

Eastern Redcedar Market Analysis

2005 Directory





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Eastern Redcedar Market Analysis

2003 Directory

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The University of Missouri Center for Agroforestry (UMCA) is an interdisciplinary research, teaching and technology transfer program that draws on the expertise of university faculty in forestry, fisheries and wildlife, entomology, plant pathology, agronomy, animal science, agricultural economics, rural sociology and horticulture. The center coordinates Agroforestry activities for use in Missouri and adjacent areas of the Midwest. Its mission is to initiate, coordinate and enhance Agroforestry activities to meet the environmental, social and economic needs of land management within the state of Missouri, North America and the temperate zone worldwide.

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The University of Missouri Center for Agroforestry conducted an analysis of the eastern redcedar market.

Research objectives

The redcedar market research study has two major objectives. The first objective is to develop a basic understanding of the eastern redcedar market (who are the participants in the market, what kind of products are currently being marketed, what are the general trends for supply and demand). The second objective is to use Porter's Five Forces Model to analyze the competitive forces that coordinate and control the market and to identify the resources and relationships needed to be successful in the eastern redcedar market. The results of the research, together with an updated directory of companies in the redcedar market, are designed to benefit those already in the market and others who are considering entry into redcedar industry.

To achieve our objectives, we analyzed the competitive forces that coordinate and control the market using Porter's Five Forces Model.

Participants in the research

Through a mail survey, followed by more in depth phone interviews, we surveyed eastern redcedar businesses from 16 states, predominantly primary manufacturers, ranging from small operations with less than \$10,000 per year gross annual sales to large firms with gross annual sales over \$16 million. Based on all feedback, it is estimated that the US redcedar market generates nearly \$60 million per year in gross sales and is growing.

We surveyed the value chain from raw material producers (private landowners, loggers and timber brokers) and primary manufacturers (sawmills, shavings or mulch producers) to secondary manufacturers (parts manufacturers, novelty producers, essential oil producers), wholesalers and retail outlets. Along the value chain, most of the participants are involved in both supplying and buying eastern redcedar products. Some of the companies are vertically integrated being involved in two or more steps in product conversion.

Redcedar products

Companies surveyed buy a large variety of products ranging from standing timber to logs, posts, cants, lumber or by-products. The products sold included logs, cants, lumber, fence posts, tongue and groove paneling, furniture, cedar-wood oil, novelties, mulch and shavings. A characteristic unique to redcedar is that every by-product and every fiber of the tree can be marketed. Manufacturing by-products that are not used as cants, fence posts or dimensional lumber can be used as flakes for pressboard, mulch, shavings, cedar balls or can be processed for extracting cedar-wood oil. The residue after extraction can be used as boiler fuel.

Forces that drive competition in the eastern redcedar market

Threat of new entrants (Barriers to entry)

Our survey respondents identified the following barriers to entry in the redcedar industry:

- ⇒ Capital requirements - 28% noted this as a barrier,
- ⇒ Lack of knowledge and experience (20%),
- ⇒ Access to inputs (16%),
- ⇒ Access to markets (16%),
- ⇒ Labor intensity (12%),
- ⇒ Economies of scale (12%).

The more difficult the barriers are to overcome by those trying to enter the market, the better they protect the companies already in the market from potential new entrants.

Bargaining power of suppliers and buyers

Characteristics of the value chain based on survey results:

- ⇒ Suppliers in the value chain are relatively small companies in terms of annual sales
- ⇒ Some of the companies surveyed have their suppliers deliver to them while other companies find it necessary to travel more than 150 miles to obtain their raw material supply
- ⇒ Transactions take place mostly on the spot market
- ⇒ The largest segment of the buyers' chain is represented by resellers
- ⇒ The majority of the companies surveyed sell their products locally

Trends in supply and demand

Based on **survey** results, the supply of all quality levels of redcedar materials is likely to stay the same in the next 10 years. However, it is possible that a shortage of good quality redcedar material and an increase in

poor quality material will occur in the next 10 years

However, based on the information obtained from US Forest Service, Forest Inventory and Analysis (FIA) data, there is abundant redcedar available in four states (Arkansas, Tennessee, Kentucky, and Missouri). FIA data indicates that the useable redcedar resource will slowly increase in quantity for the next three decades.

Survey results also indicate that demand for redcedar materials will remain the same or increase in the next 10 years. More specifically, demand for good quality cedar will increase, demand for average quality will stay the same, and demand for poor quality will decrease. This trend was expected as the redcedar industry continues to upgrade its standards to produce higher quality products.

Based on survey results, minimal bargaining power is exerted along the value chain. Bargaining power on the **supply** side is felt at the primary manufacturing level. From the buyers' perspective, there seems to be little to no bargaining power. Out of the companies surveyed, there doesn't appear to be any single buyer that purchases large volumes of redcedar material.

Threat of substitute products

Different uses of eastern redcedar have different potential substitutes. For example, western redcedar, redwood or treated lumber could be used as substitutes for eastern redcedar in home construction or dimensional lumber. Mulch can be obtained from different species of hard wood and pine shavings. Rice hulls or saw dust can also be used as pet bedding.

That said, because of its distinctive properties: reddish/brown color, unique fragrance, natural rot resistance and insect repellent qualities all derived naturally, eastern redcedar is perceived to be in a niche by itself, with very few close substitutes.

Rivalry among existing firms

Based on the surveys, the level of rivalry in the eastern redcedar market is perceived as non-competitive to moderately competitive.

Survey feedback indicates that the number of competitors will either stay the same or decrease in the next 10 years.

Competitors are attracted to the eastern redcedar market not only by the perceived profit and the independence that a private business offers but also by the full utilization of redcedar material, availability of redcedar raw material, and the fact that redcedar is a growing niche market.

In response to new competitors that may enter the market, the majority of the companies surveyed did not indicate that they had a special strategy or reaction.

Their approach to competition is to keep producing their products, focusing on quality and service.

Governmental policies

The policies that were recognized by the survey respondents to have influence over the redcedar industry included:

- ⇒ The EPA ban on CCA treated lumber
- ⇒ The implementation of sustainable forestry certification for suppliers to Lowe's and Home Depot
- ⇒ Management practices adopted by state natural resource agencies determined to eradicate redcedar

In practical terms, none of these policies were found to have a significant impact on the redcedar marketplace.

Next steps:

For the collective benefit of the redcedar industry, it is suggested that industry participants join their efforts to identify and pursue actions to grow the overall market. Actions to be taken in the near future might include:

- ⇒ Creation of a redcedar marketing board to increase awareness of market opportunities.
- ⇒ Developing an infrastructure by working with federal/state agencies to facilitate the flow of goods and information through the market.
- ⇒ Linking industry participants with research institutions to develop new market opportunities by exploring alternative uses for eastern redcedar wood, oil, and products.
- ⇒ Encourage private landowners to manage redcedar stands and foresters to learn more about how to manage it.

The University of Missouri Center for Agroforestry's redcedar market research study has two major objectives. The first objective is to develop a basic understanding of the eastern redcedar market (who are the participants in the market, what kind of products are currently being marketed, what are the general trends for supply and demand). The second objective is to use Porter's Five Forces Model to analyze the

competitive forces that coordinate and control the market and to identify the resources and relationships needed to be successful in the eastern redcedar market. This information is intended to assist companies in the market in the development of new strategies to improve their business or assist individuals who are considering entry into this industry.

EASTERN REDCEDAR

Eastern redcedar (*Juniperus virginiana* L.) is a member of the cypress family (*Cupressaceae*) native to the forests of the eastern and central United States. Because this species tolerates extremes of drought, heat and cold, the natural range extends well out into the Great Plains. Eastern redcedar thrives on thin limestone soils and will successfully invade abused, overgrazed sites, abandoned pastures, and limestone rock exposures. The species has proliferated over the past 50 years due to land conversion, overgrazing, land abandonment and fire suppression. Many landowners have a negative view of eastern redcedar, perceiving it as an invasive weed species, often chained, bulldozed and burned. As the resource has spread and increased in age, its utilization and value in an array of products has become more widely recognized. The red, heartwood of eastern redcedar logs contains secondary metabolites or "oils" that possess the qualities to resist and/or repel insects and decay.

Eastern redcedar wood is used by builders and homeowners because of its durability, beauty, fragrance, resistance to insect infestation and decay, and ease of

maintenance. It can also be used for almost any kind of furniture, especially for cedar chests and wardrobes and is commonly used in closets. As wood utilization by-products, shavings are widely used for large and small animal pet bedding and redcedar mulch distinguishes itself by its appealing color, aroma, durability and insect deterring properties¹. From an environmental standpoint, eastern redcedar is often used for wildlife habitat and in agroforestry practices for shelterbelt and windbreak plantings.

¹ Suszkiw, J. 2000 Termites go hungry on resistant trees
USDA ARS News & Information,

www.ars.usda.gov/is/pr/2000/001012.htm

Meissner H.E. and Silverman J. 2001 effects of aromatic cedar mulch on the Argentine Ant and the Odorous House ant (Hymenoptera: Formicidae), J. Econ. Entomol. 94(6): 1526-1531

We surveyed the value chain, from raw material producers to wholesale and retail outlets (Fig.1) and determined who the eastern redcedar market participants are, the array of products that are currently being marketed and the supply and demand trends. To better understand the market, we analyzed the forces that drive competition

and determined the factors that influence entry into the redcedar market, the characteristics of the value chain, the relative power of the value chain participants, potential substitutes for eastern redcedar and the level of rivalry in the market.

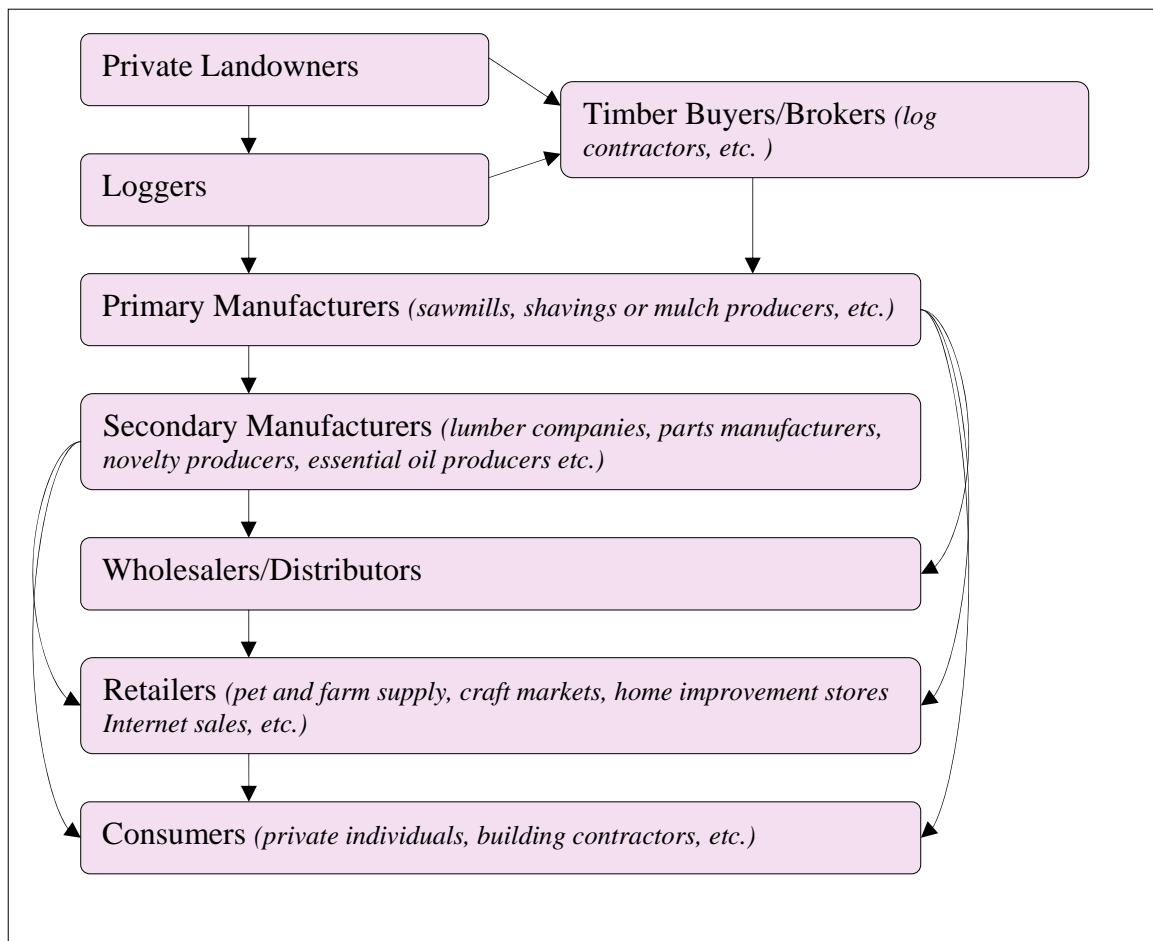


Figure 1: Redcedar value chain participants

To identify the forces within the redcedar market we developed a three-step research methodology.

In the first step we identified the market participants using available secondary information from the internet, Missouri Department of Conservation data on the wood products industry, knowledgeable university colleagues, private forest consultants, and initial contacts with businesses in the redcedar industry. We developed a database of companies participating in the redcedar market listing basic identification information (company name, contact person, address, phone, fax, email and web site address), types of products purchased and sold.

In the second step we developed a questionnaire-based survey that was mailed to the 187 companies identified. Fifty-eight surveys were returned. Based on these surveys we created a quantitative picture of the five forces acting on the redcedar marketplace. Analysis of the results from the mail survey guided the development of a more qualitative phone survey.

The third step in the research process was based on a set of phone interviews administered to a sample of the respondents that completed the mail surveys and agreed to participate in the follow up phone interview. Interviews were conducted using a semi-structured questionnaire with more open-ended questions. We conducted 25 interviews with managers and owners/managers of small, medium and large businesses in the redcedar market. With the respondents' permission, the interviews were recorded, transcribed and analyzed by the research team. Confidentiality was protected in all surveys.

Porter's Five Forces Model² was used to develop and analyze both the mail survey and the phone survey.

² Porter M. 1980 Competitive Strategy: techniques for analyzing industries and competitors. The Free Press, New York

The Five Forces Model (developed by Dr. Michael Porter of Harvard University) serves as a framework for examining competition that transcends industries, particular technologies, or management approaches. The underlying fundamentals of competition go beyond the specific ways individual companies go about competing (i.e. Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis; the 4P's of marketing: product, price, place, promotion). The underpinning of this framework is the analysis of the five competitive forces acting upon an industry and their strategic implications (Fig. 2)

The Five Forces Model looks at five areas of competition in the marketplace:

- Threat of new entrants (Barriers to entry)
- Bargaining power of suppliers
- Bargaining power of buyers
- Threat of substitute products or services
- Rivalry among existing firms

In addition to the five forces, a sixth force, governmental policies is added to Porter's model because of its influence on all the other forces.

By understanding the competitive forces within the redcedar industry, participants in the market can develop successful strategies to influence the forces for their own benefit.

