Status of the Minnesota Logging Sector in 2011[1]

by

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Abstract

With the closure of several mills within the state, industrial procurement managers became concerned about the status of Minnesota's logging sector. A mail survey and follow-up focus groups were conducted to assess that status and to consider future scenarios. While there are many logging businesses producing up to 5,000 cords annually, those businesses produce a small percent of the total annual volume harvested and they tend to have the oldest equipment, to work during the winter, and are operating at the lowest level of their reported capacity. Over time, there has been a trend toward larger producers who harvest an increasing percentage of the total annual volume harvested. Business owners are keeping their equipment longer than in the past which has both positive and negative aspects. While small logging businesses will continue to have a niche with private landowners in the future, it is likely that their number will continue to decline in the future and that there will be continued growth of producers harvesting more than 15,000 cords annually. To be successful in the future, the logging sector will need to help itself and will need assistance from public forest management agencies, procurement mills and lending institutions.

Introduction

Logging businesses play a critical role in the wood supply chain, providing wood to mills for use in the manufacture of various forest products. As such, access to information about logging businesses is important to policy makers, procurement mills, land management agencies, logger training organizations, and logger and forest products associations. Across the United States, a national assessment was conducted (Anonymous 2011) and several states have collected baseline and/or ongoing information about logging businesses (e.g., Egan and Taggart 2004a,b; Goldstein et al. 2005; Rickenbach et al. 2005; Milauskas and Wang 2006; Allen et al. 2008; Baker and Greene 2008; Egan 2009, 2011; Traver 2012; Traver et al. 2013).

Perhaps the first summary of Minnesota loggers was provided in 1977 by Harry Fisher, then president of North Shore Forest Products and vice president of the Minnesota Timber Producers Association. Fisher wrote "Today's modern lumberjack is thirty-five years old. He is married and has at least two children. He is a homeowner with a mortgage and is probably making car payments. He is a highly skilled equipment operator and is capable of operating sophisticated logging machinery under adverse conditions. He is willing to work long hours in all kinds of weather because he has found a quality of life worth living in this area."

To provide an understanding of Minnesota's logging businesses, various individuals have surveyed loggers over time and summarized their findings. The first summary was done by Bolstad (1980) who profiled Minnesota's logging and trucking business operations in 1978 and 1979. As a part of the Generic Environmental Impact Statement (GEIS) on timber harvesting and forest management in Minnesota, a second survey was conducted to assess status of logging businesses in 1990 and 1991 (Jaakko Pöyry Consulting, Inc. 1992). A third study assessed operations for 1996 (Puettmann et al. 1998). The most recent assessment summarized information for operations in 2003 (Powers 2004). Rickenbach et al. (2005) summarized information for a 2003 assessment of loggers in Michigan and Wisconsin. Traver (2012) and Traver et al. (2013) assessed the 2010 status of Wisconsin loggers.

The objectives of this study were (1) to update our understanding of Minnesota's logging sector as of 2011, (2) where appropriate, to compare those results to previous surveys in Minnesota and Wisconsin and Michigan, and (3) to gain insight into what the current status of the logging industry and markets in Minnesota may mean for the future.

Approach

Data were initially collected using a mailed survey. As the survey was designed to provide a broad overview of a number of factors and explanatory rationale for decisions were not a part of that method, focus groups were conducted to provide additional insight. Each approach is described below.

Mailed surveys

A mail survey was designed to collect information similar to previous surveys as well as collect other information. Drafts of the survey were shared with the Minnesota Forest Industries Forest Management Task Force as well as with AgStar for review and comment. The final survey included sections for background information, harvest operations, equipment and future plans within the business, and training needs. Respondents were asked to answer questions on these topics using 2011 as the reference year. A copy of the questionnaire is provided in Appendix 1.

After receiving an exemption from review through the Institutional Review Board at the University of Minnesota, the survey was designed and conducted during the spring of 2012 following standard mail survey procedures (Dillman 2000). This design included a pre-survey letter to announce the study and to encourage participation (Appendix 2), an initial full mailing (i.e., cover letter, questionnaire, postage-paid return envelope) (Appendix 3) in early April, a follow-up reminder/thank you postcard sent to all firms in the sample one week after the initial mailing (Appendix 4), a second full mailing which was sent to nonrespondents one month after the initial full mailing (Appendix 5), and a final letter mailed to nonrespondents two weeks after the second full mailing to encourage participation (Appendix 6). The timing of the survey's first mailing coincided with the Minnesota Logger Education Program's (MLEP) Logger Conferences where the chair of MLEP's Board of Directors (a logger) encouraged meeting participants to return a completed survey.

While the mailings of the full survey were sent on University of Minnesota letterhead, the letters encouraging participation were sent on MLEP letterhead. The survey was mailed in an 11 x 17-inch white self-seal envelope with window in the portrait position. A 6 x 9-inch manila envelope with a 2 x 4-inch shipping label attached with preaddressed return information was used as the return envelope and included return postage. UDAC in Duluth (http://udac.org/) assembled and mailed each of the survey mailings.

The survey was sent to the 427 logging business owners on MLEP's March 2012 membership list. All brokers were excluded from the mailing. MLEP estimates that nearly all commercially active loggers in Minnesota are included in their membership list. It can be assumed that a number of one-person, part-time or hobby operators were not included. The survey was designed as a double-blind study, where MLEP created a unique three letter code which was printed on each survey. Surveys were to be returned to the University of Minnesota where MLEP was notified of the codes as surveys were received.

Focus groups

While the mail surveys allowed data to be collected about a number of important issues, the survey instrument was designed such that it could be completed by checking boxes or writing numbers. That design was selected in an attempt to get a higher response rate. As such, the survey was not designed to ask for longer written statements which could have helped explain some of the responses. To better understand some of the themes identified through responses, to ask some new questions and to understand how results found through the survey might impact

the logging sector as a whole and some of the larger mills in northern Minnesota, a series of focus groups were conducted.

After receiving an exemption from review through the Institutional Review Board at the University of Minnesota, nine focus groups were conducted with loggers (three) and mill procurement staff (six) between May 20 to May 24, 2013 (Table 1). Each focus group consisted of either a mix of logging business owners or procurement staff from one forest products firm located in northern Minnesota. Logging business owners were invited through an e-mail message sent by MLEP's executive director (Appendix 7). Logging business owners were selected to provide a range of business sizes (i.e., small and large), equipment configurations (i.e., conventional and cut-to-length) and length of business ownership (i.e., newer businesses and more well-established businesses). Individuals attending the MLEP Board of Director's meeting were apprised of the focus group through the meeting agenda. The vice president of Forest Policy, Minnesota Forest Industries, contacted the wood procurement manager for each participating mill to invite them and their staff to each focus group.

Table 1. Background information on the nine focus groups conducted during May 2013 in Minnesota.

Date	Target audience	Organization	Location
May 20	Procurement staff	Sappi Fine Paper	Cloquet
May 21	Procurement staff	Boise Paper	International Falls
May 21	Procurement staff	Potlatch Corporation	Bemidji
May 21	Loggers	Various businesses	Bemidji
May 22	Procurement staff	UPM-Blandin	Grand Rapids
May 22	Loggers	Various businesses	Duluth
May 23	Procurement staff	Louisiana Pacific	Two Harbors
May 23	Procurement staff	NewPage	Duluth
May 24	Loggers and others	Minnesota Logger Education Program Board of Directors	Grand Rapids

Approximately two weeks prior to the focus groups, participants received either a paper copy or a pdf file containing a summary of the survey results as well as a list of focus group questions. At the beginning of each focus group, the script found in Appendix 8 was read. Participants at focus groups with logging business owners were reminded of antitrust regulations at the outset of the meeting. The questions found in Appendix 9 were asked of logging business owners and those in Appendix 10 were asked of procurement staff. Because of time constraints, some questions were not asked in every session.

During the focus groups, separate notes were taken by three individuals to record individual comments. One individual recorded comments electronically. The other two individuals reviewed the electronic set of comments and revised them as appropriate. While comments were initially organized by question for each focus group session, they were later aggregated by question into separate logging business owner and industry responses. In doing so, all location specific information was removed to maintain anonymity of respondents.

Analysis

Data from returned surveys was entered into Excel. After entry, 51 surveys were randomly selected for error checking. Every entry for each of those 51 surveys was error checked. A total of 13 errors were found and fixed. That error rate was deemed acceptable.

Traditional outlier analyses were conducted prior to analyzing the data. This included detecting outliers through the use of box-and-whiskers plots and the authors' knowledge of unreasonable survey responses.

All production volume was converted to cords for the analysis using the following conversions: 1 cord = 500 board feet (2 cords/MBF) and 2.25 green tons/cord (assumes that quaking aspen is the primary species being shipped) (MN DNR 2007).

Basic summary statistics and figures were calculated using Excel. Except where data is weighted by volume produced, the unit of analysis is the individual respondent. Where comparable data was collected in the past, comparisons with previous survey results are presented.

To better understand the effects of percentage of stumpage purchased by someone else (e.g., a mill, a broker) (Question 6), annual production level (Question 7), and in-woods transportation method from the stump to the landing (Question 11) on various factors, one-way ANOVA or Pearson Chi-squared tests were performed and individual treatment means were subsequently compared using Tukey's multiple comparison procedure if an F-test yielded a significant result. All statistical tests were conducted at $\alpha = 0.05$ using the R statistical package (R Development Core Team 2012). The factors evaluated in each analysis are shown in Table 2.

The focus group responses (Appendix 11) were generally summarized to identify themes for each question by respondent type (i.e., logging business owner or industry response). Those summaries were then inserted in with the mail survey question responses, where appropriate. As some questions were not a direct follow up to a question from the mail survey, those responses are not integrated in with the responses to the mail survey questions.

Table 2. Summary of factors included in the analyses of levels of stumpage purchaser type, annual production level and in-woods transportation systems.

