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Secondary Wood Producers' Attitudes and Opinions Regarding Locally Grown Wood Material

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Secondary Wood Producers' Attitudes and Opinions Regarding
Locally Grown Wood Material

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B.S., University of Connecticut, 2010

A Thesis

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Master of Science Thesis

Secondary Wood Producers' Attitudes and Opinions Regarding
Locally Grown Wood Material

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ABSTRACT

The United States (U.S.) wood products sector has been faced with considerable challenges in an increasingly dynamic and globalized marketplace. For some wood products manufacturers, given the success of Buy Local agricultural campaigns, there might also be unexplored markets for locally produced wood. Although secondary wood producers (SWPs) consume large quantities of wood, there is no available literature exploring their attitudes and opinions regarding the use of local wood in their production.

This exploratory study uses qualitative and quantitative methods to answer:

- What are the barriers preventing Connecticut SWPs from incorporating Connecticut grown/processed wood (CG/PW) into their manufacturing?
- What are Connecticut SWP attitudes and opinions concerning CG/PW?
- Are portable band sawmill owners/operators (PBSOs) able to supply appropriate quantities of CG/PW that are also adequate for maintaining SWPs' product quality and consistency?

Results from this study suggest that SWPs perceive CG/PW as a specialty product, often used to supplement the material their distributors cannot provide. Because value-added processes such as kiln drying are not offered by many local sawmills or PBSOs, the current applications of CG/PW can be limited. If some PWOs could produce small volumes of appropriate quality material there might be a niche market opportunity in products marketed as CG/PW. Educational efforts should address enhancing local wood products supply chain connectivity, improving CG/PW quality and developing targeted Buy Local marketing to promote products made with CG/PW.

1. INTRODUCTION

1.1 United States' Secondary Wood Production

The United States (U.S.) wood products sector has been faced with considerable challenges in an increasingly dynamic and globalized marketplace. In particular, the outsourcing of wood product manufacturing overseas has been a major threat to domestic secondary wood producers (SWPs), or those businesses that manufacture products from lumber, partially milled logs or wood byproducts (Buehlmann et al. 2010). The furniture industry has been especially impacted, with nonupholstered imports increasing 48 percent between 1992 and 2008, displacing a roughly equivalent loss in domestic consumption (Buehlmann and Schuler 2009). After the 2008 US housing crash, domestic wood products demand slowed further, negatively affecting cabinet and millwork manufacturers that rely on new construction and remodeling (Buehlmann and Schuler 2009; Espinoza et al. 2011).

While both foreign competition and decreased construction have affected the entire sector, large mass-production oriented firms and small to mid-sized custom or niche firms have adapted in different ways. Many of the remaining large SWPs have become concentrated in the southeastern US, northwestern US and Canada, where proximity to intensively managed forests and technological innovation have allowed these regions to remain competitive (Kozak, Maness, and Cadecott 2003; Londhe and Vlosky 2003; Wu and Vlosky 2000). Many small to mid-sized SWPs are either niche producers or custom woodworkers. Custom woodworkers offer quality woodworking to satisfy residential and commercial projects demanding a high degree of customization while niche producers produce small volumes of a product that meets a specific local demand (Hacker 2006). These SWPs appear to be most abundant in states with high

populations where a large and diverse customer base is readily available (Cassens and Bradtmueller 1996).

1.2 Connecticut's Wood Products Industry

Connecticut has a long and important history of wood production dating from the time of European colonization (Wharton et al. 2004). One notable instance of Connecticut wood is the eastern white pine (*Pinus strobus*), reserved from virgin New England forests for the King of England as masts for his royal fleet (Wharton et al. 2004). White oak (*Quercus alba*) and other hardwoods were also utilized in ships, buildings and cooperage (Wharton et al. 2004). As the southern New England landscape became settled, most of the old growth forests were converted to agriculture and timber shortages became widespread (Wharton et al. 2004) By 1820, only 25 percent of Connecticut was forested and those forests that remained were either unusable for agriculture or too remote to harvest (Wharton et al. 2004). With the increasing availability of more fertile land in New York and Ohio, stony Connecticut farms were quickly abandoned. By 1865, forest cover had become a larger percentage of land use and between 1880 and 1925, the forest was again harvested for charcoal used during the peak of Connecticut's iron industry (Wharton et al. 2004). This was the last period of widespread deforestation in Connecticut's post-colonial history. Over the past 100 years much of this forest has become economically mature, although industry consumption has not kept pace with overall forest productivity (Wharton et al. 2004).

Despite the abundance of high quality timber, Connecticut's primary wood producers (PWPs), or sawmills, have dwindled from 85 in 1984 to 13 in 2011 (Emmerthal 2007; U.S. Census Bureau 2011; Nevel Jr and Wharton 1988). Some of this reduction is due to consolidation resulting from new technologies, which have increased production output

substantially. In 1984, 21 percent of Connecticut PWP's were producing over 1 million board feet (bf) of lumber annually (Nevel Jr and Wharton 1988). According to the 2007 Connecticut Primary Processor Directory, 44 percent of PWP's were producing over 1,000,000 bf/year averaging nearly 4,000,000 bf/year for each mill (Emmerthal 2007). Nevertheless, the decline of primary production within the past ten years has outpaced any gains in efficiency. Between 2002 and 2011, Connecticut lost six PWP's, approximately 32 percent of the 19 operating in 2002 (U.S. Census Bureau 2011). The remaining small PWP's might soon experience increased competition from an emerging technology, the portable band sawmill. While these mills are inexpensive to purchase, maintain and transport, little is known about their capacity to compete economically with traditional sawmills.

Connecticut SWP's have experienced a similar, though less dramatic, decline over the past 10 years. Because these manufactures are so closely tied with new construction and remodeling, there was a 7 percent increase in the number of businesses in operation between 2002 and 2006. However between 2006 and 2011, Connecticut lost nearly 24 percent of its SWP's; outpacing an 11 percent decline in overall Connecticut manufacturing over the same period (U.S. Census Bureau 2011). Additionally, employment in the wood products manufacturing sector declined 48 percent between 2002 and 2011, likely due to new efficiencies in manufacturing coupled with an overall decrease in customer demand (U.S. Census Bureau 2011).

1.3 Buy Local Research

The Merriam-Webster dictionary (2013) defines local as an adjective describing something "characterized by or relating to position in space: having a definite spatial form or location." Consequently, there is no formal distance that separates goods produced locally from those that are not. The clearest way consumers of agricultural goods can determine the

“localness” of a product is whether it is domestic or imported. In the US, non-processed meats, shellfish, fruits, vegetables and nuts must be labeled with the country of origin, so in this way there is some federally accepted geographic bounds for considering a product as local (Henderson 2013). Additionally, U.S. manufacturers must specify on their labels the country where the last process value added has taken place (Jones and Martin 2012; Henderson 2013). Beyond this broad classification, consumers might consider any variety of definitions including a specific neighborhood, town, county, state, region, country, continent or any mile radii. It is important to note, however, that with increasing globalization, consumers’ perceptions of what constitutes local sources might be changing.

In recent years, there has been tremendous consumer interest in local agricultural products, the most popular of which being food items. There are many reasons for patronizing local agriculture, the most notable being associations between globalized (non-local) agriculture and a variety of negative environmental, economic and social outcomes (Hinrichs and Allen 2008). Environmental concerns are largely focused on increased transportation between producers and consumers, with new technologies for food preservation making longer hauls more economically feasible. This increased transportation, characteristic of globalized agriculture, can amount to a larger per capita carbon footprint and favors foreign farms, which remain competitive due to less stringent regulation, often associated with increased environmental degradation in those countries (Hinrichs and Allen 2008; Feenstra 1997). Keeping farms within a community of direct consumers allows for greater transparency concerning how food is produced while potentially reducing carbon emissions by shortening transportation distances. With increases in gasoline prices expected, local production might become increasingly cost-effective, even against the dominant globalized agri-business model.

Local commerce has a positive effect on its respective economy, as it keeps money within the same community (Hinrichs and Allen 2008; Rand 2011; Berlin, Lockeretz, and Bell 2009). Several studies have suggested that the negative social consequences of globalization are often mitigated by local commerce by increasing social connection, reciprocity and trust within a community (Hinrichs and Allen 2008; Born and Purcell 2006). Despite some disagreement between researchers, economic and environmental benefits do contribute substantially to societal wellbeing by providing employment and maintaining ecosystem services (Lyson and Green 1999).

Although research into local food systems is well documented in the literature, wood sourcing research is almost exclusively focused on sustainable harvesting certifications. Kozak et al. (2004) used focus groups in western Canada to identify consumer attitudes toward certified value-added wood products. Participants were skeptical about labeling but showed considerable interest in products produced within their communities and more generally temperate vs. tropical wood sources. Similar studies suggest producer and consumer support for certified wood products but provide little direct examination of consumer attitudes toward locally grown/produced wood products (Ozanne and Vlosky 1999; Vlosky et al. 2009).

Rand (2011) investigated locally grown/produced wood products in a case study of the Pioneer Valley of western Massachusetts. This region has implemented a local marketing campaign currently serving as the model for Buy Local grassroots organizations around the U.S. (Hinrichs and Allen 2008). Comparing attitudes toward local food with attitudes toward local wood in the region, Rand suggests that education for both consumers and producers is critical in developing effective marketing campaigns. Several studies have found customer knowledge of wood to be low, even at survey locations with educated respondents such as furniture trade

shows and college campuses (Costa, Garcia, and Ibanez 2011; Bumgardner and Bowe 2002; Bumgardner, Nicholls, and Donovan 2007; Polzin and Bowyer 1999). In 2011, Connecticut's Department of Agriculture (DOA) and Department of Energy and Environmental Protection (DEEP) expanded the local certification label, CT Grown, to include forest products including lumber, beams, flooring and other secondary wood products grown and manufactured in the state. Unfortunately, no research could be found that directly queries SWPs about their attitudes and opinions regarding wood material sourcing, local wood use or the perceived barriers to local wood use.

1.4 Research Questions

This study identifies Connecticut SWPs' attitudes and opinions regarding the source of wood material in their manufacturing. Specific attention will be given to businesses that use Connecticut grown/processed wood (CG/PW). Conclusions are based on evidence from both semi-structured, face-to-face interviews and self-administered, structured surveys.

The primary research questions are:

1. What are the barriers preventing Connecticut SWPs from incorporating CG/PW into their manufacturing?
2. What are Connecticut SWPs' attitudes and opinions concerning CG/PW?
3. Are portable band sawmill owners/operators (PBSOs) able to supply appropriate quantities of CG/PW that are also adequate for maintaining SWPs' product quality and consistency?