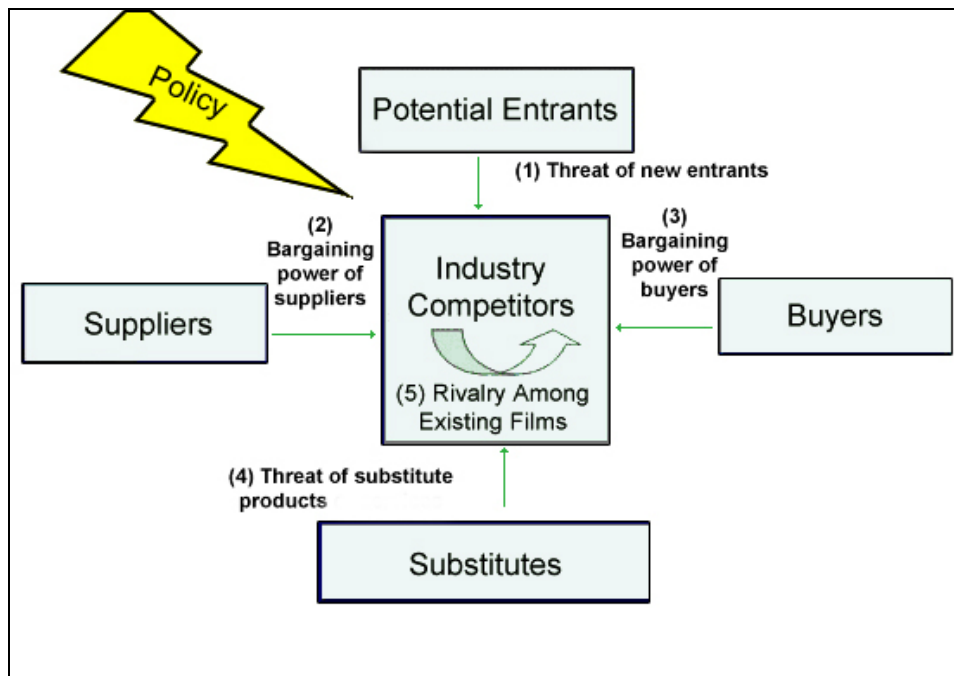
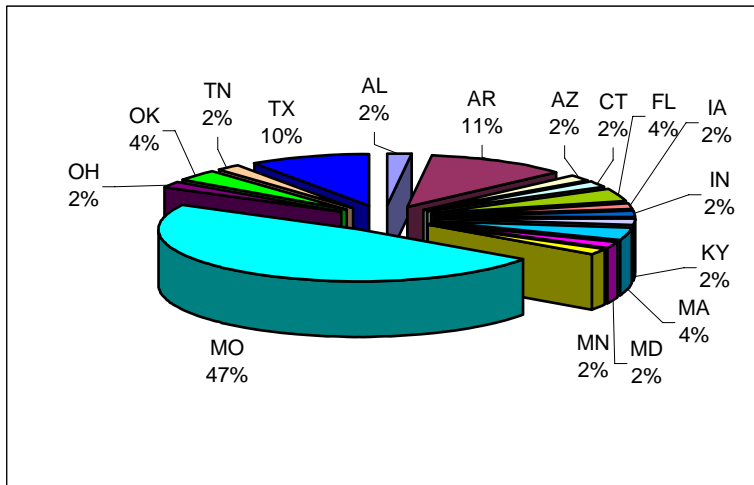


Figure 2: Forces driving industry competition

States surveyed



The geographic distribution of the 58 respondents of the mail survey is presented in Figure 3. Responses came from 16 states, predominantly east of the Rockies.

Figure 3: Distribution of respondents from mail survey

Out of the 58 respondents, 25 participated in the follow up phone interviews.

Their geographic distribution is presented in Figure 4.

The majority of respondents were from Missouri. A broader geographic distribution was obtained during the mail survey (16 states) compared with the phone survey (only 9 states).

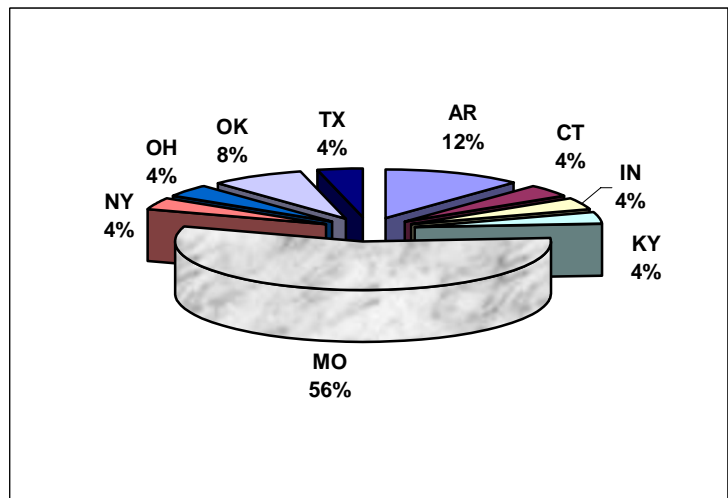


Figure 4: Distribution of phone survey respondents

Value chain position in the eastern redcedar market

The distribution of the mail and phone survey participants based on their role played in the eastern redcedar market is presented in Figure 5. Primary and secondary manufacturers were the dominant respondents to the phone survey.

We should note that respondents could be categorized as more than one of the labels i.e. a respondent could be both a primary and a secondary manufacturer.

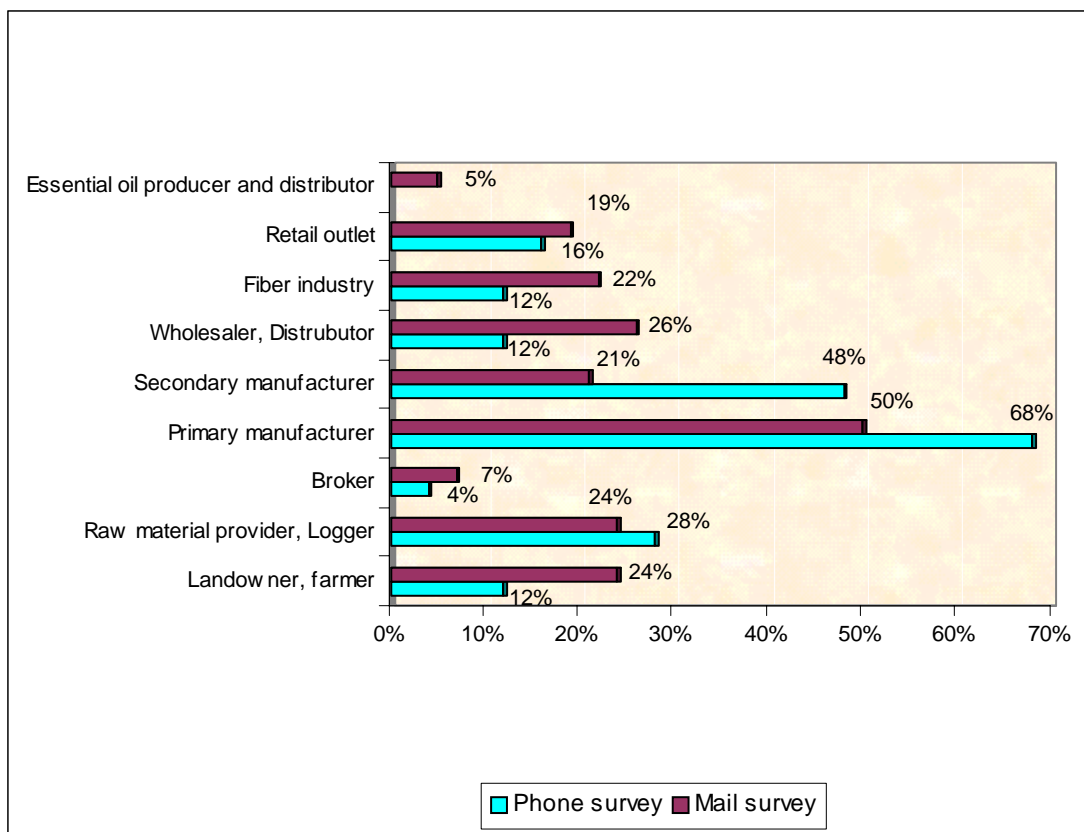


Figure 5. Value chain position for mail and phone survey respondents

Years in business

Results show that the number of firms relatively new in the market far outweighs the number of firms with tradition in the marketplace (~70% of the surveyed firms have been in the eastern redcedar business for less than 20 years and ~50% less than 10 years compared with ~30% that have more than 20 years of experience in the market – Figure I - Appendix).

This suggests that redcedar is a growing industry. New and more diversified firms entered the market and new uses continue to be found for eastern redcedar

Gross annual sales

The redcedar market ranges from small operations with gross annual sales of less than \$10,000 per year to large firms with gross annual sales over \$16 million. Out of the companies participating in the phone survey, 39% specialize exclusively in redcedar. Redcedar represents a majority of the business for 62% of the respondents (Figure 6).

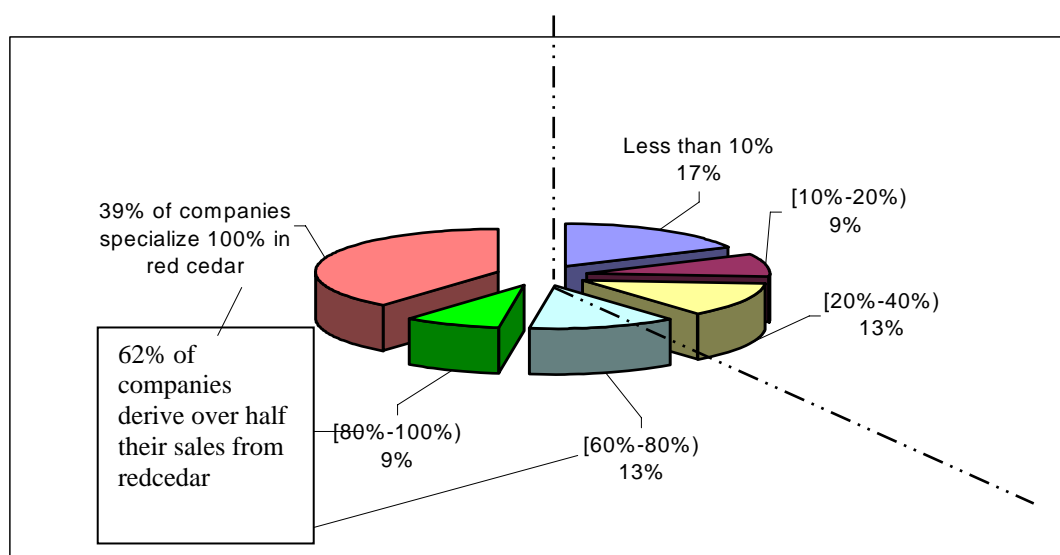


Figure 6. Percentage of redcedar from total gross annual sales (phone survey)

The distribution of the companies participating in the mail survey based exclusively on their gross annual sales from eastern redcedar products indicates that about ¼ of companies (28%) had gross annual sales in excess of \$250,000 (Figure 7). [Note that in the mail survey the top sales category was “More \$250,000”]

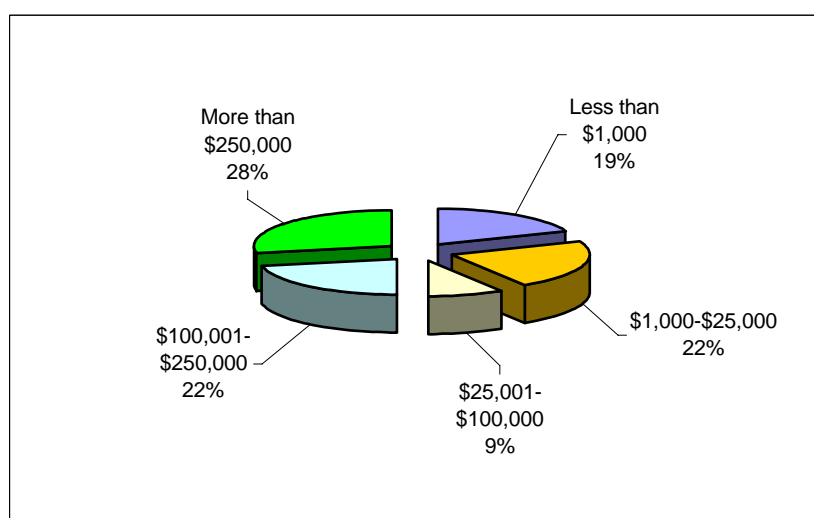


Figure 7. Gross annual sales exclusively from eastern redcedar products (mail survey)

Responses from the phone survey provide a more accurate picture of gross sales figures for companies in the redcedar market (Figure 8). About 1/3 (32%) of the firms in the phone survey indicated gross annual sales from redcedar in excess of \$1 million.

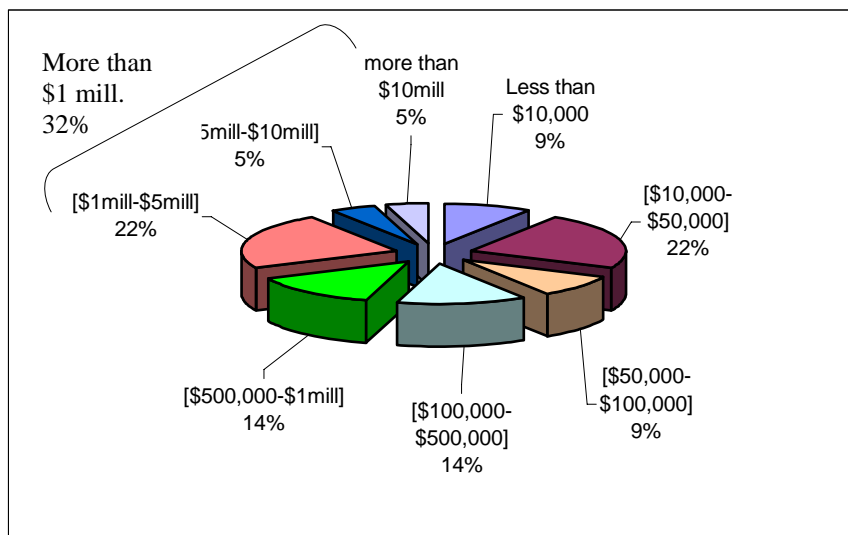


Figure 8. Gross annual sales exclusively from eastern redcedar products (phone survey)

REDCEDAR, COMMODITY VERSUS PRODUCT

Items classified as commodities can be described as possessing the following attributes:

First, customers want the cheapest price; second, commodities represent items produced and purchased in high volumes and with high frequency; and third, producers are reliant on the advantages of size and scale to achieve the lowest cost of production and resultant low prices. They are minimally differentiated and the buyers incur no cost to switch from one supplier to another.

Products, in contrast, can be described as items that are value added goods, more differentiated from one another. A product is a "value package" of elements that in combination offer benefits to satisfy customer needs. The more differentiated the products are, the more value they have and the more unique they are perceived. The challenge is to differentiate the products and add value in a way that will beat competitors and build long-term customer relationships.

Redcedar products

In the redcedar market, the companies surveyed buy a large variety of products ranging from standing timber to logs, posts, cants, lumber or by-products. The products and the quantities purchased by the phone survey respondents are presented below (Figure 9). Responses came in a variety of units of measure based on type of product purchased, i.e. board feet, tons, cords, dollars, etc. Based on the results, the largest firms use over 1

million board feet of redcedar annually. Standing timber is the most common product purchased (76%), followed by raw logs (64%) and cants (28%). The results are influenced by the fact that primary manufacturers are the largest group interviewed. The volume purchased annually ranges from less than 1,000 board feet to more than 5 million board feet and from 4,000 tons to 50,000 tons.