Factor	Survey question number	Type of analysis		Statistical analysis performed
		Production level	In-woods transportation	
Volume produced (cords)	7	NA	X	ANOVA[a]
Years in business	3	X	X	ANOVA
Average tract size harvested (acres)	4	X	X	ANOVA
Percent of total stumpage from family forest lands	8	X	X	ANOVA
Percent of total stumpage from county forest lands	8	X	X	ANOVA
Percent of total stumpage from state forest lands	8	X	X	ANOVA
Percent of volume produced during the summer	9	X	X	ANOVA
In-woods fuel/cord (gallons/cord)	21	X	X	ANOVA
Percent reporting profitability was slightly/much better in 2011 vs. 2008	23	X	X	Chi-square[b]
Percent of total capability	24	X	X	ANOVA
Percent who expect to be in business in 5 years	26	X	X	Chi-square
Percent who plan to increase or maintain volume within 5 years	28	X	X	Chi-square

[a]One-way analysis of variance.

[b]Pearson's Chi-squared contingency table tests.

Results

Of the 427 mailed questionnaires, three were removed from the sample because they were undeliverable. Two hundred and forty-three respondents returned the survey for an overall response rate of 57.3%. Of those responding businesses, 11 indicated that they did not harvest any timber in 2011. Surveys were then screened and only those firms producing 100 cords or more in 2011 were included in subsequent analyses (six surveys were thus excluded from the analysis). There were 226 useable responses.

Results are presented below in the following three sections.

- Summary of mail survey results. This section provides a summary (e.g., number of responses, averages) for each survey question and compares those responses to previous surveys (where appropriate). For some of the survey questions, responses are categorized based on data from a second survey question.
- Summary of how various factors are influenced by purchaser type, annual production and in-woods transportation method.
- Summary of focus group discussions with logging business owners, forest industry members, and equipment dealers.

County where business is located (Question 1)

The distribution of responses indicating where the respondent's logging business was located (and not where their timber was harvested) by county and Minnesota Department of Natural Resources (MnDNR) region is shown in Figure 1. Because of the relatively low number of MLEP members in the central and southern regions and thus responses, data from those regions were combined for analysis and reporting purposes. The highest concentration of responses was from the northeast region and the least from the central/southern region. Those response rates across MnDNR regions are very similar to the distribution of MLEP's membership across Minnesota (Figure 2). It is also comparable to the 2003 assessment where nearly 57 percent of the respondents were in the northeastern region and 31 percent were from the northwest region (Powers 2004).

Workers or subcontractors (Question 2)

Of the 1,605.5 full- or part-time employees and subcontractors reported as working for the 216 responding logging business owners, 57.1 percent are full-time employees, 22 percent are part-time employees, and 20.9 percent are subcontractors (Table 3). Nearly 44 percent of the workers were woods workers and 36.5 percent with truck drivers. Respondents were most likely to subcontract trucking (40.4 percent of all truck drivers were subcontractors).

The total combined number of employees and subcontractors for the 216 responding firms ranged from 1 to 62 with a median of 5 and an average of 7.43 (6.28 employees and 3 subcontractors for those firms which have employees and subcontractors, respectively). As some businesses with employees did not have both full- and part-time employees, the average number of full-time employees was 5.21 and the average number of part-time employees was 3.15. Ninety respondents had employees but no subcontractors. Fourteen businesses reported subcontractors but no employees. The ten businesses reporting the highest number of full- and part-time employees in total averaged 28.1 employees (22.1 percent of the total) and 6.5 subcontractors (19.3 percent of the total) per business. Thirty-nine respondents (18.1 percent) had 10 or more employees.

Few previous surveys assessed the number of subcontractors working for logging businesses in Minnesota. The average of 6.28 employees per respondent is slightly lower than was reported for 1991 when the average was 6.53 individuals (Jaakko Pöyry Consulting, Inc. 1992) but nearly twice the number of 3.23 individuals per firm reported for 1996 (Puettmann et al. 1998). In the 1979 survey of Minnesota loggers, the average full-time firm had 3.2 employees and the average part-time firm 2.3 employees (Bolstad 1980). Rickenbach et al. (2005) reported that for 2003, the average number of full- and part-time employees per firm was 4.1 and 0.7, respectively, in Michigan and Wisconsin. The average number of employees in the 2010 Wisconsin survey was 2.8 (Traver 2012).

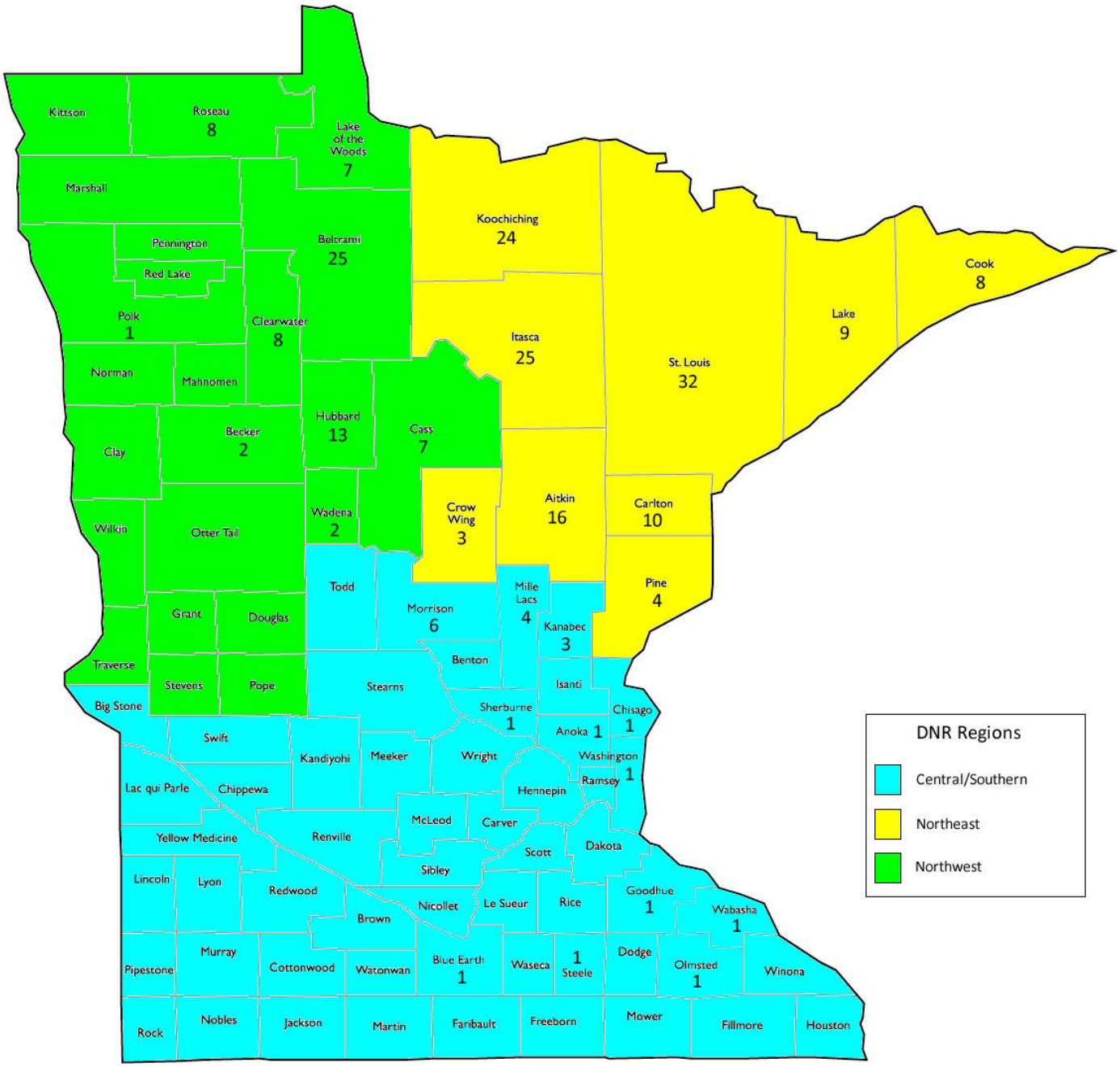

Figure 1. Summary of where respondent's business was located by Minnesota county and MnDNR region in 2011 (n = 226).

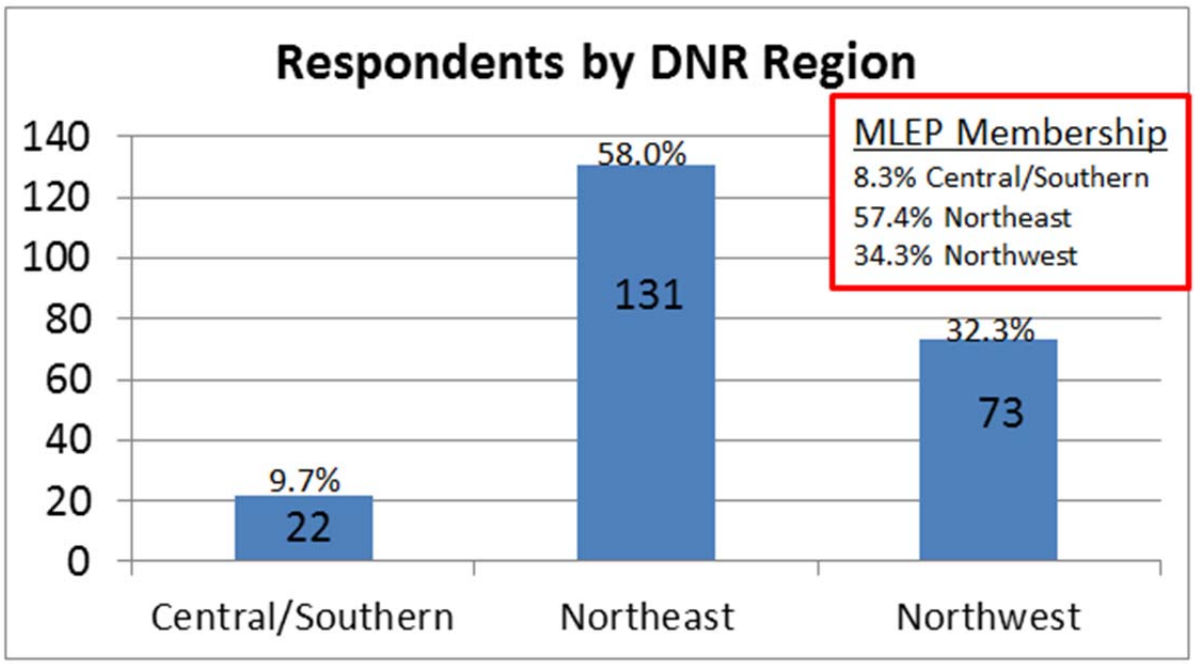

Figure 2. Summary of where respondent's business is located by MnDNR region (n=226; with percentages within each region) and the distribution of the MLEP entire membership (n=427) during 2011.