1.5 Significance of Study

Connecticut is an archetypal example of a highly urbanized state, with a largely undocumented custom SWP population and high value timber resources. These abundant resources are likely underutilized by local SWPs, as is the case in neighboring Massachusetts, where Berlik et al. (2002) asserts that state harvest volumes were only 2 percent of total wood consumption (Berlik, Kittredge, and Foster 2002). While SWP success appears to follow the housing market, PWPs have been declining since the 1980s and many that remain successful have reoriented themselves toward export markets (Espinoza et al. 2001). There could be an opportunity for the remaining PWPs to focus on the local attribute of their products and market directly to the wealthy, exurban community that surrounds them. This might include the adoption of the CT Grown label as a marketing tool, which is available to all SWPs who have access to certified CT Grown wood material. Unfortunately, little is known specifically about SWP attitudes and opinions or the barriers preventing them from incorporating more CG/PW into their manufacturing process. There might be some potential for PBSOs to fill this niche if they can supply SWPs with appropriate quantities of quality material. Information gained from this study can help to assess the cultural and physical availability of CG/PW while providing direction for educational and marketing efforts targeted at PWPs, SWPs and their customers.

2. RESEARCH DESIGN AND METHODS

2.1 Sampling

The participants that were interviewed for this study are not representative of the entire Connecticut SWP or PWP populations. During the recruitment process, there was no directory listing all currently operating Connecticut SWPs and therefore representative sampling could not be implemented. Because this research is exploratory in nature, purposeful sampling and snowballing were used to maximize the diversity of responses provided by the study participants. A database was populated with business information from outdated directories, professional organization membership listings, online keyword searches and referrals from other SWPs. This database was refined using a brief mail survey, phone calls and online research. The process yielded 408 existing businesses, nearly 100 more than the 297 observed in the 2011 business census data (U.S. Census Bureau 2011). This discrepancy might be attributable to outdated online information, individuals unreachable by phone that were assumed to be in business and/or unofficial businesses who are not filling taxes.

Most of the interviewees were identified through their response to the mail survey mentioned above. In total, 83 surveys were completed and returned and of those responses, 35 indicated a willingness to be interviewed. Twenty-eight of those respondents were interviewed and an additional ten were identified during the interview process through snowball sampling (Neuman 2004). This method involved asking interviewees to identify colleagues that were perceived to be interested in CG/PW and who would be interested in giving an interview.

Although all respondents represented a specific SWP, there was some variation in their positions within the companies. While most respondents were the owners or co-owners of their represented business (87 percent), other positions included operations managers, foresters, and

marketers. Many of the participants had favorable attitudes toward local wood usage and likely volunteered for the study because of this. Although this study does not assume the sample to be representative of the broader Connecticut SWP community, respondents' interviews produced repetitive themes, which provided evidence for answering the research questions posed in this study.

In order to answer the research question addressing PBSOs, surveys were distributed at four portable band sawmill workshops during one week in October 2012. Two of these workshops were held in Connecticut, while the other two were conducted in towns bordering Connecticut; one in Massachusetts and one in Rhode Island. Of the 145 individuals in attendance, 87 completed the survey and of these 38 indicated they were either owners or operators of portable band sawmills. Non-response bias was not calculated, however, conversations with participants suggested that non-response was largely a result of self-screening by individuals who were not PBSOs or were attending with someone who had already filled out a survey (Armstrong and Overton 1977). Results from this component are considered representative of PBSOs attending these workshops and are not necessarily representative of PBSOs in Connecticut or southern New England (Groves 2009).

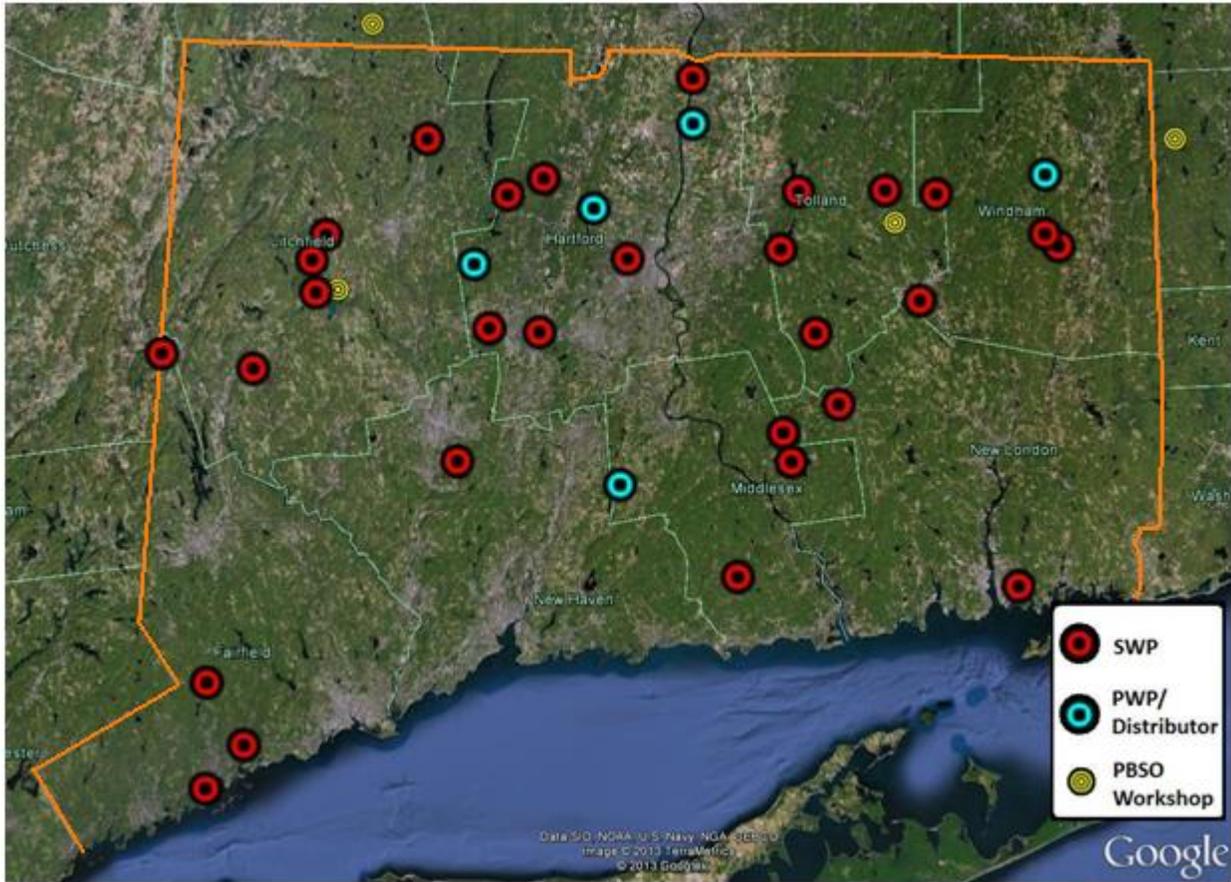


Figure 1. Interview and Survey Locations

2.2 Data Collection and Analysis

2.2.1 Group 1. SWPs and PWPs

Grounded theory was used to examine SWP and PWP attitudes and opinions. Grounded theory is a method of analyzing large volumes of textual data to derive meaning through an inductive rather than a deductive process (Glesne 2006). To generate the necessary data, 31 in-person and seven telephone interviews were conducted during the period of October 5 2012 to January 25 2013. All interviews were administered by the same individual, and took place in either manufacturing facilities or at personal residences. The first two interviews were used to pilot the instrument and as training for the interviewer. Two additional interviews were discarded

because the content was not applicable to the study. In total, 34 interviews were examined in the analysis: 29 SWPs and 5 PWPs.

Open-ended items examined the participants' experiences with and uses of CG/PW (Appendix A). Initial instrument content was based on existing research and anecdotal observations in cases where research was limited. The instrument was then vetted using university faculty, staff and industry experts to assure face validity; the extent to which an instrument is measuring what it intends to measure (Gravetter 2012). Due to the exploratory nature of this study, the instrument was allowed to remain fluid throughout the process, emphasizing emerging themes and discontinuing topics which elicited uninformative responses. Permission to conduct all interviews and surveys was granted by the University of Connecticut's Institutional Review Board prior to data collection and information regarding participants' rights was shared prior to the interviews.

After all interviews were conducted, conventional content analysis was used to examine the textual data. During this process, interview transcripts were read and concepts were grouped and re-grouped into increasingly general themes, whose focus were guided by the research questions (Hsieh and Shannon 2005). Prior to analysis, respondents were organized based on their status as a SWP or PWP and by SWP size represented by annual solid wood consumption (i.e. small [$>1,000$ bf annually], medium [$1,000 - 10,000$ bf annually] and large [$>10,000$ bf annually])

2.2.2 Group 2. PBSOs

The development of a PBSO survey instrument was guided by the limited pre-existing literature focused on domestic portable band sawmill operation (Cassens 2011; Lupo 2010). Content was vetted by the same group of faculty, staff and experts as in the SWP instrument to

assure face validity. The 11-item instrument collects mostly demographic information, but also contains items pertinent to the perceived SWP demands noted in the available literature (Appendix B). Data collected from these surveys are compared against SWPs' attitudes and opinions to assess the ability of PBSOs to supply appropriate quantities of quality material. While not a comprehensive assessment, the findings provide direction for further studies of this population and provide insight into PBSO relationships with SWPs and other consumers.

3. RESULTS AND DISCUSSION

3.1 Defining Local

The term local does not define any universally accepted, geographic area and therefore only exists within the perceptions of an individual. Consequentially, this study must address SWP and PWP interviewees' personal definitions of the term local, specifically with regards to wood products. The question posed, "What would you consider to be the largest region that would still be local with regards to wood products?", was difficult for most participants to answer because they had never considered defining local before this interview. Participants were encouraged to provide any definition that they considered to be relevant to this question. If they had trouble understanding the question they were provided with a set of standardized sample responses (i.e. "my town," "Connecticut," "New England," "the Northeast," "the U.S." and "North America")

The range of responses included political boundaries, regions, mile radii, and tree species availability. The most popular response to this question was the northeast U.S. (24 percent) with most respondents considering an area equal to or smaller than the northeast U.S. to be local (74 percent). Many respondents made it a point to include New York and Pennsylvania because these states support large volumes of high quality black cherry (*Prunus serotina*) timber, the most popular species used by the SWPs in our study. One medium sized SWP commented, "I guess [I define local as] the eastern U.S.: New York, Pennsylvania and West Virginia. Pennsylvania and New York State produce really nice cherry." It appears that many study participants define local wood based on their current understanding of where their wood is sourced. One medium sized SWP did not know where their wood was sourced from and subsequently did not provide a response as to what they considered to be local. Several

respondents indicated that native woods were local, since native species distribution is essentially fixed and limited to specific regions.