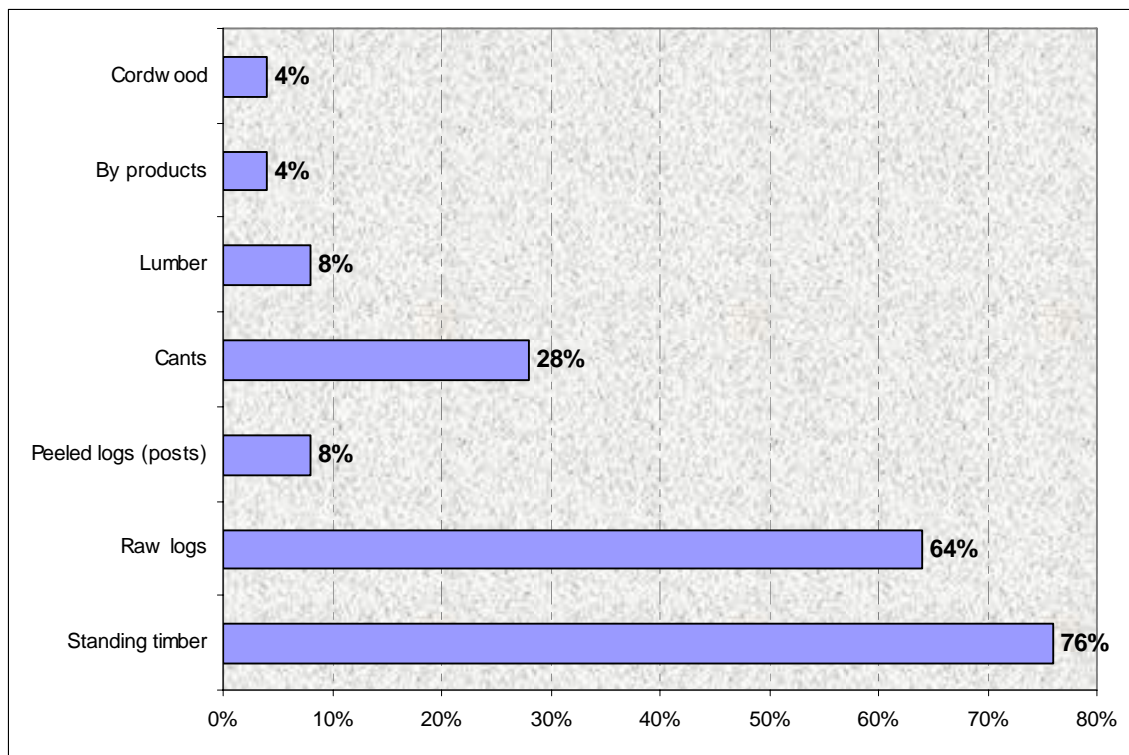


Figure 9: Products purchased (phone survey)

Forty percent of respondents expect the volume purchased to increase and another 40% expect this volume to stay the same in the next 10 years (Figure 10).

The respondents that expect the volume purchased to increase are located in regions with abundant redcedar (AR, MO, KY)

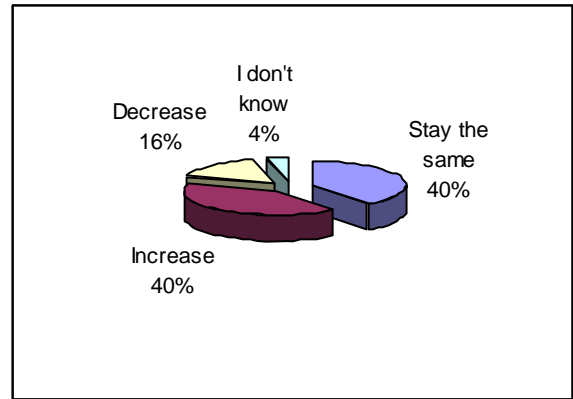


Figure 10: Expectation for volume purchased (phone survey)

Redcedar uses

Redcedar has a wide range of uses. Products range from logs, cants, and lumber to furniture, cedar-wood oil, novelties, mulch and shavings (Figure 11).

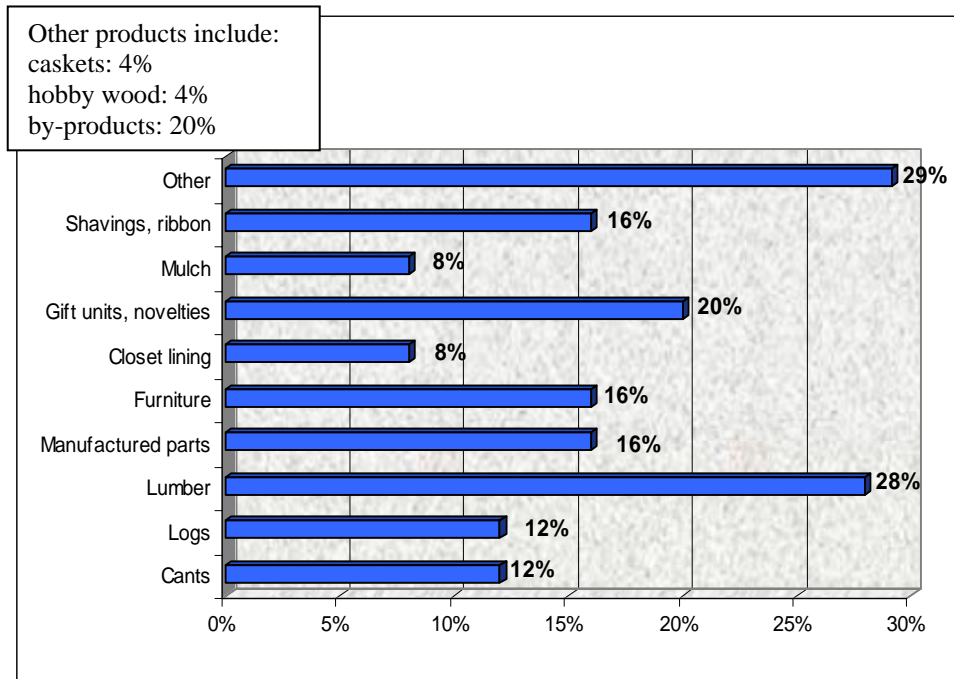


Figure 11: Products sold (phone survey)

Complete utilization

Both primary and secondary manufacturers surveyed indicated that virtually nothing is wasted with redcedar, every by-product has a market. An excellent example of the full utilization of redcedar material is provided by Giles & Kendall on their web page (www.aromaticcedar.com). Large cants are sliced into thin veneer for the furniture and laminated panels industry. Smaller cants are re-sawn and made into tongue and groove planks for closet lining. The smaller diameter trees and large log slabs are typically shaved into pet bedding or hogged into mulch. Waste

from the pressboard process is used as fuel for drying the flakes. The small slabs from the sawmill and other log waste are transformed into mulch for landscaping. Sawdust and planer shavings from the sawmill are processed for extracting cedarwood oil for the fragrance industry. Residue, after extraction is used as boiler fuel for generating the steam for the oil process and as space heating in the winter.

Volume

Thirty six percent of the respondents felt that the volume sold is going to stay the same and 24% felt that is going to decrease (Figure 12).

A company's perspective on future sales may be influenced by its size in the marketplace. Our survey indicated that the majority of companies with gross annual sales exclusively from redcedar under 1 million expect the volume sold to decrease, while the majority of companies that sell more than one million annually expect the volume sold to increase or stay the same.

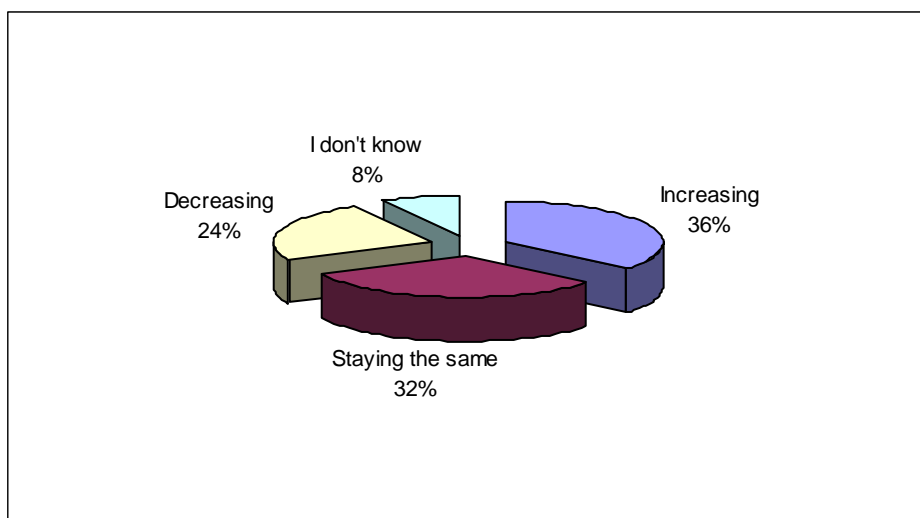


Figure 12: Expectation for volume sold (phone survey)

The mail survey identified a wider range of products specific to the redcedar market than the phone survey. Fourteen percent of the businesses surveyed indicated that the top product of their operation is dimensional lumber. Another 14% of the survey respondents mentioned that their top product is closet lining. The third most prevalent use of

redcedar wood is in animal bedding (about 10%) (Figure 13). The phone survey respondents indicated that their best selling products were: cants, 2x6 lumber, 2x4 lumber, S 4 S lumber, mailbox posts, bird houses and feeders, coffee tables, beds, gift boxes, mulch and shavings. In most cases, the best selling products were also the most profitable ones.

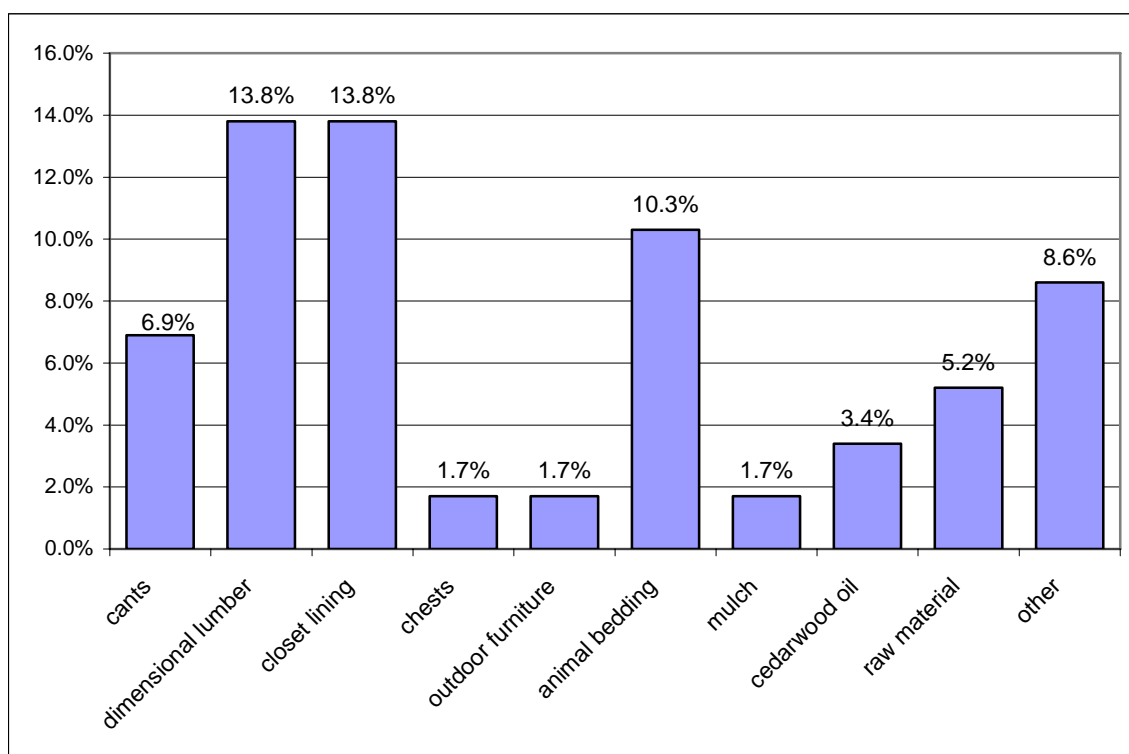


Figure 13: Top redcedar products (mail survey)

Adding value

To successfully add value to products, a company must begin by determining the purchasing criteria of their customer(s). The value package must satisfy the specific customer's needs. A company must develop a product and marketing strategy that will increase the bundle of benefits to the customer. For redcedar (Figure 14), value can be added in many ways including:

- 1) Improving product quality by removing defects and maintaining consistently high product standards;
- 2) Increasing the products functionality by promoting and marketing the products unique benefits, e.g., pleasant smell, decay resistance and insect repellent characteristics;

3) Changing the form of the product (cutting to size, specialty cutting);

4) Making it easier for the customer to obtain the product by arranging for easy acquisition, e.g., deliver the product to the customer or to a location easy for the customer to access;

5) Saving the customer time and effort, e.g., break bulk and package the product into smaller units desired by the customers and making it easier for the customer to possess the product, if necessary provide customer training in use of the product.

6) Packaging and labeling that helps differentiate the products and build brand loyalty among customers.

Eastern Redcedar Products	
Logs	Clothes hangers or hooks
Cants	Cedar necktie and belt hanger
Closet lining /Paneling	Shoe rack, shoe "trees"
Fence Posts	Cedar Moth Balls
Dimensional lumber	Bird feeders
Cedarwood oil	Bird houses
Gazebo, cabana	Mailboxes
Furniture (chests, beds, drawers, tables, chairs, shelves, wardrobes and closets)	Mailbox posts
Outdoor furniture (benches, tables, chaise lounge)	Boxes, novelties
Animal bedding	Pencils
Mulch	Carvings
Wood turnings	Wreaths
Canes	Wood chips

Figure 14: Eastern redcedar products

An example of how the price of products expresses the value that is added along the value chain for redcedar products is presented in Figure 15.

<i>EASTERN REDCEDAR PRODUCTS - \$ VALUE ADDED</i>	
Products	Unit price
Solid wood	
Logs	\$250 - \$350 / MBF
Cants	\$500 / MBF
Paneling	\$1,800 /MBF
Bird feeders	\$10...\$20 / unit (retail price)
Bird houses	\$13...\$40 / unit (retail price)
Mailboxes	\$32.19 /unit (retail price)
Mailbox posts	\$19.83 ... \$24.97 (retail price)
Gazebo	\$2,395...\$6,795(retail price)
Square Cabana	\$2,995...\$9,295 (retail price)
Chairs	\$245 (cedar + cypress) (retail price)
Rocking gliders	\$385-\$535 (cedar + cypress)
Dining Table	\$315 (cedar + cypress)
Decorative shelves	\$56.99 (retail price)
Cedar Chests	\$259 - \$2,493 (sizes 24" ...72") (retail price)
Beds	\$750...\$1086 (retail price)
By-products	
Cedar Hook	\$7.99 / sets of four - protects and deodorizes clothes (retail price)
Cedar tie and belt hanger	\$29.99/unit (retail price)
Cedar Moth Balls	\$5.99 (24 pack) (retail price)
Animal bedding	
Dog bedding compressed bail	\$22 /bail (retail price)
Premier Pet Redcedar Bedding	\$9.99 (5 cu ft) (retail price)
L/M animal farms bedding	\$4.49 (700 cu in) (retail price)
Mulch	
Retail:	\$30.95/cu. Yd.
Contractor:	\$ 28.95/cu. Yd.

