

Analysis of the Textiles Sector and Market Potential in Lane County



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Acknowledgements

Community Service Center Research Team

Tess Meinert – Lead Researcher and Author

Robert Parker, AICP, Director

About the Community Service Center

The Community Service Center (CSC) is a research center affiliated with the Department of Planning, Public Policy, and Management at the University of Oregon. It is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance to help solve local issues and improve the quality of life for Oregon residents. The role of the CSC is to link the skills, expertise, and innovation of higher education with the transportation, economic development, and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

About the EDAUC

The University of Oregon Economic Development Administration University Center is a partnership between the Community Service Center, the UO Department of Economics, the Oregon Small Business Development Center Network and UO faculty. The UO Center provides technical assistance to organizations throughout Oregon, with a focus on rural economic development. The UO Center seeks to align local strategies to community needs, specifically with regards to building understanding of the benefits of sustainable practices and providing technical training to capitalize on economic opportunities related to those practices. The EDC is partially funded through a grant from the U.S. Department of Commerce, Economic Development Administration.

Cover photo by Tess Meinert

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EXECUTIVE SUMMARY

Lane County Economic Development is reviewing the existing fiber and textile industry in the region to better understand the potential of the sector. This report presents research on the natural fiber and textile industry, the existing Lane County supply chain, and the attractiveness of this industry for further exploration and economic development. This report also includes information from interviews and research regarding the fiber and textile industry in Lane County, the State of Oregon, and across the nation. This report is not intended to be an exhaustive study of Lane County's fiber and textile industry potential but an exploratory first look.

Overview

Interest in a more developed fiber and textiles economy is present and growing in Lane County. The county is home to many alpaca and sheep farmers, as well as several cut and sew contractors and a number of natural clothing brands. Fiber processing and textile manufacturing options are missing. Demand for locally produced textiles may not be substantial enough to warrant significant investment in manufacturing capabilities. However, a fiber processing mill could be successful in and of itself or as a component of a larger tourism and education system.

Findings

The following is a summary of key findings of CSC's research related to the Lane County natural fiber and textile industry:

- **A Growing Community.** Interest in the fiber community is growing, especially in terms of people seeking out classes in knitting, spinning, and natural dyeing. Local knitting, spinning, and weaving guilds and groups are gaining new members. Lane County, and Eugene in particular, is renowned in the fiber and textile community for its Eugene Textile Center and the annual Black Sheep Gathering.
- **Gaps in the Supply Chain.** Lane County fiber and textile industry participants note a number of gaps in the local supply chain:
 - Lack of fiber processing
 - Lack of retail opportunities for locally produced goods
 - Lack of consumer education and marketing support
 - Lack of scaled textile manufacturing

Next Steps

The following is a summary of next steps suggested by CSC and supported by its research related to the Lane County natural fiber and textile industry:

- **Further Research.** Further research in terms of fiber supply, support and regulatory environment, and economic impact of the fiber and textiles economy is needed.
- **Making Connections.** Connecting with key individuals and businesses is intrinsic to developing the local industry.
- **Long-Term Vision.** Local actors in the fiber and textiles community have their own ideas about what they would like to see in terms of development. Lane County Economic Development and other economic development organizations should work with industry representatives to craft a strategy to support development of the sector in this region.

CHAPTER I: INTRODUCTION

Lane County Economic Development is reviewing the existing fiber and textile industry in the region to better understand the potential of the sector. This report presents research on the natural fiber and textile industry, the existing Lane County supply chain, and the attractiveness of this industry for further exploration and economic development. This report also includes information from interviews and research regarding the fiber and textile industry in Lane County, the State of Oregon, and across the nation. This report is not intended to be an exhaustive study of Lane County's fiber and textile industry potential but an exploratory first look.

Background

Over the past few decades, the United States has seen a major off shoring of its textile manufacturing businesses. Even for iconic US brands, lower labor costs in foreign countries made moving production abroad necessary to compete with Asian producers in a labor-intensive industry. New technological developments in the textile manufacturing sphere have allowed US firms to invest in automated processes that reduce labor costs, decreasing Asia's competitive advantage in low-cost labor.¹

In recent years, interest in natural, sustainable textile production has grown at a steady rate. While apparel manufacturing, because it requires more labor than other textile manufacturing, is still more expensive when done in the US, consumers are finding reasons to purchase more clothing and accessories from domestic companies. Demand for this industry's domestically made products is currently driven by a few trends: Made in USA, heritage fashion, and sustainable business practices.

Cheap, fast fashion is still the most popular option for filling American closets. However, as the economy strengthens and consumers gain more disposable income, people are more willing to purchase high quality clothing and accessories at a premium. The "Made in USA" label is gaining traction as a mark of greater quality, job creation and fair labor practices, and corporate responsibility.²

Small design companies that are cropping up across the nation drive some natural fiber and textile demand through their production of heirloom or heritage apparel and accessories. These entrepreneurial fashion endeavors seek unique and durable yarns to use in the production of apparel that is meant to last, blending historic fiber processing techniques with new technology. For example, Appalatch Outdoor

¹ Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

² Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

Apparel based in Asheville, NC, has an exclusive partnership with a local fiber mill that produces yarns that Appalatch then uses to 3-D print custom-fit sweaters for clients.³

Sustainable business practices are gaining recognition and become more common in many industries, not just the fiber and textiles sector. Clothing companies, such as Reformation in Los Angeles, CA, are incorporating sustainable business practices into their cultures, mission statements, and day-to-day operations.⁴ In addition to companies getting serious about sustainable business practices, consumers are making sustainable sourcing, production, and packaging a priority. Global Action Through Fashion estimates that the sustainable apparel market is worth \$3 billion globally.⁵

It is not only textile manufacturers that are taking note of these trends. Fibershed, a California-based non-profit organization founded in 2012, is dedicated to creating regional textile communities from a “soil-to-soil” perspective. Fibershed focuses on regional economic development and community education by helping to build local economies that are self-sufficient in their textile production from farm to cloth.⁶

These movements highlight the growing potential of the domestic, and even regional, fiber and textiles industry. By considering the industry from a supply chain perspective, we can better understand how to build a thriving regional economy around this industry. Because data and pre-existing literature specifically focused on the natural fiber and textiles industry is limited, much must be inferred from macroeconomic-level industry reports as well as in-depth interviews with industry participants.

Oregon and Lane County

Within the state of Oregon, interest in the fiber economy is growing. The continued existence of old institutions such as Pendleton Woolen Mills and Dehen, Inc speak to the state’s rich textile history. New makers and cut and sew contractors in the Portland area have saturated the small-scale textile construction market in the city.⁷ The state has a number of popular fiber festivals that draw fiber producers, processors, artisans and tourists from across the nation at different times throughout the year.

³ Alli Marshall, “Echoview Fiber Mill announces collaboration with Appalatch Outdoor Apparel Company.” *Mountain Xpress*, 29 May 2014. Web. 31 August 2015. <<https://mountainx.com/blogwire/echoview-fiber-mill-announces-collaboration-with-appalatch-outdoor-apparel-company/>>.

⁴ “Who We Are.” *Reformation*, 2015. Web. 31 August 2015. <<https://www.thereformation.com/about-us#business>>.

⁵ “The Issues.” *Global Action Through Fashion*, 2015. Web. 31 August 2015. <<http://globalactionthroughfashion.org/for-consumers/the-issues/>>.

⁶ “About.” *Fibershed*, 2015. Web. 31 August 2015. <<http://www.fibershed.com/about/>>.

⁷ Shannon Welsh, Pacific Northwest Fibershed. Interview, 17 July 2015.

Oregon is home to large flocks of sheep, typically raised in complement with grass seed farms, and holds the third-largest population of registered alpaca⁸ in the nation.⁹ In addition to farmers who have been raising fiber animals in Oregon for decades, the fiber industry is beginning to attract new, younger farmers as well, who are renting land to raise animals. Cottage businesses built around animal fiber processing and even flax fiber production are also making an appearance on the economic horizon. Despite new entrants into the processing industry, existing mills are inundated. Sheep and alpaca farmers from Oregon, Washington, and Idaho have barns full of fleece waiting to be processed, as six- to eight-month lead times on fleece processing are the norm in the milling industry.¹⁰

Lane County, and the city and surrounding areas of Eugene in particular, has a rich fiber culture. Historically, the region had a booming flax industry and even a woolen mill. While both have passed into memory, other aspects of the fiber and textiles industry exist here now. Alpacas and different breeds of sheep can be found on a number of locally owned farms that raise these animals for their fiber and their sweet dispositions. Local yarn and craft supply shops offer lessons in spinning, dyeing, knitting, crochet, needle felting, and other fiber crafts. These shops often have “drop-in” knitting and spinning sessions open to the community. Many more formal and informal spinning and knitting groups exist and meet regularly in different locations. Educational institutions such as the University of Oregon and Lane Community College have more formal programs relating to textiles and the fiber arts. The organic textile and local apparel market is also strong in Lane County, as several boutiques offer a selection of natural clothing brands designed and sometimes even manufactured locally.

In addition to these year-round fiber establishments, Eugene hosts annual events that draw fiber farmers and fanatics alike from across the country. The Black Sheep Gathering has been held in June for over 30 years and draws thousands of visitors to the city over a three-day period.¹¹ The city’s iconic Saturday Market also provides a venue for local artists, producers, and designers to showcase their goods. Tourists and curious citizens are also drawn to visit local farms, particularly those that host alpaca, where adults and children alike learn about the animal, tour the barn or perhaps a pasture, and get to pet or feed the friendly critters.¹² The Travel Lane County: Eugene Cascades & Coast website has a “Wildlife & Animal

⁸ According to a census by the Alpaca Owners’ Association, which only considers registered alpaca. The number of unregistered alpaca is estimated to have grown significantly over the past 5-10 years.

⁹ “Alpacas Registered in US by State.” *Alpaca Owners Association Inc*, Web. 31 August 2015. <<http://www.alpacainfo.com/about/statistics/alpacas-us>>.

¹⁰ Shannon Welsh, Pacific Northwest Fibershed. Interview, 17 July 2015.

¹¹ Rolly & Wayne Thompson, Fox Hollow Farm. Interview, 5 August 2015.

¹² Ann Dockendorf, Aragon Alpacas. Interview, 14 August 2015.

Viewing” section that recommends two alpaca farms to visit outside Eugene,¹³ and both businesses report frequent visitors that they attribute in part to their presence on the website.

As the fiber community continues to build, complementary trends in the greening of Oregon’s workforce and the revival of historic and agricultural traditions boost the possibilities for a robust fiber and textiles economy in Lane County.

Efforts have been made to revive Lane County’s historic traditions, as evidenced by the Lane County Historical Society’s Heritage Outreach Grant Program. The program aims to “stimulate an understanding and appreciation of [Lane County] historical heritage to accomplish specific programs and projects through financial assistance.”¹⁴

Purpose and Methods

This report presents background research, interviews, and case studies related to regional fiber and textile economies that will provide groundwork for developing Lane County’s potential for such an industry cluster.

Specifically, Lane County Economic Development Staff asked the Community Service Center (CSC) to:¹⁵

1. Identify existing and missing aspects of the natural fiber and textiles industry supply chain in Lane County;
2. Research current supply and demand for fiber production and textile manufacturing, both locally and on a macroeconomic scale;
3. Make a recommendation on whether or not to pursue further development of this industry within Lane County.

CSC focused research of the natural fiber and textiles industry supply chain on recent reports regarding industry performance on a macroeconomic level, as well as on in-depth interviews with business-owners and other stakeholders along the supply chain. CSC’s research focused on identifying the different aspects of the fiber and textile industry supply chain and each part’s presence in Lane County. The overview helped to develop and guide our case study research.

To gather information on regional fiber and textile economies, CSC conducted interviews with business owners or staff from several counties in the I-5 corridor, local or regional economic development organizations, and statewide agricultural

¹³ “Wildlife & Animal Viewing,” Outdoor Adventures. *Eugene, Cascades & Coast*. Web. 31 August 2015. <http://www.eugenecascadescoast.org/outdoor-adventures/?listsearch_submit=1&listingGetAll=0&subcatID=161&submit=Search&listing_keyword=#searchBr>.

¹⁴ “Heritage Outreach Grant.” *Lane County Historical Society*, 2015. PDF Document

¹⁵ This research was completed with funds from the CSC’s University Center grant through the U.S. Department of Commerce, Economic Development Administration.

and industry programs, as well as with individuals in similar positions outside of Oregon.

CSC selected case studies that targeted established and growing regional fiber and textile industry supply chains. The intent of the case studies was to explore existing resources for building local supply chains within a set geographic boundary.

Data and Limitations

Data collection in terms of local figures on employment and number of establishments by industry did not yield complete results. While detailed industry breakdowns (6-digit NAICS classifications) were available for the state, county-level data was limited to 3-digit NAICS code classifications. If a specific industry classification has three or fewer businesses within a region, or if a single business accounts for 80% or more of employment in the industry, employment and wage data for that classification cannot be disclosed. Particularly on the county level, this limits available information on local industries.

Reference USA—accessed through the University of Oregon Library system—was cross-referenced in an attempt to identify Lane County businesses with NAICS industry classifications relevant to this project. This resource is regarded as very inaccurate in the research community,¹⁶ as its information is incomplete and out of date. Though the website delivered lists of local businesses within the Textile Product Mills, Apparel Manufacturing, and several other NAICS classifications, an internet search was unsuccessful in confirming the continued existence or accurate contact information for most establishments on these lists. Reference USA also frequently lists businesses under an incorrect NAICS code. For example, a beauty supply store and hair salon came up in a search for sewing contractors and again in a search for craft supply shops.

One area of data collection was particularly evasive. Agricultural data—employment, number of farms, primary crop or livestock—is difficult to capture, as farmers sometimes raise more than one crop and frequently use temporary employees from businesses in a different industry category. The estimates of employment from the agricultural sectors are therefore considered to be significantly lower than the actual number of laborers. Though no agricultural data was readily available, a regional economist for Douglas and Lane counties reviewed the local agricultural data and confirmed that no livestock, fur-bearing animal, or oilseed (flax) farming operations were identified in Lane County.¹⁷

Accurate counts of animal populations locally and nationally are unavailable. There are several regional and national sheep and alpaca support organizations that suggest farmers register their animals, but there is no legal obligation for farmers to do so. Therefore, while these support organizations can offer rough estimates of animal populations, representatives acknowledge that estimates are likely

¹⁶ Brian Rooney, Oregon Employment Department. Phone correspondence, 14 July 2015.

¹⁷ Brian Rooney, Oregon Employment Department. Phone correspondence, 14 July 2015.

significantly lower than the actual populations. Not only do many farmers neglect to register their animals, but they also do not always report when registered animals become deceased. Without a way to conduct an exact census of the animal population by species and breed, it would be difficult to determine how much fiber is available for processing through a local supply chain.

In addition, certain businesses, particularly those in the apparel manufacturing and sales sectors, could not be reached for comment despite numerous attempts. Therefore the information regarding local apparel production and sales is based primarily on web searches and a few brief email or phone correspondences.

Finally, as the literature on the local industry is somewhat limited, most of the information on the local market and supply chain was gathered through various in depth interviews with stakeholders in the industry. While interviewees almost always had other forms of employment beyond their involvement in the fiber and textiles industry, they love what they do and want the local community to grow and succeed. Therefore, we cannot consider these opinions unbiased and must look for consensus in the group and corroboration from the literature and case studies.

Organization of Report

The remainder of this report is organized as follows:

- **Chapter 2: Overview of the Natural Fiber and Textile Industry** – presents information obtained from the literature review.
- **Chapter 3: General Natural Fiber and Textiles Supply chain** – describes the supply chains required for fiber and textiles business.
- **Chapter 4: Fiber and Textiles in Oregon and Lane County** – overviews the history of state and county industries and assesses the supply chain in both regions.
- **Chapter 5: Case Studies** – presents an overview of what types of regional natural fiber and textiles exist in the United States. More in-depth interviews were conducted for the states of California and Oregon.
- **Chapter 6: Conclusion** – describes the key findings of this research and next steps for Lane County to consider with regard to the local fiber and textile industry.

This study also contains the following appendices:

- **Appendix A: National and State Resources** – contains a more comprehensive description of the support system for regional fiber and textile economies across the nation.
- **Appendix B: Local Businesses** – contains a list of existing Lane County businesses with contact information where available, along the fiber and textile industry supply chain.
- **Appendix C: Works Cited**

CHAPTER 2: OVERVIEW OF THE NATURAL FIBER AND TEXTILE INDUSTRY

This chapter provides a macroeconomic perspective on the natural fiber and textile industries along the apparel supply chain. The goal is to acquaint the reader with these industries and develop an understanding of the many different aspects of the supply chain and possible finished products.

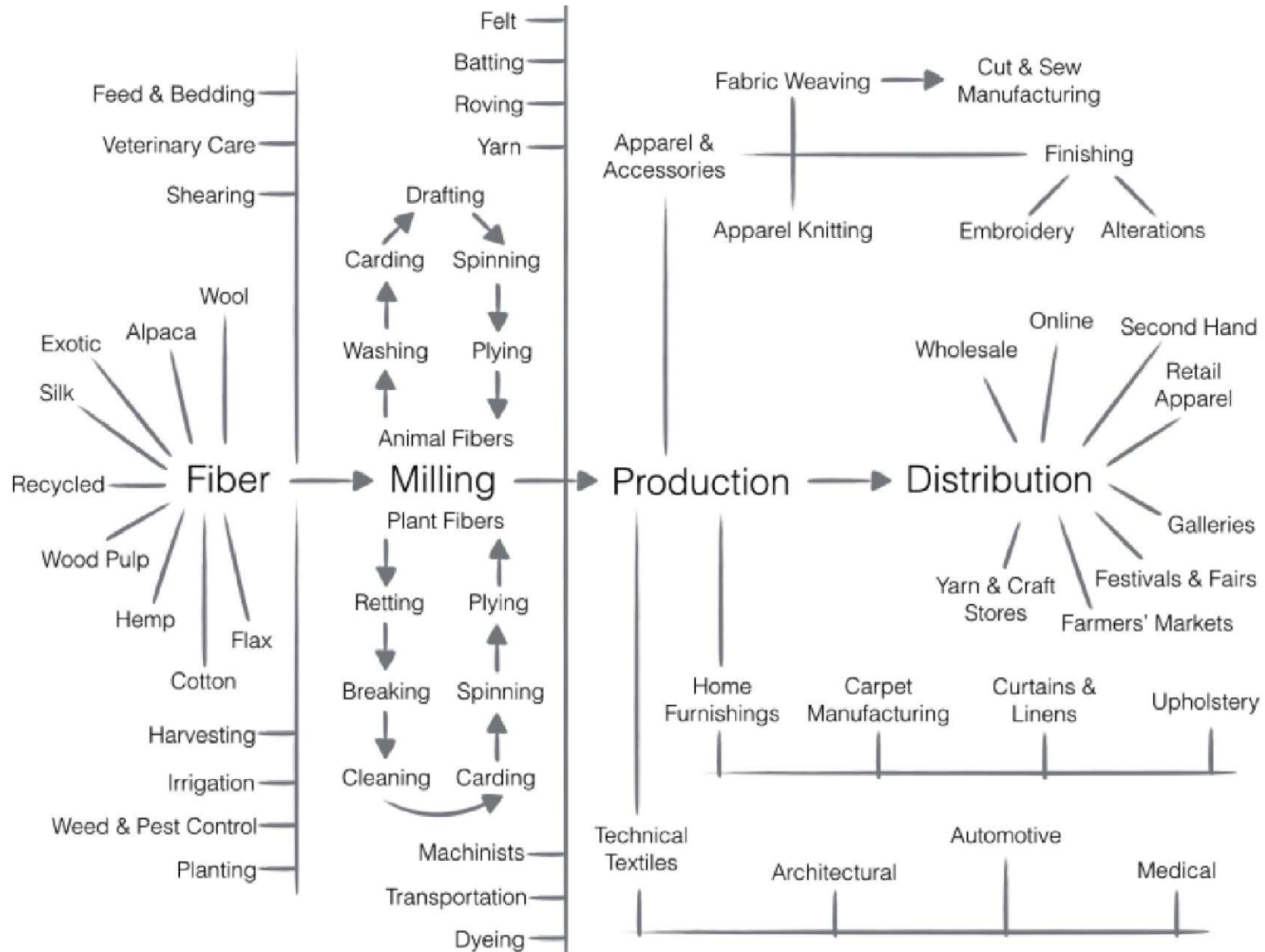
When considering the fiber and textiles industry, fiber inputs, milling and textile creation processes, and final product markets must be considered. A more detailed explanation of the supply chain and production processes is given in the next chapter, but a brief explanation may be necessary to frame the initial industry discussion.

