8 percent of Colorado's total commercial harvest volume was from forest mortality (Morgan et al. 2006). This percentage likely will increase, and forest mortality could be a significant source of current and near-term future commercial harvests, which may substantially impact Colorado's timber quality and utilization, individual mill efficiencies, products and market opportunities.

In 2002, ponderosa pine represented 28 percent of Colorado's commercial timber harvest, followed by Engelmann and blue spruce at 25 percent, and 19 percent for aspen and cottonwood (Morgan et al.

2006). In previous years, a much higher percentage of commercial harvest volume was reported from spruce, followed by ponderosa pine (McLain 1985). In terms of specific product categories, spruce is the primary species harvested for house logs, and lodgepole pine is the primary species for posts and poles (Morgan et al. 2006).

Direct and Indirect Contributions

The capacity to use wood removed from forest management treatments has a tremendous influence on Colorado's ability to positively affect change in forest condition. We can accurately quantify treatment costs and impacts of product utilization in many forest types, and management prescriptions and objectives in many locations in Colorado.

Direct Contributions

A diverse forest industry is a principal tool to influence community and landscape-level forest health, restoration and hazardous fuels treatments. Data on treatment costs and product utilization revenues illustrate that the distribution of Colorado's primary forest product manufacturing facilities has a substantial impact on overall treatment costs. Transportation distances frequently exceed hundreds of miles due to a lack of local manufacturing facilities, and may discourage product removal.

Findings on forest management treatment costs and the impact of product removals and utilization show that more than 80 percent of trees removed under current forest health restoration and fuels reduction treatments were between 5.0 and 11.9 inches in diameter (Lynch and Mackes 2002). Between 4 percent and 18 percent of the total number of trees removed were greater than 12 inches in diameter. If trees larger than 12-inch diameter-at-breast height had not been removed, ecological objectives would not have been met; restoration should be defined by ecological prescription and not only by tree diameter (Lynch and Mackes 2002).

In a follow-up report by Lynch and Mackes (2003), forest restoration treatment costs; product utilization and revenues for various forest types and conditions; and treatment sites, treatment prescriptions and objectives were identified. The review included treatments where some forest products were removed and where all woody biomass was left on-site.

Table 2. - Costs and Revenue Summary for Forest Restoration Treatment in Colorado (Lynch and Mackes 2003).

	County	Product Utilized		Treatment Costs ($/Acre)	Revenue ($/Acre)	Net Profit/Loss per Acre ($)	Total Profit/Loss on Project ($)	Stumpage Returned to Agency ($/Acre)
		Yes	No					
Mancos-Dolores	Montezuma	X		869	882	13	$6,404	79
Gordon Creek	Archuleta	X		1209	1272	63	$4,725	218
Fox Run	El Paso		X	779	0	(779)	0	0
Cheesman Reservoir	Jefferson	X		970	479	(490)	($77,873)	0
Air Force Academy	El Paso		X	679	0	(679)	0	0

The table above provides a summary of the economics of Colorado's forest restoration treatments along the Front Range (Cheesman Reservoir, Air Force Academy and Fox Run) and southwestern Colorado (Mancos-Dolores and Gordon Creek) (Lynch and Mackes 2003). Where adequate product and marketing infrastructure existed, revenues were generated from treatments with scientifically developed forest restoration prescriptions. Forest communities have critical ecological components; their absence can negatively affect ecological processes. Similarly, industry has critical components, the absence of which can impact the ability to conduct treatments on a low cost-per-acre basis or with revenue. For example, the presence of a waferboard facility within 100 miles of the Mancos-Dolores treatment site was a critical component in marketing the products from the treatment prescription. The facility has since closed; similar treatments today would result in a net treatment cost instead of net treatment profit. The contractor on the Air Force Academy project managed to utilize some of the product, which allowed the bid to be less than it otherwise would have been (Lynch and Mackes 2003).

The Cheesman Reservoir treatment on the Front Range reflected a significant loss, although product was removed and utilized. While the 255-mile haul distance to the mill contributed to the loss, because of high timber-extraction costs, it is likely the logger still would have suffered a slightly less significant loss, even if a closer wood processing facility had been available (Lynch and Mackes 2003).

Statewide data on the economic contribution of Colorado's primary forest products manufacturers are limited; however, a recent study followed the "dollar flow" in several Western Slope counties arising from timber industry activities on a 30,000-acre salvage and restoration treatment in western Colorado. The study concluded that this single management treatment resulted in $1.5 million of manufactured wood products, $750,000 in timber industry business expenditures, $500,000 of associated consumer spending and $250,000 in receipts to the local, state and federal governments (Lynch and Kelly 2006).

Indirect Contributions

Indirect economic contributions of Colorado's forest industry include the potential to mitigate economic and environmental impacts of Colorado's changing forest conditions. The industry's capacity to conduct

forest management treatments and use the material from those treatments can help avoid and/or reduce the occurrence, severity and associated costs of wildfire and forest health threats.