Distillates	
Cedarwood oil	\$1.83 (5 ml)...\$27.61 (16 oz) for aromatherapy
	\$6/lb drum quantity, \$9/lb less than one drum – for perfume and cosmetic industry and household use (improve fragrance and moth resistance properties in closets and dressers)
	\$7.95 (10ml) (on line store) for aromatherapy

Figure 15: Value added to eastern redcedar products

Force 1: Threat of new entrants (Barriers to entry)

The phone survey respondents identified the following barriers to entering the redcedar industry:

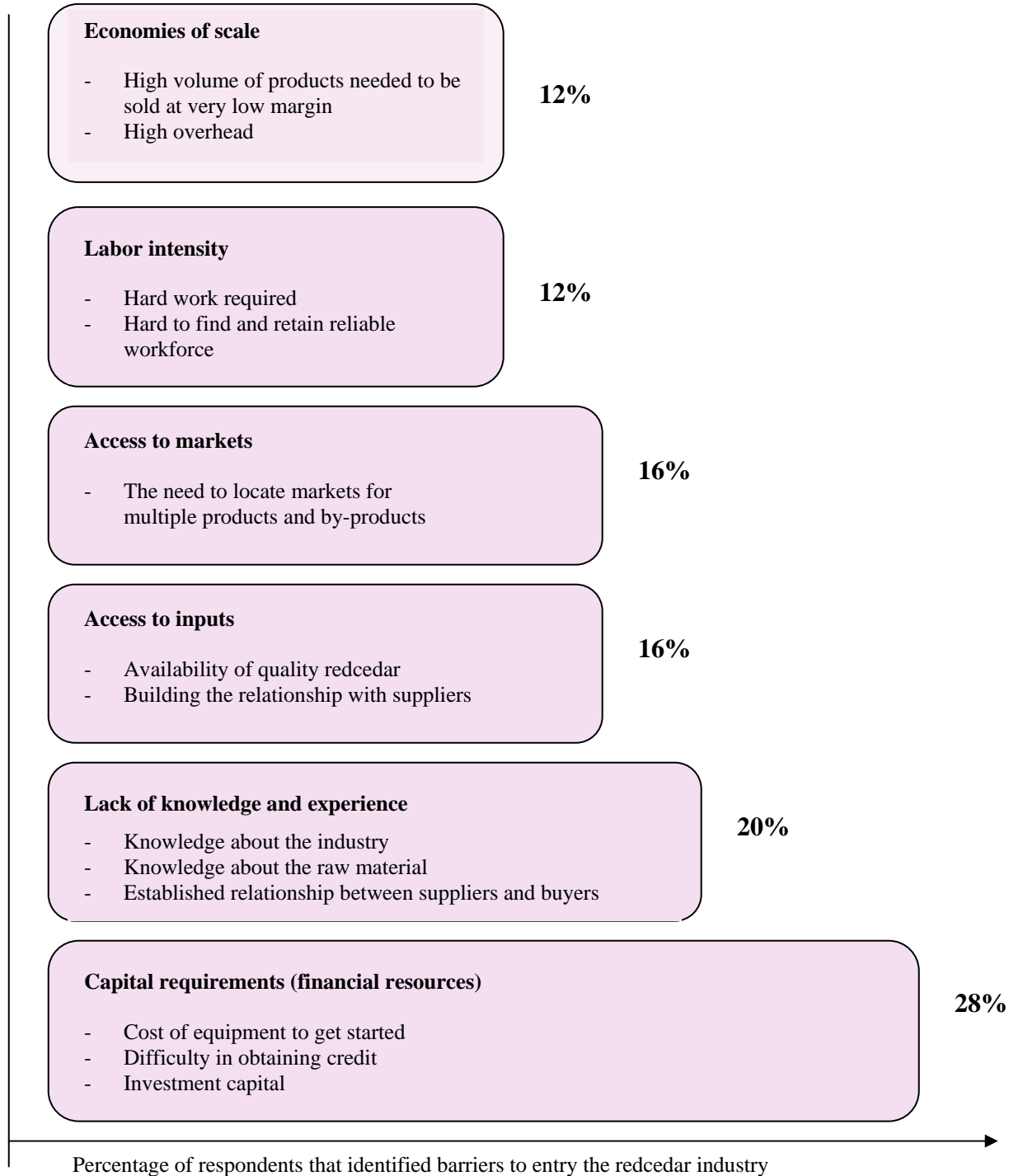


Figure 16: Barriers to entry

Barriers to entry are perceived differently by companies already in the market and those trying to enter the market. The more difficult the barriers are to overcome, the better they protect the companies already in the market from potential new entrants.

Capital requirements were perceived as the most important barrier to entering the redcedar industry. Initial capital costs required to start a business ranged from less than \$10,000 to more than \$1 million (Figure 17). Most of the companies in the redcedar business obtained initial capital by self-financing or personal loans.

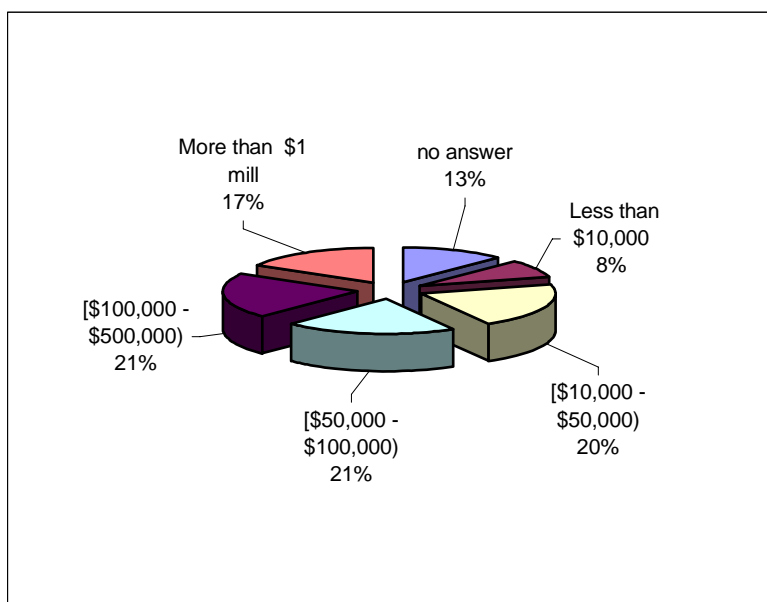


Figure 17: Initial capital costs required to start a business (phone survey)

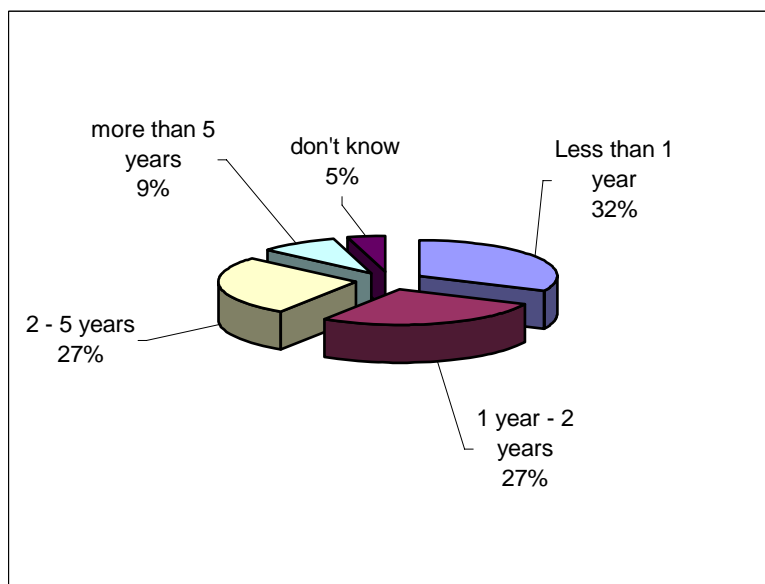


Figure 18: Time to become profitable

While it is possible to obtain bank loans, the fact that most of the redcedar businesses operate without contracts (see Figure 19) makes it harder to establish credit with financial institutions. If the company has the capital required to start its activity, and can overcome the other barriers to entry, the chances that the company will become profitable in a relatively short time are quite high. Thirty-two percent of the companies surveyed stated that they became profitable in less than one year and 86% in less than 5 years (Figure 18).

While not explicitly derived from survey data, availability of cedar logging infrastructure is most likely a larger barrier than availability of trees and logs.

From our limited responses it appears that there is a relatively high potential to start a business without a huge capital investment. One of the companies surveyed started with a \$20,000 investment and today has sales exceeding \$10 million per year.

Clearly the survey population represents a somewhat biased sample as these are the firms that have succeeded and remained in business. Furthermore, it is likely that only those firms doing well in the redcedar marketplace at this time consented to participate in the phone survey.

Lack of knowledge and experience was the second barrier to entry mentioned in order of importance. To successfully enter the redcedar industry one must have detailed knowledge about the industry. Redcedar is unique regarding its management, cutting, grading and processing. Because of its uniqueness, a specialized knowledge base is required from market participants.

Knowledge about how to establish and maintain relationships along the value chain helps assure both entry and survival in the redcedar business. Redcedar markets are generally small, local markets that are influenced heavily by reputation, frequency of transactions and strong personal relationships. In order to enter the market, a new participant would have to understand the social aspects of the market and develop strong transaction relationships. While a barrier for potential

entrants, this factor favors the companies already in the market that have cultivated and maintained strong relationships with their suppliers and customers.

Access to inputs and access to markets were equally valued by the respondents. In areas where cedar manufacturers are located, everything that is produced is marketable including primary manufacturing by-products such as shavings and sawdust. For start-up companies outside those areas, the sale of by-products would probably be difficult without significant marketing efforts. For example, without a developed poultry raising business the sale of cedar sawdust (especially from band sawing) would be difficult. Identifying and securing markets for the main products and also for the by-products is very important for successful entry and survival in the redcedar business.

Labor intensity and economies of scale were identified by some respondents as barriers to entry but less important than other factors already discussed. Labor is considered a barrier in terms of the intensity required in manufacturing redcedar products.

Economy of scale can be a barrier because some redcedar products are sold at very low margin. Companies that produce these products must generate large volumes in order to cover fixed costs and generate profit.

The size of firms contributes to the perception of “high volume”. High volume for Missouri cedar producers is rather low compared to other segments of wood industry.

The value chain in the redcedar market starts with the landowner that supplies the raw logs and ends with the retailer who ultimately adds value to the product before reaching the final consumer (see Fig.1, page 7). Most of the participants are involved in both supplying and buying redcedar products. Some of the companies are vertically integrated, being involved in two or more steps in product conversion.

Suppliers

According to the mail survey, loggers are the primary supplier of raw material (36%), followed by primary manufacturers and landowners (18%), wholesalers (12%) and timber brokers (6%).

Based on the phone interviews, landowners are the number one supplier (52%), followed by loggers (32%), primary manufacturers (20%), brokers (8%) and wholesalers (4%).

The results are influenced by the fact that the majority of companies interviewed were primary manufacturers who use private landowners as suppliers of raw material.

Characteristics of the value chain based on the phone survey results, from the suppliers' perspective

Suppliers in the value chain are relatively small companies in terms of annual sales (only 32% of companies surveyed were supplied by companies with over \$1 million annual sales; a further 20% had suppliers with annual sales between \$250,000 and \$1 million.

Transactions take place mostly in the spot market. Out of the companies surveyed, 64% purchase all (100%) of their supply in the spot market and only 12% purchase all (100%) of their supply through contractual arrangements, most of them verbal contracts (Fig.19). This may indicate that there is enough supply available that there is no need to secure a transaction through a contract; or it may indicate that the relationship between suppliers and buyers is based on trust and neither the supplier nor the buyer exerts bargaining power.

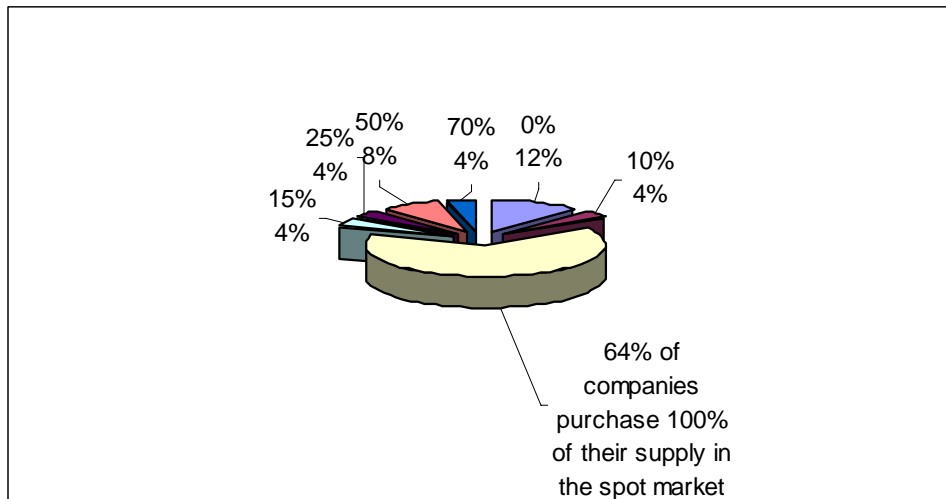


Figure 19: Percentage of supply that is purchased in the spot market (phone survey)

In terms of the distance a company is willing to go to purchase redcedar materials, we identified two extremes: (Figure 20)

- 28% of companies surveyed do not travel to get their supply because they have private landowners, local loggers or brokers deliver to them,
- 24% of companies surveyed are willing to go more than 150 miles to get the supply.

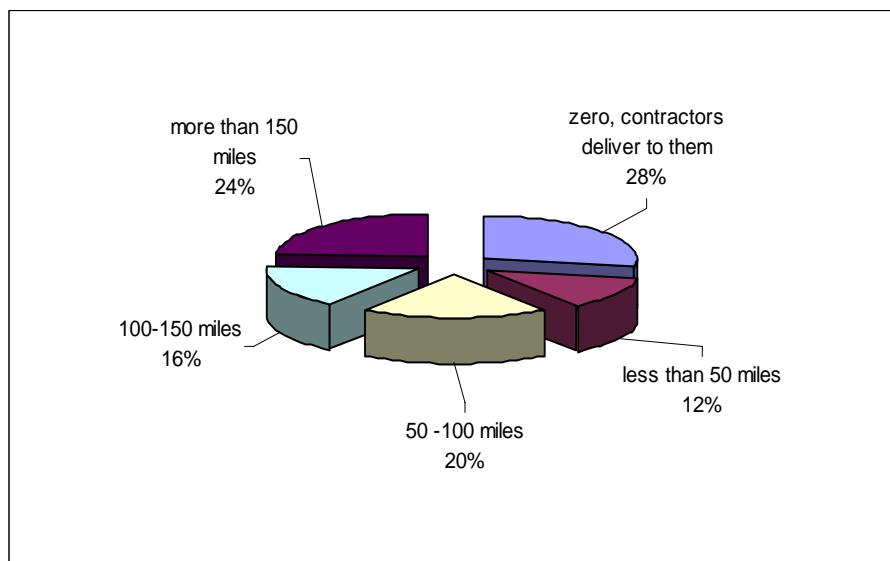


Figure 20: Farthest distance willing to go to purchase redcedar materials (phone survey)

The fact that some of the companies don't need to travel to get the supply indicates that they are in a more powerful position than their suppliers.

The fact that some manufacturers are willing to travel over 150 miles in order to acquire inputs indicates that there may be supply shortages in certain areas of the country or there are other factors affecting the supply of redcedar.

The industry has high potential for vertical integration (36% of the companies surveyed

are involved in two or more steps in product conversion, for example taking the raw log and manufacturing consumer goods such as tongue and groove paneling, mulch or novelties). Vertical integration allows a firm to have more control over its supply needs.

Trends in Redcedar Supply

With the results obtained from the mail survey, we identified some trends in redcedar supply. The phone survey helped us describe the trends in more detail for different levels of quality.

General Trends for Eastern Redcedar Supply

Roughly half of the respondents to the mail survey indicated that over the past five years redcedar supply had remained steady. An additional quarter (26%) of respondents felt that redcedar supply had declined and only 6% indicated that supply had increased during this same period (Figure 21).