First, the fiber must be raised and harvested, whether it is derived from a crop or shorn from an animal. After harvesting, farmers often sell fiber to a broker who sells bulk quantities to a mill for processing. Processing or milling often includes washing and combing the fibers to align them for spinning. From here, the fiber, yarn or thread is fed into a knitting or weaving mill, where fabric is produced. This process most commonly feeds the automotive, apparel, and home furnishings industries, which produce everything from seatbelts, to jeans, to drapes.

We exclude textile production for automobile and home furnishings markets, as well as several industries that serve businesses along the fiber-to-apparel supply chain (e.g. veterinary services, agricultural labor, dye-making), to keep this report concise, focused, and relevant to the local economy. Of the fiber and textiles industries, apparel is best suited to the Lane County region because it has the greatest opportunity for use of locally sourced natural fibers. Technical textile production in particular frequently requires the use of synthetic fibers.

A diagram of the expanded natural fiber and textile industry supply chain is presented in Figure 1. Each fiber or industry within the diagram represents a facet of the fiber and textiles industry that could be considered through more extensive research.

Figure 1: Diagram of the Natural Fiber and Textiles Supply chain

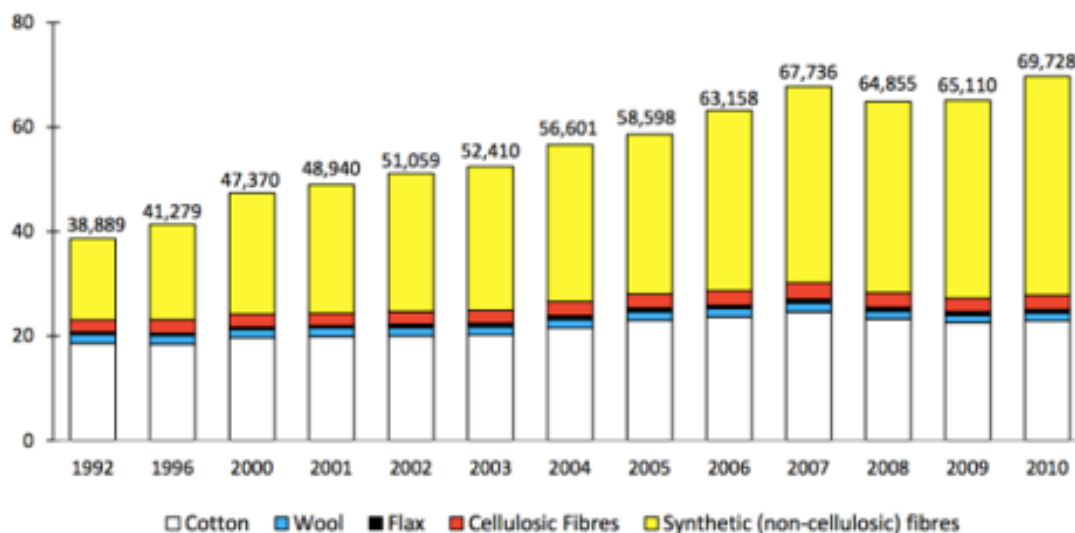


A Macroeconomic Perspective on Fibers

Natural fibers include both plant and animal fibers. The most common plant fibers used in textile production today are cotton and flax (linen), though we also explore hemp. The most common animal fibers are wool and silk. We consider wool as well as alpaca, but exclude silk as that fiber is primarily produced in China and other foreign countries.¹⁸

Though we will discuss the macroeconomic market for synthetic fibers—such as viscose, acrylic, nylon, rayon, lyocell and polyester—these materials are not covered in supply chain or Lane County-specific discussions. This information is only intended to provide context regarding competition with natural fibers. Figure 2 provides a visual of the consumption of the most common apparel fibers.

Figure 2: Evolution of World Apparel Consumption in Millions of Tons



Source: World Apparel Fiber Consumption Survey, 2013

Cotton

Cotton is world's most popular fiber, accounting for 35% of fiber production globally. The US is third-largest producer of cotton, following China and India, and the world's largest exporter of cotton, accounting for roughly 33% of global cotton trade. Texas is the US's largest domestic producer (56.5%), followed by Georgia (12.5%). Overall, the Southeast holds 35.1% of the total planted area, and the

¹⁸ "The Global Silk Industry: Perception of European Operators toward Thai Natural & Organic Silk Fabric and Final Products." *New Cloth Market*, December 2011. Web. 1 September 2015. <<http://www.fibre2fashion.com/industry-article/38/3793/the-global-silk-industry1.asp>>.

Southwest holds 60.4%. Despite lower overall production, California and Arizona have the highest yields per acre and grow very high-quality cotton.¹⁹

US Cotton industry revenues were \$6.5 billion in 2014, \$4.5 billion of which can be attributed to exports, with profits of \$745.2 million. Currently, the world price of cotton is \$0.675 per pound and is expected to decrease slowly over the next five years due to an increased supply from emerging markets.²⁰

Despite large-scale production in the US, domestic cotton accounts for less than 20% of national demand for the fiber. This is because cheap labor costs have driven many textile-manufacturing operations overseas. Of the cotton produced domestically, 16.4% is used to manufacture apparel, while 9.8% goes to manufacturing home furnishings and personal care items—69.0% is exported to China and other countries.²¹

Flax

Flax is grown for its seed and its fiber, though cultivation for seed harvesting is the dominant approach in North America today. Flax fiber is stronger than cotton and has been used to produce linen textiles since as early as 3000 B.C. The flax seed has several uses: it can be ground up and included in livestock feed, it is frequently used as a supplement or ingredient for human consumption, and its oil can also be extracted for human consumption, industrial purposes, or alternative fuel production. Flax fiber can be used to produce linen or fine, lightweight paper items, such as parchment and cigarette papers.²²

Currently, Canada is the world's largest producer of flaxseed (40% of global production), while China, the US, and India combined make up another 40% of production. North Dakota produces 95% of the nation's flax, accounting for 5.5 million of the 5.8 million bushels of total US production. The average price per bushel was \$13.60 in 2012. Most of this production is attributed to production for seeds, not fiber. As corn prices increase, flax is likely to face competition for acreage in the US—production is expected to decline over the next five years.²³

¹⁹ Zeeshan Haider, "IBISWorld Industry Report 11192: Cotton Farming in the US." *IBISWorld*, December 2014. via University of Oregon Libraries, July 2015. PDF Document.

²⁰ "IBISWorld Business Environment Report: World Price of Cotton." *IBISWorld*, July 2015. via University of Oregon Libraries, July 2015. PDF Document

²¹ Zeeshan Haider, "IBISWorld Industry Report 11192: Cotton Farming in the US." *IBISWorld*, December 2014. via University of Oregon Libraries, July 2015. PDF Document.

²² Marsha Laux and Mykel Taylor, "Flax Profile." *Agricultural Marketing Resource Center*, September 2013. Web. 2 September 2015.
<http://www.agmrc.org/commodities__products/grains__oilseeds/flax-profile/>.

²³ Antal Neville, "IBISWorld Industry Report 11112: Oilseed Farming in the US." *IBISWorld*, November 2014. via University of Oregon Libraries, July 2015. PDF Document

Hemp

Hemp, a plant related to but genetically different from the marijuana plant, is often characterized as being a tough and dense fiber, commonly associated with car paneling. However, the hemp fiber is longer, stronger, and more absorbent and provides more insulation than common apparel textiles like cotton. The hemp fiber is also known for its anti-microbial and anti-mildew properties.²⁴ There are currently 30 countries worldwide that produce industrial hemp and trade in the global market, the largest of which is China. Canada is the major hemp producer in the North American market.²⁵

The US market for hemp-based products is estimated to be more than \$580 million, all of which is currently imported, as no commercial hemp production yet exists in the US. This is due to strict regulations set in place by the US Drug Enforcement Agency (DEA) under the Controlled Substances Act, which controls and restricts but does not prohibit growing industrial hemp.²⁶

Recent legislation is making industrial hemp a more viable option for domestic production. With the passing of the 2014 Farm Bill, state departments and some research institutions may grow industrial hemp as part of a pilot agricultural program, provided this is legal within the individual state.²⁷ In January 2015, Senator Ron Wyden of Oregon introduced the Industrial Hemp Farming Act of 2015; this bill would exclude hemp from the definition of marijuana, thereby removing it from the DEA's jurisdiction. The bill was read twice and referred to the Committee on the Judiciary when it was introduced; no further action has been taken.²⁸

There is another issue that prevents widespread growing of hemp for fiber in states where regulations do not prohibit it. Hemp production competes with medicinal marijuana production. As a more valuable crop, medicinal marijuana commands most of the available farmland for these types of plants. In addition, hemp crops

²⁴ "Industrial Hemp." *Agriculture and Agri-Food Canada*, 1 October 2013. Web. 2 September 2015. <<http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/by-product-sector/crops/pulses-and-special-crops-canadian-industry/industrial-hemp/?id=1174595656066>>.

²⁵ Renee Johnson, "Hemp as an Agricultural Commodity." *Congressional Research Service*, 2 February 2015. Web. 2 September 2015. <<https://www.fas.org/sgp/crs/misc/RL32725.pdf>>. PDF Document

²⁶ Renee Johnson, "Hemp as an Agricultural Commodity." *Congressional Research Service*, 2 February 2015. Web. 2 September 2015. <<https://www.fas.org/sgp/crs/misc/RL32725.pdf>>. PDF Document

²⁷ Renee Johnson, "Hemp as an Agricultural Commodity." *Congressional Research Service*, 2 February 2015. Web. 2 September 2015. <<https://www.fas.org/sgp/crs/misc/RL32725.pdf>>. PDF Document

²⁸ S. 134, 114th Congress. "Industrial Hemp Farming Act of 2015." 8 January 2015. Web. 2 September 2015. <<https://www.congress.gov/bill/114th-congress/senate-bill/134>>.

raised upwind of medicinal marijuana farms can cause pollination issues that negatively affect the latter crop. For this reason, many medicinal marijuana farmers fight against hemp crops in their regions.²⁹

Wool

According to the International Wool Textile Organization (IWTO), roughly 2.1 million tons of wool are produced annually across the globe. Wool products draw sales revenues of \$80 billion each year for an industry with over 200,000 commercial farms, millions of small private farms, and over 4,000 textile-manufacturing companies.³⁰

Wool production takes place primarily in China, Australia, and New Zealand. At least seven other countries produce more wool than the US, which yields 12,110 tons annually.³¹ Detailed world and US production data is available in Table 1.

Table 1: World and US Wool Production

Country	Metric tons	State	1000 lbs.
China	400,000	California	2,900
Australia	362,100	Colorado	2,400
New Zealand	165,000	Wyoming	2,300
United Kingdom	68,000	Utah	2,250
Iran	61,500	Texas	2,100
Morocco	56,000	South Dakota	1750
Sudan	56,000	Idaho	1,700
Russian Federation	55,253	Montana	1,660
Argentina	55,000	Oregon	1,000
India	45,500	Iowa	900
World total (2012)	2,066,695	US total (2014)	26,700

Data Source: FAO STAT - United Nations (2014); USDA NASS (2015)

Table Source: <http://www.sheep101.info/wool.html>

The US Sheep Farming Industry is valued at \$458.5 million, about \$46 million of which can be attributed to wool revenues. Demand for domestic wool production declined in the past five years as textile producers increasingly chose synthetic fibers over wool. The past two decades have seen a global trend of increasing demand for synthetic fibers, which are cheaper to produce, resulting in a 0.9% decrease in demand for natural fibers (see Figure 2). Due to this trend, as well as

²⁹ Jim Vandagriff, Artisan Gear. Interview, 22 July 2015.

³⁰ "Facts." About IWTO. *International Wool Textile Organization*, 2015. Web. 2 September 2015. <<http://www.iwto.org/about-iwto/vision-mission/>>.

³¹ "Real Men Wear Wool." *Sheep101.info*, 4

decreasing demand for sheep and lamb meat, the US Sheep Farming Industry is expected to shrink by 0.7% annually until 2019.³²

Wool prices vary by breed due to differences in texture and quality produced by different animals. The average price for greasy wool³³ produced in the US in 2013 was \$1.45 per pound, while clean wool was sold for \$2.17 - \$4.23 per pound depending on the length of the fiber. Compare this to Australia, one of the world's largest wool producers, where clean wool was sold for \$3.69 - \$5.39 per pound depending on the length of the fiber.³⁴ Australia's prices per pound are typically higher because they raise sheep with high-quality, super-fine fiber, such as merino. Australia's government also subsidizes wool production and contributes to research and development in the field because the industry is a significant part of the country's economy.³⁵ The US does not provide this kind of support for producers or processors.

Within the US, wool farmers sell their fiber in various ways. Large-scale producers are able to sell their fleece directly to a large wool mill, such as Pendleton Woolen Mills, that buys in bulk. Large and smaller-scale producers alike frequently sell their fiber to wool pools, organizations that buy wool from many different sources then sell it in bulk to a large warehouse or processing mill that will use it to make yarn or finished textiles. The economies of scale provided by wool pools enable farmers to derive some profit where they may not have been able to before. Some farmers also choose to have their fiber processed into unspun fiber (roving) or yarn for handcrafting, or made into finished garments, accessories, or even toys to sell at farmers markets or in their farm stores.³⁶

Alpaca and Other Animal Fiber

Alpaca fiber is highly valued for its soft and light yet insulating qualities. Because of these desirable features, quality alpaca fiber fetches a higher price than many breeds of wool fiber. Price per pound varies significantly based on the quality of the

³² Lucas Isakowitz, "IBISWorld Industry Report 11241: Sheep Farming in the US." *IBISWorld*, September 2014. via University of Oregon Libraries, July 2015. PDF Document

³³ Wool that has not yet been washed. The "grease" is actually lanolin, a wool by-product that can be extracted and sold.

³⁴ "Table 33: Shorn Wool Prices: U.S. farm price, Australian offering prices, and graded territory shorn wool prices, 1978-2013." *Cotton and Wool Yearbook. United States Department of Agriculture Economic Research Service*, 21 November 2014. Web. 6 September 2015. <<http://www.ers.usda.gov/data-products/cotton,-wool,-and-textile-data/cotton-and-wool-yearbook.aspx>>.

³⁵ "Wool." *Agriculture, Farming, and Food. Australian Government Department of Agriculture*, 22 June 2015. Web. 7 September 2015. <<http://www.agriculture.gov.au/ag-farm-food/meat-wool-dairy/wool>>.

³⁶ "Real Men Wear Wool." *Sheep101.info*, 4 February 2015. Web. 2 September 2015. <<http://www.sheep101.info/wool.html>>.

fiber, the ancestry of the animal, and the end use of the fiber.³⁷ Alpaca is often blended with wool, cotton, or silk during yarn production for the apparel or handcraft industries. While alpaca fiber has been used frequently in the fashion industry, it is also gaining attention in the outdoor and sports apparel markets.

Peru is the world’s foremost alpaca producer, with roughly 6,500 tons produced annually. Peru exports about 80% of this fiber, primarily to China, Germany, and Italy to be used in textile manufacturing industries. Bolivia and Chile are also significant producers of the fiber, and North American and Australian alpaca herds are estimated to be growing significantly.³⁸

Alpaca population is difficult to estimate as farmers are not required to register their animals, and those that do may do so through a variety of different organizations. In addition, farmers with registered alpaca do not always report the deaths of their animals, creating more ambiguity within the population counts.

The Alpaca Owners Association, Inc. (AOA) has one of the largest alpaca registries worldwide with approximately 202,000 animals. The bulk of registered animals (over 186,000) are in the US, though Canada also boasts over 13,000. AOA tracks registered alpaca populations and farms, and displays this information on their website. Table 2 shows the AOA registered alpaca population, as well as the number of AOA account holders, for the US and top states.³⁹ Of the states with alpaca populations over 10,000 animals, Oregon has the third-greatest number of alpaca along with the largest average herd-size.

Table 2: US Alpaca Population

Region	AOA Accounts (Farms)	AOA Registered Alpaca	Average Herd Size (Calculated)
USA	13,899	186,071	13
Ohio	1,069	27,585	26
Washington	761	19,610	26
Oregon	587	17,171	29
Colorado	945	16,128	17
California	1,022	13,968	14
Pennsylvania	732	13,898	19
New York	693	12,168	18

Source: Alpaca Owners Association, Inc. AOA Registry Statistics

³⁷ Starr Cash, Alpaca Fiber Cooperative of North America. Email correspondence, 15 July 2015.

³⁸ “Natural Fibers: Alpaca.” *International Year of Natural Fibers*, 2009. Web. 7 September 2015. <<http://www.naturalfibres2009.org/en/fibres/alpaca.html>>.

³⁹ “AOA Registered Alpacas,” and “AOA Accounts.” AOA Registry Statistics. *Alpaca Owners Association Inc*, 7 September 2015. Web. 7 September 2015. <<http://www.alpacainfo.com/about/statistics>>.

Because registration numbers can only provide estimates, the business operations manager at the Alpaca Fiber Cooperative of North America (AFCNA), Starr Cash, believes that the actual alpaca population of the US is much larger—close to 250,000 animals. Cash estimates that the global population is roughly 4.61 million, giving the US and Canada just over a 5.4% share of the global herd. According to her estimate, 4.0 million alpaca reside in South America, primarily Peru, where they are native.⁴⁰

US alpacas, who are shorn annually and are rarely raised for their meat, typically live from 20 to 25 years and produce 2 to 5lbs of premium fiber annually⁴¹ (40 to 125lbs over a lifetime). In consideration with population estimations, this means that US fiber yield could be estimated at anywhere from 372,000 to 1.25 million pounds. A realistic estimate might fall in the middle with 650,000 to 875,000lbs per year.

Because individual farmers with the national average herd size of 13 alpaca can expect only a small fraction of this yield (26 to 65lbs per year), it is difficult for them to make and market products to the public. Similar to the US wool industry, if these farmers choose not to pay for fiber processing and yarn or finished good production, they can sell their fleece to an alpaca fiber pool. Several of these organizations exist across the nation.

Other fibers—such as angora (rabbit), cashmere, llama, mohair (goat) and yak—also play a role in the US fiber and textile market, though their use is primarily for handcraft purposes.

Synthetic Fibers

Synthetic fibers include those that are manufactured through chemical processes. They can be cellulosic (derived from plants and chemically altered or extracted) or non-cellulosic (entirely man-made). Synthetic fibers account for roughly 65% of world fiber consumption, a percentage that is expected to continue growing due to increasing demand from emerging markets. The price of synthetic fibers is tracked by an index. The index saw 1.8% increase between 2010-2015, but this growth is expect to slow over the next five years, amounting to 0.8% between 2015-2020.

In the US, synthetic fiber manufacturing brings in \$9.8 billion in revenues, \$1.6 billion of which is profit. Most US synthetic fibers are produced in South Carolina and North Carolina (30.5% of national production), where manufacturers enjoy close proximity to downstream markets as well as lower labor costs compared to the rest of the country.

⁴⁰ Starr Cash, Alpaca Fiber Cooperative of North America. Email correspondence, 15 July 2015.

⁴¹ Ann Dockendorf, “Alpaca Facts.” *Aragon Alpacas*, 2015. Web. 7 September 2015. <http://aragonalpacas.com/alpaca_info.html>.

Exports of synthetic fibers amount to \$2.5 billion, representing 25.6% of revenues, though they have been decreasing in recent years. Despite increased demand from emerging markets, exports will decline due to the strengthening of the US dollar, which will make purchasing goods from other production hubs in Asia and Europe more attractive.