Federal land management agencies face considerable suppression and rehabilitation costs. Additionally, Colorado's private citizens and local and state governments may be required to absorb expenditures indirectly associated with wildfire. Local communities may shoulder costs long after suppression and rehabilitation efforts have been completed. During and following Colorado's Missionary Ridge Fire in 2002, state and local governments incurred direct and indirect costs of $50,499,849, including sales and property tax losses, and business and employment losses (Mackes et al. 2007). Similarly, Colorado's 2002 Hayman Fire incurred indirect (non-suppression and rehabilitation) costs totaling $32,221,215 (Dale 2009).

Without the ability of national forests to reduce hazardous fuels on their lands, and without a harvesting and manufacturing infrastructure to mitigate treatment expense, Colorado's Front Range and other communities will experience the societal impacts of rising expenditures for fire suppression and rehabilitation, and loss of personal property. In addition, the enjoyment they experience from private and public lands will be compromised, as will forest residents' quality of life.
It is estimated that during the 2002 fire season, Colorado experienced a loss of $1.7 billion loss in tourism revenue.[4] Many of our state's citizens were negatively impacted during the 2002 fire season due to loss of residences and personal property, evacuations and quality of life. Impacts to community infrastructure include individual homes, subdivisions, utility distribution facilities and municipal watersheds. Losses in the millions of dollars were incurred in resource values such as timber and water. One Hayman Fire report concluded that much of the burned areas would not recover to pre-fire condition during the lifetime of any who witnessed the fires.[5]

More recently, a CSFS report identifies current and future timber and non-timber economic losses associated with the mountain pine beetle outbreak in Grand County, Colo. Timber losses and indirect impacts on private property values, recreation and tourism, public safety, watershed and wildlife habitat are estimated to climb into the billions of dollars over the next several decades (Mackes et al. forthcoming).

An economically viable and diverse forest industry cannot prevent landscape-level changes in forest conditions. However, industry can help when knowledgeable public forest resource managers and private landowners encourage local forest product manufacture and consumption to help offset forest treatment costs.

The Impact of Forest Products Utilization & Marketing and Technical Assistance Programs

The impacts of forest products utilization and marketing, and national and state assistance programs have not been frequently reported; however, on-the-ground technical assistance provided by USDA Forest Service - State & Private Forestry and state extension programs have had a long association with foresters. Decision-makers perceive that with industry decline, the need for forest product extension

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[4] Benson, M. 2002. Fires, drought, Contribute to $1.7 Billion Tourism Hit. Coloradoan Newspaper. Fort Collins.

[5] Graham, Russell T. 2003. Hayman Fire Case Study: Summary. USDA Forest Service. Rocky Mountain Research Station. RMRS-GTR-115. Fort Collins.

Hartman, Todd. 2007. Hayman recovery: 600 years. Rocky Mountain News. Available online: http://m.rockymountainnews.com/news/2007/Jun/02/hayman-recovery-600-years

and assistance programs also has declined; to the contrary, the capacity to provide that expertise through federal, university and state extension programs becomes more critical with the loss of industry and associated wood products harvesting, manufacturing and marketing expertise.

One of the few investigations on the monetary impact of forest product technical assistance found that for every dollar invested in the USDA Forest Service's *Forest Products Utilization Program*[6], $11 were returned to the national economy (Greenacres Consulting 1973).

In Colorado, direct economic impacts of technical assistance include: $1.5 million awarded to businesses to improve and expand their woody biomass harvesting and manufacturing infrastructure; $500,000 in revolving loans in southwestern Colorado; and $50,000 in annual cost savings identified by a sawmill from upgraded lumber size control, the adoption of improved in-woods and wood-yard bucking practices, and better lumber target sizing.

Qualitative measures on the benefit of technical assistance programs in Colorado include the recent adoption of fingerjoint and edge-glue manufacturing to increase the utilization of small-diameter material, and an improvement in recovery of upper-grade material for a Western Slope sawmill.

Perhaps one of the greatest services an extension forest products program can provide is not necessarily encouraging expansion, pursuing new products or opportunities, or investing in new equipment, but teaching a business when not to do so. Greater policy, funding and public attention on Colorado's forest health concerns have created opportunities without the required level of economic and/or market basis or foundation. Helping provide and deliver low- to no-cost and unbiased assistance has been critical to Colorado's small businesses and helped community, local, state and federal policy and decision-makers.

The need exists for cooperative relationships between industry, communities, local, state and federal governments to enhance the delivery of forest products technical assistance, applied research, and education and outreach about the connection between Colorado's healthy forest ecosystems and Colorado's healthy forest economies.

[6] *Established under the Cooperative Forest Management Act of 1950 as the Forest Utilization Service and renamed in 1967 as the Forest Products Utilization Program.*

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