The wood that I buy, if it's poplar, probably comes from the Alleghany, Pennsylvania or that area. Could be Connecticut, could be Massachusetts, wherever they're logging it. Could be New Hampshire... Most of the oak probably comes from New England and maple the same way
(Medium- SWP).

While a species' range provides a reasonable definition for local wood, the meaning of the term native is not standardized. While native species are defined by the U.S. Fish and Wildlife service as those species historically belonging to a particular ecosystem, the federal definition includes "all species of plants and animals naturally occurring, either presently or historically, in any ecosystem of the United States" (American Native Nursery 2013). Because of the complexities associated with the term local, respondents might have different interpretations of what constitutes local at any given moment. Therefore, it cannot be assumed that they are necessarily referring to a specific geographic area unless explicitly mentioned.

3.2 Barriers to CG/PW Use

This section explores the barriers preventing SWPs from incorporating CG/PW into their manufacturing. Although anecdotal evidence suggests that some Connecticut SWPs are using CG/PW, no documentation could be found that describes the types of material used or the unique factors preventing CG/PW use. Because of Connecticut's low proportion of mass production

style wood manufacturing firms compared to small and mid-sized custom woodworkers, this study does not assume the traditional barriers identified in the SWP literature (U.S. Census Bureau 2011). Only one study could be found that examines custom woodworkers and it was primarily a demographic cross-section of the U.S. population in 1996 (Cassens and Bradtmueller 1996). Based on the available literature, this study hypothesizes that high costs and low visibility in the marketplace are the major barriers preventing SWPs from using more CG/PW (Buehlmann et al. 2010; Forbes et al. 1994; Nicholls and Roos 2006).

Material expenses are a major consideration of any manufacturing facility and are not solely based on the price of the raw material. Expenses associated with labor and storage greatly contribute to the overall cost of purchased wood (Dasmohapatra and Gonzalez 2010). Additionally, the costs of in-house value-added (e.g., drying, planing, etc.) are likely more expensive in states with high operation costs, which are associated with high taxes, strict regulation and high salaries. Rand (2011) identified low visibility as the major factor preventing local wood use in the Pioneer Valley. Low visibility might be attributed to poor promotional efforts from the public and private forest products community. This sentiment was echoed by Charlie Thompson, a forester for a large timber investment and management organization in the Pioneer Valley. He concludes that “it’s a failure of everybody...it’s definitely a failure of foresters and loggers and whoever else is involved (Rand 2010).” SWP interviewees in this study identified four major barriers to their CG/PW use: expense, low visibility, limited demand and limited availability.

3.2.1 Expense

Most respondents commented on the high financial costs associated with using CG/PW. Some SWPs considered the price of CG/PW to be more expensive than the material they

purchase from their current distributor. One medium-sized SWP indicated discontinuing his patronage of a PWP for this reason:

I believe [a local Connecticut mill] had a solar kiln but their material just got so outrageously expensive. About 15 years ago I started getting involved in larger projects, so I was getting stuff from them for furniture pieces. But as the projects started getting bigger, they could not supply it [at cost] (Medium – SWP).

Many respondents also indicated the necessity of using large wholesalers because they provided the best prices for material purchased in bulk.

Rarely do I go to a local yard because, in my mind, their costs are much higher than wholesalers, and the wood isn't as good. It's green sometimes. It's dried by their kilns. It's just poor quality generally speaking. So I do it rarely and at some cost (Medium – SWP).

Here the respondent references some other indirect costs of local production that are associated with quality. When SWPs use low quality wood material, their production costs increase because they need more labor to process the material. In order to stay competitive, many SWPs indicated a willingness to pay considerably more for guaranteed high quality material. Dasmophapatra et al. (2010) reported similar findings in a survey of U.S. lumber hardwood buyers, where buyers rated product quality as more important than both customer service and lumber prices. Many

SWP respondents perceived CG/PW as inferior quality, making it economically impractical to risk increased time and labor.

Respondents consistently made reference to the historically low prices of wood compared to the unreasonably high cost of labor. When expanding operation costs are put into the context of globalization, it becomes clear why the furniture industry has seen such a dramatic decline:

You see this stuff is “factory made” in the Philippines. You see the factory in the Philippines and it’s just a guy on the floor with a piece of wood and his or her labor is 5 cents an hour. The materials are more expensive than the people and the materials are cheap. And you’re in competition with that. It’s painful

(Small –SWP).

Since the housing collapse in 2008, SWPs reported greatly reducing their workforce leaving little additional time to waste cutting around defects or picking through lumber piles. Since 2006, Connecticut SWPs have reduced their workforce by approximately 42 percent, leaving managers and owners little free time to explore new sources of lumber or local wood-oriented product lines (U.S. Census Bureau 2011).

I know what I’m going to encounter [at my CT distributor]. To take time and risk going to another place to get it or not get it... I bill for my time. I get a job, it’s a four hour trip up and back. You’re automatically paying me to go drive, so I don’t want to make that eight hours going to four places” (Small – SWP).

Some SWPs indicated that they did not have the storage space available to purchase large quantities of lumber from wholesalers. This appears to disproportionately impact small to mid-sized custom SWPs, who are often located in urban and suburban communities where space is limited and expensive. While they have proximity to their high-end clientele, SWPs commented on the burdens of high property-taxes and expensive living costs associated with wealthier areas. When operating under these conditions, SWPs often have little choice but to pay more for smaller, more frequent lumber orders to meet unpredictable customer demands.

I don't want to go out and buy 5,000 bf of cherry and wait five years before I can use it. I never know what I'm going to use. The job I'm starting now is going to be painted soft maple with straight grained Douglas fir trim. The one before that was basic poplar. The one before that I did something with cherry. The one before that I did mahogany. I am always varying the wood so I don't usually stockpile woods (Medium – SWP).

Kozak et al. (2003) addresses this phenomenon in British Columbia's SWP industry, describing a need for small batches not usually available directly from local sawmills. In 2001, British Columbia's cabinet makers sourced less than 10 percent of their material directly from sawmills and furniture makers sourced less than 15 percent of their material. Many sawmills are often oriented toward large purchasers, preventing smaller SWPs from accessing wood directly from PWP. There might be potential for Connecticut SWPs to increase their percentages of CG/PW used if small, diverse batches of high quality material could be made available by small and mid-sized PWP.

3.2.2 *Low Visibility*

Rand (2011) identified the low visibility of locally grown wood as a major barrier to widespread local wood usage in the Pioneer Valley. SWP respondents in this study indicated that the poor visibility of CG/PW to both SWPs and final consumers can be attributed to poor marketing and uneducated consumers. This suggests a serious need for education and connectivity between the Connecticut SWP community and the remainder of the Connecticut wood products industry. One surprising comment came from a large SWP who suggested there was no PWP in Connecticut that produced lumber in commercial volumes. When asked if customers would be interested in CG/PW if available, the respondent explained, “They wouldn’t care, because there is no reason to care.” This is reflective of the limited education targeted toward SWPs promoting CG/PW. This particularly negative attitude highlights a need for CG/PW education and marketing targeted toward both final consumers and SWPs. There is some evidence that SWPs might already be interested in education. Cassens and Bradtmueller (1996) surveyed 168 custom woodworkers and most requested more educational opportunities in promoting, selling and marketing new products. Some SWP respondents in this study felt that the Connecticut state government should provide these necessary marketing and educational resources. The role of private groups, such as non-profits, industry organizations and individual businesses, was also discussed by respondents.

I’d appreciate a phone call [from a PWP] saying “Hey, listen we’re selling wood, I know you’re a woodworker. This is what we have.” or, “here’s our website.” A lot of it is being comfortable where I go [to purchase wood] (Small – SWP).

Non-profit economic initiatives also might provide educational resources and have been proven effective in the past (Rand 2011). One PWP cited the efforts of Communities Involved in Sustaining Agriculture (CISA) and the potential in that style of regional promotion.

[CISA has] a local food website that connects consumers with producers and you learn a little bit about the family that's making the milk and the cheese and whatnot. And I would love to see something like that happen for wood products, where maybe these things could be distributed. Everyone buys a Christmas tree once a year. Maybe cut-your-own Christmas tree places could distribute these marketing materials that talk about producers right here in Connecticut and neighboring states who bring you all types of wood; not just the Christmas tree that you're cutting, but people that make flooring or make furniture or produce lumber (PWP).

In addition to education and conductivity within the wood products industry, a coordinated consumer education effort might be critical to the success of a Connecticut wood products initiative. Several studies have shown recent low levels of consumer knowledge regarding wood material, spanning both geographic area and socioeconomic status. Costa et al. (2011) proposed that French window consumers based wood choices off of perceived characteristics as opposed to the observed quality of wood material. Similarly, studies based in the US indicated poor customer identification of woods commonly used in secondary manufacturing (Bumgardner, Nicholls, and Donovan 2007; Bowe and Bumgardner 2004). SWP respondents supported these findings, commenting that consumers do not know that lumber of any kind is produced within the state. Some SWPs and PWPs use wood product education as a

sales tool and some assume that customers understand products are local simply by visiting their operation.

The customers aren't as well informed as they were 8 years ago. [The origin of the wood] doesn't arise much anymore, although when they come here they can obviously see we got some product here (Large – SWP).

Grima (2012) suggests adopting strategies successful in traditional Buy Local agricultural campaigns and tailoring those to market wood products. In a 2012 presentation, he recommended focusing on product labeling, telling the story of local wood, introducing the personalities behind wood production, educating about land conservation and doing so at appropriate venues such as farmer's markets and other educational events. These ideas could serve as a framework for the development of educational campaigns focused at Connecticut SWPs, PWPs and wood products consumers.

3.2.3 Limited Demand

Most secondary wood producers in this study agreed that customers “don't know and they don't care [where their wood comes from]” (Small – SWP). Almost unanimously, SWPs commented that customers “want what they want” regardless of the social, economic and environmental impacts of their wood choices. An increased visibility in local wood products might encourage some customers to demand local alternatives and any form of demand would likely encourage some SWPs to promote CG/PW as a marketing strategy. Respondents indicated that low levels of demand for local wood might be a result of limited knowledge about the wood species available and the benefits CG/PW consumption could provide.