Table 3. Summary of number of full- and part-time workers and subcontractors employed by responding logging business owners during 2011 (n=216). The number of respondents for each type of worker is noted in parentheses.

Type of worker	Full-time employees	Part-time employees	Subcontractor	Total number of workers
Woods worker	484 (161)	155 (80)	63.5 (36)	702.5
Truck driver	250.5 (99)	98.5 (50)	236.5 (94)	585.5
Procurement/Forester/Landowner Assistance	25 (22)	9 (9)	9 (9)	43
Mechanic	47.5 (32)	39 (29)	21 (14)	107.5
Office/clerical	56.5 (44)	37 (35)	6 (6)	99.5
Supervisor/manager	53.5(48)	14 (13)	0 (0)	67.5
Total	917	352.5	336	1605.5

As compared to the 2003 survey (Powers 2004), the percent of smaller business has decreased (Table 4). In 2003, 68.9 percent of the reporting businesses indicated that they had 3 or fewer employees as compared to 29.6 percent in the 2011 survey.

Table 4. Summary of total number of employees (including logging business owners) reported during 2011 (n = 216) compared to the 2003 survey (n = 119) (Powers 2004). Percentages may not total 100 due to rounding error.

Number of employees	2011 survey		2003 survey (Powers 2004)	
	Number of respondents	Percent of respondents (%)	Number of respondents	Percent of respondents (%)
1	21	9.7	37	31.1
2	21	9.7	19	16.0
3	22	10.2	26	21.8
4 – 6	70	32.4	25	21.0
7 +	82	38.0	12	10.1

Length of time in operation (Question 3)

Minnesota's logging businesses continue to be long-established, making a long-term commitment to the profession. The average logging business had been in operation for 28.1 years (median 29) in 2011. Approximately 70 percent of the responding businesses had been in operation for more than 20 years (Table 5).

In 1996, the average length of time in the logging business was 22.8 years and the average length of ownership of the business was 17.6 years (Puettmann et al. 1998). The average time spent in the profession was 25.3 years in 2003 (Powers 2004). While the proportion of new logging businesses in Minnesota (up to 10 years) in 2003 was slightly less than in 2011 (10.1 percent in 2003 vs. 12.9 percent in 2011), the percentage of more well-established businesses (at least 31 years in operation) was 50 percent higher in 2011 as compared to 2003 (Table 5). Rickenbach et al. (2005) reported that the average firm in Michigan and Wisconsin during 2003 has been in operation for approximately 21 years, 22 percent of firms had been logging for 30 years or more, and that there were relatively few new logging businesses in the region.

Table 5. Summary of number of years logging business has been in operation in 2011 by the number and percent of respondents in a category (n=217) compared to 2003 survey (Powers 2004). Percentages may not total 100 due to rounding error.

Number of years	2011 survey Number of respondents	2011 survey Percent of respondents (%)	2003 survey (Powers 2004) Percent of respondents (%)
0 – 10	28	12.9	10.1
11 – 20	36	16.6	25.2
21 – 30	63	29.0	37.0
31+	90	41.5	27.7

In response to the focus group question "Why aren't more young people entering the logging business today?," logging business owners indicated that there is no single reason why young people are not entering the logging business today (Appendix 11). Reasons cited included a poor work ethic of young people, the cost to get into the business/purchase equipment is too great, unlike in the past where you might be able to start small and expand a business over time that is difficult to do today because a new business is unlikely to get a good contract from a mill as a

starting business, mills do not want to have more suppliers to deal with, the rules associated with certification discourage entry, and there are other opportunities for employment which require less strenuous work and which provide a higher salary and more benefits.

Similarly, industry focus group respondents indicated that there are many reasons why young people are not entering the logging business (Appendix 11). Reasons cited included a poor work attitude and ethic of young people, the cost to get into the business/purchase equipment/borrow capital is too great, the profit margin is too low for the amount of work and risk involved, there are other opportunities for employment which require less strenuous work and which provide a higher salary and more benefits (e.g., working in the mines in Minnesota or trucking in North Dakota), unemployment benefits which don't require one to work are nearly as high as what they would receive by working, most mills will not help finance anyone that they are not familiar with, and there is a negative perception about logging.

Tract size (average and number of sales) (Questions 4 and 5)

Tract size can impact a logging businesses' profitability. Larger tracts allow firms to spread their fixed costs over more acres and units of production (e.g., cords) while also reducing the need to move from one jobsite to another as frequently. Those moves require downtime because in-woods equipment can't be productive while is being moved, the actual cost to mobilize and move the equipment from one site to another, as well as time to set up and begin work at the new site (e.g., access development, landing construction). For some businesses, it may not be worthwhile moving into a tract that is too small for their normal operations, unless the site has unique characteristics (e.g., inexpensive stumpage, proximity to another nearby harvest site they have already contracted to harvest or mill where deliveries are made).

The median tract size was 30 acres and the average 31.6 acres with a range of 4 to 80 acres. The median value (30 acres) from the 2011 survey is similar to the results of the 2008 assessment of silvicultural practices in Minnesota (D'Amato et al. 2009) which reported that the approximate average clearcut size was 29 acres and the average partial cut was 25 acres. More than three quarters (84.7 percent) of the respondents to the 2011 survey indicated that their average tract size was 40 acres or less (Table 6).

Table 6. Summary of approximate average tract sizes harvested by respondents in 2011 (n = 183). Percentages may not total 100 due to rounding error.

Average tract size (acres)	Number of respondents	Percent of respondents (%)	Average tract size of respondents in category (acres)
1 - 5	1	0.5	4
6 - 10	17	9.3	9.7
11 - 20	47	25.7	18.0
21 - 40	90	49.2	33.2
41 – 80	28	15.3	63.1

The average tract size reported from 1991 was 33 acres (Jaakko Pöyry Consulting, Inc. 1992). The median and average tract size reported for 1996 were 29 and 79 acres, respectively, although

there were concerns reported that the number may not be accurate due to an issue with the wording of the question (Puettmann et al. 1998). Rickenbach et al. (2005) reported that the average tract size in Michigan and Wisconsin during 2003 was 59 acres.

The 193 respondents who provided a breakdown of their 2011 harvesting activities by acreage categories reported harvesting 2,239 tracts in 2011 with an average of 11.6 tracts/respondent and a median of 6 tracts (Table 7). Slightly more than half of the timber sales (51.3 percent) were 11 to 40 acres in size. Small sales (10 acres or less) accounted for 6.3 percent of the timber sales. The distribution of timber sales by tract size was generally comparable to what was reported by Rickenbach et al. (2005) who reported that most harvests fell into the 21 to 40 acre and 41 to 80 acre size classes, 29 percent and 27 percent, respectively. The 11 to 20 acre size class had the third highest percentage of timber sales.

Table 7. Summary of number of timber sales harvested in 2011 by various acreage categories (n = 193). Percentages may not total 100 due to rounding error.

Acreage range	Total sales	Percent of timber sales (%)
1 – 5	142	6.3
6 - 10	283	12.6
11 – 20	491	21.9
21 – 40	659	29.4
41 - 80	417	18.6
81 - 160	191	8.5
161+	56	2.5
Total	2,239	

Nearly 10 percent (9.3%) of the respondents reported harvesting only one timber sale in 2011 and two-thirds reported harvesting five or fewer sales (Table 8). One respondent reported harvesting more than 100 timber sales.

Table 8. Summary of number of timber sales harvested in 2011 by respondent (n = 193). Percentages may not total 100 due to rounding error. Percentages may not total 100 due to rounding error.

Total number of sales harvested	Number of respondents	Percent of respondents (%)
1	18	9.3
2 - 5	55	28.5
6 - 10	57	29.5
11 - 15	26	13.5
16 - 20	13	6.7
21 - 40	15	7.8
41 - 60	4	2.1
61 - 80	3	1.6
81 - 100	1	0.5
> 100	1	0.5

Purchaser type (Question 6)

The average respondent purchased 74.6 percent of their stumpage and 25.4 percent was purchased by someone else (e.g., broker, a mill) (Table 9). More than half of the respondents (53.5 percent) purchased 100 percent of their stumpage and 6.1 percent reported that all of their stumpage was purchased by someone else. In the 1991 and 1996 surveys, 47 and 61 percent, respectively, of the stumpage was purchased by the logging business (Jaakko Pöyry Consulting, Inc. 1992; Puettmann et al. 1998).

Table 9. Summary of purchaser type data according to various criteria in 2011 (n = 213).

Criteria	Stumpage purchased by respondent	Stumpage purchased by someone else
Average	74.6%	25.4%
100% of their stumpage is provided by source	114 respondents	13 respondents
At least 75% % of their stumpage is provided by source	143 respondents	37 respondents
At least 50% % of their stumpage is provided by source	159 respondents	59 respondents
At least 25% % of their stumpage is provided by source	179 respondents	73 respondents

Volume produced (Question 7)

Respondents produced 1,989,220 cords in 2011. That production represents approximately 69 to 77 percent of the estimated 2011 statewide production of 2.6 to 2.9 million cords (MnDNR 2012). There was a considerable range in their production from 100 to 138,393 cords.

Survey response data was compared to MLEP's 2011 membership by volume categories. MLEP members voluntarily report their annual production volume as there is a reduced membership rate for businesses which produce 1,000 or fewer cords. Data were fairly comparable for all but the smallest volume producers where the survey reported approximately 26 percent of respondents produced 1,000 or fewer cords and MLEP's membership reports 40 percent of its members are at that level of production (Figure 3).