Major domestic markets for synthetics include carpet and rug manufacturers (27% of revenue), textile and apparel manufacturers (26%), and industrial products and consumer goods manufacturers (21.4%). These businesses use synthetic fibers including nylon and polyamide (41.5% of revenues), rayon and acetate fibers (17.5%), polyester (15.4%), polyolefin (7.1%), and more.

A Macroeconomic Perspective on Textile Milling

The textile mill classification covers a variety of textile manufacturers—those that spin yarn or thread from various fibers, manufacture woven and nonwoven fabrics, produce curtains and drapes, and finish and coat textile products. These industries supply the apparel, technical textiles (primarily the automotive industry), and home furnishings manufacturing sectors.

Overview

The US Textile Mill Industry is expected to see \$51 billion in revenues, \$2 billion in profit, during 2015. There are 12,584 businesses that fall under this overarching classification, employing 175,276 individuals (averaging 13.47 employees per business). The industry has seen slow growth over the past five years, and is expected to continue growing, though more slowly, through 2020. The industry's trade deficit amounts to \$14.5 billion—imports satisfy 39.6% of domestic demand and primarily come from China (43.6% of imports). This is largely due to apparel manufacturing, much of which has been offshored and has ceased sourcing textiles from the US. Despite the trade deficit, exports still make up 22.3% of the industry's revenues.⁴²

Though large-scale offshoring has been a problem in the industry, increased technological abilities and investments in automation have helped revive the industry. Competing countries largely have not been able to invest in this technology, thereby lessening their competitive advantage associated with low labor costs.⁴³

Domestic technical textile markets—automotive, aircraft, and marine vessel textiles as well as awnings, tents, tarps, etc.—represent 42.8% of the industry's revenues. The products required by these markets require little labor compared to the labor-

⁴² Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

⁴³ Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

intensive apparel industry. Automated production techniques allow US technical textile mills to produce high-quality, high-value goods that are priced competitively on the global market. Production of home furnishings goods (16.6% of industry revenues), such as linens and curtains, can also be highly automated. Apparel manufacturing (18.3% of revenues) is more labor intensive, and therefore benefits less from advances in automation.⁴⁴

The Southeast holds 31.8% of textile manufacturing businesses in the US, as factories located close to the major sources of raw material in the nation, as well as port cities. The West, thanks primarily to California, hosts 16.6% of textile manufacturing businesses, with a heavy concentration around the port cities of Los Angeles and San Francisco.⁴⁵

Yarn, fiber, and thread production accounts for 17.6% of revenues, and is a precursor to other stages of the industry. Woven and knit fabric production represents another 16.6% of industry revenues—it is this product segment that is primarily used for apparel manufacturing.⁴⁶

Overall, slow growth of the industry is anticipated. Growing sectors, due to automation, include nonwoven fabrics and curtains and linens. Woven and knit fabrics, as well as textile bags and canvas, are declining due to offshoring of manufacturing.⁴⁷

Fiber Mills

The yarn, fiber, and thread production segment of the textile milling industry includes both natural and synthetic fibers. Detailed breakdowns of the products within this segment are limited, and macroeconomic industry reports do not identify major players within the sector.

Through discussions with small-scale fiber processors, it is clear that there are only a couple of mills that are capable of cleaning natural animal fibers, typically just wool, on a commercial scale; these include Bollman Industries in Texas and French-owned Chargeurs in South Carolina. Chargeurs also possesses spinning capabilities and produces high-quality wool yarn for the technical textiles and apparel markets. Several more mills work with cotton grown on US soil—the Cotton USA Sourcing Program lists four mills that produce cotton yarn fit for commercial apparel and

⁴⁴ Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

⁴⁵ Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

⁴⁶ Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

⁴⁷ Brittany Carter, "IBISWorld Industry Report 31310: Textile Mills in the US." *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

technical textile production.⁴⁸ Commercial processing and spinning options for bast fibers—hemp and flax—are more limited, as demand for these products is mostly served through imports.

Smaller-scale fiber processing operations, particularly those that specialize in animal fibers, are widespread throughout the US. We will use the term “micro-mill” to describe small, domestically owned businesses that provide a full range of customizable services—fiber cleaning to yarn spinning—to a variety of customers that encompasses farmers, artisans, handcraft yarn companies, and on occasion niche apparel brands. It is difficult to gauge the number of these micro-mills that exist in the US. A variety of simple Google searches for terms such as “US fiber mills”, “local fiber processing”, and “wool mills” will show that well over 100 different businesses exist, though many more rely on word of mouth advertising and do not have a web presence. Currently, the Fibershed organization⁴⁹ is conducting an inventory of fiber processing mills in the United States through a series of in depth interviews. When finalized, the inventory will provide a more accurate count and description of existing mills and their capabilities than is presently available.⁵⁰

Despite the seemingly large supply of micro-mills, there is enough demand for customizable, small-batch processing that none of these businesses lack for work. Many mills have a backlog of orders stretching to 18 months and in some cases longer. Some mills have stopped accepting new customers, as their lead times have become excessive. However, long lead times have come to be standard in the industry and do not deter customers. Because mills tend to be few and far between, customers often ship their fibers across several states, or sometimes even the country, in order to find a quality processor. Many of the smallest mills do 80% or more of their business locally, as farmers utilize local mills to save on shipping costs.

Excessive lead times in micro-milling are typically due to three causes. First, demand is significant. Across the country, some sheep and alpaca farmers reportedly have barns full of unprocessed fiber, because they either do not know what to do with the fiber or they do not have a regional micro-mill to serve them. Second, owners cannot afford to hire additional staff to speed up production. While business is not lacking, profit margins in the industry are kept low, as customers can only pay so much for processing services if they hope to turn a profit by selling the finished yarn. Third, equipment breakdowns often halt processing for several weeks. It is difficult for mills to find machinists that have experience

⁴⁸ “U.S. Mills.” *Cotton USA Sourcing Program*, 2013. Web. 8 September 2015. <http://www.cottonsourcingusa.com/cotton_mill.php?mill=1#>.

⁴⁹ *Fibershed*, 2015. Web. 8 September 2015. <<http://www.fibershed.com>>.

⁵⁰ Tess Meinert is a project lead for the National Mill Inventory and can provide more information on the project if desired. Chapter 5 of this document briefly explains the National Mill Inventory during a discussion of the Fibershed program.

working with this equipment—it can sometimes take weeks before a capable repairperson can be found and brought to the mill.

Micro-mills range in size. The smallest processors may only produce a couple thousand pounds of finished yarn in a year, whereas larger operations can turn out 15,000 pounds or more—it all depends on the type of equipment the processors use and how many individuals they employ. Smaller micro-mills often operate Belfast Mini-Mill equipment, which is manufactured in Canada. Belfast claims there are 80 Mini-Mills in use in the US.⁵¹ Many of the medium-sized and larger micro-mills operate antique equipment leftover from the US's once-booming textile industry. Much of the machinery necessary to these businesses, Mini-Mills and larger mills included, is purchased second-hand, as older mill-owners retire and sell their equipment.

One of the reasons micro-mill-produced yarn is not more commonly used in the textile-creation stages of the milling industry, is that the yarn these mills produce is not always strong enough to be use in industrial knitting or weaving operations. While the yarn is suitable for handcraft purposes, it may pull apart once put under the increased pressure exuded by textile mills. Some larger micro-mills with significant financial resources have purchased new, high-tech spinning frames. These advanced set-ups produce yarn that is viable for use in industrial textile manufacturing practices.

Apparel Knitting Mills

Apparel knitting mills use yarn and thread to create finished garments. They are different from cut and sew apparel-manufacturing operations, which typically use woven fabrics purchased from textile mills to create clothing. In recent decades, US apparel manufacturers have moved offshore, due to pressure from foreign producers who had the advantage of low-cost labor allowing them to offer inexpensive clothing to the global markets. To this end, most of the domestic apparel demand is met by imports—92.9% of women's and girls' and 98.2% of men's and boys apparel manufacturing is satisfied by overseas production.⁵²

US apparel knitting mill revenues reached \$658.9 million in 2014, \$39.5 million of which was profit. The industry grew by 7.1% between 2009-2014—this was primarily due to economic recovery from the recession and not the result of operational success—and is expected to grow by 0.5% through 2019. There are 108 businesses in this industry, with a total of 2,417 employees (22.4 per business on average), receiving total wages of \$89.0 million. Most businesses are located in California (26.4%) and New York (22.6%); these businesses are heavily

⁵¹ "FAQs." *Belfast Mini Mills LTD.*, 2009. Web. 8 September 2015. <<http://www.minimills.net/page.php?26>>.

⁵² Zeeshan Haider, "IBISWorld Industry Report 31519: Apparel Knitting Mills in the US." *IBISWorld*, December 2014. via University of Oregon Libraries, July 2015. PDF Document

import/export reliant and need access to ports, as well as the visibility offered by locating in densely populated metropolitan areas.⁵³

The major US markets for apparel knitting mills include mass merchandisers and discount retailers (62%), such as Wal*Mart; wholesalers (24%); and specialty (brand) stores and department stores (10%). Wholesalers are a shrinking market, as many apparel manufacturing firms are vertically integrating in order to be more cost-effective. The major products these mills produce include sweaters (43.8% of revenue) and shirts, t-shirts, and undershirts (34.8%). Sweaters and t-shirts represent big sellers, due to multiple styles and branding opportunities. Other products include gloves, mittens, hats, and mufflers (7.7%); athletic apparel, like sweat pants and sweatshirts (5.8%); skirts, pants, and shorts (5.4%); and underwear (2.5%).⁵⁴

A new trend toward reshoring—or bringing operations back to the US—is in its infancy, however. As the domestic economy improves, demand for high-quality, domestically manufactured apparel is on the rise. Consumers are increasingly associating the “Made in USA” label with higher-quality materials and construction, as well as with corporate responsibility and fair labor practices.⁵⁵ In addition, US apparel manufacturers are increasing their product offerings and targeting niche markets, especially the eco-friendly movement, by introducing organic, sustainable, and recycled brands. In terms of competitive advantage, domestic producers are able to offer the added benefits of short lead times in terms of production as well as response to fashion trends.⁵⁶

The reshoring trend, while expected to continue for the next five years, is not yet proven to be a lasting movement. US wages are still too high to compete cost-effectively with foreign producers, and eventually Asian producers will acquire the same technology from which US manufacturers currently benefit. However, by seeking out niche markets, domestic producers have room to succeed in a strengthening economy.⁵⁷

Cut & Sew Apparel Manufacturing

Cut and sew apparel manufacturers are hired by companies that own textiles and want the material turned into garments, accessories, or other finished goods. Like

⁵³ Zeeshan Haider, “IBISWorld Industry Report 31519: Apparel Knitting Mills in the US.” *IBISWorld*, December 2014. via University of Oregon Libraries, July 2015. PDF Document

⁵⁴ Zeeshan Haider, “IBISWorld Industry Report 31519: Apparel Knitting Mills in the US.” *IBISWorld*, December 2014. via University of Oregon Libraries, July 2015. PDF Document

⁵⁵ Brittany Carter, “IBISWorld Industry Report 31310: Textile Mills in the US.” *IBISWorld*, March 2015. via University of Oregon Libraries, June 2015. PDF Document

⁵⁶ Zeeshan Haider, “IBISWorld Industry Report 31519: Apparel Knitting Mills in the US.” *IBISWorld*, December 2014. via University of Oregon Libraries, July 2015. PDF Document

⁵⁷ Zeeshan Haider, “IBISWorld Industry Report 31519: Apparel Knitting Mills in the US.” *IBISWorld*, December 2014. via University of Oregon Libraries, July 2015. PDF Document

apparel knitting mills, cut and sew manufacturers are losing business to competition from inexpensive foreign labor. Less successful companies are exiting the industry, and those that remain are focusing more on high-end, niche markets.⁵⁸

Revenues in this sector are expected to be \$2.1 billion in 2015, following a 4.1% decline over the past five years. This decrease in revenue is expected to continue through 2020, though at a slower rate (1.5%). Though profits have also been falling over the past few years, profit loss has been slower than that of revenue. Unprofitable businesses are failing and exiting the industry, while successful operations are maintaining their strength. Currently, there are 3,487 business that employ 42,085 people, or about 12 employees per operation. The industry pays \$878.5 million in wages annually.⁵⁹

The cut and sew manufacturing industry is driven by demand for apparel manufacturing and per capita disposable income, along with changes in the value of the dollar. As the dollar strengthens, demand for apparel imports rises, cutting into apparel manufacturing and cut and sew manufacturing revenues. As per capita disposable income increases, people are more willing to buy premium, domestically produced goods. Women's and girls' clothing represents the largest portion of the industry's products (65.5%), followed by men's and boys clothing (19.3%). Uniforms, infant apparel, underwear and nightwear, and other products such as bags and pet beds make up the remainder of revenues. Clothing companies represent the largest portion of customers (78.5%), and most of these are small, domestic brands that are independently operated. As the small brands gain traction in the market, larger clothing companies that outsource manufacturing often acquire them. This hurts the domestic cut and sew industry. One large company that has maintained domestic manufacturing is American Apparel.⁶⁰

Here again, we see the trend of companies moving toward domestic production and manufacturing around high-end denim and even work clothes bearing the "Made in USA" tag. Some companies are going even more local, highlighting being "Made in LA" or "Made in NYC." This messaging is meant to convey responsiveness to current fashion trends and "green consumerism"—organic fabrics and local supply chains. In addition, domestic apparel product lines and branding are reflecting sustainability messages and urging customers to consider more than just price—fair labor practices and high-quality materials are stressed.⁶¹

⁵⁸ Edward Rivera, "IBISWorld Industry Report 31521: Cut and Sew Manufacturers in the US." *IBISWorld*, June 2015. via University of Oregon, July 2015. PDF Document

⁵⁹ Edward Rivera, "IBISWorld Industry Report 31521: Cut and Sew Manufacturers in the US." *IBISWorld*, June 2015. via University of Oregon, July 2015. PDF Document

⁶⁰ Edward Rivera, "IBISWorld Industry Report 31521: Cut and Sew Manufacturers in the US." *IBISWorld*, June 2015. via University of Oregon, July 2015. PDF Document

⁶¹ Edward Rivera, "IBISWorld Industry Report 31521: Cut and Sew Manufacturers in the US." *IBISWorld*, June 2015. via University of Oregon, July 2015. PDF Document

Despite these fashion and messaging trends, IBIS World does not expect widespread, long-term change in consumer purchasing habits. Fast, inexpensive fashion reigns. With globalization, East Asian countries that have been the major cut and sew manufacturers for decades will catch up to the US technologically, further reducing the cost of their goods, as well as the quality. Overall, the number of domestic businesses in the sector is expected to shrink by 0.8% by 2020, while employment decreases by 2.7%.⁶²

A Macroeconomic Perspective on Natural Fiber and Textile Products

The natural fiber and textiles industry provides a wide variety of products that are created at various points along the supply chain before finished goods like apparel and accessories can be produced. We highlight the most common products, their uses, and markets in the following subsections.

Milling-stage Products

Fiber is cleaned during the milling process, which results in waste fiber as well as useful byproducts. Wool and other greasy animal fibers provide a byproduct called “lanolin”, which makes up 10-15% of raw fleece weight depending on breed. Lanolin is a natural, water repellent skin and fiber softener that is used primarily in medical, cosmetic, and toiletry applications but is also useful as a lubricant or protectant for some metals in industrial applications.⁶³ While information on the global or national lanolin market is not readily available, the product is sold in kilogram and metric ton quantities on the online international marketplace Alibaba.⁶⁴

Plants raised for fiber provide seeds as a byproduct early in the milling process. Cotton, flax, and hemp seeds are all valued for their oil, as well as their nutritional properties when sold as livestock feed or even in some cases for human consumption.

Because of the resurgence of traditional crafts such as fiber blending, handspinning, needle felting, and rug weaving, mills have been able to sell “roving.” Roving is a term that commonly describes fiber that has been through the carding, or fiber alignment, process but has yet to be spun.⁶⁵ Many small mills—those that

⁶² Edward Rivera, “IBISWorld Industry Report 31521: Cut and Sew Manufacturers in the US.” *IBISWorld*, June 2015. via University of Oregon, July 2015. PDF Document

⁶³ “LANIS Lanolin: Perfect Performance, Naturally.” Lanolin. *Imperial-Oel-Import*, 2010. Web. 8 September 2015. <<http://www.lanolin.com/home.html>>.

⁶⁴ “Lanolin-Lanolin Manufacturers, Suppliers and Exporters on Alibaba.com Cosmetic Raw Materials.” *Alibaba.com*, 8 September 2015. Web. 8 September 2015. <http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=lanolin>.

⁶⁵ “What are Batts, Top, Roving, and So Forth?” *Abby's Yarns*, 10 August 2007. Web. 8 September 2015. <<http://abbysyarns.com/2007/08/whats-are-batts-top-roving-and-so-forth/>>.

service individual farmers and sometimes hand-made knitwear designers—provide roving to customers that prefer to make their own yarn or other finished products.

Some mills also produce batting, a filler or padding layer often used in quilts or mattresses, and felt. These products are useful in many markets, whether commercial or handcraft.

Not all mills have the capability or desire to produce each of these byproducts and intermediate products—some prefer to undertake the whole process from washing to spinning, as it adds the most value for the customer. These examples represent options for additional revenue streams in the natural fiber and textiles industry.

Craft Yarn⁶⁶

A 2015 study by Mintel reports that individual participation in arts and crafts is increasing. Based on Mintel’s survey of US consumers, 21% of women and 7% of men engage in needlecrafts such as knitting, crocheting, and quilting. Women between the ages of 18 and 34 were the most active in pursuing arts and crafts, and represent a large and attractive market base for businesses providing craft supplies.⁶⁷

Today’s knitter, crocheter, or other craft yarn consumer has a vast number of options to choose from, with yarns varying in color, construction, fiber content, length, weight, and more. The yarn enthusiast can fill their needs at craft stores, yarn shops, fabric supply stores, supercenters, farmers markets, fiber mills, farms, online wholesalers and yarn warehouses, private yarn makers, and more. Business owners in this industry have noted an increasing number of customers of all ages and demographics, especially since the mid-2000s.⁶⁸

In recent years, the craft yarn industry has seen a surge in small businesses. Some new yarn shops are opening up, but the real growth and increased diversity in the market has come from fiber blenders, handspinners, and independent dyers who sell directly to craft customers.⁶⁹ These businesses are often a one-person operation, and typically market their goods only on the online vintage and

⁶⁶ Barring sources cited in footnotes, this section was compiled primarily from the author’s personal experience and interaction with the industry as a consumer. Some interviews have corroborated these opinions, but little statistical information was available through literature review.

⁶⁷ “Arts and Crafts Consumer – US.” *Mintel*, January 2015. via University of Oregon Libraries, 30 July 2015. PDF Document

⁶⁸ Concluded through interviews with yarn shop employees, mill owners, and yarn makers cited in Appendix C.

⁶⁹ Concluded through interviews with mill owners, cited in Appendix C, regarding their customer base and trends in the industry.

handmade market Etsy,⁷⁰ or on a private website. They produce unique fibers for spinning and felting as well as yarns for knitting, crochet, weaving, or other crafts.

Social media—Instagram⁷¹ in particular—has played a role in popularizing handcrafts and the small businesses associated with the industry. Instagram is a mobile application and website where users display photos and caption them with “hashtags.” When clicked, hashtags transport the user to another window where only pictures tagged with that hashtag are shown. The craft yarn community has its own set of popular hashtags that business owners and consumers use equally to display their wares, offer giveaways, announce sales, show off finish products, and ask for craft advice. Several independent dyers and other makers rely solely on Instagram and hashtags for advertising.⁷²

Ravelry is another social media outlet specifically for knitters, crocheters, and handspinners. Ravelry is a community that has over 5.5 million registered users with roughly 825,000 regularly active members.⁷³ This website is designed to allow users to find patterns, buy yarn, and display their finished projects. Interest groups and forums can also be created for local crafting meetings, fan clubs, common problems, specific brands or businesses, and more. Yarn, fiber, and equipment sales from private vendors and Ravelry users are also enabled through the website’s shop function.