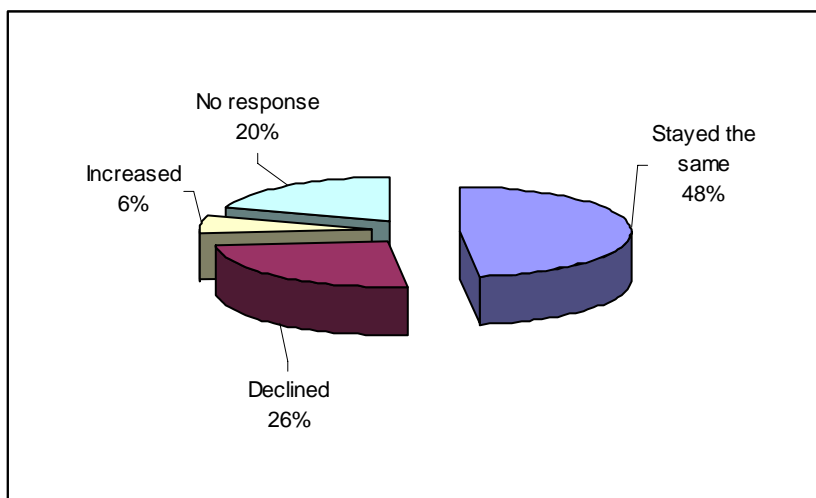
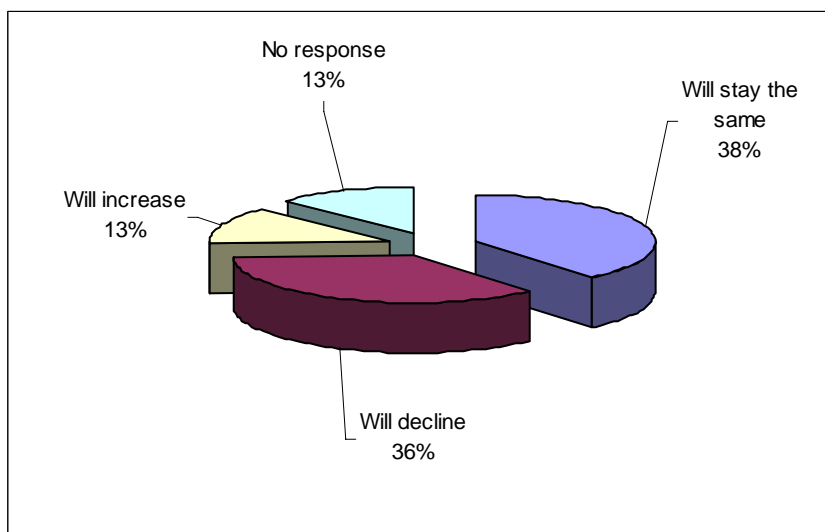


Figure 21: Changes in the supply of eastern redcedar products over the last five years (mail survey)



More importantly, in the next five years, almost 40% of the survey respondents felt that supply will remain steady, 36% felt that supply will decline and 13% see supply increasing. Survey participants expected the current changes to continue into the future (Figure 22).

Figure 22: Changes in the supply of eastern redcedar products over the next five years (mail survey)

Specific Trends for Eastern Redcedar Supply

The phone survey further investigated supply trends and the factors that influence them. Supply trends in the next 10 years were analyzed for different levels of quality. More than half of the respondents to the phone survey (54%) believed that the supply of **good** quality redcedar materials will stay the same, 29% indicated that the supply of good quality redcedar materials will decrease and 17% felt that the supply will increase (Figure 23).

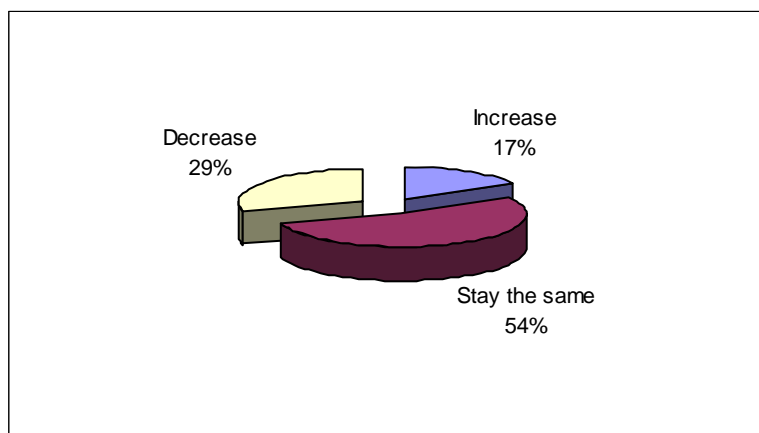


Figure 23: Supply of good quality redcedar materials over the next 10 years (phone survey)

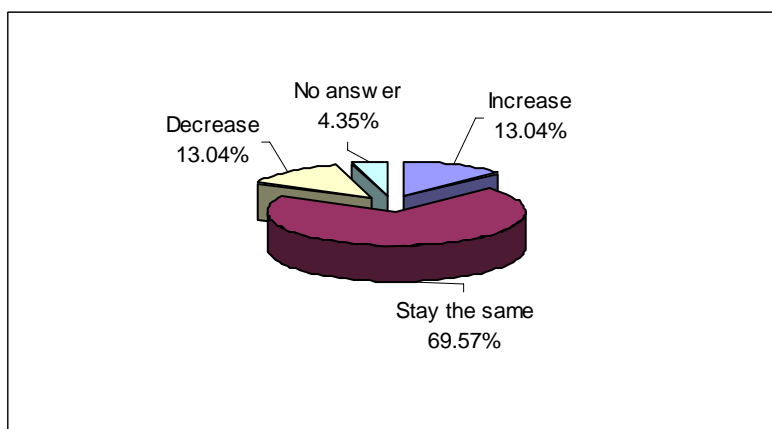


Figure 24: Supply of average quality redcedar materials over the next 10 years (phone survey)

In terms of **average** quality, 70% of respondents said that the supply will stay the same, 13% said that the supply will decrease and 13% felt that the supply will increase (Figure 24).

The opinion about the supply of **poor** quality redcedar materials is as follows: 48% felt that it would remain steady, 39% expected an increase and 9% expected a decrease.

The overall conclusion from the **surveys** is that the supply of all quality levels of redcedar materials is likely to stay the same. However, it is possible that a shortage of good quality redcedar material and an increase in poor quality material will occur in the next 10 years.

Additional information about the redcedar resource, obtained from U.S. Forest Service (USFS) Forest, Inventory and Analysis (FIA) data³, raises questions about the supply concerns expressed in the surveys. Based on FIA data there should be an abundance of quality redcedar available, at least for some regions. The four states with the highest census of redcedar are Arkansas, Tennessee, Kentucky and Missouri (See Appendix figures IV, V, and VI).

Note: This data is strictly derived from forest land inventory and does not include non-forest land or other land classes, thus does not include what appears to be a huge component of the emerging resource.

These four states account for 53% of the nation’s redcedar (Eastern redcedar).

Phone surveys reveal that the most desirable cedar falls within the 6-8” dbh range, typically thought to be between 35 and 45 years old. If we look at the data on the existing redcedar resource in the top 4 states, (Figure 25) we see that **15%** of the trees fall in the most desired, 6-8” dbh class. These are the trees at the optimum age with the least amount of age related defect.

Looking into the future, **22%** of the resource is in the 4” dbh class (3.1-5.0”). Assuming an

average growth rate of .2” dbh per year, all of this cedar would be desirable for harvest (at 6” dbh) within the next 5-15 years. Even if we assumed a 20% mortality in this age class, we would have a harvestable resource at least as large as what is presently available.

Looking further into the crystal ball, those trees in the 2” (1.0-3.0”) dbh class constitute a massive **61%** of the total number of trees inventoried. Again, let’s assume a 50% mortality and an average growth rate of 0.2” per year. On average these trees would be of harvestable size within 25-35 years. Following this logic a bit further, this would present the industry with twice as much harvestable cedar inventory on the stump as is currently available.

Boiling all of this down, the current raw inventory data shows that the useable redcedar resource will be slowly increasing in quantity for the next 3 decades. Information on the silviculture (reproduction, biology, growth) of redcedar can be found online at: http://www.na.fs.fed.us/spfo/pubs/silvics_manual/Volume_1/juniperus/virginiana.htm

3 – Personal communication with Neal Sullivan – Ecologist, USDA Forest Service, North Central Research Station, 202 ABNR Building, Columbia, MO 65211

State	Total number of trees (Mill)	2" diam class (1.1-3.0) (Mill)	4" dbh (3.1-5.0) (Mill)	6" dbh (5.1-7.0) (Mill)	8" dbh (7.1-9.0) (Mill)	% available at present (6/8" dbh)	% available 10-20 yrs (4" dbh)	% available 20+ yrs (2" dbh)
Arkansas	451	296	89	34	20	12%	20%	66%
Kentucky	400	239	94	38	18	14%	24%	60%
Tennessee	437	244	99	49	26	17%	23%	56%
Missouri	384	226	89	40	18	15%	23%	59%
4 state total	1,672	1,005	371	161	81	15%	22%	60%
% of nation	53%	52%	53%	55%	60%			
Nationally	3,142	1,922	702	291	135	14%	22%	61%

Figure 25: Redcedar on timberland, by state (USFS FIA data)

Overall, the perception of the phone survey respondents is optimistic. Along with the aforementioned trends, they still expect to have enough redcedar available in their primary area to meet their supply needs in the next 10 years (Figure 26).

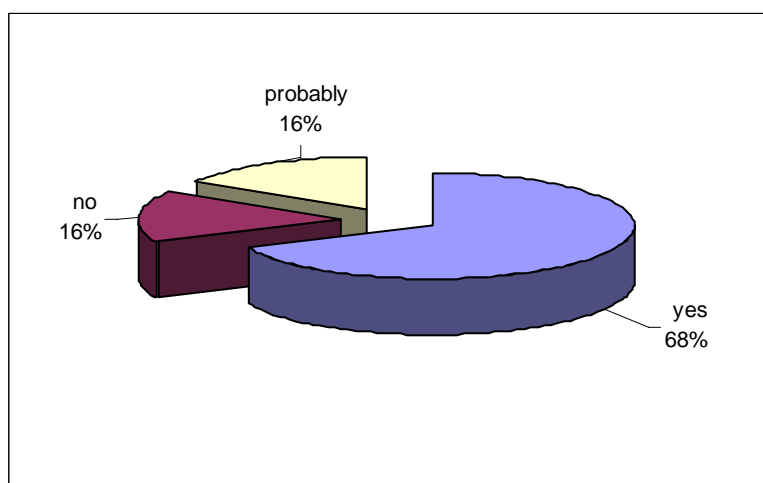


Figure 26: Availability of redcedar in the area to meet the companies' needs in the next 10 years (phone survey)

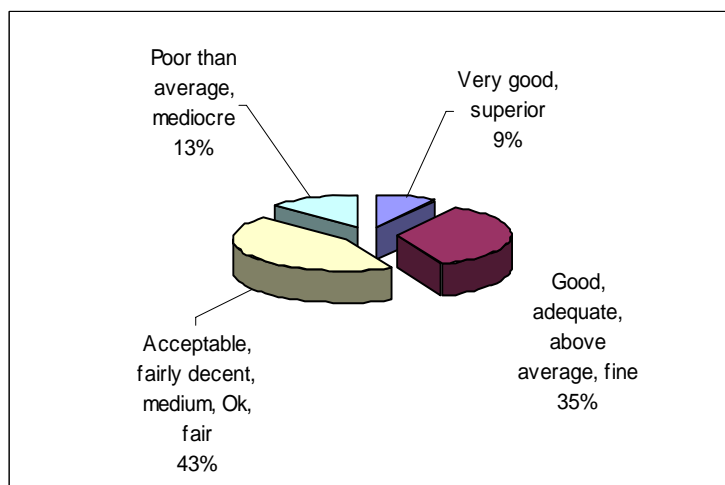


Figure 27: Quality of redcedar (phone survey)

The highest number of respondents (43%) felt that the quality of redcedar available through the supply channel is acceptable, 35% indicated that the quality is good, a smaller percentage consider the quality mediocre (13%) and 9% consider the quality of redcedar available through the supply channels very good. (Figure 27).

Current industry trends that influenced supply

Some current industry trends that contributed to the increase in redcedar supply are: land conversion to hunting uses retaining cedar as escape cover and winter shelter for deer and turkey, restrictions on wood burning and the growing popularity of small portable saw mills. New housing developments replacing forested land, clearing land for pasture, and development of industry in rural areas are some examples of current industry trends that decreased supply of redcedar materials.

Buyers

Figure 28 identifies the predominant buyers from the mail survey. The predominant group of buyers identified is private individuals (29%) which includes consumers, do-it-yourselfers, and domestic wood-workers. The retail craft market was the second most predominant buyer (23%).

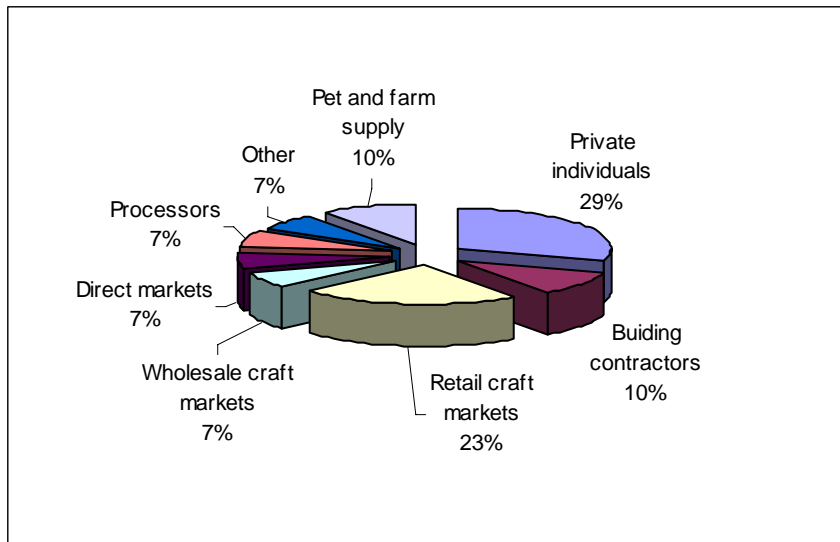
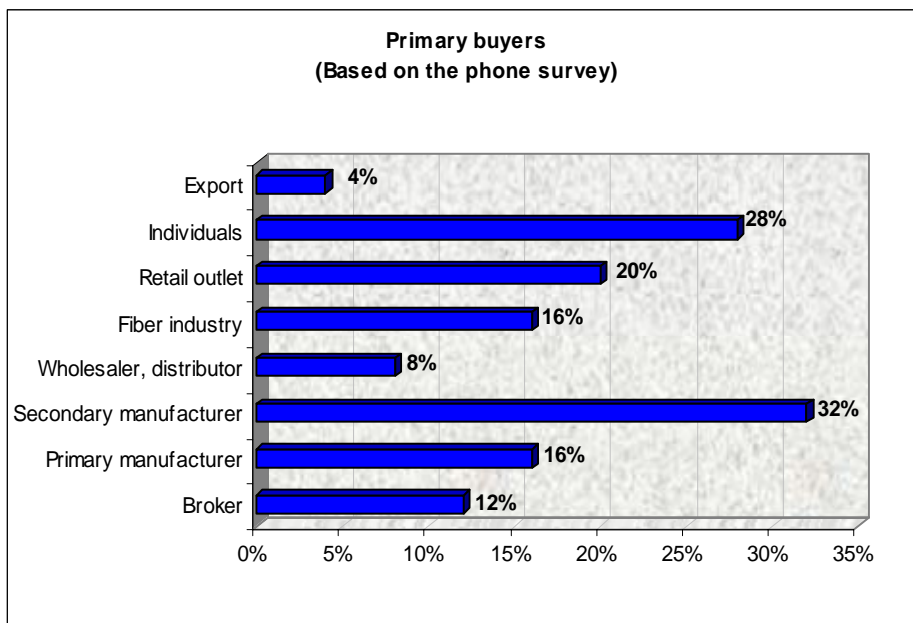


Figure 28: Primary buyers (mail survey)



The phone survey had secondary manufacturers listed as primary buyers (32%), individuals being considered as the second largest category of buyers (28%) and retailers were listed as the third most common buyer (20%). (Fig. 29)

Figure 29: Primary buyers (phone survey)

Characteristics of the value chain based on the phone survey results, from the buyers' perspective

The largest segment of buyers can be classified as resellers:

- 80% of the respondents sell 50% (or more) of their products to resellers,
- 36% sell 50% (or more) direct to final consumers (end-users).

- 60% of buyers purchase more than half of their supply on the spot,
- 40% of buyers use contractual arrangements. The relationship between buyer and seller becomes more formal (more contractual arrangements) as the value chain approaches the retail segment (Fig. 30).