A summary of number of responses by production level is shown in Table 10. The average respondent produced 9,518 cords in 2011. The median value was 4,000 cords. The 149 respondents (71.3 percent of the respondents) who produced 100 to 9,500 cords averaged 2,923 cords per respondent. While they represent only 28.7 percent of the respondents (the 60 remaining respondents), those logging businesses which are "above average" volume producers pull up the average volume per respondent considerably (the average volume produced by those 60 respondents was 25,896 cords in 2011).

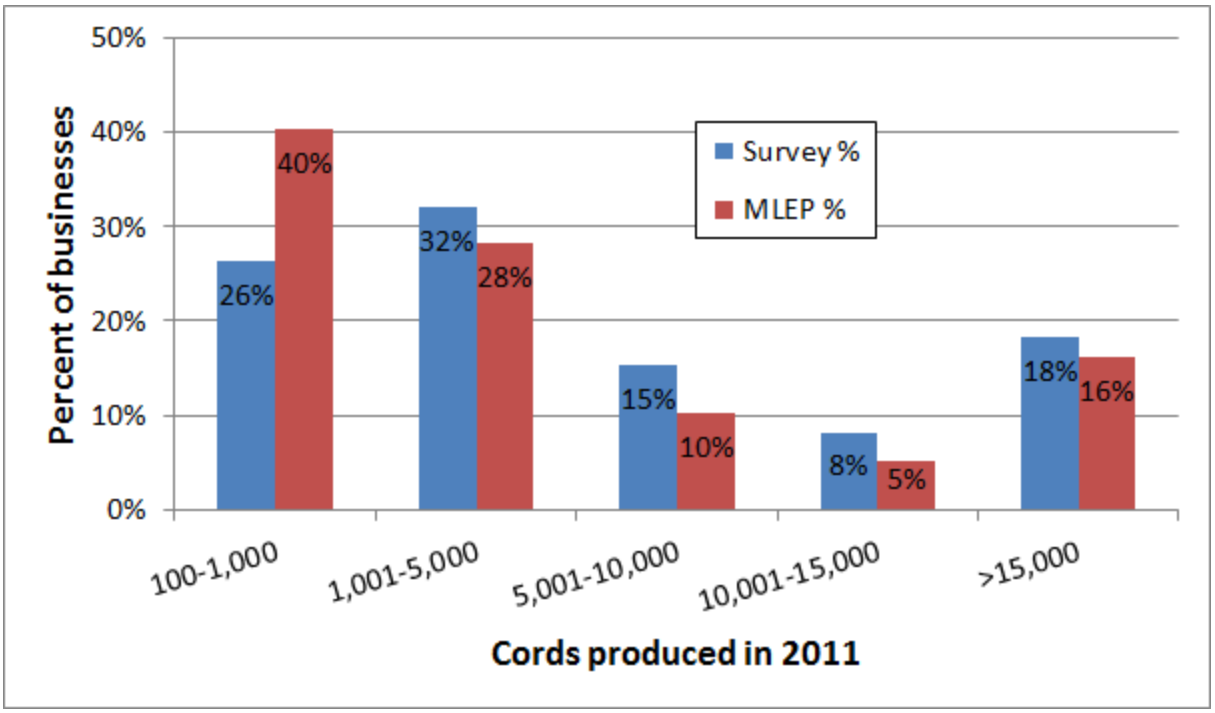

Figure 3. Comparison of 2011 survey responses to production volume (cords) reported by MLEP's membership.

Table 10. Summary of cords harvested by respondents in 2011 (n = 209), 2003 (n = 101) and 1996 (n = 361). Percentages may not total 100 due to rounding error.

	2011 Survey			2003 survey (Powers 2004)	1996 survey (Puettmann et al. 1998)
Volume harvested (cords)	**Number of respondents**	**Percent of respondents (%)**	**Percent of total volume (%)**	**Percent of respondents (%)**	**Percent of respondents (%)**
≤ 1,000	55	26.3	1.5	15.8	44
1,001 – 2,500	27	12.9	2.6	17.8	31
2,501 – 5,000	40	19.1	7.6	20.8	--
5,001 – 10,000	32	15.3	12.6	20.8	13
10, 001 – 15,000	17	8.1	11.1	15.8	8
15,001 – 20,000	8	3.8	7.6	8.9	1
20,001 – 30,000	20	9.6	24.3	--	2
30,001 – 40,000	4	1.9	6.7	--	1
40,001 – 50,000	1	0.5	2.3	--	--
> 50,000	5	2.4	23.6	--	--

In general, the sector continues to be characterized by a large number of firms which produce relatively small volumes annually and few firms with high levels of production (Table 10, Figure 4). The 38 largest producers (each produced more than 15,000 cords in 2011), who represent 18.2 percent of the respondents, harvested 64.5 percent of the reported volume in 2011. The 10

largest producers harvested 32.6 percent of the volume in 2011. In contrast, the 122 smallest producers (each produced 5,000 or fewer cords in 2011), who represent 58.4 percent of the respondents, harvested 11.8 percent of the reported volume.

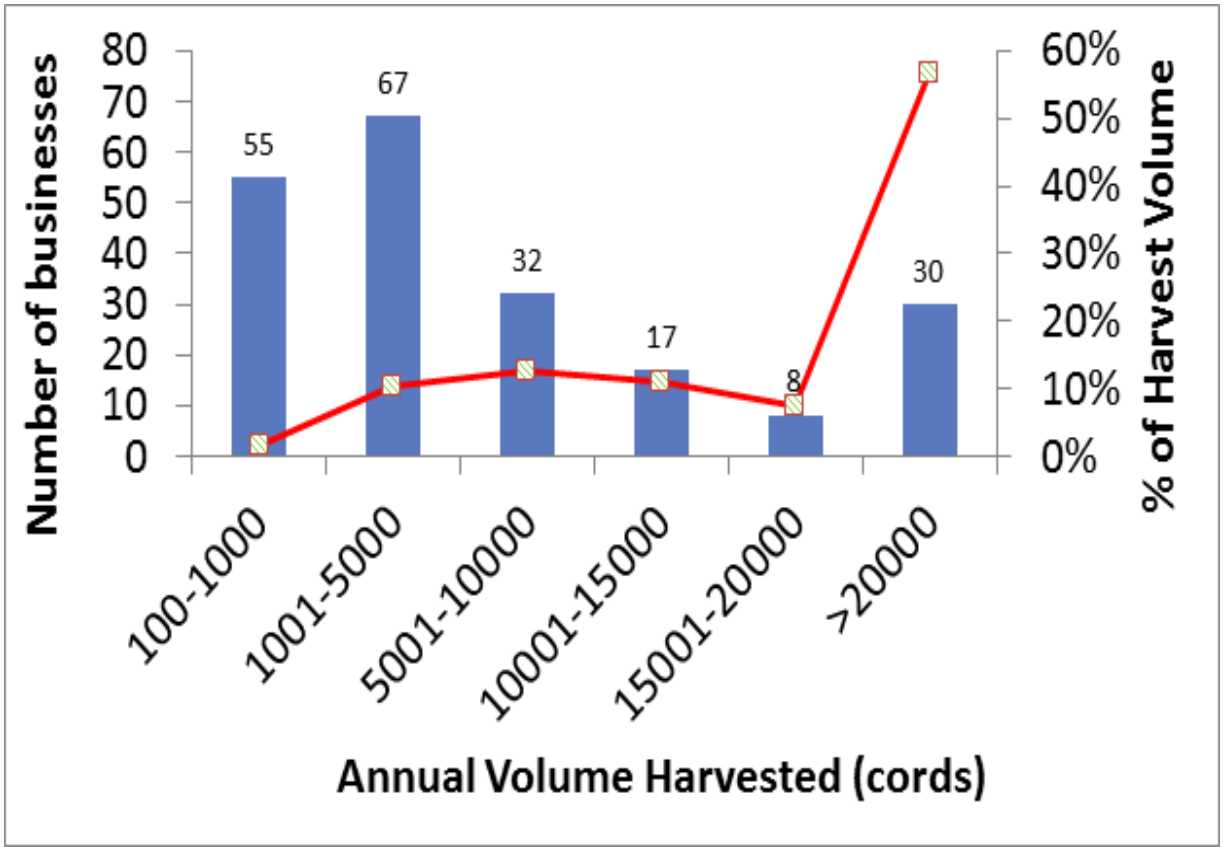

Figure 4. Number of businesses by annual volume harvested in Minnesota during 2011. (n = 209)

The average Minnesota respondent produced 3,444 cords in 1978 (Bolstad 1980), 4,225 cords for full-time firms and 1,175 cords for part-time firms in 1979 (Bolstad 1980), 9,100 cords in 1991 (Jaakko Pöyry Consulting, Inc. 1992), and 4,150 cords in 1996 (Puettmann et al. 1998). In Michigan and Wisconsin, the average firm produced slightly more than 5,900 cords in 2003 (Rickenbach et al. 2005). In 2010, the average responding Wisconsin firm produced 6,893 cords (Traver 2012).

While respondents in northeast Minnesota produced 64 percent of the total volume reported, those in the central region produced 6 percent of the reported volume. Average annual production was 10,487 cords in the MnDNR's northeast region, 8,824 cords in the MnDNR's northwest region, and 5,932 cords in the MnDNR's central/southern region. Of the 30 respondents who reported producing more than 20,000 cords in 2011, 21 were from the MnDNR's northeast region. Those 30 respondents produced 56.9 percent of the total volume reported by respondents (Table 10).

The percentage of the smallest volume producers (up to 1,000 cords annually) increased in 2011 as compared to the 2003 survey (Powers 2004) but was still less than was reported in the 1996 assessment (Puettmann et al. 1998) (Table 10). The percent of higher volume businesses producing at least 15,000 cords annually continues to increase as compared to previous surveys in Minnesota. In Michigan and Wisconsin, the largest 8 percent of firms (producers of more than 15,000 cords) harvested one-third of the timber in 2003 (Rickenbach et al. 2005).