Instagram and Ravelry appear to have been the catalysts for several international trends in yarn and knitting patterns. Competition between independent yarn dyers is increasing as more players enter the market. With such visibility through social media, “indie dyers,” as they are called in the craft world, can easily have their ideas copied by other dyers across the globe.⁷⁴ This results in trends such as the speckled and striped yarn dyeing technique displayed in Figure 3 and Figure 4 each from different indie dyers. Pattern trends are significantly more innocent. Certain designers become popular from their frequent presence on social media, or styles are popularized by frequent use, and therefore greater visibility, on Ravelry and Instagram. The advent of social media has fueled the growing interest in craft yarn.

⁷⁰ “Yarn & Roving.” *Etsy*, 8 September 2015. Web. 8 September 2015. <<https://www.etsy.com/c/craft-supplies-and-tools/fiber-and-textile-art-supplies/yarn-and-roving>>.

⁷¹ *Instagram*, 8 September 2015. Web. 8 September 2015. <<https://Instagram.com>>.

⁷² Vanessa Rothenbuhler, Lynai Yarns. Interview, 2 April 2015.

⁷³ “Statistics: Users.” *Ravelry*, 9 September 2015. Web. 9 September 2015. <<http://www.ravelry.com/statistics/users>>.

⁷⁴ Vanessa Rothenbuhler, Lynai Yarns. Interview, 2 April 2015.

Figure 3: Speckled and Striped Yarn from Lynai Yarns



Figure 4: Speckled and Striped Yarn from Haute Knit Yarn



Natural and Organic Apparel and Accessories

Demand for natural apparel and accessories is difficult to assess, especially as this distinction is lumped together with other clothing that is “sustainable” or “fair-trade.” Many of the organizations attempting to gauge the sustainable fashion arena are environmentally focused non-profits that look more into sustainable practices than market data. In addition, many of the studies conducted on this topic are now nearly 10 years out of date. That being said, in 2007, the Global Action Through Fashion organization estimated that only \$3 billion of the \$450 billion global fashion market was reserved for sustainable or fair-trade apparel and accessories.⁷⁵

Growth in the sustainable apparel market is being driven by consumers’ sensitivity to environmental issues as well as their own self-interest. As the impact of human

⁷⁵ “The Issues.” *Global Action Through Fashion*, 2015. Web. 31 August 2015. <<http://globalactionthroughfashion.org/for-consumers/the-issues/>>.

behavior on the environment becomes ever more visible, consumers are adopting more environmentally friendly practices. However, when it comes to making purchases, they are motivated by financial considerations. According to a study by Cotton, Inc., 70% of consumers “are happy to be environmentally-friendly as long as it saves them money,” and 86% say that their purchasing decisions are influenced by the knowledge that apparel features or care factors could save them money. Items marketed as long-lasting and durable play to these desires. On the whole, the study found that consumers respond more to and are willing to pay a premium for goods that are made with natural fibers or are “Made in USA” rather than goods marketed with “environmentally-friendly” or “sustainable” messaging.⁷⁶

The number of new businesses entering the market over the past few years evidences a surge in popularity of natural fiber apparel. Consider Farm2Fashion, which was professedly inspired by the “Made in America” movement. F2F launched in February 2014 with the goal of sustainably creating luxury products that would last generations.⁷⁷ Appalatch is another new apparel company that prides itself on its local sourcing and manufacturing—the yarn used to produce its customer-fit sweaters is from Echoview Fiber Mill, just one town away.⁷⁸ As demand for domestically made, natural apparel grows, so will the number of businesses operating in this high-end niche.

The trend toward sustainable apparel is also demonstrated by major brands such as Patagonia, Levi Strauss & Co., and American Apparel, as they continue to bolster their sustainability programs and source natural materials. As major brands often serve as trend leaders for smaller companies, it’s not unlikely that more apparel operations will follow suit.

⁷⁶ “Consumer Perspectives on ‘Green’ Apparel.” Supply Chain Insights. *Cotton Incorporated*, 2013. Web. 9 September 2015. <<http://www.cottoninc.com/corporate/Market-Data/SupplyChainInsights/consumer-perspectives-on-green-apparel/>>.

⁷⁷ “The Mission.” *Farm 2 Fashion*, 2015. Web. 9 September 2015. <<http://www.farm2fashion.net/pages/the-mission>>.

⁷⁸ Alli Marshall, “Echoview Fiber Mill announces collaboration with Appalatch Outdoor Apparel Company.” *Mountain Xpress*, 29 May 2014. Web. 31 August 2015. <<https://mountainx.com/blogwire/echoview-fiber-mill-announces-collaboration-with-appalatch-outdoor-apparel-company/>>.

CHAPTER 3: GENERAL NATURAL FIBER AND TEXTILES SUPPLY CHAIN AND PRODUCTS

This chapter provides an overview of natural fiber and textiles supply chains. The following sections contain information regarding both plant and animal fiber growth and processing, but do not include the production of synthetic materials. Wool and alpaca have been selected to illustrate the animal fiber process, while flax and hemp are detailed for plant fiber production. Cotton has been excluded as the milling process is slightly different and this plant is not suitable for the Oregon climate. As apparel manufacturing is the focus of the “textiles” portion of this report, home furnishings and technical textile manufacturing have been omitted from this chapter. Figure 1 (page 9) provides a simplified diagram of the overall supply chain. This figure could serve as a reference for other areas of textile production to research should Lane County choose to examine different aspects of the textile supply chain.

Animal Fiber Production

This description is based on producing wool and alpaca fibers, but many aspects are applicable to raising other fiber animals such as camels, goats, llamas, rabbits, and yak. It highlights the industries that serve the animal fiber production process.

When raising animals for fiber, husbandry is taken very seriously. The best animals produce higher quality fiber, and therefore ancestry is tracked closely—particularly with alpaca. As female alpaca only produce one offspring (cria) each year, it is important that animals are intentionally bred to preserve or improve fiber quality in a herd. In this way owners increase the value of their herd and their fiber, a crucial aspect of the alpaca business as owners recoup their investments through the sales of animals that place at competitions based on fiber quality.⁷⁹

Sheep husbandry is also important. New breeds and qualities of fiber are produced when owners crossbreed animals to achieve specific fiber qualities. For example, the Cormo breed was developed by crossing Corriedale rams with Merino ewes. The result is a hardy animal that is adaptable to harsh climates and produces a long, super-fine, high-yield, white fleece.⁸⁰ These qualities are ideal for garment and handcraft yarn production.

Superior animal care is necessary to produce a high-quality fiber. Bedding, feed, shelter or enclosures, and veterinary care all play a role in fiber production. For animal owners that do not have substantial grazing land, or live in a climate where grazing is not an option for parts of the year, proper feed—hay and some nutritional grains or pellets—are an expensive necessity. Several owners in a small

⁷⁹ Robbin Freedman, Pura Vida Alpacas. Interview, 13 August 2015.

⁸⁰ “Why Cormo Sheep?” *The American Cormo Sheep Association*, 2015. Web. 17 September 2015. <<http://www.cormosheep.com/TheCormoBreed.html>>.

region may go in together on an annual supply of hay in order to get a better price than what is available at the nearest feed store.

Fiber quality is affected by environment and stress. This relates in part to pasture care—farmers often remove plants with burrs or other materials that could snag in an animal’s fleece from the area. Sometimes farmers will also place coats or thin blankets on their animals to protect the fleece from dirt, excrement, and vegetable matter. These coats are made from scrap materials at home or can be purchased online.

Proper fencing and shelter also play a role. While shelter can help protect animals from the elements, enclosures must be constructed to keep fiber animals in and predators—cougars, bears, wolves, and packs of dogs—out. Structures like barns and lean-tos can be purchased as kits or built the old-fashioned way and are meant to be stationary. Enclosures in this industry, however, need to be moveable, at least in some parts of the farm. Moving pieces enable owners to move animals to different pastures, close them in for veterinary care or shearing, pair them off for breeding, or even pick up and go to fairs and competitions.⁸¹

As livestock, sheep and alpacas require special veterinary care. Large animal vets are commonly employed by this industry, but many owners prefer to work with specialists. Veterinary care is not inexpensive, and often professionals travel long distances to serve a number of different farms. The burden of travel costs falls on the farmer.⁸²

Once an animal has been cared for all year and has produced a thick fleece, it is time for shearing. Some farmers shear the animals themselves, while others prefer to hire shearing teams to conduct the process for them. It is imperative that shearing be done correctly, as incorrect cuts shorten the length of fibers, thereby reducing their length and value. This is why many farmers hire out or at least take courses in shearing themselves. Like specialized veterinarians, good shearers are few and far between, and the farmer bears the cost of travel.⁸³

The result of shearing is a fleece—the coat that is removed, typically only once per year, without harm to the animal. A fleece can be sold directly to handcrafters who prefer to process fiber themselves, to a fiber pool that will combine many fleeces to receive the best price at market, or to a mill that will process the fiber for its own purposes. Many small farmers, especially those that consider their small flocks and herds to be pets, choose to keep fleeces for themselves or have the fiber processed and returned to them.

⁸¹ Robbin Freedman, Pura Vida Alpacas. Interview, 13 August 2015.

⁸² Ann Dockendorf, Aragon Alpacas. Interview, 14 August 2015.

⁸³ Rolly & Wayne Thompson, Fox Hollow Farm. Interview, 5 August 2015.

Plant Fiber Production

The flax and hemp plants both produce bast fibers—fibers from the outer bark of a plant's stalk. This discussion seeks to briefly explain the raising of these fibers and the related industries associated with this stage of production.

As with any scaled agricultural production endeavor, different kinds of farm equipment must be purchased or leased and workers must be hired or contracted in order to complete the stages of growing a successful crop. Equipment may be borrowed from a neighbor, leased from a dealer, or purchased from a farm equipment manufacturer.⁸⁴ Hiring labor may be a matter of finding seasonal workers or utilizing a contracting company that supplies labor.⁸⁵

Site selection and soil quality are key to any successful crop. If a farmer does not own land with the appropriate soil conditions, he or she must rent acreage of sufficient quality. Determining soil quality prior to planting is very important. Soil testing can be done on one's own or samples can be shipped off to a testing facility.

Once soil quality has been determined, seeds must be purchased and planted. Seeds may be purchased from a local farm supply store, a farm supply wholesaler, or through various seed catalogues. Before seeds can be planted, the earth must be tilled and readied for sowing. Large farms will sow seeds mechanically, but smaller operations may depend on labor to plant by hand.

Weeding must be done by hand while the plants are young. This is a time-intensive process that requires a good deal of care to avoid damaging seedlings. As the crops grow, foot-traffic has to be limited to prevent damage that will keep the plants from maturing. Pest control is not a major problem for bast fibers, as they are resistant to pests and disease.⁸⁶ Irrigation is unlikely to be necessary unless the growing region is in a state of drought.⁸⁷

Hemp and flax are ready to be harvested 70-100 days after the seeds are sown. Large commercial bast fiber operations use special cutting machines to harvest the crop,⁸⁸ while smaller farms pull the plants up by hand. If the stalks are cut, farmers must be careful to do so at the base of the plant, so as not to waste fiber. Plants are

⁸⁴ "Leasing vs. Buying Machinery: Compare the Options." *Prairie Farmer*, 17 February 2009. Web. 9 September 2015. <<http://farmprogress.com/story-leasing-vs-buying-machinery-compare-the-options-9-21867>>.

⁸⁵ Brian Rooney, Oregon Employment Department. Phone correspondence, 14 July 2015.

⁸⁶ "Environment." *Bast Fibers LLC*, 2007. Web. 9 September 2015. <<http://bastfibersllc.com/environment.html>>.

⁸⁷ "Fibre Flax Planting and Processing Instructions." *Richters*, 2011. Web. 9 September 2015. <<https://www.richters.com/show.cgi?page=InfoSheets/d2701.html>>.

⁸⁸ "Industrial Hemp." *How Products are Made*, 2015. Web. 9 September 2015. <<http://www.madehow.com/Volume-6/Industrial-Hemp.html>>.

then left in the field to dry, unless heavy rain is expected, at which point the cut crop must be brought inside.⁸⁹ Once dry, the crop will be ready for processing.

Tilling the soil is an important part of preparing for the next season's bast fiber crop. The roots and leaves of the previous year's harvest are plowed back into the soil, bestowing nutrients that make the use of fertilizer unnecessary.⁹⁰

Milling

Because the milling activities for animal fibers and plant fibers differ, this report describes each in turn.

Animal Fibers

Animal fibers sent to mills undergo a series of cleaning and processing steps. While most fiber is processed fully into yarn, some is also sold at various stages of completion. The goods along the production line will be identified as we come to them, as will useful byproducts of processing.

Before a fleece can be processed it must be cleaned. The first step involves skirting the fleece: removing coarse hairs, vegetable matter, and dirt. The farmer often undertakes the skirting process, as clean fleeces fetch a higher price and require less time for mill workers to clean.

Next the fiber is washed, or "scoured," with hot water and natural or chemical soaps to remove dirt, vegetable matter, and (when it comes to sheep fleece) lanolin. Lanolin is the natural grease secreted by a sheep's skin that protects the animal and its fiber from the elements.⁹¹ It is a multi-use natural byproduct that is valued in the leather, personal care, and pharmaceutical industries, as well as in industrial settings.⁹² Lanolin can be captured and refined after the scouring process, and either sold on the market or kept for private use. Removal of the grease from a sheep fleece is time-intensive, however, and several washes are often required to fully clean the fiber. Alpaca fiber is not greasy, therefore washing the animals' fleece is less time-intensive and uses less water.

Once the fiber has been washed, it moves on to the carding stage. Carding is a mechanized process that sorts out low-quality fibers, such as guard hairs, from high-quality fibers (this is called the "picking process") and combs and aligns the remaining fibers in preparation for spinning. The lower quality fibers removed

⁸⁹ "Fibre Flax Planting and Processing Instructions." *Richters*, 2011. Web. 9 September 2015. <<https://www.richters.com/show.cgi?page=InfoSheets/d2701.html>>.

⁹⁰ "Environment." *Bast Fibers LLC*, 2007. Web. 9 September 2015. <<http://bastfibersllc.com/environment.html>>.

⁹¹ "From Fleece to Grease." *Imperial-Oel-Import*, 2010. Web. 8 September 2015. <<http://www.lanolin.com/lanolin-basics/from-fleece-to-grease.html>>.

⁹² "Functions and Applications." *Imperial-Oel-Import*, 2010. Web. 8 September 2015. <<http://www.lanolin.com/lanolin-basics/functions-and-applications.html>>.

during picking can be collected and repurposed—used to make insulation, for example.

Fiber blending—mixing two or more types of fiber—is also undertaken at the carding stage. This is useful in altering the texture or natural properties of the final product. For example, silk is sometimes blended with alpaca to increase the strength and luster of the fiber. Other common blending fibers include bamboo, Tencel, merino wool, and nylon. As most mills do not make these materials,⁹³ they must be purchased from a wholesaler. A popular wholesaler for small- and medium-scale fiber processing mills is Ashland Bay, which sells to handcraft supply stores as well as mills.⁹⁴

Several products are available after carding: batting, roving, and with a little more effort, felt. Batting is a sheet of carded fiber that is typically used between the layers of fabric in a quilt or in a mattress. It is a lightweight product that still provides insulation. Roving is a much skinnier and denser version of batting,⁹⁵ and is the intermediate product that is used to create yarn. When fiber is sold in roving form, the customer may be a handspinner or dyer who is interested in completing the remaining processing steps on his or her own for business or pleasure. Handcraft supply wholesalers and retailers will also purchase roving and sell it in natural colors or dye it to increase the value. Figure 5 displays braided and dyed roving for sale to handspinners and other handcrafters.

Figure 5: Roving Braided and Dyed at the Eugene Textile Center



⁹³ Some mills that own their own animals may offer blending fibers from their flocks in addition to blending fibers purchased from a wholesaler.

⁹⁴ “About Us.” *Ashland Bay*, 2015. Web. 9 September 2015.
<https://www.ashlandbay.com/about_us>.

⁹⁵ Batting comes in sheets that are several feet wide by several feet long and an inch thick, whereas roving might be half a foot wide, several inches thick, and several yards long rolled up into a ball or coil.

Felt is also produced after the carding stage, though it requires an additional step to produce. Felt can be produced by either a wet or a dry method. In both methods, sheets of batting are layered on top of one another in order to produce the desired thickness. Wet felting involves passing the batts through a steam table, then layering them and applying pressure to matt the fibers together.⁹⁶ Dry felting uses a machine with many notched needles that poke fibers from the top batt down through the other layers, matting the fibers together and creating a thick material.⁹⁷ Felt may be sold on the handcraft market, directly to makers, or even to the apparel manufacturing industry.

In order to make yarn, thick roving must be drafted into a manageable width and thickness for a spinning machine to handle. The pin-drafting machine gently stretches and combs the roving into one long, thin strand whose fibers are more aligned than regular roving. The thinner length of fiber is then taken into the spinning machine where it is quickly pulled and twisted into yarn. Both the pin-drafting and spinning machines have settings that can be manipulated to result in thicker or thinner yarns, or “weights.”

Once several strands of yarn have been spun, they may be plied, or twisted with one or more other strands, to increase the yarn’s strength and thickness. Whether or not a yarn is plied, the finished product is wound onto cones or into skeins. Cones are ideal for industrial weaving or knitting, whereas skeins are better suited for the handcraft market. Finished yarns may be returned to farmers or sold to any number of yarn brands, independent dyers, handcrafters, or textile and apparel manufacturers.⁹⁸

Plant Fibers

Once a bast fiber crop has been grown and harvested, it undergoes a process called “retting.” Retting involves leaving a crop to rot in order to remove the natural glue that binds bast fibers together. There are three kinds of retting:⁹⁹

- Water retting – the stalks are left in tanks of water, ponds, or rivers where bacteria aid the decomposition process (2-4 weeks; medium expense; highest quality)

⁹⁶ “Felts.” *SWICOFIL*, 2015. Web. 9 September 2015. <<http://www.swicofil.com/felting.html>>.

⁹⁷ “Wool Felt: What is it and How is it Made?” *Handmade Presents*, 24 October 2012. Web. 9 September 2015. <<http://www.handmadepresents.co.uk/ideagallery/wool-felt-what-is-it-and-how-is-it-made/>>.

⁹⁸ Textile and apparel manufacturers will only purchase yarns strong enough to be used with their machinery. Typically, small-scale mills are unable to provide this level of strength, though their products are suitable for handcrafts.

⁹⁹ “Bast Fibers – Others.” Sustainable Fibres and Fabrics. *University of the Arts London*, 2015. Web. 9 September 2015. <<http://sff.arts.ac.uk/Fibre%20Processing/bastfibresproces.html>>.

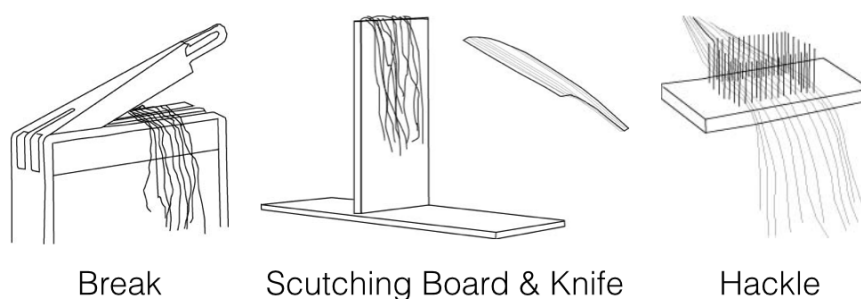
- Dew retting – the stalks are left in the field, where a daily cycle of dew and sun, and the growth of fungus help break down the fibers (6 weeks; least expensive)
- Chemical retting – the stalks are immersed in a tank of chemicals to help them decompose (a few hours; most expensive; lowest quality)

Proper retting practices will ensure a strong, easy-to-separate fiber. If stalks are retted for too short or long a time, the fiber will be difficult to separate or too weak for fiber production. After retting, the fibers must be dried before they can enter the next phase of processing: breaking.¹⁰⁰

While retting typically happens at the growing location, breaking takes place at a processing facility. Some farms may have processing facilities on site, while others must send their crop out. Most crops will require a transport service to go from the farm to the mill if there is not a processing facility on the farm.