Demand for CG/PW is also affected by existing marketing efforts, specifically those where a SWP already claims to provide a local product. One large SWP used a marketing strategy that changed the definition of local, based on where the product was distributed. The respondent explains:

Our current strategy is to market by regions. So if it's in Connecticut, the little signs around our products will say "handcrafted in Connecticut." If it's sold anywhere else in New England, it's "handcrafted in New England" and anywhere else outside New England, it's "handcrafted in America" (Large-SWP).

This tactic might only apply to manufacturers who export, compared to the majority of custom SWPs who work within their communities. In these cases, it might be redundant to market localness since builders, homeowners and commercial facilities are interacting with SWPs directly. Regardless, consumers might be confused by products claiming to be handcrafted in Connecticut versus those who use CT Grown wood. If a SWP is already marketing their localness by saying their product is "Made in America," they might have little motivation to purchase CG/PW at additional risk and cost.

It's on [our] label that we are Connecticut...people kind of already know that. And our business does well in Connecticut because it is a local product. I wouldn't mind [using CG/PW] because I want to support the local movement, but I honestly don't think that in our industry it will make any difference (Large-SWP).

3.2.4 Limited Availability

Those SWPs who use or have used CG/PW indicated that there is a limited availability of CG/PW that meets their manufacturing demands. While SWPs described certain applications where CG/PW was available in acceptable quantities, there were concerns about obtaining more of their wood material from these local sources. To fully explore CG/PW availability, it is important to discuss both the overall quantity of material and the quantity currently available for SWP consumption.

When asked about their quality demands, many respondents indicated that CG/PW sources had a problem providing the necessary volume of appropriate species, dimensions and moisture content. CG/PW use is often not possible because those woods that are stylistically popular do not grow commercially in Connecticut. Black cherry, black walnut (*Juglans nigra*) and mahogany (*Swietenia spp.*) were consistently identified by SWPs as those popular species that are difficult or impossible to find at CG/PW sources. The many species referred to as mahogany are imported from tropical regions, where cherry and walnut grow locally but are reported to be of poor quality and in limited supply. One midsized SWP describes a common response regarding the use of Connecticut grown cherry:

Connecticut doesn't have cherry that we harvest that much. And the quality isn't there. I know if I get cherry from West Virginia, it's not nearly as nice as cherry from Pennsylvania or New York (Medium-SWP).

Connecticut has similar issues with walnut, given that the state is at the northern-most extent of its range. Interviewed SWPs perceive that most of the walnut available commercially is grown

and processed in Ohio and Pennsylvania. In the instances where CG/PW is walnut, some respondents mentioned that trees came from backyards where the logs were salvaged for a specific woodworking purpose. Two of the interviewed PWP's indicated that they processed yard trees. However, each explained that the current methods of commercial operation are difficult and expensive in residential neighborhoods.

A major barrier to SWP's buying from any source is procuring the necessary dimensions. CG/PW can be problematic since popular species, such as cherry and cedar, are often difficult to find in sizes appropriate for their application. SWP's want longer, thicker and wider boards because it is most efficient for them to cut to size or to use in special applications such as book matching. One medium-sized SWP discussed the dimensions of red oak (*Quercus rubra*) boards that were perfect for building stairs:

I like to go to [a CT distributor] for their red oak because its 12-foot lengths, but also 12-inch widths... When I manufacture treads, I'll make them from two pieces of material for prevention of cupping, but if it's a 12-inch width, I'll just rip it in half, flip it, and glue it, so more often than not, grain and color will match

(Medium-SWP).

Respondents also indicated that boards were sometimes too thin and some specifically mentioned this in lumber from Connecticut PWP's and PBSOs. Several SWP's suggested 1 1/8" was the optimal thickness for rough-cut lumber sold as 1" material, but there was variation in responses based on the product manufactured.

The most frequently discussed quality issue, addressed by nearly all participants, was the moisture content in CG/PW. Nearly all SWPs indicated that CG/PW was either green or air dried and that the material that was dried was generally inconsistent in moisture content. Without appropriately dried wood, most woodworkers are unable to maintain the quality necessary to meet their customer's demands.

Well we have [used CG/PW] in the past years ago, but we needed drier lumber. Even if you get a rough-cut board, if you don't dry it properly, it's gonna twist. And if it doesn't, it's going to twist later on, you know (Medium-SWP)?

Although some Connecticut PWP currently offer kiln dried lumber, a history of unacceptable quality and poor customer service has likely contributed to an overall lack of trust. SWPs in this study perceived that wholesale suppliers are better able to maintain consistent moisture levels, providing better quality assurance to their customers.

We have a moisture meter, which I don't use much with my present suppliers. They seem to have it pretty well nailed. But you gotta be real careful to check each board when you buy at a sawmill because you don't know (Medium-SWP).

Forbes et al. (1994) found that furniture makers value moisture content above competitive pricing, since materials of unacceptable quality ultimately cost more to process when time in manufacturing and final product longevity are accounted for. When SWPs are forced to check

the moisture content on their boards, any savings in price might be negated by the additional cost in labor.

Availability of the necessary quantities of a given order can be problematic, especially when dealing directly with mills. Because the chain of custody between mills and distributors is not usually well documented, the distributor who interacts with the SWP often does not know the state specific origin of the individual boards within an order. For a SWP to be confident that their wood is sourced from Connecticut or neighboring states, they must go directly to a PWP or specialty distributor to purchase lumber. Even more constricting than quality issues, SWPs are limited by a PWP's capacity to supply large or small orders. Many PWP's are oriented toward commodity or niche markets, making small, specialized purchases difficult for large PWP's and large orders of kiln dried lumber difficult for small PWP's to provide.

The size of a PWP can determine the quantities of wood available to any given SWP. Connecticut's larger PWP's indicated their orientation toward export markets and large producers who generally demand large quantities of a single species in a single order. Therefore, many PWP's' contribution to supplying CG/PW has been limited to high end flooring sales or material used in the building of post and beam structures. The two post and beam builders interviewed in this study obtain most of their lumber locally and are very satisfied with the quality and volumes of that material. Another large SWP that specialized in flooring indicated procurement issues with Connecticut PWP's, even though the PWP's could physically supply the volume and quality necessary.

We buy some from [a local CT sawmill] and we tried working with [another large CT sawmill] but they were too big at the time. We were just too inconsequential for them. They were focused on export anyway (Large-SWP).

SWPs commented that some smaller PWP's cannot produce enough volume to meet their demands. More importantly, many of these non-export PWP's sell green wood directly into the commodity market and do not provide value-added services, such as kiln drying. While air-dried lumber is acceptable for certain applications, one medium sized SWP indicated inconsistencies in availability were a concern.

Ten or twelve years ago I needed larger quantities and [my local Connecticut PWP] couldn't support the quantities that I needed. I'm not sure exactly what they are doing now. They usually had a good stock of air dried but it got to be too hit-or-miss. I would need 500 feet and they would only have 100 feet and not have the rest of it for another year (Medium-SWP).

Those smaller PWP's who attempt to break into the value-added market need to overcome the negative SWP attitudes observed in our interviews. "Backyard" methods of kiln drying were not trusted by many of the SWPs interviewed. Although some of these methods are endorsed by state and federal outreach agencies, SWPs might be wary about using lumber produced in homemade dry-kilns because they are risking product quality compared to commercial wholesale production. One medium-sized SWP was dissuaded simply by the appearance of a homemade

kiln: “This [small PWP] up here has a kiln, but I looked at it once and it scared me. It looked like it was made out of a garage.”

When a SWP is not marketing the CG/PW attribute, it is usually not economically feasible to use a Connecticut PWP unless they require large volumes or a product that their normal distributor does not offer. Consumers are currently not demanding CG/PW from nearly any of the SWPs interviewed, likely due to the absence of any coordinated marketing of its benefits. Therefore, SWPs have no reason to foster relationships with PWPs, who have largely ignored their specific material requirements to this point. The cost associated with procuring wood within this framework then becomes the major barrier, ultimately excluding all but some niche producers and some SWPs who have personal reasons for purchasing CG/PW. Many of those SWPs who use wood for personal reasons indicated spending a considerable amount of time seeking out CG/PW, even though it was not economically optimal for their business.

3.3 Attitudes and Opinions Regarding CG/PW

SWP attitudes and opinions regarding CG/PW varied considerably across all respondents. Most respondents had some favorable views toward CG/PW or wood produced within the northeast. This was expected because our sampling method was biased toward those SWPs who had previously expressed an interest in locally grown wood. Reasons for SWP interest in local products was diverse but consistent with the themes identified by Rand (2011). Similar to the Pioneer Valley, Connecticut SWPs value economic, social and environmental concerns, but respondents focused heavily on economic considerations.

It keeps money local. You have this building being occupied here as opposed to just a big empty building. People are here working. So there's the economics of it and there is the

community aspect of it. Being able to go up and ya know haggle face to face with the guy who's cutting the tree. And it makes the whole process a stronger process (Medium-SWP).

Most SWPs expressed reserved optimism about customer interest in CG/PW. While nearly all respondents indicated their customers didn't care where their wood came from, many mentioned their customers' support of Buy Local, especially in food-based agriculture. One medium-sized SWP commented that: "customers actually would prefer more locally grown or more locally harvested material, just because I think there's some type of pride that comes with that." In addition to these generally positive attitudes toward the benefits of CG/PW, respondents discussed other themes specific to their experiences. The most prominent themes included wood byproducts, unusual wood material and CT Grown certification for wood products.

3.3.1 Wood Byproducts

The role of wood byproducts was not considered in the development of this research, but was discussed so frequently that an item was added to the instrument during the interview process. Both SWPs and PWPs reported producing wood waste and discussed how they approached its removal. Scraps and sawdust were most commonly reported as waste products, however, some vertically integrated PBSO/furniture operations also generated slabs as a waste product. One large SWP summarized the overall sentiment by reciting a piece of industry wisdom: "The difference between a profitable wood shop and an unprofitable woodshop is what it does with its scrap."

Wood scraps are produced by PWPs when logs are cut to length before and after sawing or after drying in facilities that have that capacity. Different PWPs have different types of wood

waste based on the markets they are supplying and therefore can have very different waste products. One of the larger PWP's indicated that nearly all scraps became firewood to be picked up on site or sold to larger firewood distributors in the form of logs. A smaller, more specialized PWP explained that in addition to firewood, pallet-grade lumber was sold directly on-site to farmers and landowners.