The average worker (i.e., regardless of whether they are a full-time or part-time employee or a subcontractor) produced 1,239 cords in 2011. The range was from 10 to 12,000 cords per worker with a median of 833 cords. Bolstad (1980) reported an average of 1,202 cords and a median of 1,040 cords per worker in 1979.

Stumpage sources (Question 8)

The average respondent harvested 64.3 percent of their volume from public sources (county/municipal, state, US Forest Serviced) and 35.7 percent from private (private nonindustrial, American Indian, industrial) and other sources (Table 11). Those totals are comparable to data reported for 2009 which shows that 38.8 percent of the volume harvested was from private and industrial lands and 61.2 percent from public lands (MnDNR 2012). When respondent data was weighted by 2011 volume produced in cord equivalents (Question 7), the importance of industrial and county/municipal sources rose, suggesting that larger volume producers tend to have more of a preference for stumpage from (or access to) those two sources as compared to the average respondent.

The percent of timber harvested from private nonindustrial timberlands and US Forest Service lands decreased between 1996 (Puettmann et al. 1998) and 2011 (Table 11). In general, Michigan and Wisconsin loggers are more dependent on private nonindustrial timberlands as a stumpage source than Minnesota loggers. The percent of volume removed from industrial sources is relatively consistent across all surveys at 12 to 15 percent.

Table 11. Summary of percent of stumpage harvested from timberland owners in Minnesota by percent of respondents and percent of volume produced in 2011 (n = 204) and 1996 (n = 361), in Michigan and Wisconsin in 2003, and in Wisconsin in 2010. Percentages may not total 100 due to rounding error.

	2011 Survey		Percent of volume harvested (%)		
Timberland owner	**Percent of respondents (%)**	**Percent of volume harvested (%)**	**1996 survey (Puettmann et al. 1998)**	**2003 Michigan and Wisconsin survey (Rickenbach et al. 2005)**	**2010 survey of Wisconsin loggers (Traver 2012)**
County/municipal	23.0	27.2	18	12	17
State	33.5	33.7	22	7	3
US Forest Service	3.6	3.4	10	5	4
Private, nonindustrial	31.6	21.3	36	60	62
American Indian	1.1	0.4	1	--	2
Industrial	6.6	13.6	13	15	12
Other	0.7	0.5	---	---	0

Nineteen respondents (9.3 percent) harvested all of their timber in 2011 from private nonindustrial sources and 60 respondents (29.4 percent) harvested at least half of their volume from that source (Table 12). Sixty-three respondents (30.9 percent) harvested at least half of their timber in 2011 from state DNR lands. Relatively few respondents don't harvest timber from at least one of those two sources.

In the 2003 survey of Michigan and Wisconsin loggers, 35 percent of the logging firms obtained 100 percent of their timber from private woodlands, 41 percent derived more than three-quarters of their stumpage from that ownership, and 11 percent obtained none of their timber from private woodlands (Rickenbach et al. 2005). Thus, a higher percentage of loggers in Michigan and Wisconsin are more dependent on stumpage from private woodlands than in Minnesota.

Table 12. Summary of number of logging businesses by type of timberland owner according to various volume criteria in 2011 (n = 204).

	Number of logging businesses by timberland owner						
Criteria	**Private nonindustrial**	**County/ municipal**	**State**	**US Forest Service**	**American Indian**	**Industrial**	**Other**
Harvest 100% of volume from that source	19	5	10	1	1	1	0
Harvest at least 75% of volume from that source	34	15	30	2	2	4	1
Harvest at least 50% of volume from that source	60	40	63	8	2	14	1
Harvest at least 25% of volume from that source	88	81	109	11	3	23	1
No volume harvested from that source	42	89	53	183	199	171	199

Season of operation (Question 9)

Approximately 51 percent of the volume harvested during 2011 was reported to be produced during winter (December to February)[1] (Table 13). The smallest percentage of wood was harvested during the spring (March to May). It is unknown how much of that spring wood was harvested during frozen conditions prior to spring breakup. When respondent data was weighted by 2011 volume produced in cord equivalents (Question 7), the importance of non-winter production rose, suggesting that larger volume producers are better able to harvest on a year-round basis than smaller producers. There was a continued trend toward a higher percentage of wood being harvested during winter and a decreasing percentage during the summer, as compared to the 1991 (Jaakko Pöyry Consulting, Inc. 1992) and 1996 surveys (Puettmann et al. 1998).

[1] The authors recognize that winter in northern Minnesota does not end in February and that harvest activities under winter/frozen soil conditions continue into March. However, to maintain continuity with previous surveys, the seasons were defined as in the past.

Table 13. Summary of season of harvest by percent of respondents and percent of volume harvested during 2011 (n = 205), 1991 and 1996 (n = 361) in Minnesota. Percentages may not total 100 due to rounding error.

	2011 Survey		Percent of volume harvested (%)	
Season of harvest	Average percent across all respondents (%)	Percent of volume harvested (%)	1991 survey (Jaakko Pöyry Consulting, Inc. 1992)	1996 survey (Puettmann et al. 1998)
Winter (Dec – Feb)	60.6	50.8	43	47
Spring (Mar – May)	5.5	7.7	9	9
Summer (Jun – Aug)	15.8	20.4	23	21
Fall (Sep – Nov)	18.1	21.1	25	23

Twenty-eight businesses (13.7%) indicated that they produced 100 percent of their volume during winter (Table 14). Sixty-nine percent of the respondents indicated that at least half of their volume was produced during the winter. While one respondent indicated that none of their production occurred during winter, 109 (53.2 percent) indicated that they did not produce any volume during the spring and 57 (27.8%) indicated that they did not produce any volume during the summer.

Table 14. Summary of number of logging businesses by season of harvest according to various volume criteria in 2011[1] (n = 205).

	Number of logging businesses by season			
Criteria	Winter	Spring	Summer	Fall
Produce 100% of volume during that season	28	0	0	1
At least 75% of volume produced during that season	63	0	0	1
At least 50% of volume produced during that season	142	0	3	8
At least 25% of volume produced during that season	200	8	66	76
No volume produced during that season	1	109	57	43

[1]Winter was defined as being December to February, Spring was defined as March to May, Summer was defined as June to August, and Fall was defined as September to November.

Felling methods (Question 10)

About half of the reported volume was felled with a reach to tree feller-buncher (Table 15). While 50.4% of respondents indicated that they fell some of their timber with a chainsaw, the total volume represented by that felling method is small (2.4% of the total). About 44 percent of the respondents use more than one method to fell their timber.

The percent of volume felled using a chainsaw has continued to drop over time, going from 27 percent in the 1991 survey (Jaakko Pöyry Consulting, Inc. 1992), to 16 percent in 1996 (Puettmann et al. 1998), to 1 percent in 2003 (Powers 2004) to 2.4 percent in 2011 (Table 15). The percent of volume felled with a feller-buncher remained relatively constant between the 1991, 1996, 2003 and 2011 surveys, ranging between 73 to 85 percent. But, the percent of volume felled with a reach to tree feller-buncher has increased over time, going from 33 percent

in 1996 to 22.3 percent in 2004 to 51.1 percent in 2011, suggesting that feller-bunchers are becoming more mechanized over time. The percent of volume felled with a cut-to-length harvester in 2011 was similar to the 2003 rate, tripling from 5 percent in 1996 to 15.7 percent in 2011.

Table 15. Summary of percent of volume felled in 2011 (n = 204), 2003, 1996 (n = 361) and 1991 by felling method. Percentages may not total 100 due to rounding error.

	2011 Survey		Percent of volume felled (%)		
Felling method	**Number of respondents using that method**	**Percent of volume felled (%)**	**2003 survey (Powers 2004)**	**1996 survey (Puettmann et al. 1998)**	**1991 survey (Jaakko Pöyry Consulting, Inc. 1992)**
Business does not fell timber	2	---	---	---	---
Chainsaw	103	2.4	1.0	16	27
Drive to tree feller-buncher	93	30.8	62.4	46	73 (feller-buncher)
Reach to tree feller-buncher	70	51.1	22.3	33	--
Cut-to-length (CTL) harvester	35	15.7	14.3	5	0

For those respondents who indicated that they felled all of their timber using a chainsaw, the percentage of the total number of respondents in 2011 (14.7 percent) was comparable to the 2003 survey (14.3 percent) (Powers 2004) (Tables 15 and 16). The percent of the total number of respondents from the 2011 survey who felled zero (none) percent of their volume with a chainsaw (49.5 percent) was relatively unchanged from the 2003 survey (50.4 percent). For those respondents who indicated that they felled all of their timber using a drive to tree feller-buncher, the percentage of the total number of respondents in 2011 (15.7 percent) was lower than the 2003 survey (32.2 percent). The percent of the total number of respondents who felled none of their volume with a drive to tree feller-buncher increased in 2011 (54.4 percent) as compared to the 2003 survey (38.8 percent). For those respondents who indicated that they felled all of their timber using a reach to tree feller-buncher, the percentage of the total number of respondents in 2011 (19.6 percent) was higher as compared to the 2003 survey (8.3 percent).

The percent of the total number of respondents who felled none of their timber with a reach to tree feller-buncher decreased in 2011 (65.7 percent) as compared to the 2003 survey (80.8 percent). For those respondents who indicated that they felled all of their timber using a cut-to-length harvester, the percentage of the total number of respondents in 2011 (5.9 percent) was higher as compared to the 2003 survey (3.3 percent for drive to tree cut-to-length harvesters and 1.7 percent for reach to tree cut-to-length harvesters) .

Table 16. Summary of number of logging businesses that felled timber according to various volume criteria in 2011 (n = 204).

Criteria	Number of logging businesses by felling method			
	Chainsaw	Drive to tree feller-buncher	Reach to tree feller-buncher	Cut-to-length (CTL) harvester
Fell 100% of volume with that equipment	30	32	40	12
At least 75% of volume felled with that equipment	34	76	52	23
At least 50% of volume felled with that equipment	39	83	57	26
At least 25% of volume felled with that equipment	45	87	61	31
No volume felled with that equipment	101	111	134	169

In-woods transportation methods (Question 11)

After felling, more than 80 percent of the volume is transported from the stump to a landing using a grapple skidder (Table 17). A forwarder transports the second highest percent of total volume. More than 75 percent of the responding businesses use a grapple skidder to transport some of their volume to a landing (Table 18). More than 81 percent of the businesses do not use a forwarder in their operations.