On the buyers' side, similar to the suppliers, the market can be characterized as a spot market:

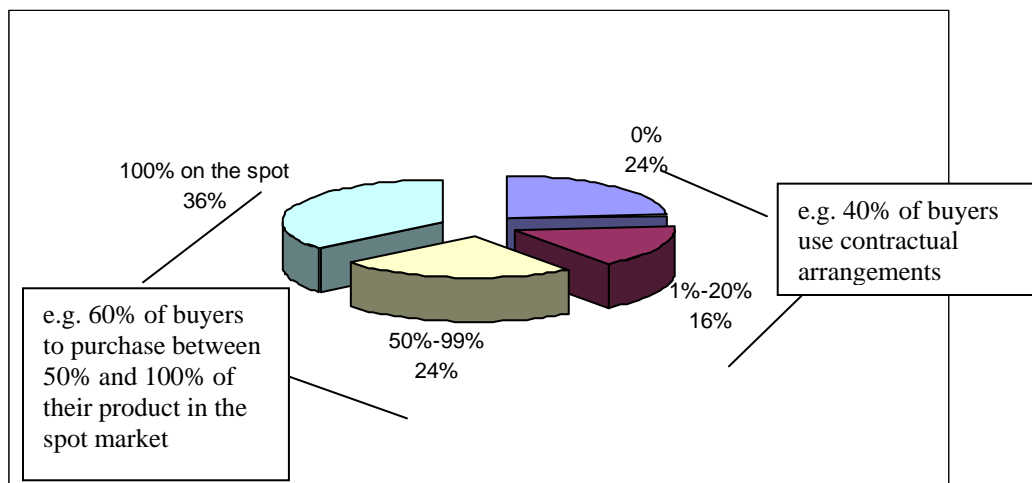


Figure 30: Percent of buyers that purchase on the spot (phone survey)

Marketing area

Seventy six percent of the respondents sell their products in local markets. Forty-eight percent of respondents sell their products nation wide and 32% also have international customers (Figure 31). The products sold internationally include lumber, boxes, logs, manufactured parts, and pet shavings.

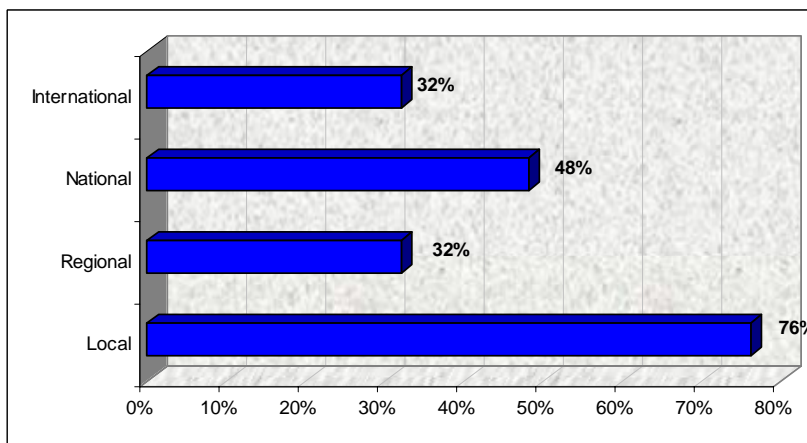


Figure 31: Marketing area (phone survey)

In terms of primary marketing area, 52% of respondents have a local market, 36% have a national market and 12% have a regional market as their primary marketing area (Figure II, Appendix).

Trends in Redcedar Demand

Results from the mail survey identified general trends in redcedar demand. The phone survey helped describe the trends in more detail, for various levels of quality.

General Demand Trends for Eastern Redcedar

On the demand side (Figures 32 and 33), about one third of the respondents feel that demand has been steady over the past five years and a slightly higher percentage, 37%, feel that demand will remain steady in the coming five years.

A larger percentage of respondents (~50%) feel that demand will increase in the coming years in comparison to the previous five years (39%).

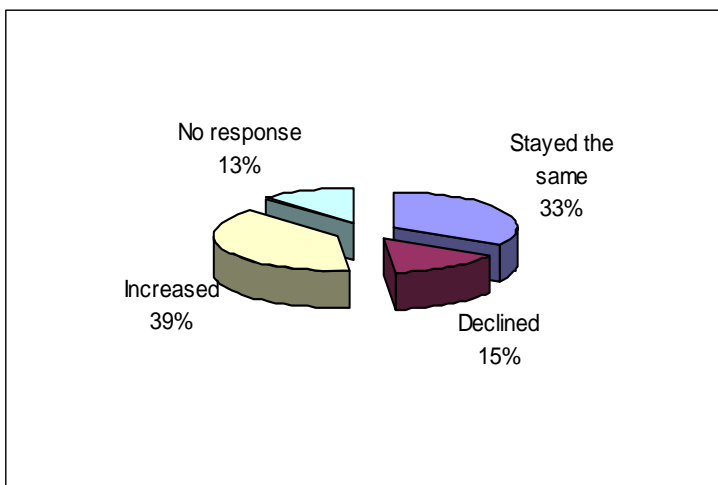


Figure 32: Changes in the demand for eastern redcedar products over the last five years (mail survey)

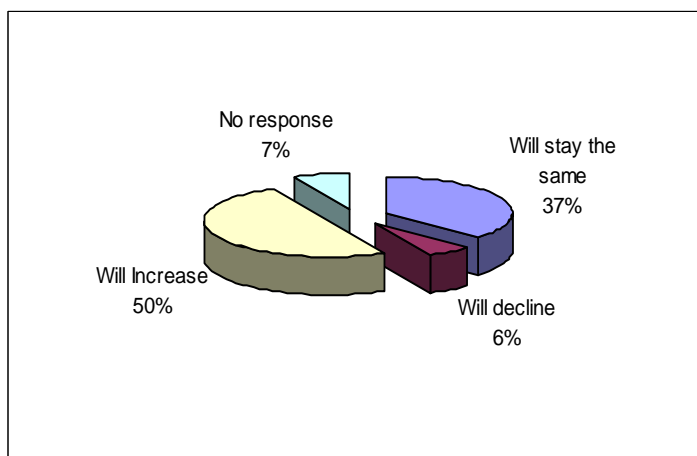


Figure 33: Changes in the demand for eastern redcedar products over the next five years (mail survey)

Specific Demand Trends for Eastern Redcedar

Phone survey results enabled further investigation of demand trends and the factors that influence them. We analyzed the demand trends in the next 10 years for different levels of quality. Almost 3/4 of the respondents (72%) believed that the demand for **good** quality redcedar materials would increase, 20% felt that the demand for good quality redcedar materials would remain the same and 4% felt that the demand would decrease.

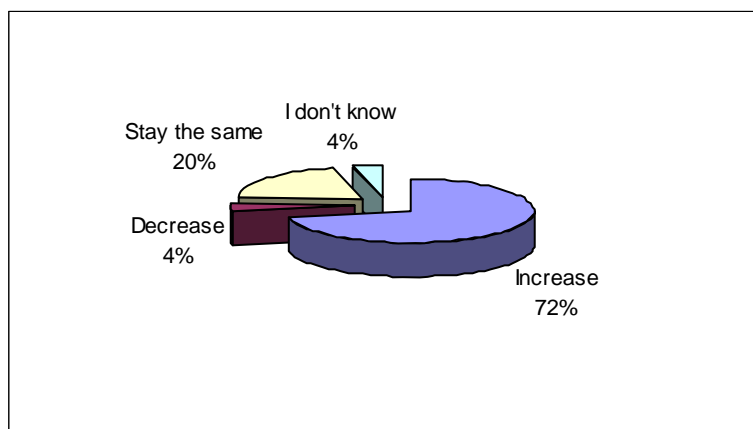


Figure 34: Demand for good quality redcedar materials/products over the next 10 years (phone survey)

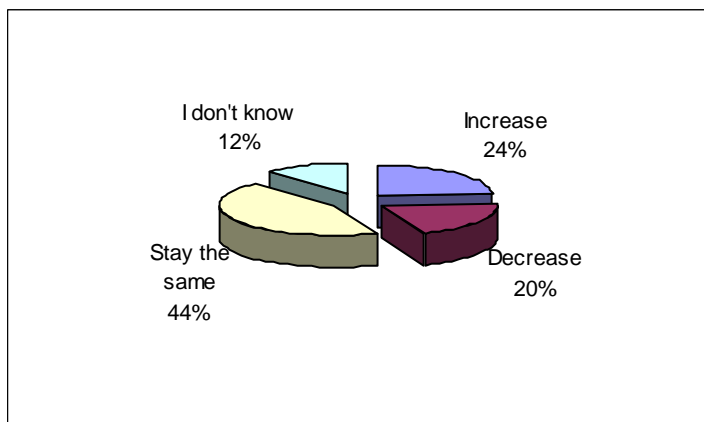


Figure 35: Demand for average quality redcedar materials/products over the next 10 years (phone survey)

In terms of **average** quality redcedar, 44% of respondents felt that the demand would stay the same, 24% felt that demand would increase and 20% felt that demand would decrease (Fig. 35).

Demand for **poor** quality redcedar materials is as follows: 40% feel that demand will decrease, 24% feel that it will remain steady, and 16% feel that it will increase (Fig. 36).

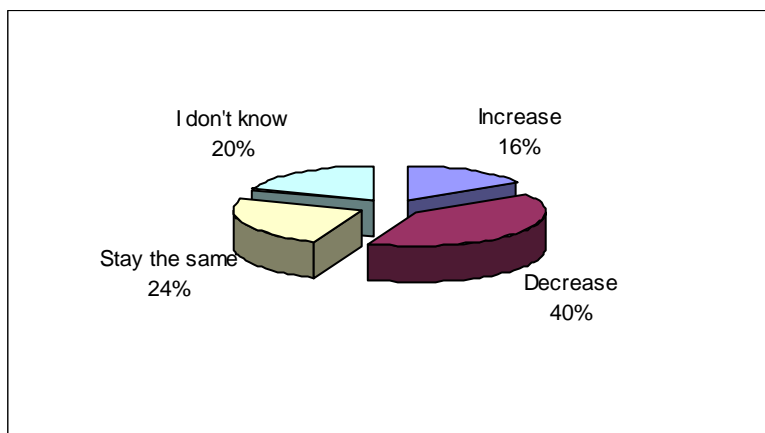


Figure 36: Demand for poor quality redcedar materials/products over the next 10 years (phone survey)

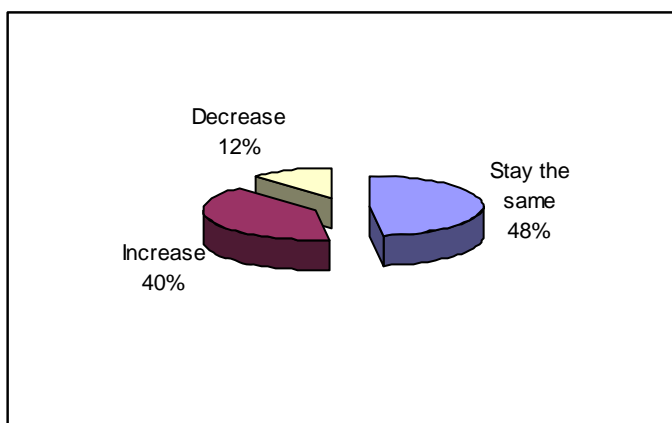


Figure 37: Demand for redcedar materials/products in the primary marketing area (phone survey)

Bottom line, the perception of the phone survey respondents is that the demand for redcedar products in their primary marketing area will stay the same (48%) or increase (40%). (Fig.37).

The logical conclusion is that demand for redcedar materials will remain the same or increase. More specifically, demand for good quality cedar will increase; demand for average quality will stay the same; and the demand for poor quality will decrease. This trend is expected as the redcedar industry continues to upgrade its standards to produce higher quality products.

In the future, the focus should be on good quality redcedar material. Given the substantial projected increase in the resource base, good quality redcedar should be readily available in major redcedar regions of the United States (AR, KY, MO, TN).

Current industry trends that influence demand

Current industry trends that have increased the demand for redcedar products include an increase in exports, changing fads (such as western style furniture or using cedar mulch for landscaping) and growth in the use of cedar bedding in the poultry industry. Other trends that directly influence demand include the recent influx of poor quality redcedar products and the ban on copper chromated arsenate (CCA) treated lumber.

The sluggish economy, tourism markets (which support the novelty markets), and the importation of substitute products also have an indirect influence on the demand for eastern redcedar products.

In conclusion, based on the results of both the mail and phone surveys, very little bargaining power is exerted along the value chain. At the level represented by landowners and loggers

there is little to no power. Those products are not differentiated and are perceived as commodities with no cost for buyers to switch from one supplier to another. As primary and secondary manufacturers add value to the product, bargaining power could possibly increase along the chain.

From the buyers' perspective, very little, if any, bargaining power is exerted. There doesn't appear to be one single buyer that purchases large volumes of redcedar material. However, it should be noted that the large volume "do-it-yourself" home improvement stores, such as Lowe's and Home Depot, were not included in the surveys. It is possible that they would have some bargaining power over suppliers, due in part to their large volume and customer exposure.

Force 4: Threat of substitute products or services

Following the mail survey, the conclusion was that western redcedar (*Thuja plicata*) may pose a threat as a substitute for eastern redcedar and that in general, the trend toward products that are "natural" (not chemically treated) provides eastern redcedar an advantage over other types of substitutes.

The results of the phone survey provided more detailed information about the potential substitutes for eastern redcedar based on specific uses of the wood.

- Construction

The beauty, fragrance, durability, ease of maintenance and resistance to insect infestation and decay makes eastern redcedar the material of choice for many construction companies and individuals. Compared to eastern redcedar lumber, western redcedar lumber can be of better quality (longer, wider material) and more readily available. But western redcedar has a shorter life span, is harder to mill, splinters easily, lacks the smell and resistance to insect infestation, and is more expensive.

By injecting wood with chemicals, treated wood receives some of the properties possessed naturally by eastern redcedar: rot resistance and splinter-free. Treated wood can be cheaper and more available but contains harmful chemicals such as arsenic. Treated lumber is also subject to EPA regulations.

Redwood could be another potential substitute for redcedar. It has a better grade and quality, and higher insect resistance, but is less available, more expensive and is subject to concerns over sustainability.

Looking beyond the survey it must be stated that there are no strength grade or construction grade specifications developed for eastern redcedar. Eastern redcedar does not grow particularly tall, so long lengths of lumber, required for construction, are not available to

the construction industry and would not meet building code requirements.

- Furniture and gift items

Eastern redcedar can be used for almost every kind of furniture, especially for cedar chests, wardrobes and closets. The fragrance of cedar is recognized for repelling moths.

Cypress may be a substitute for eastern redcedar in the manufacture of furniture or gift items. It can be cut to longer, wider material. However, cypress is more expensive, less available and harder to work with. Pine and oak are also substitutes for redcedar in manufacturing boxes and novelties but eastern redcedar is less expensive.

- Mulch

Compared with the mulch obtained from other types of wood, eastern redcedar mulch distinguishes itself by its appealing color, which resists fading better than other natural products. The color is complemented by the attractive aroma and insect (termite) deterring properties.

- Shavings

If used as pet shavings, eastern redcedar is better quality than pine shavings, rice hulls or saw dust. It is more available and healthier to animals, but it can be more expensive. If compared with polystyrene, hay or canvas to pet bedding, eastern redcedar pet bedding is higher in quality, natural, and not harmful to the environment. On the flip side, it is more expensive and less available than these potential substitutes.

The phone survey confirmed that eastern redcedar is perceived to be unique, with very few close substitutes. Eastern redcedar possesses a unique fragrance, rot resistance and insect repellent qualities all derived naturally that places it in a niche by itself.

Force 5: Rivalry among existing firms

Rivalry among existing competitors can be fierce. Companies can never stop learning about their industry, their rivals, or ways to improve or modify their competitive position. When studying the eastern redcedar market, the mail survey provided us with information about who the players in the redcedar market are but not very much about the competitiveness of the industry. By using targeted questions, the phone survey provided more information about the competitive environment in the redcedar industry.