[Buy Local is] the perfect vector for marketing our waste so that nothing gets unused. We have boards that we cut that maybe we don't sell right away. We'll make tomato stakes out of them... If a tree fell on their fence, there is no reason for [farmers] to go to Home Depot and buy southern pine or anything when they can come here and give them better prices, pretty much giving it to them, and then their fences are made out of Connecticut oak (PWP).

Another similar sized PWP donated large wood scraps to a local high school for bonfires and used this form of waste removal as an opportunity to enhance their public image in the community.

SWPs also have an endless stream of scraps that are burned, remanufactured or simply thrown away. Because wood waste occupies space that SWPs need for general operations and storage, the faster they remove waste material the more economical their operation. Most respondents indicated that they sold cheap or gave away kiln-dried scraps as firewood to offset the cost of removal. Some small SWPs were able to remanufacture waste into products, optimizing their lumber usage per order. A couple examples that were given included component

pieces for windows and furniture or small specialty items such as cutting boards. Very few SWPs reported throwing away wood material but one small firm had no choice:

I'm so tight here, I don't even have a tenth of an acre. Unfortunately the scrapes go to a dumpster. I try to store stuff here. You save little pieces and after a while you don't even know what you have (Small-SWP).

Wood chips and sawdust produced by PWP's reportedly went to landscaping, agriculture or wood energy, because of the large volumes produced on a consistent basis. Some large SWPs also enjoyed this status, selling kiln-dried sawdust by the ton to wood pellet manufacturers. One large SWP was planning to add their own pellet manufacturing facility to capture some of these profits. Another large PWP had customers, schools and other public facilities across New England purchasing wood chips for on-site heating and energy production.

Smaller SWPs cannot produce the necessary volumes of sawdust and chips to sell directly to pellet companies. They indicated marketing their sawdust through local networks, often relying on farmers to buy it for bedding or fertilizer. This provides Connecticut's struggling farmers with a commodity that would be far more expensive if bought through a specialized distributor. Most of the respondents felt pride in supporting local agriculture and had similar responses to the following PWP:

Sawdust and shavings are supplied to all of our local farmers, which is really really big for me. I like supplying your local farmers, your local horse farms and cows and chickens and taking care of those people at a decent price compared to what it costs to go out and

get a bag of shavings. I think it's really important to take care of the local farmers (PWP).

The connection between CG/PW and Connecticut agriculture might be an effective message to emphasize in the marketing of CG/PW. Promoting the Connecticut wood products industry's involvement in local agriculture and sustainable energy might be useful in marketing a more positive public image for local wood production.

3.3.2 Unusual Material

When asked about CG/PW, many SWPs explained they only sought it out when they needed specialty products not available through their current distributors. Usually those specialty boards were salvaged, had "interesting" defects or were custom sawn. Because it is difficult to mass produce these boards, many SWPs considered local sources to be more economical and convenient than wholesalers. SWPs identified sources of this material to be portable sawmills, some traditional PWPs, specialty distributors and old building salvagers.

Boards that have interesting defects are often in demand by custom SWPs, especially when they are looking to build a unique custom item such as furniture or sculpture. In Section 3.2.4, defects were described as a barrier to most SWPs and were often the product of biotic and abiotic factors characteristic of a given region. The most common example posed by respondents was the black streaks found in much of Connecticut's cherry. While many SWPs felt these defects were unacceptable in maintaining their product quality, several custom SWPs considered those same defects to be desirable.

Twenty years ago, when I was building furniture, I would have to go through every piece and make sure there were no imperfections in it. Everything was clean and clear. Now if it doesn't have a knot or imperfection or knobby little thing on it, it doesn't work (Medium-SWP).

The one mainstream distributor even indicated marketing this type of material as "figured", and was selling it at a premium.

Several SWPs wanted minimal levels of finishing, giving the end product a more rustic appearance. This was accomplished using old building salvage, air dried PWP lumber, rough cut lumber or even re-sawing planed boards to achieve a rough-cut appearance. Barn and factory salvage were discussed by many SWPs as a way of using CG/PW while commemorating Connecticut's agricultural and industrial legacies. One small SWP summarized the point:

We are going to use up all the old growth stuff and we're going to have to use whatever is left. There are so many factories being torn down that were made of heart pine and whatever. They're selling lots of flooring from some old factory that is this beautiful old pine. I salvaged [some] and built an old barn out of it. That stuff is happening all over (Small-SWP).

Some SWPs commented that portable band sawmills are the perfect equipment to re-saw this material. Mills can be towed right onto the site and material can be milled as it is excavated. Because the blades are inexpensive and easy to replace, metal inside the wood does not pose the risk it does for traditional PWPs, where repairing a blade is expensive and time intensive.

Sometimes SWPs mimic imperfections due to the lack of commercially available material. Using air-dried wood for non-structural components can produce slight bending, bowing and cupping desirable to those who are interested in a rustic aesthetic for their wood products. A few respondents mentioned adding fake tool marks, nails and metal fasteners to mimic the appearance of salvaged lumber. One respondent described working with a Connecticut PWP to meet his demand for rustic looking lumber.

[A gallery in Fairfield County] needed table legs and stuff [and] it's hard to find it, especially reclaimed. So I was just buying new wood and making it match the reclaimed stuff. So that's what I got from that [Connecticut PWP]. I got a pretty good price for it and if it had a few cracks in it that was a plus. It was sort of rough. It was lying out in the woods in the sun and in the rain. It was a good way for him to use it up (Small-SWP).

The same SWP described an instance where he re-sawed planed boards just to show the saw marks in the final piece. Connecting SWPs with “waste” lumber generated at PWP facilities could be an opportunity to showcase the unique rustic characteristics of CG/PW. Because rough and unusual material usually attracts attention, several SWPs suggested marketing specialty items with trim or bark as an educational tool for a public that is unknowledgeable about their wood material sources.

Well, a lot of times if I tell them that I get materials from local people here, they do appreciate it, especially if they see a nice veneered product or nice piece of wood that

they really like the look of it, how it's finished. Then I tell them that it's grown locally...there's a little bit of excitement about that (Medium-SWP).

3.3.3 *CT Grown Certification*

Although the CT Grown label has been expanded to include forest products, little is known about how Connecticut PWP and SWP perceive the state's program for certifying CG/PW. The available literature has a heavy emphasis on customer interest and knowledge regarding third party sustainable forestry certifications such as those provided by the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC) and the Rainforest Alliance (RA). Although customer support appears to be favorable, an overall need for education has been cited as a barrier to increased consumption of certified products (Forsyth, Haley, and Kozak 1999; Jayasinghe et al. 2007; Chen et al. 2011). Those studies examining SWPs and their relationship to certified wood products have been primarily quantitative, in the form of mail surveys. The open-ended items in this study asked about certified wood products, first generally and then more specifically regarding the CT Grown program. There is no literature available that specifically addresses "local" wood products labeling or the attitudes and opinions of those who might purchase that material.

When asked about labeling in general there was an overall negative reaction to third party sustainability certification systems. Respondents indicated very little demand for these specific materials and had limited trust in the sustainability claims made by certification bodies. One recent start-up SWP discussed the reasoning for not choosing certified products.

My overall feeling on green or eco-friendly certification is that you really have to look into it a little more. A lot of the responses from [PWPs] in VT are very cynical and

critical of the FSC. They feel like they have been at it for a really long time and that it is in their best interest to manage the forests sustainability. They're very organized, they have great leadership and to have this third party certification thing come in and tell them what to do... There is some feeling that they were offended. So we held off on it and took their word for it, for now. We'll revisit it later on if it is really important to our customers but for now we don't have it (Small-SWP).

A similar attitude seemed pervasive among SWPs and PWP, who viewed certification as a well meaning but ineffective means of protecting forests and marketing their products. One small SWP indicated support for certified local over sustainably harvested:

From what I've heard, FSC is a start but I don't really trust it as a source for what's green. I personally would rather use something local than just say that the FSC label. Forest practices are for profit. That's the bottom line; more than ecological factors. I don't trust the motivation (Small-SWP).

Distrust of sustainability certification does not necessarily apply solely to the organizations listed above. Some SWPs interviewed questioned the percentage of CT Grown wood necessary to certify a product as local. While the DEEP has guidelines for the percentage of CG/PW to be considered CT Grown, there was still distrust toward the actual percentages and who would oversee compliance by PWP and SWP. Examples of this can be seen in food marketing as well, as indicated by a medium sized SWP who used CG/PW in his manufacturing.

I look at the juice label and Tropicana orange juice is 100 percent orange juice from concentrate with additives. I'm like "ok, how much of this is actually 100 percent orange juice? What are the other additives? Is there Brazilian orange juice, sugar, arsenic?" I know water is in it. "Is this 100 percent Connecticut grown and milled wood with wood from other sources? Okay, so 100 percent of the wood is from CT but how much of the wood is from other sources?" I would be concerned about that (Medium-SWP).

SWPs and PWP's agreed that both supply of and demand for certified wood products, overall, are fairly low. Respondents who had contracts stipulating the use of certified wood products indicated that almost all demand was from universities and commercial businesses. Some of this demand might have been motivated by Leadership in Energy and Environmental Design (LEED) certification, which accepts third-part certified wood as credit toward its own certification. Unfortunately, both SWPs and PWP's indicated poor economic returns on certified wood, due to higher administrative costs and procurement issues.

There was considerably more support for certified rainforest lumber over domestic lumber. Many respondents commented on how certified rainforest lumber was commonly seen without any non-certified alternatives. Respondents cited environmental concerns and future availability as major reasons for purchasing certified rainforest lumber. Additionally, SWPs commented that when consumers did ask about sourcing of wood, it was usually about rainforest sourced lumber.

When asked directly "How would your customers react to a CT Grown label on your product?" most respondents answered similarly to this large SWP:

I think most of them would just say, ‘Oh that’s nice.’ But I think the majority of them could care less. People are becoming more conscientious of that and I think they are receptive to the idea of trying to keep it local; obviously they are with their food sources. If you say wood, I think if anything you’d probably catch them off guard just like you did with me. I didn’t even know that existed with wood. I think they’d all find it interesting (Large-SWP).

It is likely that there is no current demand for labeling for the same reasons that there is little demand for CG/PW: limited promotion. Of the 29 SWPs interviewed, 66 percent were aware of the CT Grown label but only 21 percent knew about its 2012 expansion to incorporate wood products. The overall figure is likely much lower, since this sample is already bias toward supporting CG/PW. After a standardized explanation of the program was provided to the respondents, some SWPs commented that there might be some increased demand when young educated professionals replace older customers and demand more transparency in material sourcing. One medium SWP planned on marketing new types of products directly to this demographic.