Methods for extracting the fiber, cleaning it and carding it vary with the scale of the processing operation. On the smallest scale, breaking utilizes a hand-operated wooden device aptly named a “break” that smashes the stalks of the crop and dislodges them from the fibers. Once stalks are broken, the scutching step removes the stalks from the fibers through beating and scraping. If the stalks continue to cling to the fibers, the crop may be in need of a second round of retting. However, if the fibers are successfully separated from the stalks, they are ready for the hackling process. Hackling involves drawing the fibers through a series of pins that are stuck into a board. This combs the fibers and aligns them in preparation for spinning. Figure 6 displays the tools used in hand-processing bast fibers.¹⁰¹

Figure 6: Tools for Hand-Processing Bast Fibers



Large bast fiber processing mills use mechanized processes. Breaking is done with a series of heavy rollers or with a hammer mill. Once the stalks have been broken,

¹⁰⁰ “Fibre Flax Planting and Processing Instructions.” *Richters*, 2011. Web. 9 September 2015. <<https://www.richters.com/show.cgi?page=InfoSheets/d2701.html>>.

¹⁰¹ “Fibre Flax Planting and Processing Instructions.” *Richters*, 2011. Web. 9 September 2015. <<https://www.richters.com/show.cgi?page=InfoSheets/d2701.html>>.

the fibers undergo a cleaning process that removes excess material prior to carding.¹⁰²

The bast fiber carding process is the same as the carding process for animal fibers. As with animal fibers, blending takes place at the carding stage. When bast fibers—particularly hemp, but sometimes flax as well—are blended with the intention of going on to the textile production market, they are typically mixed with cotton, wool, or silk.¹⁰³

The carding stage of plant fiber processing produces roving, which, similar to animal fibers, may be sold in this form to handcrafters or craft supply wholesalers or retailers, with the latter being more common. Sometimes, the fiber also goes on to a matting process to create a non-woven textile, the equivalent of felting animal fibers. More often, however, the fiber moves on to become yarn.¹⁰⁴

The drafting, spinning, plying and coning or skeining processes are the same for plant and animal fibers.

Machines and Machinists

The equipment used in fiber mills varies depending on the type of fiber processed and the scale of production. In small- and medium-scale mills, equipment has often been purchased second-hand due to the high price and limited availability of newer machines. Because much of the equipment has been around since the early- to mid-1900s, there are few people remaining that have experience with these machines and know how to fix them when they break down. Even with newly manufactured equipment, few machinists are trained to repair them. This means, that when one piece of equipment breaks down, an entire mill may cease production for weeks until a competent machinist can be found and brought to the facility. This problem plagues many smaller mills, though larger ones may be able to afford to keep an engineer or machinist on staff.

Often, when mills purchase new equipment, a representative from the manufacturer will offer training on running the machines and fixing minor breakdowns. Many mill owners agree that a close relationship with the manufacturer, or having a partner skilled in machining, is key to maintaining their operations.

¹⁰² "Industrial Hemp." *How Products are Made*, 2015. Web. 9 September 2015. <<http://www.madehow.com/Volume-6/Industrial-Hemp.html>>.

¹⁰³ "Bast Fiber Blends." *Camira*, 3 August 2015. Web. 9 September 2015. <<http://www.camirafabrics.com/us/blog/bast-fiber-blends-brochure>>. PDF Document

¹⁰⁴ "Industrial Hemp." *How Products are Made*, 2015. Web. 9 September 2015. <<http://www.madehow.com/Volume-6/Industrial-Hemp.html>>.

Transportation

Most small- and medium-sized mills rely on the postal service, FedEx, or UPS to receive and send fiber and finished products from far-away clients. Many request that customers drop-off orders at the mill or meet the mill owner at a fiber event, eliminating the need for a transportation service and increasing understanding between customer and miller. Larger mills, those that receive hundreds or thousands of pounds of fiber in single orders, must depend on trucking services to receive and ship their fiber and products.

Dyeing

Dyeing may take place at any stage in the fiber milling process, or even after yarn has been made into a textile or a finished garment. Some mills offer in-house dyeing services, though these are typically small-scale operations. Dye houses primarily stand alone and work under contract, though some textile manufacturers have in-house dyeing capabilities. With the exception of natural dyeing facilities, many of which make their own pigments, commercial dyers purchase product from dye manufacturers in order to serve customers.¹⁰⁵

Textile Production

Textile production begins with the use of a sturdy yarn. Not all the yarn spun in US mills is fit for use in commercial textile production. Many smaller mills, particularly cottage industry businesses with micro-milling machinery, are incapable of spinning a yarn strong enough to endure industrial textile production. This yarn is ideal for handcrafts such as knitting and crochet, as well as for non-industrial weaving. Larger mills and those with more advanced spinning frames produce the fine yarn and thread that is used for both machine-woven and machine-knit fabrics.

Fabric Weaving

Fabric weaving operations may be large or small. Large weaving operations employ skilled labor to run mechanized looms that use multiple threads or strands of yarn to create fabric. Training is required in order to ensure employees can manage the complex machines. As with other segments of the fiber and textile industry, good relationships with equipment manufacturers or repair professionals are key to maintaining a working facility.

On a smaller scale, artisans working on floor, wall, or tabletop looms can produce hand-woven textiles. This process is very time-consuming as the equipment typically used is antique or based on traditional loom designs that have remained largely the same for centuries.

Weaving companies may develop textile designs themselves or they may buy patterns from textile designers. Client companies may also provide designs to weavers if they have specially commissioned a textile.

¹⁰⁵ Chuck Stewart, *Tumbling Colors*. Email correspondence, 26 August 2015.

Cut & Sew Manufacturing

Cut and sew manufacturing is necessary to apparel creation, as it takes woven textiles and turns them into garments. This part of the apparel construction process is very labor-intensive. Cut and sew operations may be large, with whole factories of workers operating machines, or small, with one person working at a home sewing machine.

Sewing equipment manufacturing and repair businesses are necessary partners for cut and sew manufacturers. In addition, cut and sew operations depend on suppliers of thread and other notions to complete their work, as the company that contracts them may not provide specific materials for these aspects of apparel production.

Cut and sew businesses work with clients to determine the patterns and products they will work with and produce. These operations typically have several, if not many, different contracts in progress at one time. Word of mouth and a good reputation are key to gaining customers.

Apparel Knitting

Apparel knitting differs from fabric weaving in that it utilizes one continuous strand of yarn to construct a garment. Knitting machines may be automated or operated by hand. The machines produce fabric in sheets or tubes. The pieces of knitted fabric are then seamed together to form garments or accessories.

As in the other sectors in this industry, equipment manufacturers and trained machinists are valuable resources. Knitting machines break down and must be fixed. Specialized professionals are often required to repair the machines.

Another key complement to the apparel knitting business is the pattern-making business. Some apparel knitting companies or individuals undertake this endeavor themselves, while others commission patterns or purchase existing ones from professionals. Many times, the designer or apparel company that contracted the apparel knitting manufacturer will have produced or provided the pattern.

In large-scale apparel knitting factories, each employee controls multiple automated machines. On a small scale, one machine can be run by a single person who can then hand-stitch finished sections of knit fabric together to create a garment.

Apparel knitting businesses are not limited to mechanized operations. Some hand knitters produce garments and accessories the old-fashioned way. These people work on commission for businesses or private clients, or simply sell their own creations.

Finishing

Embroidery services may be engaged by apparel manufacturers or by businesses that have purchased garments or accessories that they want to embellish with their logos or other customizations. Because not every company can afford to

manufacture its own apparel and accessories, embroidery services enable more businesses to enter the market with identifiable brands.¹⁰⁶

Alteration services are an after-market option that consumers frequently use. These services are categorized as an apparel manufacturing business, though the manufacturing process is completed before the alterations take place. Alteration businesses are an important part of the apparel supply chain because clothing is not made to fit every shape and size of individual. Pant legs may be too long, waste-lines may need to be taken in—customization is key, and major manufacturers cannot deliver it for the global customer-base.¹⁰⁷

Finished Product Distribution

This section provides an overview of the different ways in which natural fiber apparel and mill-stage products reach consumers.

Apparel Distribution

As with synthetic and blended fiber clothing, natural fiber apparel can be purchased in a variety of venues. The first link in the chain is wholesale. While dedicated natural apparel wholesalers are limited, many private brands provide their wares to retailers at wholesale prices. Natural apparel retailers are more common; whole stores are dedicated to supplying only natural fiber apparel clothing and other goods. Still more retailers who are not specifically labeled as natural apparel boutiques may have small selections of natural fiber garments and accessories.

One of the major marketplaces for natural fiber apparel is the Internet. Brands and boutiques alike are able to reach much wider audiences through online channels as opposed to brick and mortar retail outlets. In addition, small-scale makers have opportunities to compete in the market by selling their natural apparel creations on Etsy and other public marketplace websites. Increased accessibility to the growing natural fiber apparel customer base is key for small and large brands alike.

Natural fiber apparel is commonly seen at music and arts festivals as well as fairs, where customers often go with full wallets and willingness to purchase something unusual or seemingly unique. These venues are an important link in the distribution chain, as they represent places that some of the natural fiber customer base gravitates toward.

Along the same lines, though to a lesser extent, farmers markets are another place where natural fiber apparel customers may congregate. Farmers markets tend to

¹⁰⁶ Sally Lerman, "IBISWorld Industry Report OD5325: Commercial Embroidery Services in the US." *IBISWorld*, June 2014. via University of Oregon Libraries, August 2015. PDF Document

¹⁰⁷ Ibrahim Yucel, "IBISWorld Industry Report OD5004: Clothing Alteration Services in the US." *IBISWorld*, February 2015. via University of Oregon Libraries, August 2015. PDF Document

attract people who are conscious of the agricultural options in their region and want to purchase locally produced food and other goods. Natural fiber apparel fits into the additional items category, though typically people at farmers markets are shopping with purpose and a budget in mind, and may be less likely to make impulse purchases.

Once original customers have tired of their apparel or need to make room for new or seasonal wardrobe items, some dedicate their used garb to consignment or thrift stores. While the majority of apparel in these stores is mass-produced and partially, if not completely, constructed from synthetic fibers, the second hand market is an important consideration in the apparel distribution chain. It represents a low-cost option and an alternative to purchasing new items from other venues. In addition, second hand stores are an essential shopping ground for individuals and businesses that focus on “upcycling,” or taking an existing article of clothing and making it into a new garment.¹⁰⁸

Mill-stage Product Distribution

Mill-stage products have a major presence on the Internet. Online wholesalers, retailers, private brand websites, marketplaces, and even social media allow for handcraft sector commerce. As previously discussed in the overview of the craft yarn market in Chapter 2, the worldwide web has made an enormous variety of colors and textures of yarn, roving, batting, and felt accessible to consumers. Wholesalers purchase products from major mills, many of which are overseas, and sell goods to big brands and small business owners who conduct further processing or dyeing to make their wares. Retailers supply a large variety of brands at prices higher than wholesalers. Major brands and even small businesses have private websites where they can display and sell their products. Online marketplaces, such as eBay, Etsy, and Ravelry allow small-scale makers and hobbyists to purchase the materials they need to create their wares and then enable the same people to sell finished goods. Even social media sites and mobile applications provide a venue for interacting with customers, announcing sales, and unloading items.

Brick and mortar retail plays a significant role in any regional fiber community. Yarn stores, specialty craft shops, and even farm or mill stores—on-sight retail outlets stocking the owner’s and sometimes other local farms’ products—are key to distributing natural fiber products. Fiber crafts are tactile in nature, and many handcrafters like to touch the products before making a purchase. In addition to stocking major brands, many yarn and craft shops have a “local” section where customers are able to find regional products. However, these retail outlets require a significant supply of any one type or color of product so that they can have a consistent offering for customers. Larger projects require handcrafters to purchase multiple identical units, and many small farms cannot meet this demand consistently. In addition, retail mark-ups often make the products from small farms

¹⁰⁸ Sarah Ditty, “ReFashioned: Cutting-edge Materials and Processes for Upcycling.” Source Intelligence. *Ethical Fashion Forum*, 1 October 2013. Web. 9 September 2015. <<http://source.ethicalfashionforum.com/article/refashioned-cutting-edge-materials-and-processes-for-upcycling>>.

unaffordable or at least unattractive to customers. For this reason, farmers or mills band together to create their own stores where they can sell their goods at competitive prices without the retail mark-up. These stores tend to be remote, however, as they are located on the farm or mill property.¹⁰⁹

Farmers markets provide an outlet for small farmers with multiple products to sell their wares, including roving and yarn. These community establishments are a haven for businesses selling natural fiber products, as the crowd the markets draw is already inclined toward locally produced or natural items. In addition, farmers are able to sell their products without losing as large a percentage of the profits as they would at a traditional brick and mortar retail venue. This is critical for a small business that competes on price with larger manufacturers.

Like farmers markets, festivals and fairs provide a way for small businesses to sell their wares without the fear of increased prices at a retail shop deterring customers, though the fixed costs of a booth are often greater than those at markets. Retailers also frequent these larger venues and set up booths to display a condensed variety of yarn, roving, and other odds and ends that they sell. Both retailers and farmers use these opportunities to increase visibility and awareness for their business.

Finally, galleries sometimes display the work of fiber artists, who use mill-stage products such as yarn, roving or felt in their work. They may also supply small amounts of local yarn or felted goods produced by farmers or millers that customers purchase as gifts.

Education

Handcraft education plays a major role in the fiber arts (and therefore mill-stage products) market. Most formal education programs do not teach skills such as handspinning, dyeing, knitting, crochet, weaving, needle felting, or other fiber crafts. This means that to gain new customers, distributors of mill stage products must offer lessons and attract students that will want to buy their products.

Retail outlets are hubs for craft education. Yarn shops have drop-in hours where customers can come for free help with their projects. They also offer handcraft lessons for all ages and group sessions where many customers work on the same pattern or work together to complete a project. Specialty craft supply stores offer more intricate classes on dyeing techniques and advanced spinning or weaving practices.

Festivals and fairs also make great educational venues. Opportunities for lectures and demonstrations are ample, as is the demand for instruction by attendees who often come from all over the nation for large and popular events. These events promote interest in handcrafts and natural textiles alike, and because vendors and artisans are in attendance, they are a good opportunity for business people to connect with customers.

¹⁰⁹ Ann Dockendorf, Aragon Alpacas. Interview, 14 August 2015.

Much of fiber craft education comes down to individuals who have knowledge passing on their skills. This can be as simple as a grandmother teaching her grandchild to knit. In today's Internet culture, YouTube provides a venue for people with skills to educate others through video tutorials. Almost any technique a person might want to learn can be researched through the online video channel. Fiber artists play a role in educating future mill-stage product and natural textiles customers as well. Many people make a living by either offering lessons in their community or traveling the nation or world to offer courses to audiences of varying sizes.

Finally, formal educational programs at community colleges and universities, while not entirely common, are a resource for individuals who are serious about mastering fiber crafts. There are over 130 formal education programs in the US that focus on, at least partially, fiber arts.¹¹⁰

¹¹⁰ "Resources." *Studio Art Quilt Associates*, 2015. Web. 9 September 2015. <<http://www.saq.com/resources.php?ID=348>>.

CHAPTER 4: FIBER AND TEXTILES IN OREGON AND LANE COUNTY

This Chapter briefly examines the history of fiber and textiles in Oregon and Lane County and provides an analysis of the current fiber and textiles supply chains in both regions. Businesses and resources referenced in this chapter are listed along with available contact information in Appendices A and B of this document. Source documents have been included in the Dropbox accompaniment to this report.

Oregon's Historic Fiber and Textile Industry

Oregon's fiber history began in the early 1800s as flocks of sheep were driven west by pioneers. Sheep were a valuable resource for pioneer towns, as their wool provided a necessary supply of material for clothing. The state's sheep population grew more quickly than the pioneers' demand for clothing, and entrepreneurial minds recognized an opportunity for production and export. Thus, the state's first woolen mills were erected to generate a product for cross-country business, as well as business along the Pacific Coast.¹¹¹

Early mills faced many problems, including lack of financing, lack of skilled labor, and lack of entrepreneurial talent. This combination caused many mills to fail—ownership changed hands fairly frequently in the early years. Of the four prolific woolen mills at the time, the same family owned three. These mills were located in Salem, Ashland, Brownsville, and Sellwood. Mills purchased wool from individual farmers as well as wool brokers—middlemen that primarily operated out of Portland and could connect the western mills with the large sheep-raising tracts in the eastern parts of the state.¹¹² One such farm was the Imperial Stock Ranch in Shaniko, OR, founded in 1871. The ranch was responsible for creating a new breed of sheep that was specially suited to the high desert climate and eventually became one of the largest wool suppliers in the state.¹¹³

Soon fiber production outstripped capacity at various mills, and separate scouring facilities were set up in The Dalles, Pendleton, Sellwood, and Echo. These washing plants were installed to wash excess wool that could be shipped back to the East

¹¹¹ Peter Shroyer, "Oregon Sheep, Wool and Woolens Industries." Impact of the Transcontinentals. *Oregon Historical Quarterly*, 67, no. 2, June 1966. via University of Oregon Libraries, 26 August 2015. PDF Document

¹¹² Peter Shroyer, "Oregon Sheep, Wool and Woolens Industries." Impact of the Transcontinentals. *Oregon Historical Quarterly*, Vol. 67, no. 2, June 1966. via University of Oregon Libraries, 26 August 2015. PDF Document

¹¹³ "Legacy of the American West." History. *Imperial Stock Ranch*, 2014. Web. 10 September 2015. <<http://imperialstockranch.com/the-ranch/history/>>.

Coast, where larger processing plants had need of clean fiber.¹¹⁴ Between the scouring plants and fiber and textile production mills, wool became Oregon's top export—with regular shipments going to San Francisco and other parts of California as well as the East Coast—and an important source of revenue for the state.¹¹⁵

Despite several decades of success, the early wool and textile industry died out for the most part. As transportation costs increased, the mills' ability to export their goods decreased.¹¹⁶ In addition, eastern fiber processing, textile manufacturing, and garment production benefited from financing and technological advancement unavailable on the West Coast. As those facilities improved, the demand for Oregon fiber processing and textiles declined.¹¹⁷

Pendleton Woolen Mills grew out of the pioneer woolen mill heritage. The Pendleton facility was originally a scouring plant and failed mill that was revitalized in 1909, and Pendleton Woolen Mills was born. The facility primarily produced blankets for Native Americans in its early days, before adding clothing production to its repertoire over the next few decades.¹¹⁸

Portland in particular played host to a number of textile manufacturing businesses that lasted beyond the fading of the Oregon wool industry, some of which, like Pendleton, are still standing today. Jantzen Knitting Mills, Columbiaknit, and Dehen Knitting Company all came onto the production scene in the early 1900s.