Similar to felling operations, the percent of volume transported in-woods using a cable skidder has continued to drop over time, going from 30 percent in the 1991 survey (Jaakko Pöyry Consulting, Inc. 1992), to 15 percent in 1996 (Puettmann et al. 1998), to 0.7% in 2003 (Powers 2004) to 2.4 percent in 2011 (Table 15). The percent of volume transported with a grapple skidder remained relatively constant between the 1991, 1996, 2003 and 2011 surveys, ranging between 69 to 87 percent. The percent of volume transported in-woods with a forwarder continued the trend of increasing from the 1991 to 1996 to 2003 to the 2011 surveys.

The percent of the total number of respondents who transported in-woods zero (none) and 100 percent of their volume with a cable skidder (Table 18) was relatively unchanged from the 2003 survey (Powers 2004). The percent of the total number of respondents who transported all of their volume with a grapple skidder decreased in 2011 (59.0 percent) as compared to the 2003 survey (66.9 percent). The percent of the total number of respondents who transported 100 percent of their volume with a forwarder increased in the 2011 survey (9.3 percent) as compared to the 2003 survey (5.9 percent).

The 22 logging businesses that cable skid 100 percent of their total volume averaged 1,063 cords of production during 2011. The 19 logging businesses that forward 100 percent of their volume averaged 7,100 cords of production during 2011. The 121 logging businesses that grapple skid 100 percent of their total volume averaged 10,744 cords of production during 2011.

Table 17. Summary of percent of volume transported in-woods from the stump to the landing in 2011 (n = 204), 2003, 1996 (n = 361) and 1991 by transport method. Percentages may not total 100 due to rounding error.

	2011 Survey		Percent of volume transported in-woods (%)		
In-woods transportation method	**Number of respondents using that method**	**Percent of volume transported in-woods (%)**	**2003 survey (Powers 2004)**	**1996 survey (Puettmann et al. 1998)**	**1991 survey (Jaakko Pöyry Consulting, Inc. 1992)**
Business does not transport timber in-woods	2	---	---	---	---
Cable skidder	49	2.4	0.7	15	30
Grapple skidder	154	81.3	87.3	79	69
Forwarder	38	16.3	12.0	5	1
Other[1]	3	<0.1	<0.1	<2	---

[1]The other in-woods transportation methods noted for the 2011 survey were a Bobcat, a low ground pressure Bombardier and a short wood skidder. The components of the Other category were not described in the 2003 survey. For the 1996 survey, they included a farm tractor and a bulldozer.

Table 18. Summary of number of logging businesses by type of in-woods transport method according to various volume criteria in 2011 (n = 205).

	Number of logging businesses by in-woods transportation method			
Criteria	**Cable skidder**	**Grapple skidder**	**Forwarder**	**Other[1]**
Transport 100% of volume with that equipment	22	121	19	0
At least 75% of volume transported with that equipment	24	140	25	0
At least 50% of volume transported with that equipment	31	146	30	1
At least 25% of volume transported with that equipment	34	151	34	1
No volume transported with that equipment	156	51	167	202

[1]The other in-woods transportation methods noted were a Bobcat, a low ground pressure Bombardier and a short wood skidder.

A total of 41 respondents indicated that they use two methods to transport material in-woods from the stump to the landing. No respondents reported using more than two methods. Nineteen respondents reported a mixture of cable and grapple skidding, 13 reported using both grapple skidding and forwarders, 6 reported using both cable skidders and forwarders, and 3 reported using cable or grapple skidders with some other method (i.e., Bobcat, low ground pressure Bombardier, shortwood skidder).

A breakdown of businesses by in-woods transport method by DNR region is presented in Table 19. In that summary the cable skid, grapple skid, and forwarding businesses transported 100 percent of their in-woods volume using that one method. A high percentage of the cable skidding and large grapple skidding businesses are in the MnDNR's northeast region. Compared to the overall average for a region, the percentage of businesses that forward 100 percent of their volume and which are small mixed producers is relatively high.

Table 19. Summary of number of logging businesses by type of in-woods transport method according by MnDNR region in 2011 (n = 203). Percentages may not total 100 due to rounding error.

		Percent of businesses by MnDNR Region (%)		
In-woods method[1]	**Number of businesses**	**Central/Southern**	**Northeast**	**Northwest**
Cable skid	22	4.5	77.3	18.2
Grapple skid				
≤ 5,000 cords	64	6.3	53.1	40.6
5,001 - 15000 cords	29	3.4	48.3	48.3
> 15,000 cords	28	3.6	78.6	17.9
Forward	19	21.1	57.9	21.1
Mixed				
≤ 5,000 cords	24	29.2	50.0	20.8
> 5,00 cords	17	5.9	52.9	41.2
Overall total	203	9.4	58.6	32.0

1The cable skid, grapple skid, and forwarding businesses transported 100 percent of their in-woods volume using that one method. For the respondents who use a mixed method, two different methods to transport material in-woods from the stump to the landing were reported.

Delimbing/topping location (Question 12)

Nearly all responding businesses delimb/top some or all of their timber as a part of their operation to remove those materials from the tree bole as a part of roundwood production. Delimbing/topping in the cutover and at the landing/roadside are most common (Table 20). The other delimbing/topping locations are at the stump (2 respondents) and material is whole-tree chipped, perhaps at a landing/roadside.

The percent of volume delimbed/topped in the cut-over (40.3 percent) in 2011 was approximately two-thirds of the percentage delimbed/topped at that location in the 1991 (Jaakko Pöyry Consulting, Inc. 1992) and 1996 surveys (Puettmann et al. 1998) (Table 20). The percentage of volume delimbed/topped at the landing/roadside increased nearly 50 percent in 2011 as compared to 1991 and 1996, becoming the most important delimbing/topping location.

These differences in 2011 as compared to the 1991 and 1996 surveys may be due to implementation of Minnesota's forest management guidelines in 1999 (Minnesota Forest Resources Council 2005). Specifically, the timber harvesting guideline "Plan roads and landings to occupy no more than 1 to 3% of the timber harvest area" may have caused operations to build fewer delimbing/topping intermediate landings, thus bringing that task into the main landing.

Table 20. Summary of percent of volume delimbed/topped in 2011 (n = 205), 1996 (n = 361) and 1991 by location. Percentages may not total 100 due to rounding error.

	2011 Survey		Percent of volume delimbed/topped (%)	
Delimbing/topping location	**Number of respondents using that method**	**Percent of volume delimbed/ topped (%)**	**1996 survey (Puettmann et al. 1998)**	**1991 survey (Jaakko Pöyry Consulting, Inc. 1992)**
Business does not delimb/top their timber	6	---	---	---
In the cut-over	156	40.3	67	68
At the landing/roadside	127	46.4	31	32
Not delimbed/topped	10	4.5	2	1
Other[1]	3	8.8	---	---

[1]The other delimbing/topping locations noted were at the stump (2 respondents) and whole-tree chipped.

Table 21. Summary of number of logging businesses by delimbing/topping location according to various volume criteria in 2011 (n = 205).

	Number of logging businesses by delimbing/topping location			
Criteria	**In cutover**	**Landing/roadside**	**Not delimbed/ topped**	**Other[1]**
Delimb 100% of volume at that location	66	38	1	1
At least 75% of volume delimbed at that location	97	59	2	3
At least 50% of volume delimbed at that location	125	87	3	3
At least 25% of volume delimbed at that location	140	98	3	3
No volume delimbed at that location	49	78	195	202

[1]The other delimbing/topping locations noted were at the stump (2 respondents) and whole-tree chipped.

Bucking/slashing method (Question 13)

Nearly two-thirds of the volume was mechanically bucked/slashed into individual product lengths (Table 22). Less than one-third of the businesses didn't buck/slash any of their volume using mechanical means (Table 23).

The percent of volume bucked/slashed with a chainsaw has declined from about 13 percent in the 1996 (Puettmann et al. 1998) and 1991 (Jaakko Pöyry Consulting, Inc. 1992) surveys to 2.9 percent in 2011 (Table 22), suggesting that this operation is becoming more mechanized. The percent of volume mechanically bucked/slashed (e.g., slasher) stayed relatively constant at 65 percent. The production of tree-length material through bucking/slashing has increased since 1996.

Table 22. Summary of percent of volume bucked/slashed in 2011 (n = 205), 1996 (n = 361) and 1991 by various methods. Percentages may not total 100 due to rounding error.

	2011 Survey		Percent of volume bucked/slashed (%)	
Bucking/slashing method	**Number of respondents using that method**	**Percent of volume bucked/slashed (%)**	**1996 survey (Puettmann et al. 1998)**	**1991 survey (Jaakko Pöyry Consulting, Inc. 1992)**
Business does not buck/slash their timber	9	---	---	---
Chainsaw	70	2.9	13	14
Mechanical	142	64.8	65	69
Full-tree	18	9.2	20	---
Tree-length	42	12.7	2	---
Not bucked/slashed	---	---	<0.5	17
Other[1]	9	10.3	---	---

[1]The other bucking/delimbing methods noted in the 2011 survey were cut-to-length (2 respondents), chipping/ biomass chipping (2 respondents), whole-tree, 8-foot pulpwood, at the stump, Hahn harvester, and slasher.

Table 23. Summary of number of logging businesses by bucking/slashing method according to various volume criteria in 2011 (n = 205).