Some of the new breed of customer that I am probably going to start to go for is probably going to be buying smaller items. My daughter and her husband, they just moved to Boston. They’re in their early 30s. She’s a lawyer and he’s in finance. They have adequate resources. They are very concerned about the environment. I think all their friends seem to be the same way. So I think if I was marketing stuff and saying ‘this

coffee table is made from locally grown, sustainably harvested wood' I think that could influence them (Medium-SWP).

Some niche SWPs commented on the lack of caché the Connecticut brand has in the woodworking world. Niche producers indicated that some SWPs market their location to give credibility to a product. One small SWP indicated that Connecticut was not the preferred brand in his industry and that the label would make very little difference since customers are almost exclusively out-of-state.

Unfortunately, Connecticut doesn't have the cache in the wooden boat industry. I'd benefit by saying I'm a Maine boat builder, or even Massachusetts ... Vermont has Vermont Made, which is the selling point. I haven't gotten the perception that Connecticut made is going to really sell for anybody outside of Connecticut (Small-SWP)

A few SWPs and one PWP commented that regional labeling might be more effective by capitalizing on the well-recognized New England brand and focusing more money into one coordinated marketing effort. Additionally, the one PWP complained that "*each state is like its own little kingdom*" often restricting their local marketing since they are near a state boundary (Thirty-six percent of towns in Connecticut (60/169) are located on or are one town away from a state border). Because of Connecticut's small size, coordinated regional marketing efforts might be necessary to allow SWPs and PWPs to take full advantage of local markets that are isolated by political boundaries.

Those SWPs and PWPs who currently carry the CT Grown label, have split views on the effectiveness of the label in attracting new customers. Three of the four PWPs interviewed carried the CT Grown label and 4 of the 29 SWPs carried the label. Two PWPs were unaware of any major interest in their products as a result of the CT Grown label while one PWP, offering value-added distribution, was more enthusiastic.

A lot of our local customers coming in are highly interested in the fact that they can get a product that is right here in CT. I'd say 40 percent of our customer base in retail is because we are CT Grown [certified]. As we saw our products, I put it in our retail or build a piece of furniture out of it. I try to track that to where it was cut, who was the logger and who cut it for us. Who kiln-dried it? Who sawed it in the mill? I try to follow the whole process to let people know that... If you really need me to go out and get soil samples for you, I would (PWP).

Two SWPs in the post and beam industry did not notice any additional interest due to the labeling while two similar midsized SWPs noted an unexpected demand in out-of-state customers. One of the midsized SWPs found more consistent interest in the label when selling outside of the state at furniture shows and more sporadic interest within the state. The other SWP reported considerable interest from New York City residents while they were staying at their Connecticut vacation homes.

[They] get wood milled and say ‘Hey CT Grown’, that’s where I have my weekend house.” It becomes a cool thing, whereas, without it you’re just going to get wood milled. It’s kind of a club they’re in (Medium-SWP).

The two midsized SWPs’ experiences contradict non-label users’ perceptions that CT doesn’t have cache outside of the state. Respondents couldn’t provide explanations as to why there is such little demand from Connecticut residents compared to elsewhere. It might be another reflection of the low visibility of the wood products industry and their role in manufacturing within the state.

3.4 Portable Band Sawmill Owner/Operator Capabilities

In order to better understand the relationship between PBSOs and SWPs, this study used both qualitative and quantitative methodologies to query both groups about portable sawmills. In the qualitative portion, SWP’s were asked about their experiences using portable sawmills and the benefits or downsides of using such equipment. In the quantitative portion, PBSOs attending four workshops in southern New England were asked 11 items about their portable sawmill usage. Some items determine basic participant demographics, while others explore the ability of PBSOs in the sample to provide material consistent with the needs of SWP respondents. These questions include species milled, size of logs milled, sources of that material, and whether the final product is kiln dried by PBSOs. Questionnaire responses were compared to SWP responses concerning the species milled and moisture content of that lumber, two important barriers to SWP adoption of CG/PW.

3.4.1 Secondary Wood Producer Perceptions

SWP perceptions of portable sawmills were generally positive, however many participants expressed concern over the limited applications for this material in their manufacturing. Larger firms in particular were unwilling to consider PBSOs as a source, because of their inability to produce large volumes of wood material. These same firms indicated that when homeowners offered them logs, they would redirect them toward local PBSOs. Many respondents indicated that customers tried to sell them storm damaged trees after major storm events.

People offer me trees all the time after the storm here. ‘Gee, this cherry tree fell down, would you take it?’ And I go ‘Well yeah, I might chop it up for firewood, it’d be nice.’ Apple tree, oh apple’s great when you burn it but [sawing] is too labor intensive to be cost-effective (Medium-SWP).

While large SWPs mentioned that buying wood from PBSOs was uneconomical, some had considered purchasing a portable band mill or already owned one. Post and beam manufacturers and some smaller PWP were particularly interested in purchasing a mill because of their custom sawing capabilities.

Small and mid-sized SWPs were interested in the custom lumber produced by portable sawmills but had misgivings about the abilities of PBSOs to produce useable dimensions at an appropriate moisture content. Custom materials that respondents indicated purchasing from PBSOs include thick mantle stock, custom boards for furniture and custom structures made from wood cut on the property. On a portable sawmill, mantles can be cut to any thickness, timber can

be milled on site to create a barn kit while furniture components match best in color and grain when they are sourced from the same log. When a furniture maker owns a portable sawmill, they can extend their creative process to determine exactly what material they choose to work with.

I know other guys who mill. But they're just banging it out, trying to get board feet.

We're not trying to get board feet, were trying to get boards. If we spent 2 hours at the mill and came out with 4 just smokin' boards. That's better for us than if we were there for 2 hours and did 1,000 board feet (Medium-SWP).

When SWPs discussed product quality, positives focused on the material's rustic character while negatives included inappropriate dimensions and moisture content of the material. The most popular application of portable sawmills was the custom resawing of old building material into boards. A major strength in portable band sawmilling is the inexpensive and easily replaceable blades, which often encounter metal in resawing.

Everyone was very pleased with [the finished product], but it was a really demanding thing to use reclaimed lumber. If you're just using virgin green lumber, generally there's no fear of finding fastenings and bullets and things like that. This particular stuff was riddled with nails and the guy knew that going into it. It was challenging to make it all work and in the end, it was a lot of blade replacements but it's a great idea (Medium-SWP).

SWPs indicated that metal sometimes added character to a final product and helped to sell the story of that material. To achieve this rustic character a few respondents admitted to adding fake nails and skimming boards with a portable sawmill to add blade marks.

Many SWPs who were trying to find grade quality material considered PBSO-produced lumber to be of poor quality. Inappropriate dimension was mentioned as a problem and similar to all CG/PW, boards were usually too thin. Most importantly, SWP respondents commented that PBSO-produced lumber had moisture levels that were too high for most of their woodworking applications. Some products do not require kiln-dried lumber; however, most SWPs do not consider it cost effective to buy a small number of green boards for one use. The perception that most PBSOs do not produce kiln-dried lumber was pervasive among our respondents. One large SWP explained that:

Often times what happens with those [portable] mills is they don't have kilns. So you have to air-dry it or you have to find somebody with a kiln. And so that's why I don't bother (Large-SWP).

3.4.2 Portable Band Sawmill Owner/Operator Self Report

3.4.2.1 Results

This study sampled 87 participants at four band sawmill workshops in Connecticut, Massachusetts and Rhode Island. Of those respondents, 38 (44 percent) owned or operated a portable band sawmill and 19 (22 percent) planned on purchasing one (Figure 2). The largest current use categories were hobby and part-time income with 37 percent using their mill exclusively for hobby use, 39 percent using their mill for part-time income and 18 percent using

it for both part-time income and as a hobby (Figure 3). Only 2 participants (6 percent) reported deriving full-time income from their portable sawmill.

When asked if they sold lumber from their mills, 50 percent indicated that they sold lumber, 32 percent indicated that they did not and 18 percent did not sell lumber but planned to start (Figure 4). Of those who indicated selling lumber, 44 percent sold to businesses, 17 percent sold to public works, 11 percent sold to distributors, 11 percent sold to other organizations and 6 percent sold to farmers. The most popular sources for sawlogs included forest harvesting (69 percent), yard/street trees (53 percent), land clearing (36 percent) and salvage material (31 percent). Since most respondents were based out of Connecticut, it is not surprising 79 percent of PBSOs obtained their logs from Connecticut.

The question of which species were most commonly sawn was left open-ended to be better compared to SWP responses. Responses were diverse and included everything from pine to telephone poles. The four most popular responses were oak (*Quercus spp.*) (67 percent), pine (*Pinus spp.*) (67 percent), maple (*Acer spp.*) (44 percent) and cherry (*Prunus spp.*) (25 percent). To prevent confusion over wood species labels, we grouped species by genus, which was consistent enough to be comparable. The limiting nature of this strategy prevents differentiating between species such as red oak and white oak or red maple and sugar maple. Therefore, these semantic limitations must be considered when comparing PBSO responses to SWP responses. When asked about factors affecting the quality of the lumber produced, the responses were stark. Eighty-nine percent of respondents sawed lumber between 10” and 24”. Eighty-six percent of PBSOs indicated they did not kiln dry any of the lumber they produced before selling it.