Flax production and processing also played a role in Oregon's fiber and textile history. The Willamette Valley's climate is well suited to raising flax for fiber, and historically Oregon flax crops were recognized as some of the most superior flax fibers in the world. Commercial cultivation began in 1865, and several short-lived processing ventures sprang up between 1870 and 1890. Commercial production did

¹¹⁴ Alfred Lomax, "Oregon Wool-Scouring Plants of the Early 1900s." *Oregon Historical Quarterly*, Vol. 51, No. 1, March 1950. via University of Oregon Libraries, 26 August 2015. PDF Document

¹¹⁵ Peter Shroyer, "Oregon Sheep, Wool and Woolens Industries." Impact of the Transcontinentals. *Oregon Historical Quarterly*, 67, no. 2, June 1966. via University of Oregon Libraries, 26 August 2015. PDF Document

¹¹⁶ Peter Shroyer, "Oregon Sheep, Wool and Woolens Industries." Impact of the Transcontinentals. *Oregon Historical Quarterly*, 67, no. 2, June 1966. via University of Oregon Libraries, 26 August 2015. PDF Document

¹¹⁷ Alfred Lomax, "Oregon Wool-Scouring Plants of the Early 1900s." *Oregon Historical Quarterly*, Vol. 51, No. 1, March 1950. via University of Oregon Libraries, 26 August 2015. PDF Document

¹¹⁸ "Company History." Pendleton Heritage. *Pendleton Woolen Mills*, 2015. Web. 10 September 2015. <<http://www.pendleton-usa.com/custserv/custserv.jsp?pageName=CompanyHistory&parentName=Heritage>>.

not succeed due to the extremely labor-intensive nature of harvesting and processing the fiber.¹¹⁹

In the late 1890s, the Oregon Woman's Flax and Hemp Fiber Association renewed interest in flax production to combat falling wheat prices. The organization hoped that by building up growing operations, fiber processing initiatives would be attracted to the area. A mill was built, but only a few years later it was destroyed by fire in 1905.¹²⁰

The industry stagnated until 1914, when World War I interrupted flax shipments from Europe. Improvements in harvesting and processing technologies along with a guaranteed labor supply from the state penitentiary helped make this renewed interest a success for a number of years. Flax processing plants sprang up across the Willamette Valley, and though they occasionally burned down, there was plenty of interest in the industry to generate financing to rebuild. This trend continued until after World War II, when renewed trade with Europe provided access to less expensive flax and linen. By 1955, the industry had been all but eliminated.¹²¹

Oregon's Current Fiber and Textiles Supply chain

Though Oregon has lost its historic status as a major producer of wool, fiber sheep and alpaca are still an important facet of agriculture. The Imperial Stock Ranch is still operating and recently gained international recognition as the purveyor of the yarn Ralph Lauren used to make the Team USA sweaters for the 2014 Sochi Olympics.¹²² Today, much of the wool from sheep that are grazed on grass seed farms along the I-5 corridor is sold to wool pools and purchased by Pendleton Woolen Mills for use in its blankets and other products.¹²³ In addition, Oregon now has the third-largest alpaca population in the US, next to Washington and Ohio.¹²⁴ Alpaca fiber ownership is typically retained by the farmer and sent to one of Oregon's fiber mills, or even out of state, for processing into roving and yarn.

¹¹⁹ Steve Wyatt, "Flax and Linen: An Uncertain Oregon Industry." *Oregon Historical Society*, Vol. 95, No. 2, Summer 1994. via University of Oregon Libraries, 26 August 2015. PDF Document

¹²⁰ Steve Wyatt, "Flax and Linen: An Uncertain Oregon Industry." *Oregon Historical Society*, Vol. 95, No. 2, Summer 1994. via University of Oregon Libraries, 26 August 2015. PDF Document

¹²¹ Steve Wyatt, "Flax and Linen: An Uncertain Oregon Industry." *Oregon Historical Society*, Vol. 95, No. 2, Summer 1994. via University of Oregon Libraries, 26 August 2015. PDF Document

¹²² "The American Wool Tradition." Wool. *Imperial Stock Ranch*, 2014. Web. 10 September 2015. <<http://imperialstockranch.com/wool/>>.

¹²³ Sue Kalina, Sheep Breeder. Interview, 14 August 2015.

¹²⁴ "AOA Registered Alpacas." AOA Registry Statistics. *Alpaca Owners Association Inc*, 7 September 2015. Web. 7 September 2015. <<http://www.alpacainfo.com/about/statistics>>.

The state is home to a number of fiber farming associations, such as the Alpaca Association of Western Oregon or the Oregon Wool Growers Association. These membership-based organizations work to educate consumers, build demand, and promote sales of wool and alpaca fiber products. Not all fiber farmers belong to these associations, though many feel that they are important to developing the fiber industry.¹²⁵

In addition to animal fiber, there has been some interest and development around flax and hemp fibers. The only known flax fiber production in Oregon is on a cottage-industry scale outside of Portland, where one woman has raised two acres of flax and is processing it by hand. The proprietor hopes to scale the initiative, but no further information regarding her progress was available at the time this report was published.¹²⁶

Industrial hemp fiber cultivation is permitted in Oregon—one of only seven states that allow the crop. Though legislation passed in 2009 that allowed hemp cultivation, the state’s Department of Agriculture did not form a committee to explore and draft rules for Oregon’s hemp program until 2013. The delay was intended to allow federal legislation to catch up to Oregon, as well as to provide plenty of time for the state to develop a “robust” program that would be amenable to federal requirements.¹²⁷ Shifting winds in the legislature, however, have recently placed a hold on efforts to build the industrial hemp crop in Oregon.

“As of August 24, 2015, the Oregon Department of Agriculture [ceased] to issue any new industrial hemp production or handling licenses and agricultural hemp seed production permits for the remainder of 2015. Given the lack of clarity in the current statute and policy concerns that have become apparent during this first year of program implementation, the Department will work closely with policymakers and the industry to make a decision on when to reactivate issuance of licenses...for the 2016 growing season.”¹²⁸

Since industrial hemp cultivation began to ramp up in Oregon, there has been pushback from marijuana farmers who are concerned about cross-pollination

¹²⁵ Ann Dockendorf, Aragon Alpacas. Interview, 14 August 2015.

¹²⁶ Shannon Welsh, Pacific Northwest Fibershed. Interview, 17 July 2015.

¹²⁷ Noelle Crombie, “Industrial Hemp in Oregon: State Officials Drafting Rules for Hemp Production.” *The Oregonian/Oregon Live*, 05 November 2013. Web. 10 September 2015. <http://www.oregonlive.com/politics/index.ssf/2013/11/industrial_hemp_in_oregon_stat.html>.

¹²⁸ “Industrial Hemp.” *Oregon Department of Agriculture*, 24 August 2015. Web. 10 September 2015. <<http://www.oregon.gov/ODA/programs/MarketAccess/MACertification/Pages/Hemp.aspx>>.

issues. However, the Department of Agriculture claims that this is not a factor in the decision to temporarily cease offering new permits.¹²⁹

While crop fiber processing is virtually nonexistent in the state, Oregon has a number of animal fiber processing options. Today there are at least five small-scale fiber processing mills around the state, most of which are north of Lane County along the I-5 corridor. In addition to these small operations, Pendleton Woolen Mills still processes wool in Pendleton, OR. The company's Pendleton, OR facility is also responsible for some textile creation, as it is still a functioning weaving factory that produces blankets and fabric.¹³⁰ Oregon textile creation also lives on with Dehen, Inc¹³¹ and Columbiaknit.¹³²

While large-scale textile manufacturing is limited in Oregon, cut and sew contracting is fairly common. A number of companies around the state dedicate their time to helping small businesses produce apparel and accessory lines.¹³³ Many of these businesses exist in Portland, where the maker culture is strong. One exceptional facility is the Portland Garment Factory (PGF), which offers much more than simple cut and sew services. Established in 2008, PGF offers design support, sample construction, and scaled production to entrepreneurs and larger brands.¹³⁴ Despite these resources, some small businesses find it difficult to have their products sourced and manufactured locally.¹³⁵

Bend, OR and the surrounding areas play host to another maker community, much of which is centered on outdoor gear production. Several small businesses in the region are apparel and gear brands that cut and sew their own products. While

¹²⁹ Noelle Crombie, "Oregon Stops Issuing Industrial Hemp Licenses." *The Oregonian/Oregon Live*, 25 August 2015. Web. 10 September 2015. <http://www.oregonlive.com/marijuana/index.ssf/2015/08/oregon_to_stop_issuing_license.html>.

¹³⁰ "Pendleton Fact Sheet." About Us. *Pendleton Woolen Mills*, 2015. Web. 10 September 2015. <<http://www.pendleton-usa.com/custserv/custserv.jsp?pageName=CompanyFactSheet&parentName=AboutUs>>.

¹³¹ "2000 – Today." *Dehen 1920*, 2013. Web. 10 September 2015. <<https://www.dehen1920.com/2000-today>>.

¹³² "About Us." *Columbiaknit Factory Store*, 2015. Web. 10 September 2015. <http://usa-wear.com/ostore/index.php?route=information/information&information_id=4>.

¹³³ "Cascade Commercial Cutting and Sewing." *LinkedIn*, 2015. Web. 10 September 2015. <<https://www.linkedin.com/pub/cascade-commercial-cutting-and-sewing/84/44a/50a>>.

¹³⁴ "Services." *Portland Garment Factory*, 2015. Web. 10 September 2015. <<http://www.portlandgarmentfactory.com/services>>.

¹³⁵ Anna Reed, "Three Perspectives on the Current State of Local Clothing Production: The Challenges of Garment Production in Portland." *Neighborhood Notes*, 13 June 2011. Web. 10 September 2015. <http://www.neighborhoodnotes.com/news/2011/06/the_challenges_of_garment_production_in_portland/>.

many source materials from overseas—partially due to the use of performance textiles in their designs—others pride themselves on purchasing domestically produced fabrics, wool in particular.¹³⁶

In addition to the existing maker culture in Oregon, there are organizations seeking to continue building the legacy of products sourced and made in the state. Portland Apparel Lab is a new apparel and lifestyle business accelerator that is in its development stage. The organization aims to support entrepreneurs by providing strategic and operational support, as well as a common workspace.¹³⁷ Other entrepreneurial support organizations exist throughout Oregon that also provide support for the community—Oregon Entrepreneurs Network, Built Oregon, and RAIN, to name a few.

Lane County’s Fiber and Textile Legacy

Lane County’s history is entwined with the fiber and textile industry, though much of what was ceased to be nearly a century ago. One of the earliest examples of the local fiber and textile industry is the turbulent woolen mill history. In 1870, Lane County had the state’s second-largest sheep population next to Douglas County, producing nearly 168,000lbs of wool each year. At the time, the number of sheep and amount of wool was a valuable surplus, and pioneers realized that a woolen mill provided an exciting business opportunity. Mills meant steady payroll for townspeople, which in turn bolstered the local economy. In addition, once one industrial business located in a town, others were likely to follow, further stimulating a town’s financial standing. For this reason towns fought to have woolen mills, with citizens and investors coming together to put up large bonuses to encourage prospective mill owners to locate in their area.¹³⁸

Constructed in the early 1870s, Eugene’s millrace encouraged the manufacturing industry in the area, with many businesses building facilities along the waterway to utilize power generated by water wheels. One individual with a few small machines established the first carding mill in Eugene along the millrace in the early 1870s. Between 1872 and 1901, this business was shutdown, sold, and reopened under different owners a number of times due to lack of funding, fire, owners moving away, and other causes. In 1901, after a ten-year period of dormancy for the local textile manufacturing industry, the Willamette Valley Woolen Manufacturing Company opened its doors. The mill undertook washing, carding, spinning, dyeing, and weaving and maintained an apparently successful blanket and flannel trade, with machines operating at capacity. However, by 1904 the company had failed to

¹³⁶ “About Black Crater Clothing.” Contact Us. *Black Crater*, 2015. Web. 10 September 2015. <http://www.blackcraterclothing.com/contact_us_as_desinger_and_manufacturer_of_fleece_wool_water_resistant_wear.html#about>.

¹³⁷ “About.” *Portland Apparel Lab*, 2015. Web. 10 September 2015. <<http://portlandapparellab.com/about/>>.

¹³⁸ Alfred Lomax, “Woolen Textile Manufacturing in Eugene, Oregon.” *Lane County Historian*, Vol. 8, No. 1, March 1963. via Oregon State University Libraries, August 2015. PDF Document

pay many of its debts and was taken to court by several of its contractors and creditors. The business formally disbanded in 1905.¹³⁹

In 1906, the mill reopened under the leadership of experienced mill owners and textile manufacturers as the Eugene Woolen Mill Company. The mill had four carding machines and 14 looms in addition to other equipment, making it one of the larger woolen mills in the state. It employed 40 people and sourced wool primarily from Lane and Douglas counties, but also from a wool broker in Portland. It produced blankets, shirts, coats, and mackinaws. Under the new leadership, the Eugene mill functioned stably and experienced financial success, making money for its stockholders. The mill continued to draw its power from waterwheels on the millrace until 1928, when a flood permanently halted industrial use of the small waterway. The mill continued operating successfully until 1950,¹⁴⁰ when it shut down for an undisclosed reason—likely because of the increased popularity of synthetic fibers following WWII.

In addition to the woolen mill, Lane County once had a strong flax processing industry. Before World War II, most processing was undertaken in the Salem area. As Oregon ramped up flax production when trade routes with Europe were interrupted during the war, several retting and scutching plants were erected in Lane County. The first was a cooperative effort in Springfield owned by the Oregon Fiber Flax Growers Association. Two more plants were built, and together these mills processed thousands of pounds of flax annually and employed hundreds of people, many of them women. When the war ended, trade with Europe regained strength and European imports to the East Coast were cheaper than West Coast products that had to be shipped across the country by rail to reach the textile mills. Lane County's retting and scutching plants died out along with Oregon flax production.

Though both the Eugene Woolen Mill and Lane County's flax industry faded into memory, the maker culture remained and flourished. The 1970s saw the creation and rise of Eugene's Saturday Market. Saturday Market was conceived to fill a void in downtown Eugene following the closing of an old farmers market nearly two decades before. The new market allowed the large artisan community to sell their goods to customers who were interested in buying and using local crafts. The market's basic principles are set up to support artists and enrich the downtown community. Vendors or their partners or family members must make, grow, or gather the items they sell—this limits entrants into the market, making sure to

¹³⁹ Alfred Lomax, "Woolen Textile Manufacturing in Eugene, Oregon." *Lane County Historian*, Vol. 8, No. 1, March 1963. via Oregon State University Libraries, August 2015. PDF Document

¹⁴⁰ Alfred Lomax, "Woolen Textile Manufacturing in Eugene, Oregon." *Lane County Historian*, Vol. 8, No. 1, March 1963. via Oregon State University Libraries, August 2015. PDF Document

showcase local artists and farmers.¹⁴¹ In addition, rent for weekly booths is reasonable considering the visibility and sales opportunities the market offers. Saturday Market started out with 29 vendors and has grown significantly over the years, reaching 800 active members in 2015, with 300 vendors participating each week.¹⁴²

Another outlet for the fiber and textiles community came in the form of the Black Sheep Newsletter in 1974, which led to the creation of the annual Black Sheep Gathering (BSG) in 1981. The newsletter was founded as an open forum for sheep farmers and handspinners on the West Coast (and eventually internationally) to find markets for their fleece and share experiences, ideas, and other information. Contributions to the newsletter are reader submissions, and topics range from shepherding and spinning to science and genetics.¹⁴³ The BSG festival began as an annual potluck where members of the sheep and wool community could meet and market their wares. In 1984, the event was held at the Lane County Fairgrounds in Eugene in conjunction with the World Congress on Coloured [sic] Sheep. Since then, BSG has attracted breeders, fiber artists, wool enthusiasts, tourists, and others, bringing them together for three days of animal shows, fleece competitions, classes, demonstrations, lectures, shopping, and community spinning.¹⁴⁴ Because the festival does not charge an entry fee or require registration for non-vendors and people who are not taking classes, there are no attendance records. However, individuals who have been involved with the festival since its inception estimate that thousands of people travel to Eugene to attend BSG for one or more days each year.¹⁴⁵ Many visitors and vendors take up temporary residence in the campground adjacent to the Lane County Fairgrounds, while still more flood Eugene's hotels, motels, and bed and breakfast-type establishments. Long-time attendees, who have learned from experience, go so far as to book rooms a year in advance to ensure they have a place to stay.

Lane County's Fiber and Textiles Supply chain

Certain parts of the fiber and textiles supply chain are well developed in Lane County, while others are completely lacking. The local climate (from both an ecological and a regulatory perspective) limits the production of crop fibers, such as cotton, flax, and hemp. Due to the presence of several farms, the animal fiber

¹⁴¹ Bill Goldsmith and Lotte Streisinger, "Saturday Market: A Historical Perspective." *Saturday Market*, 1995. Web. 10 September 2015. <<http://www.eugen SaturdayMarket.org/smhist.html>>.

¹⁴² "Frequently Asked Questions." *Saturday Market*, 2015. Web. 10 September 2015. <<http://www.eugen SaturdayMarket.org/faq.html>>.

¹⁴³ *Black Sheep Newsletter: A Magazine for Shepherds and Fiber Enthusiasts*, 2015. Web. 10 September 2015. <<http://www.blacksheepnewsletter.net>>.

¹⁴⁴ "A Brief History of BSG..." *Black Sheep Gathering*, 2015. Web. 10 September 2015. <<http://www.blacksheepgathering.org/history.html>>.

¹⁴⁵ Rolly & Wayne Thompson, Fox Hollow Farm. Interview, 5 August 2015.

supply is robust. Despite the fiber supply, serious deficiencies in fiber processing and textile manufacturing exist. Small-scale apparel manufacturing is present, though weak. However, many natural clothing brands and stores operate locally. In addition, craft retail and education shops, farmers markets, and annual festivals evidence a growing interest in the fiber and textiles industry. The following sections describe the existing resources as well as the supply chain gaps more thoroughly.

Existing Resources

This section provides a brief overview of the aspects of the fiber and textiles supply chain that exists within Lane County. An extensive, though not exhaustive, list of local farms, businesses, services, and other organizations is available in Appendix B.

Fiber Supply

Lane County has a number of alpaca farms and even a few fiber sheep farms. Oregon as a whole has the nation's third-largest population of alpaca,¹⁴⁶ and there are likely several hundred of these animals in Lane County alone. Each alpaca may produce between two and five pounds of fleece, and sheep will yield several pounds as well. By this logic, several thousand pounds of raw fiber are available from Lane County farmers, and much more is present in other parts of the state.

The majority of Oregon's sheep population is located in nearby counties, such as Linn, Benton, and Douglas, on grass seed farmlands. Despite of wool pools that purchase fiber from sheep farmers and sell bulk quantities to Pendleton Woolen Mills,¹⁴⁷ there is still an excess of fiber sitting in barns across the state, as well as in neighboring Washington, California, and Idaho.¹⁴⁸

In terms of animal farming support services, Lane County has a dependable network of feed stores and even some specific veterinary care, but lacks local shearing services. In terms of large animal, and particularly alpaca, care, Oregon State University has one of the nations top programs.¹⁴⁹ The location of this school in Corvallis is convenient for local alpaca and sheep farmers, though it is outside the county border. Shearing, however, is a different story. According to fiber farmers, there used to be more options for this service locally, but businesses have since died out or relocated to other parts of Oregon or other states.¹⁵⁰

¹⁴⁶ "AOA Registered Alpacas." AOA Registry Statistics. *Alpaca Owners Association Inc*, 7 September 2015. Web. 7 September 2015. <<http://www.alpacainfo.com/about/statistics>>.

¹⁴⁷ Sue Kalina, Sheep Breeder. Interview, 14 August 2015.

¹⁴⁸ Shannon Welsh, Pacific Northwest Fibershed. Interview, 17 July 2015.

¹⁴⁹ Cindy Myers, Alpacas at Hum Sweet Hum. Interview, 14 August 2015.

¹⁵⁰ Rolly & Wayne Thompson, Fox Hollow Farm. Interview, 5 August 2015.

Education and Mill-stage Product Retail

Since its inception in 1981, the Black Sheep Gathering (BSG) has continued to grow and attract more tourists to the Lane County Fairgrounds each year. Thousands of attendees flood Eugene's hotels, restaurants, and campgrounds as they visit the city for the festival. Hundreds of vendors, farmers, and instructors travel long distances to attend, sell their animals and wares, and gain visibility in the fiber and textile community. The event provides a venue for farmers, millers, artisans, and enthusiasts to engage in commerce and education related to the fiber and textiles industry. Despite national recognition, local residents are not in large supply at the annual BSG festival. Because BSG is organized by volunteers and financed by the previous year's vendor and workshop fees, the event does not have much capital to spare for advertising or local promotion. Many Lane County and even Eugene residents are unaware of BSG, even as it takes place.¹⁵¹

Employees and proprietors of local yarn stores agree that the Eugene market is saturated—with four small businesses in addition to the yarn sections at chain craft stores and supercenters, consumers have a wide variety of options to choose from. Other towns in the county also have yarn stores, though not so many as Eugene. These shops supply not only yarn, but also handcraft supplies such as knitting needles, crochet hooks, spindles, spinning wheels, looms, pattern and instruction books, and other tools of the trade for the average hobbyist. In addition to offering physical goods, yarn stores provide lessons in basic techniques, free knitting help hours, and occasionally more specialized classes.¹⁵² They fill a basic-skill education gap in the fiber and textiles community.