	Number of logging businesses by bucking/slashing method				
Criteria	**Chainsaw**	**Mechanical**	**Full-tree**	**Tree-length**	**Other[1]**
Buck 100% of volume using that method	36	79	1	6	3
At least 75% of volume bucked using that method	37	108	3	8	6
At least 50% of volume bucked using that method	40	124	10	28	7
At least 25% of volume bucked using that method	46	136	11	31	9
No volume bucked using that method	136	64	188	164	196

[1]The other bucking/delimbing methods noted were cut-to-length (2 respondents), chipping/biomass chipping (2 respondents), whole-tree, 8-foot pulpwood, at the stump, Hahn harvester, and slasher,

Other processing methods (Question 14)

Nearly 85 percent of the respondents did not use any additional processing methods for their timber in 2011 (Table 24). The most common processing method was full-tree chipping. Using a chain flail-delimber/debarker/chipper and full-tree grinding were least common. Of the 18 businesses that reported chipping materials, 8 (44.4 percent) reported chipping all of their volume (Table 25).

In comparison to the 1996 (Puettmann et al. 1998) and 1991 (Jaakko Pöyry Consulting, Inc. 1992) surveys, where a maximum of 2 percent of the volume was processed using other methods, full-tree chipping, chain flail delimbing/debarking/chipping and full-tree grinding were much more prevalent in 2011 (Table 24). This suggests that in-woods chipping and grinding became much more common in 2011 to supply energy market and paper making demands.

Table 24. Summary of percent of volume processed by other processing methods in 2011(n = 170), 1996 (n = 361) and 1991. Percentages may not total 100 due to rounding error.

	2011 Survey		Percent of volume processed (%)	
Other processing method	**Number of respondents using that method**	**Percent of volume processed (%)**	**1996 survey (Puettmann et al. 1998)**	**1991 survey (Jaakko Pöyry Consulting, Inc. 1992)**
Business does not use other methods to process their timber	144	---	---	---
Chipping	18	39.4	1	1
Chain flail-delimber/debarker/ chipper	4	25.3	1	---
Full-tree grinding	4	12.7	---	---
No other processing	---	---	98	99
Other[1]	18	22.6	---	---

[1]The other processing methods noted were chipping tops and limbs (3 respondents), chainsaw (3 respondents), slasher (2 respondents), limbed and slashed, used whole tree, stroke delimber, and at the stump.

Table 25. Summary of number of logging businesses by type of other processing method according to various volume criteria in 2011 (n = 170).

	Number of logging businesses by other processing method			
Criteria	**Full-tree chipping**	**Chain flail-delimber/ debarker/chipper**	**Full-tree grinding**	**Other[1]**
100% of volume processed using that method	8	1	0	7
At least 75% of volume processed using that method	8	2	0	10
At least 50% of volume processed using that method	12	2	2	11
At least 25% of volume processed using that method	13	3	4	12
No volume processed using that method	152	166	166	157

[1]The other processing methods noted were chipping tops and limbs (3 respondents), chainsaw (3 respondents), slasher (2 respondents), limbed and slashed, used whole tree, stroke delimber, and at the stump.

Processing methods (Question 15)

Chainsaws (89 respondents) and slashers (85 respondents) were the two most commonly cited methods of processing timber (Table 26). Delimbers and slashers processed the largest percentage of the volume. Respondents who used a chipper or a grinder generally tended to use it to process less than 50 percent of their volume (Table 27).

Table 26. Summary of percent of volume processed by various processing methods in 2011 (n = 195). Percentages may not total 100 due to rounding error.

Processing method	Number of respondents using that method	Percent of volume processed (%)
Business did not process their timber	4	---
Delimber	58	33.4
Chipper	24	14.5
Grinder	8	5.4
Slasher	85	23.5
Cut-to-length (CTL) harvester	36	17.0
Chainsaw	89	4.5
Other[1]	9	1.7

[1]The other processing methods noted were Hahn harvester (6 respondents), tree-length (2 respondents), and tree-length chainsaw.

Table 27. Summary of number of logging businesses by processing method according to various volume criteria in 2011 (n = 195).

	Number of logging businesses by processing method						
Criteria	Delimber	Chipper	Grinder	Slasher	Cut-to-length (CTL) harvester	Chainsaw	Other[1]
100% of volume processed using that method	16	0	0	31	15	38	3
At least 75% of volume processed using that method	29	1	0	50	24	41	5
At least 50% of volume processed using that method	44	4	1	61	28	45	9
At least 25% of volume processed using that method	50	12	5	73	31	51	9
No volume processed using that method	137	171	187	110	159	106	186

[1]The other processing methods noted were Hahn harvester (6 respondents), tree-length (2 respondents), and tree-length chainsaw.

Inventory and age of in-woods equipment (Question 16)

Many pieces of equipment were reported as being owned and actively used in-woods within the reporting businesses (Table 28). Much of the equipment is 11 to 14 years old. Responding businesses which use chainsaws have 3.1 saws, on average. The average age of those saws is 3.4 years. Cable skidders are the oldest type of in-woods equipment, averaging 33.7 years. Median age values were similar (within 0.7 years) to the average values for all but forwarders (average 11.6 and median 8) and chippers (average 11.6 and median 6).

Table 28. Summary of average number of pieces of in-woods equipment and average age of the newest piece of equipment in 2011 (n = 220) and the average age of equipment in 1996 and 1991. The number of respondents for each in-woods equipment type in the 2011 and 1996 surveys are shown in parentheses.

In-woods equipment type	Average number of pieces per respondent in 2011 (number of respondents)	Average age (years) of newest piece of equipment in 2011 (number of respondents)	Average age (years) of equipment in 1996 (number with age reported) (Puettmann et al. 1998)	Average age (years) of equipment in 1991 (Jaakko Pöyry Consulting, Inc. 1992)
Chainsaw/hand delimbing	3.1 (165)	3.4 (151)	---	---
Feller-bunchers	1.3 (149)	14.8 (138)	11 (236)	8
Cut-to-length (CTL) harvesters	1.4 (39)	7.6 (37)	---	---
Cable skidders	1.2 (58)	33.7 (52)	---	---
Grapple skidders	1.8 (166)	13.8 (152)	---	---
Forwarders	1.3 (41)	11.3 (40)	---	---
Skidders/forwarders	---	---	16 (465)	10
Mechanical delimbers	1.4 (80)	11.4 (73)	10 (95)	7
Chippers	1.3 (24)	11.6 (23)	10 (6)	10
Grinders	1.1 (8)	4.3 (8)	---	---
Slashers	1.4 (125)	14.0 (115)	9 (146)	7
Loaders	2.0 (124)	14.4 (116)	---	---
Other[1]	1.3 (45)	20.4 (40)	---	---

[1]The other in-woods equipment noted in 2011 were dozers (17 pieces), Hahn harvesters (10 pieces), Semi-trucks (5 pieces), Bobcat (3 pieces), chip vans (3 pieces), grader (3 pieces), trailers (2 pieces), Bombardier (2 pieces), dump truck (2 pieces), center-mounted loader (2 pieces), excavator (2 pieces), track feller (1 piece), backhoe (1 piece), flail delimber (1 piece), firewood processor (1 piece), shortwood skidder (1 piece), log loader (1 piece), and one-ton truck (1 piece).

The 1991 (Jaakko Pöyry Consulting, Inc. 1992) and 1996 (Puettmann et al. 1998) surveys asked respondents to indicate the age of each piece of equipment, not the age of the newest piece of equipment as was asked in the 2011 survey. For feller-bunchers, delimbers, slashers, and chippers, the average age of all reported equipment in 1996 and 1991 is lower than the average age of the newest piece of equipment in 2011 (Table 28). he average age of all skidders/ forwarders, a combined category, in 1996 and 1991 is also lower than the weighted average age of the newest piece of cable skidders, grapple skidders and forwarders (17.7 years). This suggests that respondents are holding onto their in-woods equipment longer in 2011 than in 1996 or 1991. In general, the trend across all three surveys has been to hold onto equipment longer than in the past.

As equipment ages, the general trend is for maintenance requirements to increase and breakdown occurrences to become more prevalent. This can lead to decreased production as repairs are needed to fix machinery. Older machines are also more prone to experiencing oil leaks and hydraulic hose failures. While newer machines require loan payments to a lender to pay for the equipment, they do not tend to break down as often and thus have lower maintenance costs.

As the annual production rate increases, the average age of the newest piece of mechanized felling machinery (i.e., a cut-to-length harvester or a feller-buncher) decreases (Table 29). On average, the average age of the newest piece of mechanized felling machinery for businesses which produce up to 1,000 cords annually is more than 5 times as old as it is for businesses which produce more than 20,000 cords annually. Thus, higher production businesses see advantages to maintaining a younger equipment mix than smaller producers.

Table 29. Summary of average age of newest piece of mechanized felling machinery by annual production (cords) in 2011 (n = 150).

Annual production (cords)	Average age of newest piece of felling machinery (years)
100 - 1,000	25.9
1,001 - 5,000	16.9
5,001 - 10,000	10.0
10,001 - 15,000	6.5
15,001 - 20,000	6.6
> 20,000	5.0

In response to the focus group questions "What are the advantages and disadvantages of operating with older equipment? Given those disadvantages, why is equipment aging as compared to past surveys?," logging business owners indicated that some of the reasons that loggers may operate with older equipment include that older equipment is better built, it is easier to maintain and repair because the engines are simpler, and it lasts longer; loggers do not want to go into debt purchasing new equipment; loggers do not want to carry as much debt today as they did in the past; there is a lot of uncertainty among loggers today given the changing marketplace; smaller logging businesses tend to operate older equipment; you can afford to leave equipment idle for a while if you do not log year round or if you do not have sufficient markets; and owners are scared of equipment with the new emission standards (Appendix 11).

Disadvantages of operating with older equipment reported by logging business owners include it breaks down more often and can become more difficult to repair, it is not worth anything in the trade-in market so why trade it in, it is more difficult to find spare parts and they cost more, it is difficult to produce a lot of volume in a short period of time if you need to do so (e.g., good weather) and replacement parts take longer to obtain (Appendix 11). Disadvantages of newer equipment reported by logging business owners are that its cost has doubled in price and it is more difficult to repair, requiring technicians. As those technicians cannot always keep up with the technological changes, they can't repair equipment sometimes.