Based on the phone survey, the level of rivalry in the eastern redcedar market is perceived as non-competitive to moderately competitive. Only 8% of the 25 respondents considered the industry to be highly competitive while 48% considered it to be non-competitive (Figure III, Appendix). One reason of reaching this conclusion is the small number of competitors in any given

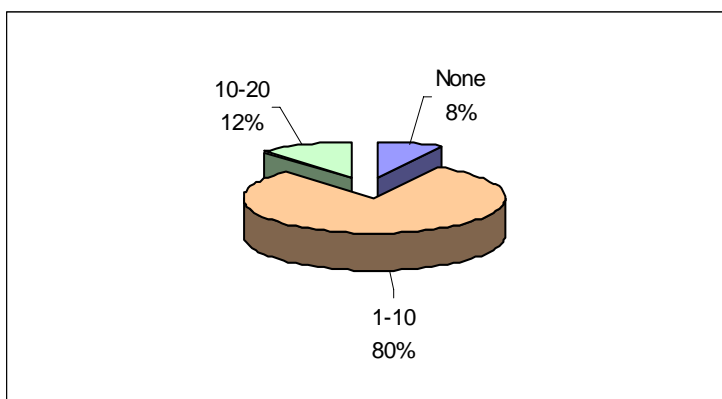
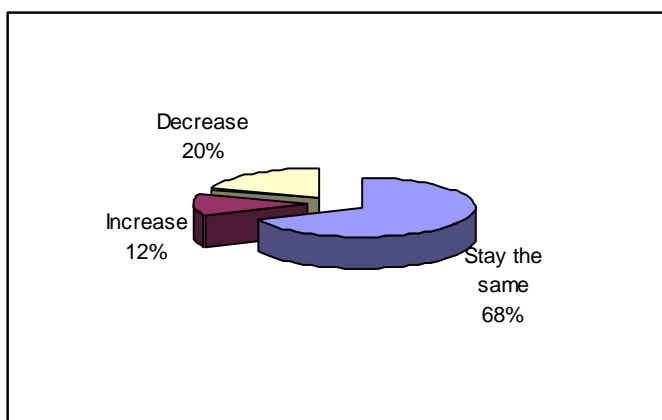


Figure 38: Number of companies that sell/buy/use redcedar products in area

area. Eighty percent of the respondents mentioned between one to ten companies that sell/buy or use redcedar products in their area, while 8% are without any local competitors. (Figure 38)



Respondents indicated that the number of competitors will either stay the same (68%) or decrease (20%). Only 12% of respondents felt that the number of competitors will increase in the next 5 years (Figure 39).

Figure 39: Opinion about the number of competitors in the next 5 years

Phone survey respondents indicated that competitors are attracted to the eastern redcedar industry by two classes of factors. Generic factors such as the perceived profit and the independence that a private business offers would attract some competition. Specific factors for the redcedar industry such as the total utilization of the product, the availability of redcedar and the fact that this is a growing niche market would attract other competitors (Figure 40).

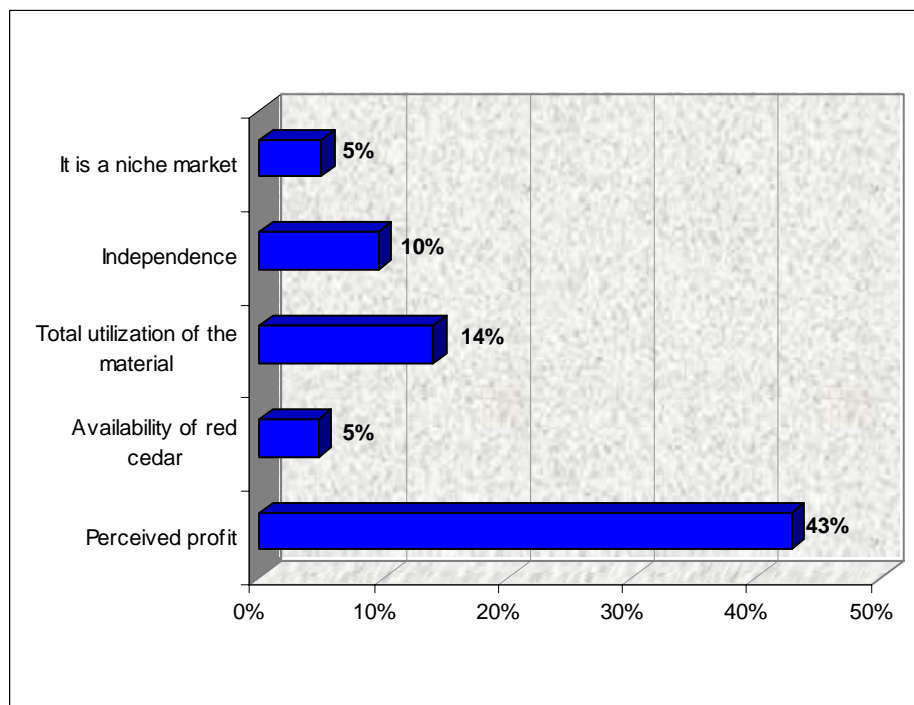


Figure 40: Aspect of business that would attract competitors

In response to new competitors, most (68%) of the companies already present in the redcedar market stated that they had no special strategy or reaction to new companies entering the market. Their approach is to keep producing their products, focusing on quality service.

Another 16% of the respondents indicated that they would have a cautious reaction towards a new competitor. They mentioned that they would strengthen relationships with other participants in the value chain as a reaction to new competition. The relationship between suppliers and buyers plays an important role in the ongoing success of those already in the market. Good communication and good

relationships with the suppliers and customers will assure protection from new competitors.

Only 8% of respondents stated that they would welcome competitors because competition is the best thing in the world for a business. Another 8% declared that they wouldn't like to be pressured by new competitors and they would possibly cut prices to maintain their position in the market.

Based on the responses from the survey, the level of rivalry in the redcedar industry is relatively low. The participants in the redcedar industry may only compete for raw materials in areas where quality inputs are scarce.

Additional Market Forces: Policy

Although governmental and non-governmental policy is not recognized as a “force,” per se, the Five Forces Model acknowledges that policy influences all forces in the model. Several policies were mentioned during preliminary interviews that were perceived to have an affect on the redcedar industry. Those policies included:

- the ban on CCA treated lumber,
- the implementation of sustainable certifications for suppliers to Lowe’s and Home Depot, and
- management practices adopted by State natural resource agencies determined to eradicate redcedar.

These policies all were perceived to have an effect on either the potential supply or the demand of redcedar. Through follow-up surveys and interviews it was determined that the policies that were presumed to have the greatest impact, had little or no impact on the market. For example, it was presumed that with the ban on CCA treated lumber, the demand for the rot resistance of redcedar lumber would impact that market in a positive way. However, several factors have minimized the effect of that ban. First, although CCA has been banned, it is still readily available in any retail outlet. Second, other alternate methods of treating wood have taken the forefront and are being promoted as viable alternatives. Finally, only a very small amount of the redcedar sold in the market was used as an alternate for CCA treated lumber, such as in decking and fencing material.

Sustainable forestry was also perceived to be a policy issue that would have a major impact on the market for redcedar. For the most part,

eastern redcedar is not harvested or managed in a way that would be consistent with sustainable management practices. In northern and western Missouri, redcedar is cut out of fence rows or cleared out of areas where regeneration is not wanted. However, due to its persistence, redcedar remains a species that is spreading rapidly. Certain large volume retailers had insisted that all their lumber be sustainably harvested, meaning that care is taken to ensure future harvests and preserve forest health. It was feared that these retailers would pull eastern redcedar products off their shelves until suppliers could certify that the redcedar was being sustainably harvested. There are no significant producers of certifiable redcedar products. Fortunately, over the past year, this requirement has been relaxed and redcedar is still being sold in large volumes at these retail institutions.

Finally, it was reported that several States have adopted the policy of cutting and burning young redcedar trees in order to prevent its further spread. These management practices have had a minor effect on the supply in some areas, but are not widespread. Alternately, other policies adopted by the government have increased the potential supply of redcedar. For example, many of the conservation easement programs funded by the United States Department of Agriculture have removed management from agricultural land and allowed redcedar to spread into areas that were once cropped or grazed. It appears that the redcedar industry has been relatively free from direct governmental policy intervention.

The analysis of the competitive forces helped us identify resources and relationships needed to be successful in the redcedar market.

Critical resources needed to successfully compete in the eastern redcedar marketplace include access to raw material and labor, market knowledge (where and how to sell everything that comes out of the mill), financial resources (even if it is possible to start small and grow the business in time), and the cultivation of personal relationships among players in the market value chain.

To gain an edge over other firms in the marketplace, the companies must build competitive advantages. A competitive advantage can be a better price for the value offered, a higher and consistent quality, a recognized brand name, or additional services offered (availability, in time delivery, convenience, flexibility, serviceability, and reliability). Understanding of the coordination, control, and relationships within the market can also be a valuable competitive advantage.

Concentrating on small market niches, knowing where the resource can be found, having good management and a trained work force, building strong relationships with suppliers and customers, and watching for competition are some keys that help companies to be successful in the marketplace.

We performed an overall analysis of the redcedar market. Each company, based on its position in the value chain, must understand the competitive forces that apply to them and overcome the specific barriers.

This research has shed some light on the inner workings of the redcedar industry. The market directory provided is intended to help make new contacts in the market and develop new relationships.

Next steps:

For the collective benefit of the redcedar industry, it is suggested that industry participants join their efforts to identify and pursue actions to grow the overall market. Actions to be taken in the near future might include:

- ⇒ Creation of a redcedar marketing board to increase awareness of market opportunities.
- ⇒ Developing an infrastructure by working with federal/state agencies to facilitate the flow of goods and information through the market.
- ⇒ Linking industry participants with research institutions to develop new market opportunities by exploring alternative uses for eastern redcedar wood, oil, and products.
- ⇒ Encourage private landowners to manage redcedar stands and foresters to learn more about how to manage it.

Creation of a redcedar marketing board

One of the key characteristics of the current redcedar market is the disjointed nature of the market participants. Little coordination exists between participants in the market for redcedar products. The market consists primarily of numerous individuals functioning autonomously. Because these market participants are disjointed, efficiencies that could benefit all players in the market are lost. By creating a redcedar marketing board, coordination within the market would help reduce these market inefficiencies.

For example, from our survey it was determined that the supply of raw redcedar material in states such as Oklahoma and Texas seemed to be limited; however, in Missouri and Arkansas, redcedar is so abundant that people are paying to have it destroyed. A red

cedar marketing board would be able to coordinate supply and demand, provide a contact point for those who are looking to buy or sell redcedar, and lobby governmental agencies to adopt management practices on public land that benefit the growth of good quality redcedar.

Regional and local organizations can be formed to help educate the market about the use and management of the redcedar resource. These regional and local groups can work with public educational institutions and programs, such as Future Farmers of America (FFA) or University Outreach and Extension to educate landowners and future landowners of the potential redcedar markets.

Eastern redcedar's invasive nature has been one of the greatest impediments to its market development. Very little effort has been spent on understanding what it takes to improve the growth or quality of the species. Likewise, very little effort has been put into understanding its market uses and potentials. The abundance of redcedar has translated into the idea that it is a low value species. A marketing board can work with research institutions in order to develop new uses and markets, as well as improve the quality of the products that are sold.

Develop an infrastructure by working with federal/state agencies

The United States Department of Agriculture (USDA) has supported many agricultural industries since it was established. Without the USDA's production and price reports, many agricultural commodities would suffer greater market risks than they currently experience. Likewise, many federal or state agencies provide information about timber markets and timber growth, such as the Missouri Department of Conservation's quarterly timber reports or the US Forest Service's FIA database. Although eastern red

cedar prices and growth rates are reported through these agencies, more could be done to help establish an infrastructure that promoted the redcedar industry.

For example, the USDA has developed marketing standards for all the agricultural commodities. When "corn" or "pork bellies" are marketed there is an understanding of what is being traded. For "corn", buyers and sellers understand that it is a fixed number of bushels of number 2 yellow corn with a specified moisture content. However, no such understanding exists in the redcedar market. As a result, buying or selling raw redcedar materials requires a considerable amount of negotiating on terms of quality and quantity. Most timber species have specified standards, yet eastern redcedar's standards of quality are extremely vague. From this research it was quickly discovered that redcedar quality was often defined differently depending on what it was going to be used for.

Landowner's who have redcedar growing on their property will be reluctant to participate in a market where standards of quality and quantity are not clearly defined, simply because they are not in a position to negotiate price or hedge against risk.

Coordinate industry participants with research institutions to develop new market opportunities

In several areas of the country, research institutions are beginning to work with landowners to develop new market opportunities. For example, the Oklahoma Redcedar Association is working with Oklahoma State University to develop a particle board product that can be used in closet lining and other places where solid wood redcedar had typically been used. Likewise, Niobrara Valley Wood Products in Nebraska is working with the University of Nebraska to form a cooperative of eastern red

cedar marketers. In each case, the partnership of market participants and research institutions has been a positive force in laying market foundations.

A template for an Eastern Redcedar Marketing Board already exists for the western redcedar. The Western Redcedar Lumber Association (WRCLA) is a non-profit association representing 28 quality producers of Western Redcedar lumber products in Washington, Oregon, California, Idaho, North Dakota (USA) and British Columbia (Canada). Known as "the voice of the cedar industry"-the WRCLA operates customer service programs throughout the United States and Canada to support its members' cedar products with information, education and quality standards. <http://www.wrcla.org>

Other institutions, such as the Midwest Research Institute, are looking at the chemical properties of eastern redcedar that can be used as a natural insecticide or to provide rot resistance to other types of wood. Researchers at the USDA Forest Service, Forest Products Laboratory (FPL), have developed a new kind of water filter made from a variety of wood fibers including eastern redcedar that show promise in cleaning water contaminants in a more effective and less expensive way. These filters are cleaning heavy metals from former mine sites; phosphorus, nutrients, and pesticides from agricultural activities; and oil from highway and parking lot runoff.

As mentioned earlier, the invasive nature of eastern redcedar has hindered the interest in research into redcedar reproduction; however, a need for research on the production of non-invasive 'male' cultivars could promote the use of eastern redcedar for windbreaks, timber and other product applications. In terms of wildlife habitat, male redcedar (lacking fruit) would provide winter cover but would not function as a food source.

A joint effort between The University of Missouri Center for Agroforestry and US Forest Service North Central Research Station will develop a handbook for redcedar that will provide an all encompassing look at production, biophysical characteristics, and markets. The goal of this handbook is to provide landowners with a basic understanding of redcedar and the industry in order to promote their involvement in the market.

Encourage private landowners to manage redcedar stands and foresters to learn more about how to manage it.

Studies have shown that growth and yield of eastern redcedar are affected by site quality, stand density and hardwood competition³. Good growth rates can be maintained by controlling competition and stand densities. In a 45-year-old eastern redcedar stand, highest volume growth was obtained in unthinned stands from which hardwoods had been removed, double the growth of stands where hardwoods were left.⁴ Maintaining relatively dense stands can maximize post production. Thinning one or more times before harvest cut hastens sawlog production but may not increase total yield. Eastern redcedar should be managed in even-aged stands, judging from studies conducted in northern Arkansas.⁴ The ideal density for growing saw logs is not known, but excessive thinning may promote excessive formation of sapwood and growth of lower branches.

³ Lawson, Edwin R. 1985. Eastern redcedar - an American wood. USDA Forest Service, FS-260. Washington, DC. 7 p.