In addition to courses offered at yarn supply stores and the annual BSG, Lane County is home to a number of individuals that offer private lessons in knitting, crochet, spinning, weaving, and dyeing. Some of these artists offer classes on the side as a part-time income source, while others dedicate their lives to instruction. Some instructors provide private or group lessons to students who come to their homes,¹⁵³ while others work for the University of Oregon, Lane Community College, or the Eugene Textile Center.¹⁵⁴

The Eugene Textile Center (ETC), founded in 2008, is a pillar of the Lane County fiber and textiles community. It is a local hub for mill-stage product retail, basic- and advanced-skill education, and individual- and small-scale yarn and textile production equipment sales. Though it is a fairly new establishment, co-founder and sole-owner Suzie Liles believes that it is the only establishment of its kind, possibly on the West Coast, and certainly in Oregon. ETC's online presence allows it to sell mill-stage products and equipment internationally, through which it has earned recognition from the fiber and textiles community. Liles' center brings in

¹⁵¹ Rolly & Wayne Thompson, Fox Hollow Farm. Interview, 5 August 2015.

¹⁵² Employees, Soft Horizons Fiber. Conversation, 4 August 2015.

¹⁵³ Tracy Livernois, McTavish Farm Shetlands. Interview, 16 July 2015.

¹⁵⁴ Janis Thompson, Eugene Textile Center. Conversation, 14 August 2015.

the world's best fiber and textile instructors to teach courses in fiber arts, textile creation, and surface design. ETC is so prolific that Liles has received several reports of individuals moving to Lane County because of the fiber and textiles resources the center and the surrounding community have to offer. This does not mean that her business does not face struggles, however. Liles states that a lack of funding for advertising and limited space to hold classes are two significant problems ETC faces.¹⁵⁵

Liles actively works to continue growing the fiber and textiles industry in Lane County. In September 2015, she purchased a distributorship for Glimakra Looms, which produces Swedish weaving equipment—the only physical presence of this company in the US and Canada. This new facility, a warehouse, will be located on Railroad Blvd. in Eugene.¹⁵⁶ The previous distributorship was located in Clancy, MT and reported \$347,000 in annual revenues for 2013 and 2014, a significant increase from 2012 (\$147,000).¹⁵⁷

Perhaps the largest yet most underutilized resource for fiber and textiles education and production in the community is the University of Oregon (UO) Fibers Program, craft center, and weaving facility. These programs have experienced significant turnover in the past few years, making connecting with the local fiber and textiles community difficult. Many people, students and community members alike, are unaware that these resources are available.¹⁵⁸ Publicizing the programs and redeveloping the connection between Lane Community College—which has its own robust fiber and textiles curricula—UO, and the rest of the Lane County fiber and textiles community would promote interest in the industry and strengthen the local maker community.

Textiles and Apparel Manufacturing

Lane County has scant resources in terms of textile creation and apparel manufacturing. Options for purchasing textiles in the county are limited to fabric stores that operate on a wholesale or retail basis. There are many of these businesses across the county, ranging from nationwide chain stores¹⁵⁹ to locally owned organic textile dealers.¹⁶⁰ Despite this availability, many local apparel and

¹⁵⁵ Suzie Liles, Eugene Textile Center. Interview, 25 August 2015.

¹⁵⁶ Suzie Liles, Eugene Textile Center. Interview, 25 August 2015.

¹⁵⁷ "Glimakra Looms." *ReferenceUSA*, December 2014. via University of Oregon Libraries, 10 September 2015. Excel file

¹⁵⁸ Suzie Liles, Eugene Textile Center. Interview, 25 August 2015.

¹⁵⁹ Such as Jo-Ann Fabrics.

¹⁶⁰ "About Sew Eco-Logical." General Information. *Sew Eco-Logical*, 2014. Web. 10 September 2015. <<http://www.seworganic.com/geninfo.htm>>.

accessory companies source their materials from overseas, though some purchase fabric from businesses around Portland.¹⁶¹

In terms of garment and accessory creation, some artisans—such as contract weavers—produce small-scale, individual items like scarves and shawls, but even this appears to be very limited in the region.¹⁶² Lane County has a number of cut and sew contractors, many of whom serve local clients. These businesses are typically very small, with only one or two employees. There are also several alterations and embroidery operations in the local area that serve individual customers as well as small and large businesses.¹⁶³

Apparel and Accessories Retail

Lane County, and Eugene in particular, has a number of natural fiber apparel and accessory brands. These businesses depend on online sales—some through their own private websites¹⁶⁴ and others through Etsy storefronts¹⁶⁵—as well as multi-brand boutique retailers¹⁶⁶ and weekly booths at the Saturday Market.¹⁶⁷ Few, if any, have their own brick and mortar storefronts.

Gaps in the Supply chain

Now that the existing resources have been outlined, we must recognize the shortcomings in the local fiber and textiles supply chain.

Plant Fiber Farming

There is no crop fiber farming in Lane County, nor is there a local crop fiber processing mill. The nearest flax operation is outside of Portland and is very early-stage—the woman running the operation has two acres of flax crop and is conducting the processing by hand on her premises.¹⁶⁸ Hemp farming is also non-

¹⁶¹ Lorelee Harding, Circle Creations. Email correspondence, 23 August 2015.

¹⁶² Suzie Liles, Eugene Textile Center. Interview, 25 August 2015.

¹⁶³ Concluded following phone conversations with several local sewing contractors listed in Appendix C. A ReferenceUSA search for these types of businesses yielded many results, though contact attempts revealed the information to be very outdated, as most of the companies listed were no longer in operation or had changed their contact details.

¹⁶⁴ “Clothing for Your Natural Lifestyle.” *Circle Creations*, 2015. Web. 12 September 2015. <<http://www.circlecreations.net>>.

¹⁶⁵ “Watermelonkidz.” Watermelon Kidz Handmade Clothing. *Etsy*, 2015. Web. 12 September 2015. <https://www.etsy.com/shop/watermelonkidz?view_type=list>.

¹⁶⁶ “Trillium.” *Facebook*, 3 September 2015. Web. 12 September 2015. <<https://www.facebook.com/trilliumeugene>>.

¹⁶⁷ “Clothing & Accessories.” *Saturday Market*, 2015. Web. 12 September 2015. <<https://www.facebook.com/trilliumeugene>>.

¹⁶⁸ Shannon Welsh, Pacific Northwest Fibershed. Interview, 17 July 2015.

existent in this part of Oregon and is unlikely to take hold until the state Department of Agriculture develops its industrial hemp program.¹⁶⁹ While several hemp clothing and accessory businesses exist around Eugene, OR, the makers of these items source their materials overseas, where looser regulations and higher-quality production beat out any domestically available products.¹⁷⁰

Fiber Processing

There is no animal fiber processing mill in Lane County. The nearest options for fiber processing are Snowpeak Fiber Mill (Lebanon, OR), Skyline Fiber Mill (Salem, OR), Star Castle (Coquille, OR), Columbia Custom Carding (Deer Island, OR) and Fantasy Fibers (Canby, OR).¹⁷¹ Fiber supply is fairly small locally, with few farms having over 30 animals (and 100-200lbs of fiber per year), but a new mill would likely see enough orders from out of town to succeed. Based on estimated local and regional fiber supply, a Lane County fiber mill may be able to support a much larger scale of production. Such mills have roughly ten full- and part-time employees and reach production levels of 10,000 – 15,000lbs per year.¹⁷² Deterrents to starting any mill typically come down to the amount of start-up capital required and traditionally low profit margins of these endeavors. In addition, the learning curve of running a mill is steep, and skilled mill labor is difficult to come by.

The region lacks a key support industry for fiber processing mills—specialized fiber and textile manufacturing machine repair—though this deficiency is very common across the nation. Currently, Oregon’s fiber processors depend on training they receive from mill equipment manufacturers or previous owners of the machines in order to identify and attempt to fix their own problems. However, if a mill owner (or her employees) lacks an engineering background, the fix-it-yourself option is not viable, and mill-owners must find and hire repair professionals to come and treat their machines.¹⁷³ A repair technician in Lane County would likely find work at each of the mills in Oregon, as well as at some mills in Washington and California.

Little formal training for individuals to work on milling equipment is available, further exacerbating the problem of repairpersons being difficult to find. Lane County has several machinist shops, where professionals can be contracted to make or repair manufacturing equipment or pieces. However, many if not all of

¹⁶⁹ “Industrial Hemp.” *Oregon Department of Agriculture*, 24 August 2015. Web. 10 September 2015.
<<http://www.oregon.gov/ODA/programs/MarketAccess/MACertification/Pages/Hemp.aspx>>.

¹⁷⁰ Jim Vandagriff, Artisan Gear. Interview, 22 July 2015.

¹⁷¹ Concluded through interviews with Oregon mill owners and fiber farmers cited in Appendix C.

¹⁷² Mary Jeanne Packer, Battenkill Fibers. Interview 30 April 2015.

¹⁷³ Mary Jeanne Packer, Battenkill Fibers. Interview, 30 April 2015.

these individuals have not worked with fiber processing equipment.¹⁷⁴ Lane Community College does have programs relating to manufacturing technology and machining,¹⁷⁵ but could not be reached for comment on whether these programs cover or could be adapted to include fiber and textile manufacturing equipment.

Locally-Made Mill-Stage Product Retail

Farmers with batches too small and prices too high to be a viable product at local yarn and other craft or handmade stores have very limited resources for selling mill-stage products. Some sell online at Oregon Wool,¹⁷⁶ though that market place is not very developed. Others have small shops on their farms, which only get business from visitors. Most farmers do not have private online stores because they do not have the time or technical savvy to update them. A Spinner's Barn Farm Store & Gallery is a small shop located on the Aragon Alpacas property that houses goods from various Western Oregon alpaca farms, artisans, and artists, as well as alpaca products from the Andes.¹⁷⁷ The shared space is one of the only places these business people can successfully display and sell their wares.¹⁷⁸ While venues like the Eugene Textile Center and local yarn shops do occasionally offer small selections of locally raised, spun, or dyed fibers, there is no year-round, all-local storefront where customers can choose a locally produced item.¹⁷⁹

One community resource to which alpaca farmers would like access is related to online sales. Many of these farmers have rudimentary websites or no websites at all. Most of those that do, rarely update their pages with new content, including items and animals for sale, because they have neither the time nor the technical knowledge to do so. Good photography, professional appearance, and useful information are all important pillars of fiber farm websites. Local business owners suggest that having a professional web designer who could come to their farms, photograph their animals and products, and regularly assist in updating their information and managing online store fronts, would be extremely valuable to their businesses and to the fiber industry.¹⁸⁰ While untested by interviews, local apparel and accessory brands and natural fiber products and apparel boutiques may also find these services valuable.

¹⁷⁴ John Stokes, Metal Products Company. Email correspondence, 7 July 2015.

¹⁷⁵ "Manufacturing Technology." Advanced Technology. *Lane Community College*, 2015. Web. 12 September 2015. <<https://www.lanec.edu/advtech/mfg>>.

¹⁷⁶ "Shop for Our Products." *Oregon Wool*, 2015. Web. 5 October 2015. <<http://www.oregonwool.com>>.

¹⁷⁷ Ann Dockendorf, "Farm Store & Gallery." *A Spinner's Barn*, 2015. Web. 12 September 2015. <<http://spinnernsbarn.com>>.

¹⁷⁸ Ann Dockendorf, Aragon Alpacas. Interview, 14 August 2015.

¹⁷⁹ Suzie Liles, Eugene Textile Center. Interview, 25 August 2015.

¹⁸⁰ Cindy Myers, Alpacas at Hum Sweet Hum. Interview, 14 August 2015.

Education

During interviews, fiber farm owners—particularly those that raise alpaca—expressed concern at the lack of consumer education regarding animal fiber products. In the animal fiber community, it is acknowledged that alpaca and wool fibers have qualities that are superior to plant and synthetic fibers: they are naturally anti-microbial, water and sweat wicking, flame retardant, and versatile in terms of temperature. Despite these impressive natural properties, common opinion outside the animal fiber community is that these fibers are hot and itchy. In order to sell their wares to a wider audience, individuals providing these products must work to change public opinion through education. This problem plagues the entire natural animal fiber industry, not just individual farmers. For this reason, farmers, mill owners, artisans and industry organizations frequently make consumer education part of their personal and organizational missions. While there are several Oregon associations that undertake the consumer education process, there is not an industry organization specific to Lane County that makes this its mission. Local farmers believe that such a resource would be invaluable in promoting the fiber and textiles industry in Lane County.¹⁸¹

Beyond consumer education, we also consider skill instruction. ETC, BSG, and the area's ample yarn store resources provide an excellent foundation of fiber and textiles education in the community. However, as interest in knitting, spinning, dyeing, and weaving continue to grow, so must the scale of the educational environment. Though ETC plays host to a number of classes, demand for instruction is exceeding the space that business has available. In addition, a weavers' guild that meets regularly at ETC has grown almost too large to hold gatherings at the center. Currently, there is no affordable space for ETC or these growing guilds to rent in order to hold large classes or meetings.¹⁸²

Textile Manufacturing

Textile manufacturing in Lane County is limited to the production of crafters and artisans. While the weaving community is growing in the region, particularly around the Eugene Textile Center, most of the output from this group is on a very small scale—they are making shawls, blankets, rugs, etc., not bolts of fabric that could be cut and sewn into other items. Suzie Liles, owner and founder of the ETC and a member of the Eugene Weavers Guild, believes that there are two to three production weavers in Lane County, likely in the Cottage Grove area, though she could not identify them at the time of her interview.¹⁸³ No local apparel knitting manufacturers on either a large- or small-scale could be identified.

While several small contract sewers and garment makers are present in Lane County, a large-scale unit of this type is not. The largest local contract cut and sew business we were able to identify has 15 employees and serves 13 different

¹⁸¹ Concluded following interviews with local alpaca farmers cited in Appendix C.

¹⁸² Suzie Liles, Eugene Textile Center. Interview, 25 August 2015.

¹⁸³ Suzie Liles, Eugene Textile Center. Interview, 25 August 2015.

countries, with its largest client being an Alaskan company and having only one client in Lane County.¹⁸⁴ Smaller scale businesses—one or two people who tend to work out of their homes—conduct 90% or more of their business within the county, and have several contract accounts from flag and banner companies, local apparel or accessory companies, and the University of Oregon and other local businesses that want generic items customized with embroidery.¹⁸⁵ For the most part, cut and sew production is limited to what a handful of individual contractors can do during their business hours, several of whom also provide alterations services. In terms of competition within the region, more extensive and robust cut and sew service options are available in Portland.¹⁸⁶

Two related problems local sewing contractors face are the lack of skilled labor and poor placement by employment services. One business owner noted that the local employment department routinely sends him machine operators that have never worked with a sewing machine. The placement process, he claims, is too generic. Any individual with the title of machine operator on their resume, regardless of prior industry, may be sent to his business when there is a role to fill. The problem is that sewing machine operation takes a very different set of skills than does running a stamping, laminating, or other type of machine.¹⁸⁷

Part of the reason for the lack of textile manufacturing and cut and sew operations is the same for Lane County as for the nation—overseas production of fabric and apparel is significantly cheaper than domestic work. Large capital outlays are required to build large-scale textile production facilities, and domestic labor is expensive. Some local apparel brands would be interested in sourcing materials closer to home if they became available, though price-point would be a key factor in the decision-making process.¹⁸⁸ Some materials that are frequently used by local apparel and accessory brands—hemp, for example—are not produced domestically, let alone regionally. Unless legislation and competition with marijuana production change, it is unlikely that hemp textile production will take place on a sufficient scale to serve the local market. However, hemp textile based companies in the US have faced problems with imports ranging from delays due to dockworker strikes in Los Angeles to quality issues with Chinese and Eastern European suppliers.¹⁸⁹ These negative factors could provide the foundation for a business opportunity should hemp production become viable domestically.

¹⁸⁴ Terry Shuck, TNJ Custom Sewing & Design. Interview, 25 August 2015.

¹⁸⁵ Concluded following interviews with local cut and sew business owners cited in Appendix C.

¹⁸⁶ Shannon Welsh, Pacific Northwest Fibershed. Interview, 17 July 2015.

¹⁸⁷ Terry Shuck, TNJ Custom Sewing & Design. Interview, 25 August 2015.

¹⁸⁸ Lorelee Harding, Circle Creations. Email correspondence, 23 August 2015.

¹⁸⁹ Jim Vandagriff, Artisan Gear. Interview, 22 July 2015.

CHAPTER 5: CASE STUDIES

This chapter provides case studies on relevant regions and fiber and textile supply chains and economies. The intent is to illustrate how local economies of this nature can be built and what is currently being done in the Pacific Northwest in regard to regional fiber and textile supply chain development.

Fibershed

A natural fiber and textile economy revival has been taking place across the United States since 2012 when Rebecca Burgess founded Fibershed, a non-profit organization that “develops regenerative textile systems that are based on carbon farming, regional manufacturing, and public education.”¹⁹⁰ The organization has grown to include 24 affiliate Fibersheds across the nation—many of which are located in California, Oregon, and Washington—as well as 10 international communities.¹⁹¹ Each Fibershed is envisioned to include the entire supply chain for apparel production from fiber growth to garment creation and sale within a 300-mile radius or smaller region.

Links to several Fibershed resources are available in Appendix C, and several PDF copies of the organization’s studies have been included in the Dropbox accompaniment to this report. While the contents are summarized in the following sections, the Fibershed website¹⁹² is worth exploring.

Steps for Starting a Fibershed

While the Fibershed organization is in its early stages and affiliate programs are very free-form, the non-profit does provide suggestions and guidelines for anyone wishing to start a Fibershed program or simply a region textile project.¹⁹³

Different regions are better suited to different projects as climate, terrain, and local vegetation vary. For this reason, every Fibershed begins with significant research. Key questions include:

- What crops and animals are being raised locally and by whom?
- Are there individuals or businesses with knitting, weaving, spinning, dyeing, and sewing capabilities near by?

¹⁹⁰ “About.” *Fibershed*, 2015. Web. 12 September 2015.
<<http://www.fibershed.com/about/>>.

¹⁹¹ “Affiliate Membership.” *Fibershed*, 2015. Web. 12 September 2015.
<<http://www.fibershed.com/affiliates/>>.

¹⁹² *Fibershed*, 2015. Web. 12 September 2015. <<http://www.fibershed.com>>.

¹⁹³ “Start Your Own Fibershed.” *Fibershed*, 2015. Web. 12 September 2015.
<<http://www.fibershed.com/about/start-your-own-fibershed/>>.

- How small or large will the Fibershed have to be to include each link on the supply chain?

Organization and networking must follow research. Anyone wanting to start a Fibershed program or project must make connections between growers and makers. Once introductions have been made, the organizer and local participants can begin to sculpt a vision of what their regional projects may look like. A key aspect of this stage is documenting, verbally and photographically, the people one meets and their farms and crafts. This part of the project takes a significant amount of time and effort, especially as relationships once built must be maintained.

After an organizer has built a network and the group has collectively begun to envision a certain project or direction in which a Fibershed might go, it is time to begin serious conversations about the functionality of the project, which local fibers or crops to showcase, and the exact resources necessary to the undertaking. The finished product one envisions should match the region it comes from—for example, an Alabama Fibershed would not produce a heavy woolen sweater; it might be better suited to a loose cotton shirt.

Once a project has been decided upon, there must be an effort to cultivate both the natural resources and the community. Raw materials—animals or crops and dyes—must be in good supply prior to production. A Fibershed depends on a strong community to share the resources, labor, and enthusiasm to make the project a success. An organizer should act as a liaison, cultivating connections between community members and bringing them together.

Innovation is both a necessity for and product of Fibershed programs and projects. Technology plays a role in gaining funding for projects—web designers, photographers, and videographers are key to presenting the Fibershed to the public, often via crowd funding websites, but also just for general visibility. Mapping and online organizational tools are also frequently used to connect the community and keep projects moving forward. The creativity inherent in a group of growers and makers results in a different brand of innovation. New patterns or techniques are often developed, as are new ways of processing fiber with a lower environmental impact, or new uses for byproducts of the process.