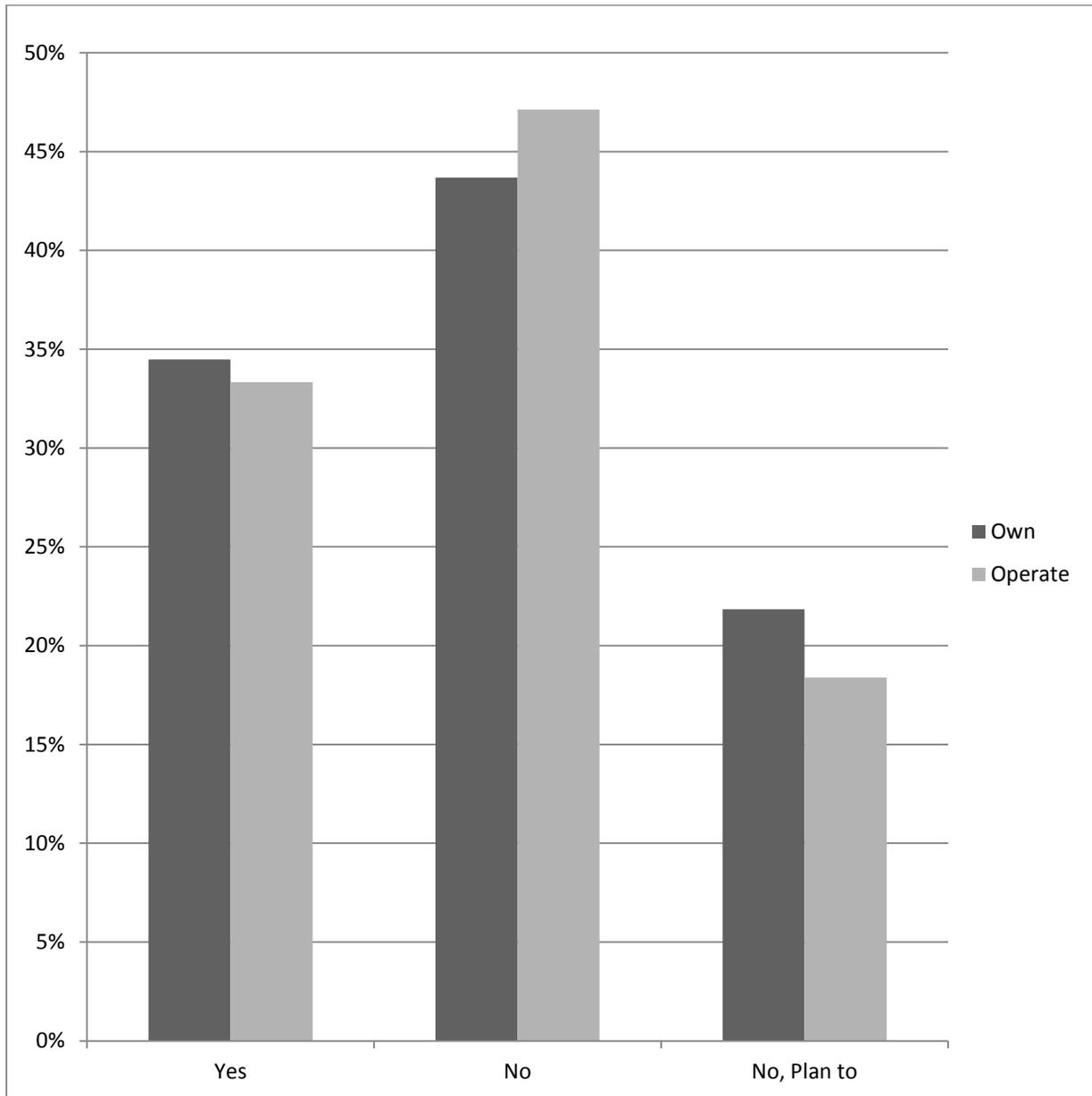


Figure 2. Workshop attendees' response to items asking whether they own, operate or plan to own or operate a portable band sawmill. (N=87)

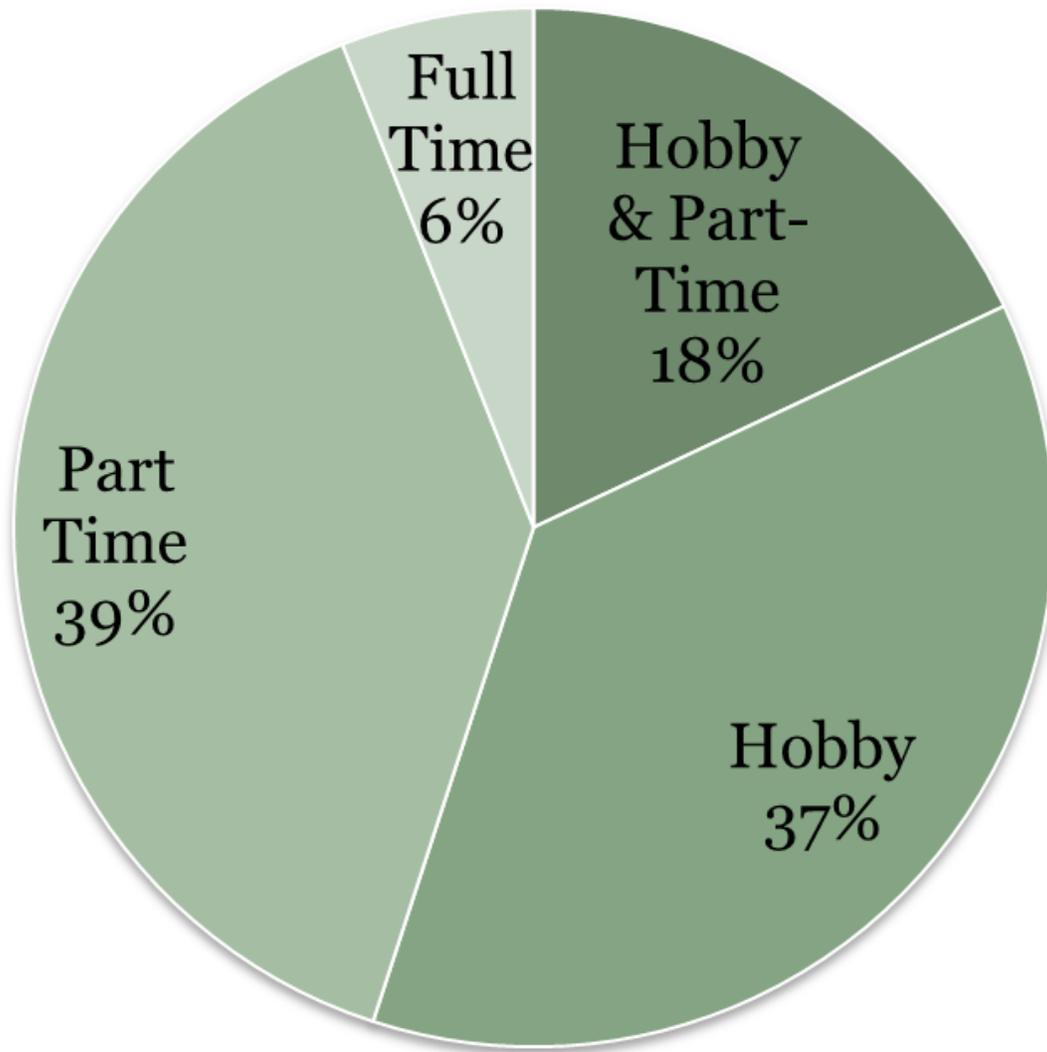


Figure 3. PBSOs' response to the item asking "How would you describe your portable band sawmill use?" (n=38)

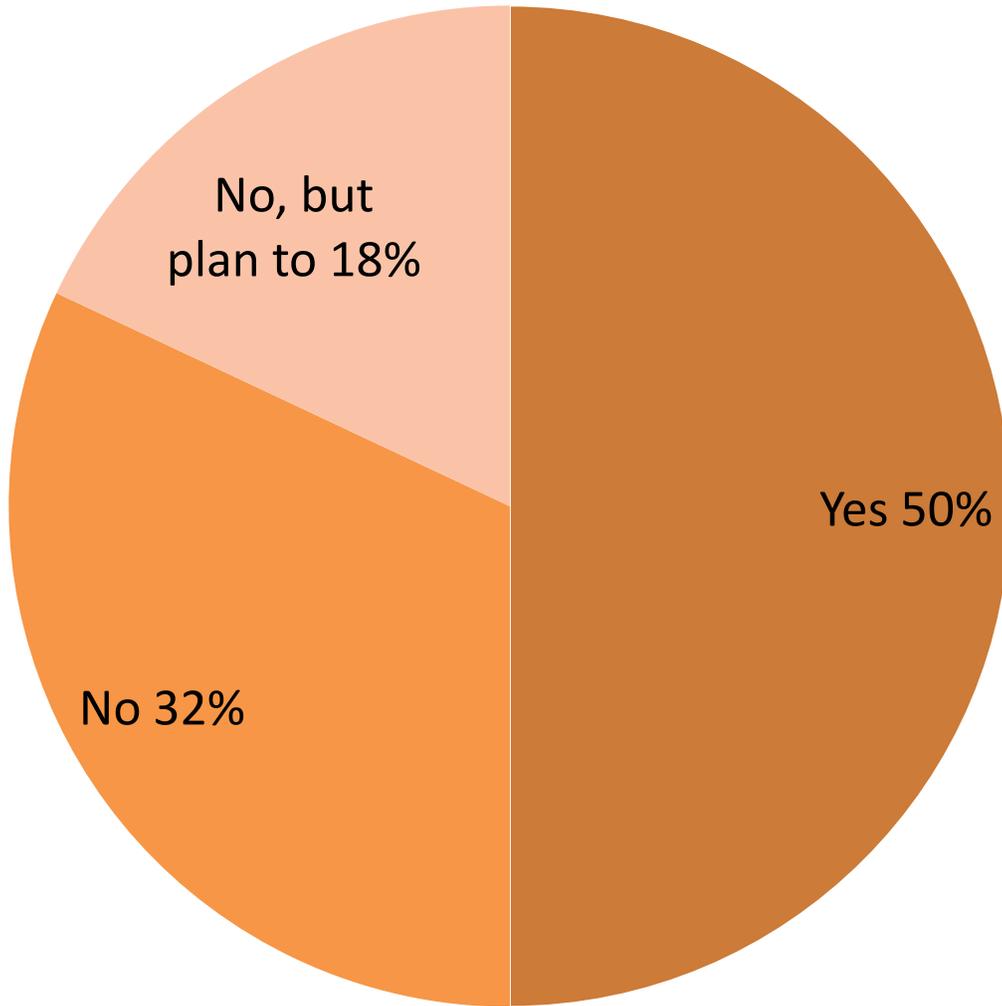


Figure 4. PBSOs' response to the item asking "Does the mill you represent sell sawn lumber?"

3.4.2.2 Discussion

While it appears that PBSOs are able to provide material that is suitable for some SWP applications, this survey suggests that most PBSOs are not supplying enough of the necessary quality material to supply SWPs in this sample. However, based on the unexpectedly high attendance at southern New England portable band sawmill workshops, PBSOs might be willing to address these shortfalls to meet SWP demands (Emmerthal 2012). While 66 percent of participants did not own a portable sawmill, 22 percent indicated plans to purchase one. Similarly, while 50 percent of PBSOs did not sell lumber, 18 percent indicated an intention to start. It might be assumed that these future adopters are using state-organized workshops as an educational tool before they invest in sawmills and/or start selling lumber. Many SWP interviewees referenced the abundance of yard trees and storm damaged logs to supply this sample PBSO population, who currently derives 43 percent of its material from these sources.