⁴ Ferguson, E. R., E. R. Lawson, W. R. Maple, and C. Mesavage. 1968. Managing eastern redcedar. USDA Forest Service, Research Paper SO-37. Southern Forest Experiment Station, New Orleans, LA. 14 p

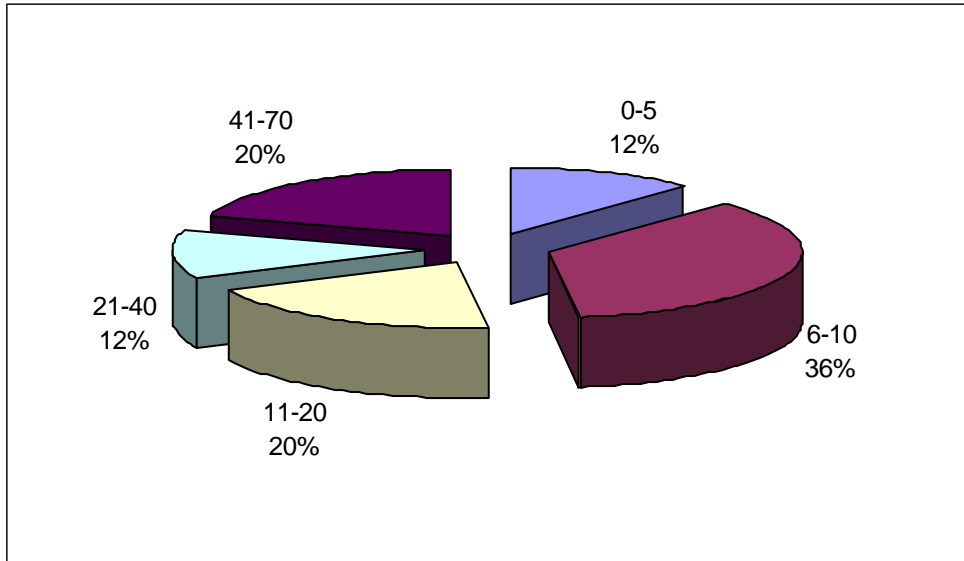


Figure I: Years in business (phone survey)

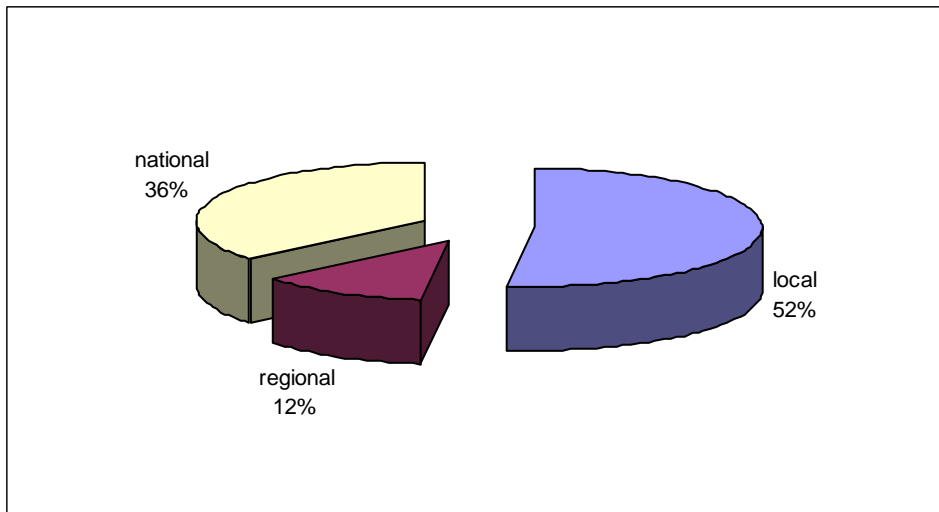


Figure II: Primary marketing area (phone survey)

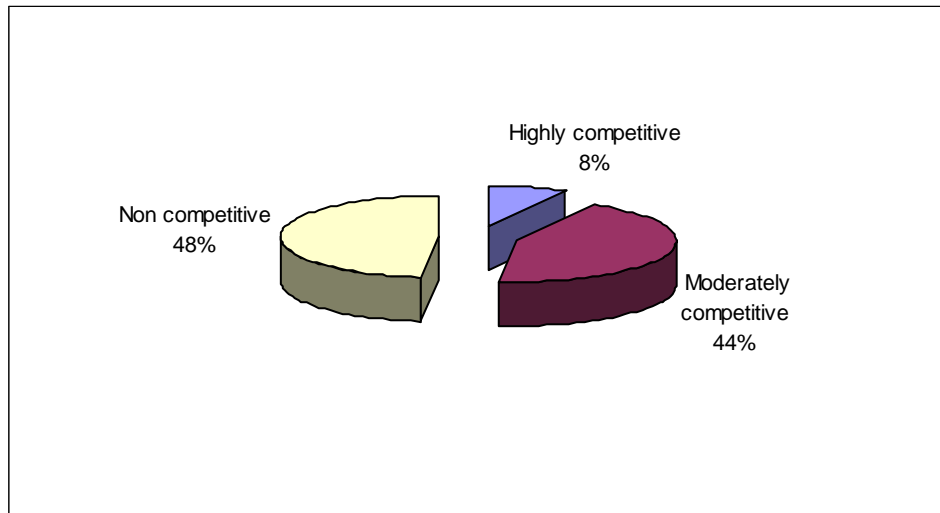


Figure III: Level of rivalry in area (phone survey)

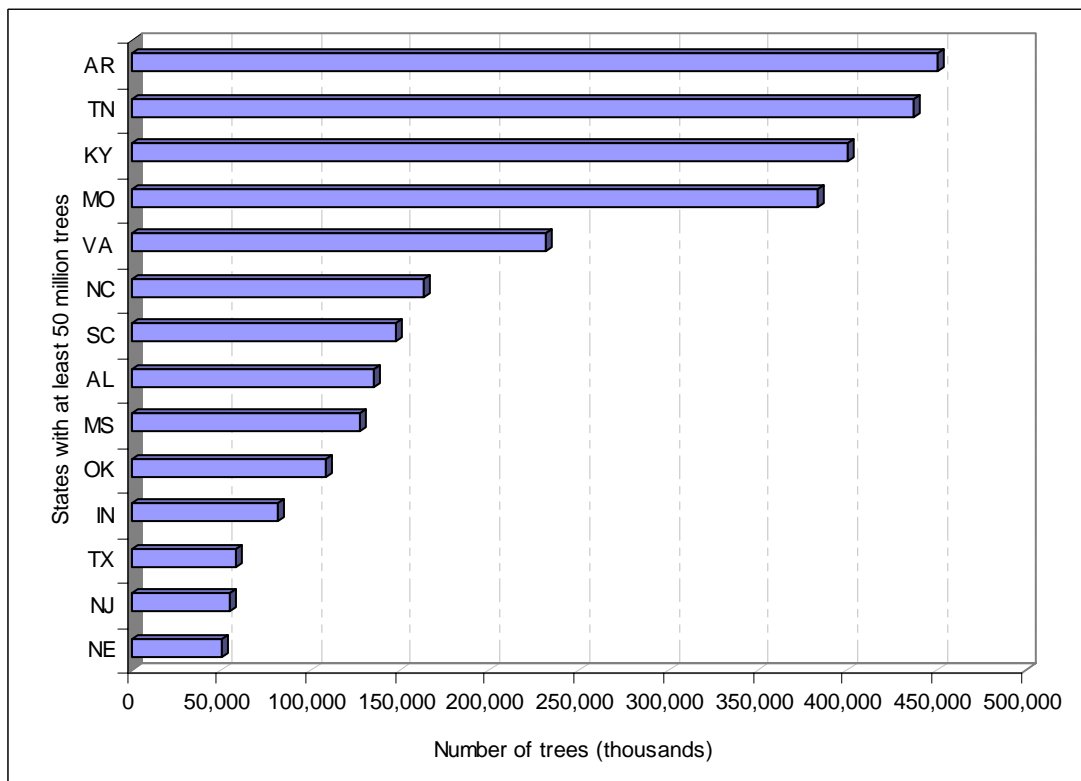
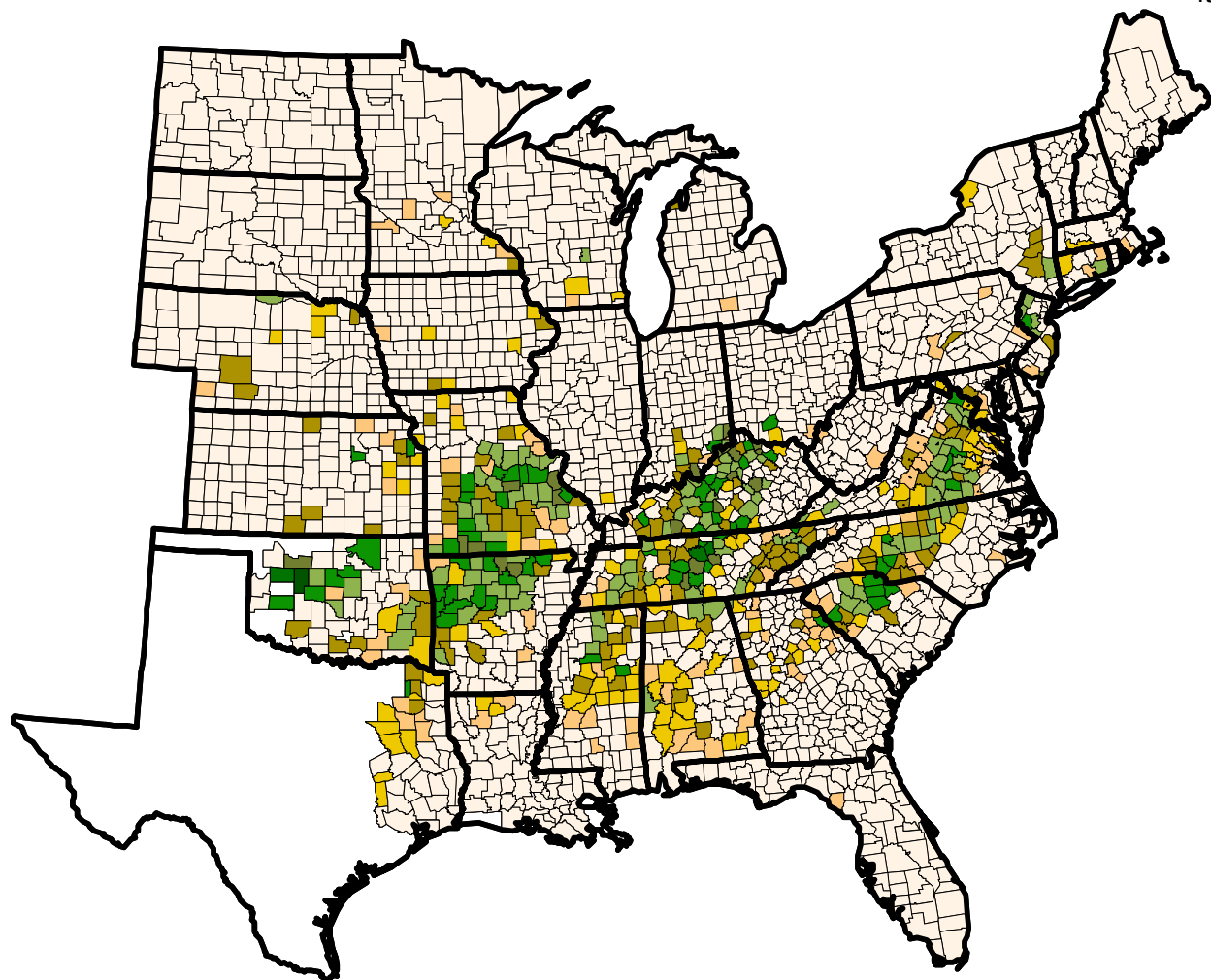


Figure IV: Total number (thousands) of trees by state



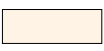








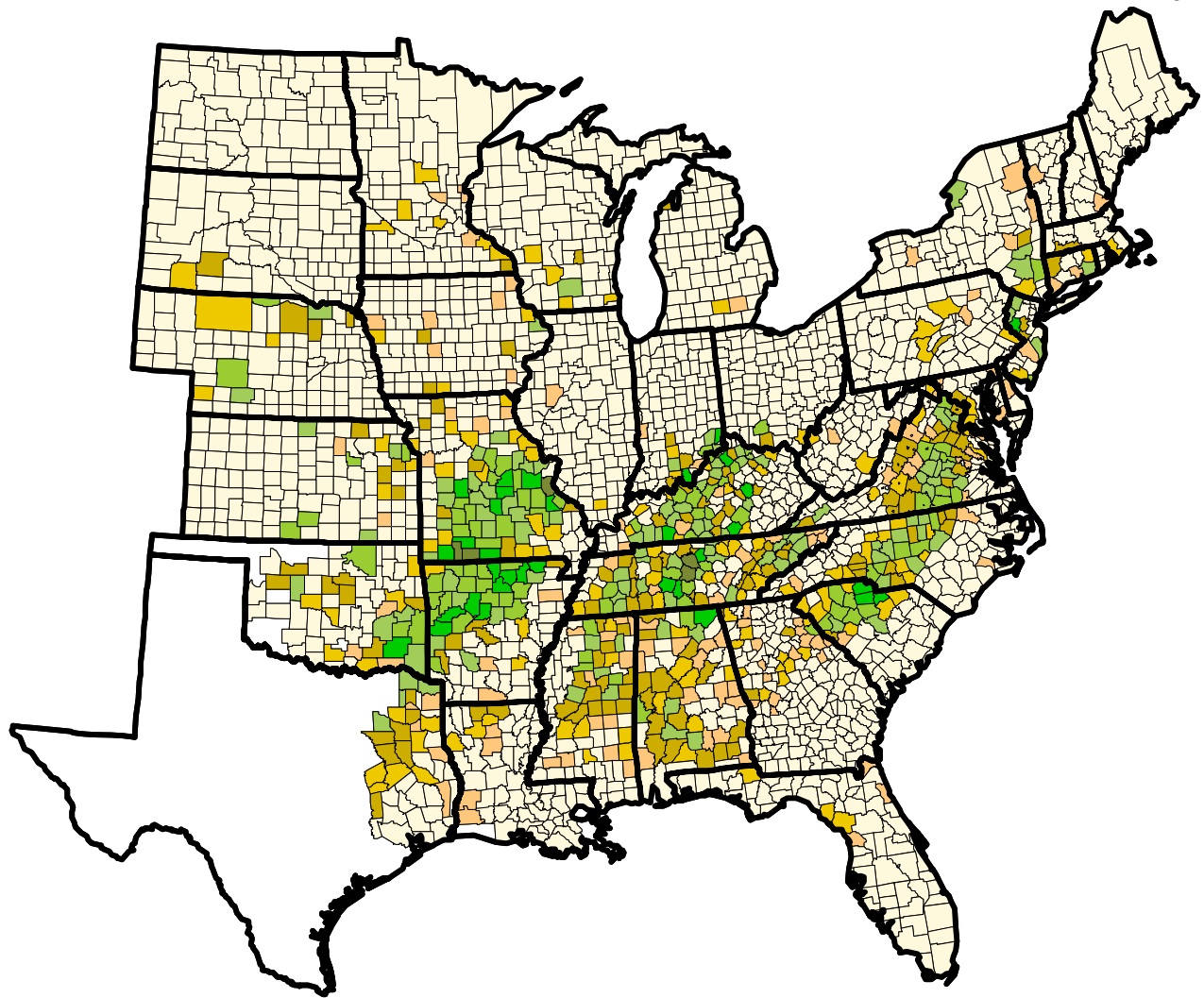
Number of trees per acre by county			
	0 - 2		32 - 64
	2 - 4		64 - 128
	4 - 8		128 - 256
	8 - 16		256 - 307
	16 - 32		
Based on most recent FIA data (8 Sept. 2003)			

Figure V: Eastern redcedar: Density of trees on timberland



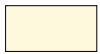









Millions of trees per county			
	0 - 0.5		8 - 16
	0.5 - 1		16 - 32
	1 - 2		32 - 64
	2 - 4		64 - 128
	4 - 8		128 - 482
Based on most recent FIA data (8 Sept. 2003)			

Figure VI: Eastern redcedar: Trees on timberland