As the community, projects, and innovations scale, so do the possibilities. The first Fibershed program has graduated from a simple pair of socks—the first item in its regional wardrobe project—to pursuing solar powered mills, bast fiber processing, and dye extract manufacturing. All this in less than five years since inception.

Current Fibershed Projects

Fibershed focuses on public education in addition to economic development of regional fiber and textile communities. Brief descriptions of a few major Fibershed

projects planned and enacted by the organization's founder in the San Geronimo, CA area follow.¹⁹⁴

A quintessential example of a Fibershed undertaking is the Grow Your Jeans project.¹⁹⁵ This recent project involved growing indigo and non-GMO cotton, spinning and dyeing yarn, weaving denim fabric on a hand-powered floor loom, pattern-making and sewing pairs of jeans. To celebrate the success of the endeavor, Fibershed has organized an event where attendees will meet the growers and artists, learn about the production process, have the opportunity to purchase regionally made clothing, and enjoy local food and drink. Proceeds will go to funding a business plan to continue the Grow Your Jeans project.

Fibershed has undertaken two projects specifically to help quantify the resources available to the fiber and textiles community. The first was the California Wool Inventory & Mapping project, which was designed to analyze the state's wool supply.¹⁹⁶ Fibershed partnered with key public and private entities and conducted its own data collection by seeking out farmers to discuss their flocks: breed, number, fiber quality, fiber supply, and more. The project mapped roughly 45% of California's wool, provided vital information for the community's makers, and justified further research for other projects. The second and on-going project is the National Mill Inventory, which is focused on identifying and interviewing all of the fiber processing operations, big and small, across the United States.¹⁹⁷ The final product of the inventory will be a publically disseminated directory of fiber mills, contract knitters and weavers, and cut and sew operations, that will be accompanied by a narrative on the national fiber story. The inventory is intended to aid designers, artisans, and major brands build regional fiber and textile supply chains.

While Fibershed supports the regional textile movement, it also understands the importance of making its systems economically viable. One example of this aspect of its work is the California Wool Mill Feasibility Study.¹⁹⁸ The study "was conducted to assess the production of cloth in a vertically integrated supply chain using 100% California grown wool fiber. The study team ... created an ideal technical road map

¹⁹⁴ More detailed descriptions of Fibershed projects are available at <http://www.fibershed.com/economic-development/> and <http://www.fibershed.com/education/>, both of which are also cited in Appendix C.

¹⁹⁵ *Grow Your Jeans*, 2015. Web. 12 September 2015. <<http://growyourjeans.org>>.

¹⁹⁶ "Wool Inventory & Mapping Project." *Fibershed*, 2013. Web. 12 September 2015. <<http://www.fibershed.com/wool-inventory-mapping-project/>>.

¹⁹⁷ The National Mill Inventory is still in its early stages and information is therefore not yet available on the Fibershed website. Tess Meinert is volunteering as one of two project leads for the National Mill Inventory and has more information upon request.

¹⁹⁸ Also cited in Appendix C, <http://www.fibershed.com/wool-mill-vision/> provides a more in depth overview of the project, a video of founder and Executive Director Rebecca Burgess explaining the motivation for the project, and a link to download the study.

for an ecologically sensitive closed-loop mill design utilizing renewable energy, full water recycling, and composting systems.”¹⁹⁹

As part of its public education mission, Fibershed provides curricula for school children grades 1-8.²⁰⁰ These lessons seek to teach young people about the interaction between humans and the environment, while instilling aspects of fiber and textile tradition. Currently, free downloads of three fully-developed lessons are available on the Fibershed website as well as in the Dropbox accompaniment to this report:

- Restoration Dye Garden Curriculum²⁰¹
- Natural Dye Investigation²⁰²
- Carbon Cycle Curriculum²⁰³

Fibershed often works with other organizations to achieve its public education mission. Carbon Conversations was a 2014 event for which Fibershed partnered with the Carbon Cycle Institute, an organization that works to “stop and reverse global warming.”²⁰⁴ The event was a panel-style discussion where experts and carbon reduction program directors spoke about carbon emissions, sustainable farming practices, and climate change solutions.²⁰⁵

One of Fibershed's largest public education forums is its annual Wool & Fine Fiber Symposium. This event brings together hands-on activities and demonstrations, lectures and presentations on farming and animals, and the sale of Fibershed-produced goods.²⁰⁶ While there is a small entry fee, sponsorship from various businesses covers the costs of the demonstrations, facility rental, and lecturer

¹⁹⁹ Amber Bieg, et. al. “Fibershed Feasibility Study for a California Wool Mill.” *Fibershed*, February 2014. Web. 12 September 2015. <<http://www.fibershed.com/wool-mill-vision/>>. PDF Document

²⁰⁰ “Fibershed Curricula.” *Fibershed*, 2014. Web. 5 October 2015. <<http://www.fibershed.com/education/fibershed-curricula/>>.

²⁰¹ Rebecca Burgess, “Restoration Dye Garden Curriculum.” *Fibershed*, 2014. Web. 5 October 2015. <<http://www.fibershed.com/education/restoration-dye-garden-curriculum/>>. PDF Document

²⁰² Katherine Jolda, “Natural Dye Investigation.” *Fibershed*, 2014. Web. 5 October 2015. <<http://www.fibershed.com/education/natural-dye-investigation/>>. PDF Document

²⁰³ Rebecca Burgess, “Carbon Cycle Curriculum.” *Fibershed*, 2014. Web. 5 October 2015. <<http://www.fibershed.com/education/carbon-cycle-curriculum/>>. PDF Document

²⁰⁴ “About CCI.” *Carbon Cycle Institute*, 2015. Web. 12 September 2015. <<http://www.carboncycle.org/about-cci/>>.

²⁰⁵ “Carbon Conversations.” *Fibershed*, 2015. Web. 12 September 2015. <<http://www.fibershed.com/carbon-conversations/>>.

²⁰⁶ “Wool Symposium 2015.” *Fibershed*, 2015. Web. 12 September 2015. <<http://www.fibershed.com/event/wool-symposium-2015/>>.

travel. The offerings at the symposium change each year, encouraging interested parties to keep coming back.

Pacific Northwest Fibershed²⁰⁷

The Pacific Northwest Fibershed is organized by Shannon Welsh and covers a region within a 300-mile radius of Portland, OR. Like many Fibersheds, the Pacific Northwest affiliate organization is fairly new. Welsh is currently interviewing business owners and private makers along the soil-to-skin natural fiber and textile supply chain, in an effort to better understand the regions' current production, processing, and making capabilities. She does not currently have a membership structure, but is exploring the regional fiber community in order to develop next steps and build awareness for her Fibershed.

Welsh noted several trends she has witnessed in the area—most of her interviews have been with Oregon producers, processors, and makers. During her canvas of the local fiber supply, Welsh found that many farmers have barns full of fiber. These farmers are either unsure of what to do with the fiber, or cannot get a good price for their product.

According to Welsh, fiber-processing operations that undertake the full range of activities from washing to spinning are in short supply. Many farmers send their fiber to Wyoming or Montana to be cleaned and spun into yarn. There are very few²⁰⁸ mills within the Pacific Northwest Fibershed that Welsh has discovered—each of which has been lauded by its customers as being a high-quality facility. These processors have no shortage of work orders coming in, and many are inundated with six- to eight-month backlogs of work.

Around Portland, Welsh believes the market is saturated with contract knitters, weavers, and cut and sew operations. The “maker” industry is alive and well in Portland and may serve as a substitute for larger and more mechanized apparel manufacturing operations in the future. A clothing designer herself, Welsh has examined these resources extensively.

As Lane County lies within the Pacific Northwest Fibershed, Welsh has also been exploring the resources available here. She would be an invaluable contact in any Lane County fiber and textile industry projects moving forward.

²⁰⁷ Shannon Welsh, Pacific Northwest Fibershed. Interview, 17 July 2015.

²⁰⁸ At the time of publication, Welsh had not provided a complete list of fiber and textile businesses in her Fibershed to the authors. She is still in the process of creating a contact list and would likely be willing to share it if required for further development.

CHAPTER 6: CONCLUSIONS AND NEXT STEPS

Interest in a more developed fiber and textiles economy is present and growing in Lane County. While the supply chain for crop fiber and textile production is virtually non-existent, the seeds of an ample animal fiber industry are already here. The county is home to many alpaca and sheep farmers, as well as several cut and sew contractors and a number of natural clothing brands. What is missing are the middle links in the supply chain: fiber processing and textile manufacturing. Demand for locally produced textiles may not be substantial enough to warrant significant investment in manufacturing capabilities. However, a fiber processing mill could be successful in and of itself or as a component of a larger tourism and education system.

This chapter presents the key findings that came out of CSC's research as well as next steps for further research and development of the industry. These are provided for Lane County's consideration should it decide to conduct further research and analysis toward building the local fiber and textile economy.

Key Findings

The following are a list of key findings from the literature review, interviews with industry stakeholders, and case studies.

Literature Review

- Lane County has a rich history of fiber production and textile manufacturing, though these industries died out in the 1950s due to competition from European markets and increased demand for synthetic textiles.
- There is interest in building or reviving Lane County's historic industries. The Lane County Historical society's Heritage Outreach Grant Program has already provided support to local businesses and organizations in their endeavors to revive historic industries, including a gristmill that mimics the one that stood near the Eugene Woolen Mill in the early part of the 20th century.
- Fiber crop production and processing, as well as large-scale textile milling and apparel manufacturing options do not currently exist in Lane County, as reported by QCEW data. This is not unusual in today's business climate, as domestic fiber sources are typically raised near large mills in the southeast and most textile and apparel manufacturing occurs overseas.

In-depth Interviews

- Interest in the fiber community is growing, especially in terms of people seeking out classes in knitting, spinning, and natural dyeing. Local knitting, spinning, and weaving guilds and groups are gaining new members.

- Local farmers and many small-scale fiber processors nationwide depend on other sources of income. Their fiber-related businesses are usually just enough to pay for themselves, while the owners work other jobs part-time or depend on the income of spouses. Larger-scale fiber processors are able to support themselves from their fiber businesses.
- Local farmers would benefit from a processing mill established in Lane County, along with a permanent venue for selling their small-batch products.
- Education, community service, and tourism play significant roles in the local alpaca business. Tourists often visit farms along covered bridge and wine country trails, while university students bring their families to farms. Farmers welcome guests, conduct tours, and educate children and other visitors. Friendly animals are taken to nursing homes, hospitals, and community events.
- Several themes recurred during discussions with stakeholders in the local fiber and textiles community about their needs that are not being met:
 - Local Processing
 - Consumer Education
 - Marketing Assistance
 - Retail Space

Case Studies

- Regional fiber economies are being built in many places across the nation, though they typically encompass many counties or several states.
- Difficulties arise in organizing these economies because the people responsible for building a formal network of farmers, processors, and makers have businesses of their own, cannot dedicate significant time to the organization process, and are unpaid for their efforts.
- The Portland Fibershed encompasses Eugene and is in an early organizational phase, but with further development could result in a fully developed fiber and textile supply chain.

Next Steps

While this report provides a thorough overview of what is available and unavailable in the local community, it is primarily the work of one individual with limited connections and no authority in the industry. Further research, networking, and development of a long-term vision need to be undertaken by persons with greater influence if the county chooses to pursue development of the local fiber and textiles economy.

Further Research

- Conduct a fiber inventory of Lane County and the surrounding areas with significant sheep and alpaca populations. An example of such an inventory

is available from Fibershed²⁰⁹ and has been included in the Dropbox file that accompanies this report. This will provide a more in-depth view of the local supply of fiber:

- How much fiber is available for processing?
- What is the quality of the fiber available?
- What end applications are most appropriate for this type of fiber?
- Explore the regulatory and support environment around the natural fiber and textiles industries.
 - Local historic societies
 - Sheep and alpaca organizations
 - Oregon Tilth
 - Fiber arts associations
- Conduct an economic impact study around building a fiber mill.
 - Which size mill would be best and where to buy the equipment
 - Expertise, training, and employment required and resulting
 - Impact on local tourism and education

Making Connections

- Certain individuals are especially influential or well connected within the local fiber and textiles community. These are the people who would be excellent contacts and resources should the county decide to pursue development of the local industry:²¹⁰
 - **Ann Dockendorf**, Owner, Aragon Alpacas
 - ann@aragonalpacas.com
 - (541) 912-0782
 - **Barbara Pickett**, Professor Emeritus, University of Oregon Fibers Program
 - bpickett@uoregon.edu
 - (541) 346-3658
 - **Cindy Myers**, Owner, Alpacas at Hum Sweet Hum
 - alpacashsh@gmail.com
 - (541) 232-5263
 - **Laura Todd**, Coordinator, Black Sheep Gathering
 - blacksheepgathering@gmail.com
 - **Rolly & Wayne Thompson**, Owners, Fox Hollow Farm
 - kusiwarmi13@gmail.com
 - **Suzie Liles**, Co-founder and Owner, Eugene Textile Center
 - suzie@eugenetextilecenter.com
 - (541) 913-9512
 - **Shannon Welsh**, Founder, Pacific Northwest Fibershed
 - skaiwelsh@gmail.com

²⁰⁹ The Fibershed Wool Inventory & Mapping project, 2013, is included in the organization's greater "Fibershed Feasibility Study for a California Wool Mill," though a summary of the inventory is available on the Fibershed website and has been cited in Appendix C.

²¹⁰ Contact information is available in Appendix B.

- There are several regional and state organizations that may be helpful in conducting further research or making additional connections in the Oregon fiber and textiles community:²¹¹
 - Alpaca Association of Western Oregon
 - Eugene Weavers Guild
 - Oregon Wool Growers Association
 - Pacific Northwest Alpaca Association

Long-Term Vision

Should the county pursue development of the local fiber and textiles economy, the following ideas represent potential avenues that would benefit stakeholders in the industry and members of the larger community as well:

- Combination fiber mill, farm store, and education space
- Combination web designer, e-tail manager, and photographer
- Consumer education and marketing specialist

²¹¹ Contact information is available in Appendix A.

APPENDIX A: NATIONAL AND STATE RESOURCES

National Organizations

American Sheep Industry Association

- (303) 771-3500
- <http://www.sheepusa.org>

Alpaca Fiber Cooperative of North America

- Starr Cash, Business Operations Manager
- starr@afcna.com
- <http://afcna.com>

Alpaca Owners Association

- (402) 437-8484
- <http://www.alpacainfo.com>

Alpaca Research Foundation

- Abe Rosenbloom, President
- aaosenbloom@gmail.com
- <http://www.alpacaresearch.org>

Fibershed

- Rebecca Burgess, Founder
- Fibershed@gmail.com
- <http://www.fibershed.com>

The National NeedleArts Association

- (800) 889-8662
- info@tnna.org
- <http://www.tnna.org>

Woolful

- Ashley Yousling, Founder
- hello@woolful.com
- <http://woolful.com>

Oregon Resources

Alpaca Association of Western Oregon

- info@alpacafarmsoregon.org
- <http://www.alpacafarmsoregon.org>

Eugene Weavers Guild

- info@eugeneweavers.com
- <http://eugeneweavers.com>

Oregon Flock & Fiber Festival

- Brandy Chastain, Festival Director
- director@flockandfiberfestival.com
- <http://flockandfiberfestival.com>

Oregon Sheep Growers Association

- Nikki Koesan, Helpful Correspondent
- (503) 364-5462
- info@sheeporegon.com
- <http://sheeporegon.com>

Oregon Wool Growers Association

- owga@oregonwool.com
- <http://www.oregonwool.com>

Pacific Northwest Alpaca Association

- Chris Sturgeon, President
- (206) 280-8221
- pnaapresemial@gmail.com
- <http://www.pnaa.org>

Pacific Northwest Fibershed

- Shannon Welsh, Founder
- skaiwelsh@gmail.com

Portland Apparel Lab

- Crispin Argento & Dawn Moothart, Founders
- founders@portlandapparellab.com
- <http://portlandapparellab.com>

Portland Garment Factory

- Britt Howard, Consultations & PR
- (503) 257-2905
- britt@portlandgarmentfactory.com
- <http://www.portlandgarmentfactory.com>

APPENDIX B: LOCAL BUSINESSES

Farms

Aragon Alpacas

- Ann Dockendorf, Owner
- ann@aragonalpacas.com
- <http://aragonalpacas.com>

Alpacas at Hum Sweet Hum

- Cindy Myers, Owner
- alpacashsh@gmail.com
- <http://www.humsweethumalpacas.com>

Fox Hollow Farm

- Rolly & Wayne Thompson, Owners
- kusiwarmi13@gmail.com
- http://www.oregonwool.com/index.html?page=http%3A//www.oregonwool.com/cgi-bin/woolnet_show_member.cgi%3FID%3D6

McTavish Farm Shetlands

- Tracy & Tom Livernois, Owners
- tracyntom@gmail.com
- <http://www.mctavishfarmshetlands.net>

Pura Vida Alpacas

- Robbin Freedman, Owners
- baileyhillfarmgirl@gmail.com
- <http://www.baileyhillalpacas.com/baileyhillalpacas.com/Welcome.html>

Mill-stage Product Retail

Black Sheep Gathering

- Laura Todd, Coordinator
- blacksheepgathering@gmail.com
- <http://www.blacksheepgathering.org>

Eugene Textile Center

- Suzie Liles, Co-Founder & Owner
- suzie@eugenetextilecenter.com
- <http://www.eugenetextilecenter.com>

Soft Horizons

- Mona Rummel, Owner

- (541) 343-0651
- <http://softhorizonsfibre.com>

Stick + String (formerly Textiles a Mano)

- Anna Hults
- hultsanna@gmail.com
- <http://www.stickPLUSstring.com>

The Knit Shop

- helpdesk@knitshop.com
- <http://knit-shop.com>

Apparel Manufacturing

Celestial Fiber Arts

- Celeste Percy, Owner
- (541) 334-6504

Cindy Sew It

- Cindy Burton, Owner
- (541) 344-1052

Cordell Sewing and Embroidery

- Brandon Cordell, Owner
- bcordell@uoregon.edu
- <https://www.facebook.com/CordellsSewingAndAlterations>

Imagine Custom Sewing

- Karen Freeman, Owner
- <https://www.etsy.com/shop/imaginecustomsewing>

Our Sewing Room

- (541) 225-4857
- <http://www.oursewingroom.com>

TNJ Custom Sewing and Design

- Terry Shuck, Owner
- (541) 736-1919

Textile Wholesale & Retail

Jo-ann: Fabric and Craft Stores

- <http://www.joann.com>

Petersen-Arne

- Craig Curtis & Cynthia Morris, Owners

- (541) 485-1406
- <http://www.petersen-arne.com/AboutUs>

Piece by Piece Fabrics

- (541) 743-0266
- <http://www.piecebypiecefabrics.com>

Sew Eco-Logical

- Kayleen Hanna, Owner
- (541) 683-5828
- <http://www.seworganic.com>

Apparel and Accessory Brands

Apocalypse Carousel

- Andrea Ros
- <http://www.apocalypsecarousel.com>

Artisan Gear

- Jim Vandagriff, Owner
- (541) 357-7562
- <http://www.artisangear.com>

Batikwalla

- Victoria Dresdner, Owner
- batikgirl@hotmail.com
- <http://www.batikwalla.com>

Circle Creations

- Lorelee Harding, Owner
- email@circlecreations.net
- <http://www.circlecreations.net>

Precious Peach Creations

- Leila Gutierrez, Owner
- mtziondr@gmail.com
- <https://www.etsy.com/shop/leilapreciouspeach>

Watermelon Kidz Handmade Clothing

- Kim Anderson, Owner
- <https://www.etsy.com/shop/watermelonkidz#>

Apparel and Accessory Retail

Saturday Market

- (541) 686-8885

- info@eugenSaturdaymarket.org
- <http://www.eugenSaturdaymarket.org/index.html>

Trillium

- (541) 485-8117
- <http://www.apocalypsecarousel.com>

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²¹² Conducted by Tess Meinert, who has retained recordings, transcripts, and photographs related to these interviews.

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