Supplying the correct tree species to meet SWP demand is crucial for PBSO success in marketing CG/PW. In this study, the two samples were somewhat complimentary in their supply and demand of northeastern species. The three species most commonly sawn by PBSOs were oak (67 percent), pine (67 percent) and maple (44 percent). SWPs indicated their three most commonly used species were cherry (57 percent), maple (57 percent) and oak (43 percent). From this information, it appears that the PBSO workshop participants collectively are not producing the lumber that many SWPs in this sample are demanding. Because of some error due to semantics, it cannot be determined whether SWPs are referring to red maple (*Acer rubrum*) and/or sugar maple (*Acer saccharum*) species with two different but common applications. SWP respondents indicated that red maple is used for painted material and is cheaply obtained from distributors. Sugar maple is expensive, not usually painted and not used in the high volumes that

red maple is. Additionally, some SWP respondents explained that white oak is a very different product from red oak and has held a high price and demand while red oak has been more volatile. While this species usage comparison is not completely clear, it seems that there might be an opportunity for PBSOs to process more cherry if it is made available to them. Although the sampled PBSOs' current markets were not explored in depth, PBSOs might be able to find markets in small to mid-sized SWPs demanding custom sawn cherry with slight imperfections (i.e. "character marks", resin deposits and figure).

SWPs considered moisture content to be one of the most significant barriers to their adoption of CG/PW. There was an overwhelming perception by SWPs that PBSOs do not produce kiln dried lumber that meets their quality requirements. This was supported by portable band sawmill participants, 86 percent of which did not produce kiln dried lumber as a final product. While the sampled PBSOs can currently exploit markets for green and air-dried wood, they are unable to supply a majority of the material demanded by SWPs interviewed in this study.

4. Recommendations and Suggestions

The findings of this study indicate a need for increased connectivity between members of the wood products supply chain in Connecticut. One method to accomplish this could involve educational programs targeted at SWPs and PWP, who have an interest in both using and promoting CG/PW. Program topics can be diverse; addressing communication along the wood products supply chain, local wood marketing, technical assistance training and improving general business practices. Special attention should be given to the targeting of program content, as PWP and SWP have vastly different operations with unique challenges specific to the business size, product manufactured and target customer.

SWP respondents indicated that many large PWP (>1,000,000 bf/yr) are not interested in local distribution, with the exception of framing timbers and flooring material. While it might be cost prohibitive for most large PWP to sell to small and midsized SWP, there are opportunities for some PWP to adopt a form of local distribution. Several of the SWP interviewed indicated that they were not aware CG/PW existed but were interested in utilizing more in their production. Educational programs should have a strong focus on promoting PWP marketing of CG/PW to SWP; especially those who are too small to purchase in large quantities (>10,000 bf/yr) .

PBSO are a segment of PWP who might have the capacity to provide lumber to SWP seeking small quantities of CG/PW (Lupo 2010). This study identified several wood quality issues that SWP consider to be unacceptable in their raw material. When comparing SWP and PBSO responses, black cherry was the most popular wood used while it was the fourth most commonly sawn wood. Given the SWP interest in character marks and unusual material, it is likely that PBSO could be sawing more black cherry, even if the quality appears to be

particularly poor by industry standards. Most SWPs expressed interest in lumber that is thicker than most PWPs produce; greater than 5/4". This is necessary for manufacturing specialty items such as mantels and tabletops, which require thick material for strength and stability. The thicker boards also allow for less stringent tolerances on PBSOs, since SWPs can plane down wavy boards and still have enough wood to maintain product quality.

The most important quality consideration, emphasized by SWPs, is consistent, accurate and appropriate moisture content. Most respondents agreed that small PWPs, PBSOs in particular, produce green or poorly dried wood that is unacceptable in many common applications. This perception was supported by the PBSO survey, which found 86 percent of respondents did not dry the lumber they produced. Educational programs should provide more technical assistance content to address these issues.

SWPs could benefit similarly from educational efforts targeted specifically at business development and CG/PW marketing. While program content should reflect the unique role of SWPs in the supply chain, PWPs and SWPs can share resources and develop relationships to facilitate communication within the local industry. This could be accomplished through an online network of wood producers and consumers, where SWPs could find the appropriate CG/PW without incurring the costs usually associated with using new distributors (i.e. time spent on communication, travel and quotes). One small SWP expressed his support of this concept: "If there was some kind of grand list... If there was a guy who had a lot of oak [he could sell me]. I'd search online, I'll phone call. Whatever I have to do to find it." (Small-SWP)

By supplying the Connecticut wood products industry with education and resources supporting the use of CG/WP, public and private organizations can promote land conservation, sustainability and economic activity in forested communities across the state.

5. Appendices

A. Secondary Wood Producer Instrument

You are invited to participate in a research study which is exploring secondary wood manufacturing and attitudes toward local wood usage. I am currently a graduate student pursuing a Master's degree at UConn and this interview process is major part of my thesis research.

I anticipate the interview should take no more than one hour and you may stop it at any time. You may answer any and all questions or refuse to answer any questions. Your responses are entirely anonymous. Likewise, the business you represent will be referred to only by the demographic information you provide. One example of this may be "A mid-sized cabinet and furniture manufacturer in Hartford County".

I would like permission to audiotape this interview for the purposes of transcription. These recordings will be deleted after the transcription process is complete. Copies of your transcribed interview will be stored in a secure university hard drive and in paper form in a locked cabinet. After I have compiled the data in my thesis, these documents will be deleted and shredded so that no information you give can be tied back to you or the company you represent.

- Do you consent to being interviewed?
- Do you consent to this interview being audio recorded?
 - If no, do you consent to any note taking during the interview?

- *I am going to start with some general demographic questions*
 - a. What is your position at _____?
 - b. How is it that you become involved in the work you do?
 - c. What products do you manufacture?
 - d. How many people are employed at _____; Full time and part-time
 - e. What would you estimate your annual wood usage to be?
 - f. Who are the customers?

- *Alright, now I would like you to think about the raw wood material you add value to.*
 - g. In general, what types of wood suppliers have you used?
 - i. Be as specific as you would like.
 - ii. (ex. lumber distributor, lumber wholesaler, private woodlot, sawmill)
 - h. Please describe the relationship with your current wood suppliers.
 - i. Are you satisfied?
 - i. Have you ever used a lumber produced from a portable sawmill?
 - i. How was that experience?
 - ii. What did you think of the quality?
 - j. What species of wood do you most commonly use in your manufacturing?
 - k. What do you do with your wood waste?

- *In these next questions, I want to hear your opinions on locally grown wood.*
 - l. What is the largest region you would consider to be local with regards to wood products?
 - m. Do you currently use locally grown wood in manufacturing?
 - n. Do you currently use CT grown wood in manufacturing?
 - o. Do your customers ever ask about where the lumber you use comes from?
 - i. Rainforest?
 - ii. FSC?
 - iii. Locally grown?
 - p. Do you know of any wood product manufacturers that promote CT grown wood?
 - i. Would you be willing to share their name with me?

- *Next I want to discuss CT Grown certification.*

q. What do you know about the CT Grown label?

i. If yes,

1. Are you aware that the State of Connecticut expanded the CT Grown label to include wood products?

ii. If no,

1. “The CT Grown label is a state certification applied to agricultural products grown and processed within Connecticut. In 2011, the Department of Energy and Environmental Protection (DEEP) and the Department of Agriculture (DOA) expanded their definition of agriculture to include forest products.. Additionally, wood products made from lumber with a CT Grown label can also carry the label”

r. How do you think customers would react to a CT Grown label

i. Do they care about labeling?

- *Is there anything else you would like to tell me?*

- *Do you have any questions for me?*

Thank you for your time and input!

B. Portable Sawmill Owner/Operator Instrument

Information Sheet for Local Wood Usage Survey



Principal Investigator: Thomas Worthley

Student: Nathaniel Cyrus

Title of Study: "Attitudes Concerning Local Wood Usage in Secondary Wood Producers"

You are invited to participate in this survey concerning portable band mill use in southern New England. I am a graduate student at the University of Connecticut, and I am conducting this questionnaire as part of my research. I am interested in knowing more about the demographics of portable sawmill owners/operators and how they can provide CT secondary wood producers with the wood necessary for their manufacturing.

Your participation in this study will require the completion of the attached questionnaire. This should take approximately 5 minutes of your time. Your participation will be anonymous and you will not be contacted again in the future. You will not be paid for being in this study. This survey does not involve any risk to you. However, the benefits of your participation may impact your industry by helping increase knowledge about portable band mill owners/operators.

You do not have to be in this study if you do not want to be. You do not have to answer any question that you do not want to answer for any reason. We will be happy to answer any questions you have about this study. If you have further questions about this project or if you have a research-related problem, you may contact me, Nathaniel Cyrus at 860-235-9938 or my advisor, Thomas Worthley at (860) 345-5232. If you have any questions about your rights as a research participant you may contact the University of Connecticut Institutional Review Board (IRB) at 860-486-8802. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

Please complete the attached survey and return it during the workshop. Thank you.



Portable Band Mill Owner/User Questionnaire

1. Do you own a portable band mill?
Yes ()
No ()
I plan on purchasing one ()

2. Do you regularly operate a portable band mill?
Yes ()
No ()
I plan on operating one ()

Answer the following only if you answered YES to questions 1 and/or 2.

3. Where is the mill's current base of operations?
Connecticut ()
Massachusetts ()
Rhode Island ()
New York ()
Vermont ()
New Hampshire ()
Maine ()
Other. Please Specify _____

4. How would you describe your portable band mill use? (Check all that apply)
Hobby ()
Part-time income ()
Full-time income ()

5. Does the mill you represent sell sawn lumber?
Yes ()
No ()
We plan on selling lumber soon ()

6. If you answered YES to Question 5, who is the lumber sold to? (Check all that Apply)

Individuals ()

Businesses ()

Public works ()

Organizations ()

Lumber Distributors ()

Other. Please Specify _____

7. Which sources supply saw logs for the mill? (Check all that Apply)

Land Clearing ()

Forest Harvesting ()

Street/Yard Trees ()

Salvage Material ()

I Don't Know ()

Other. Please Specify _____

8. Which states supply saw logs for the mill? (Check all that Apply)

Connecticut ()

Massachusetts ()

Rhode Island ()

New York ()

Vermont ()

New Hampshire ()

Maine ()

Other. Please Specify _____

9. Which tree species are most commonly sawn on the mill?

10. What diameter saw logs does the mill typically process?

Less than 10" ()

Between 10-24" ()

Greater than 24" ()

I Don't Know ()

11. Does the mill you represent kiln dry the lumber it produces?

Yes ()

No ()

I Don't Know ()

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