Advantages of older equipment cited by industry respondents were that it is built to last a long time; an owner is not worried about the tax benefits provided by depreciation to reduce their income; you can reduce your overall costs due to having a lower capital investment; older equipment which is well-maintained is more affordable to operate; while it commonly is possible to fix a problem on an old machine, repairs to a new machine require calling in a repair person who may not be available for one or more days; delivered prices from mills have been relatively flat while the cost of new equipment has been rising; owners are afraid of the new technology on the new equipment; the new Tier 4 engines which became available in 2011 are more expensive

to purchase, have lower fuel economy, their requirement for ultra-low sulfur diesel and low ash oil, and require more maintenance; a business may need to hire additional people to work on new equipment to keep it running; and there is a general uncertainty about the new equipment, making owners want to stick with their old equipment longer (Appendix 11).

According to industry respondents, disadvantages of operating with older equipment include increased down time to repair and maintain the machinery; because the machinery has more down time, it is less productive and thus it may be more difficult to fill contracts with mills; the cost of replacement parts has increased a lot; higher costs of operation; and employees aren't producing wood when the machine isn't operating (Appendix 11).

Industry respondents indicated that some of the better logging business owners have been purchasing new equipment over the past year. The new equipment tends to be for conventional systems (Appendix 11). Some of the reasons that loggers are purchasing new equipment include increased reliability with new equipment as it may require less maintenance; you want equipment to be well-maintained, especially working with private landowners, to build and retain a good reputation; and newer equipment provides the ability to take depreciation on taxes, offsetting income.

Inventory and age of over-the-road equipment (Question 17)

Responding businesses which reported their over-the-road equipment have 3 to 4 tractors and trailers, on average (Table 30). The average age of the newest piece of over-the-road equipment is generally 11 to 17 years old. Many other pieces of equipment were reported as being owned and actively used over-the-road within the reporting businesses.

Table 30. Summary of average number of pieces of over-the-road equipment and average age of the newest piece of equipment in 2011 (n = 159). The number of respondents for each over-the-road equipment type is shown in parentheses.

Over-the-road equipment type	Average number of pieces	Average age of newest piece of equipment (years)
Tractor (semi)	3.4 (141)	12.1 (131)
Pulp/sawtimber trailer	4.1 (131)	13.9 (118)
Lowboy	1.2 (131)	16.8 (115)
Van/walking floor trailers	5.6 (28)	11.3 (27)
Other[1]	1.6 (18)	24.5 (15)

[1]The other over-the-road equipment noted were pole trailers (10 pieces), dozers (2 pieces), straight truck (2 pieces), single axle (2 pieces), one-ton truck (2 pieces), dump truck (1 piece), tandem truck/trailer (1 piece), machinery trailer (1 piece), trailer with loader (1 piece), flatbed truck (1 piece), log/lowboy trailer (1 piece), loader truck and pulpwood trailer (1 piece), one-ton truck with trailer (1 piece), trailer (1 piece), loader truck (1 piece), and unspecified (1 piece).

Owned vs. contracted hauling (Question 18)

Most respondents (78.7 percent) use contract hauling for some portion of their wood (Table 31). However, contract hauling only transports 36.1 percent of the total volume. Approximately one-third of the respondents did not have any of their wood hauled using trucks they own and one-fifth of the respondents did not use any contract hauling (Table 31). Eighty-seven respondents (44.2 percent) use a mixture of both trucks owned by the business as well as contract hauling to transport their wood to mills. The 1979 survey of Minnesota logging businesses found reported that 40 percent of the wood was contact hauled for full-time firms and 45 percent by part-time firms (Bolstad 1980).

Table 31. Summary of method of hauling harvested material (trucks owned vs. hauling contracted) during 2011 by number of respondents and weighted by respondent volume produced (n = 197).

Hauling method	Number of respondents who use hauling type	Percentage of volume produced (%)
Trucks owned	129	63.9
Contracted	155	36.1

Table 32. Summary of percent of volume hauled by logging businesses in 2011 according to various volume criteria (n = 197).

	Number of logging businesses by hauling method (percent of businesses)	Number of logging businesses by hauling method (percent of businesses)
Criteria	**Trucks owned**	**Hauling contracted**
No volume hauled using that method	68 (34.5%)	42 (21.3%)
Respondents who use that method haul 100% of their volume using that method	42 (32.6%)	68 (43.9%)
Respondents who use that method haul at least 75% of their volume using that method	87 (67.4%)	84 (54.2%)
Respondents who use that method haul at least 50% of their volume using that method	108 (83.7%)	96 (61.9%)
Respondents who use that method haul at least 25% of their volume using that method	115 (89.1%)	113 (72.9%)

As the 2011 level of production of responding logging businesses increased, the percent of wood which was contract hauled tended to decrease (Table 33). While respondents who produced as many as 5,000 cords tended to contract out about 60% of their volume for hauling, that percentage decreased to around 30 percent for businesses producing more than 5,000 cords.

Table 33. Summary of average percent of volume transported to mills by trucks owned by the logging business vs. through contract trucking for various production levels in 2011 (n = 197).

		Trucks owned	Trucking contracted
Volume harvested (cords)	**Number of respondents**	**Average percent of volume (%)**	**Average percent of volume (%)**
≤ 1,000	50	34.5	65.5
1,001 –5,000	64	45.0	55.0
5,001 – 10,000	30	64.1	35.9
10,001 – 15,000	16	46.9	53.1
15, 001 – 20,000	8	73.8	26.2
20,001 – 30,000	19	62.4	37.6
> 30,000	10	70.4	29.6

Average one-way haul distance (Question 19)

The average one-way haul distance for about two-thirds of respondents is between 31 to 90 miles (Table 34). For nearly 76 percent (75.9 percent) of the respondents, the average one-way haul distance was up to 90 miles. Twenty-four percent of the respondents reported an average one-way haul distance of at least 91 miles.

Table 34. Summary of one-way mileage range in miles for traveling from timber harvest sites to the mill in 2011 (n = 216). Percentages may not total 100 due to rounding error.

Mileage range	**Number of respondents**	**Percent of respondents (%)**
Up to 30 miles	19	8.8
31 – 60 miles	77	35.6
61 – 90 miles	68	31.5
91 – 120 miles	42	19.4
121 – 150 miles	7	3.2
More than 150 miles	3	1.4

Comparing average haul distances across the three MnDNR regions (placement in a MnDNR region is based on where the business was located during 2011), approximately 96 percent of the respondents in the northeast region have an average distance greater than 30 miles (Table 35). While respondents located in the central/southern region have the highest percent of logging business owners who average up to 30 miles one-way haul distance, one-third of the respondents in that MnDNR region have a one-way haul distance which exceeds 90 miles, as compared for 22.3 percent in the northeast region and 25 percent in the northwest region.

Table 35. Summary of one-way distance in miles for traveling from timber harvest sites to the mill in 2011 by MnDNR region in which the business is located (n = 216). Percentages may not total 100 due to rounding error.

	Percent of respondents by MnDNR Region (%)		
Mileage range	**Central/Southern Region (n = 21)**	**Northeast Region (n = 127)**	**Northwest Region (n = 68)**
Up to 30 miles	19.0	3.9	14.7
31 – 60 miles	42.9	37.0	30.9
61 – 90 miles	4.8	37.0	29.4
91 – 120 miles	19.0	19.7	19.1
121 – 150 miles	9.5	1.6	4.4
More than 150 miles	4.8	0.8	1.5

Current value of in-woods equipment (Question 20)

More than half of the respondents (56.7 percent) estimated that the current value of their in-woods equipment at the end of 2011 was under $250,000 (Table 35). The median equipment value range was at least $100,000 but less than $250,000. Approximately 71 percent (71.4 percent) estimated that the current value of their equipment was less than $500,000. Without considering the effects of inflation over time, that percentage has not changed much since 2003 when 79 percent reported that the value of their in-woods equipment was up to $500,000 (Powers 2004). Given that equipment was being held longer in 2011 (Question 16) as compared to 2003, and that equipment tends to lose value with increasing age, it is not surprising that the current value of in-woods equipment has not changed much since 2003.

In the 1996 survey, 94 percent of respondents indicated that the value of their in-woods equipment was up to $500,000 (Puettmann et al. 1998). The average and median capital investment for Michigan and Wisconsin firms in 2003 was $397,000 and $167,000, respectively (Rickenbach et al. 2005). The median capital investment was $223,000 for Wisconsin firms in 2010 (Traver 2012).

In the 2011 survey, 27 respondents (17.1 percent) estimated that the current value of their equipment was at least $1 million. That compares with 5 percent of respondents in the 2003 survey (Powers 2004) and two percent of respondents in the 1996 survey (Puettmann et al. 1998).

By assigning an integer to each value range in Table 36 (e.g., 1 = Less than $100,000; 2 = At least $100,000 but less than $250,000, 14 = more than $3,000,000), it is possible to compare the estimated average current value of in-woods logging equipment across different equipment configurations. For those businesses which use a cable skidder to transport all of their volume from the stump to a landing, their average value range is 1.1 (n = 22). For forwarding businesses, the average value range is 3.0 (n = 19). For grapple skidding businesses, the average value range is 3.7 (n = 117). For mixed businesses, the average value range is also 3.7 (n = 41).

Table 36. Summary of estimated current value of in-woods logging equipment on December 31, 2011 (n = 217), in 2003 (n = 119) and in 1996 (n = 368). Dollar values are not adjusted for inflation. Percentages may not total 100 due to rounding error.

		Percent of respondents (%)		
Value range	**Number of respondents (2011 survey)**	**2011 survey**	**2003 survey (Powers 2004)**	**1996 survey (Puettmann et al. 1998)**
Less than $100,000	74	34.1	36.1	63
At least $100,000 but less than $250,000	49	22.6	42.9 (100-500k)	19
At least $250,000 but less than $500,000	32	14.7		12
At least $500,000 but less than $750,000	16	7.4	16.0 (500k-1 million)	3
At least $750,000 but less than $1,000,000	9	4.1		1
At least $1,000,000 but less than $1,250,000	6	2.8	5.0 (> 1 million)	2 (> 1 million)
At least $1,250,000 but less than $1,500,000	6	2.8		
At least $1,500,000 but less than $1,750,000	8	3.7		
At least $1,750,000 but less than $2,000,000	0	0		
At least $2,000,000 but less than $2,250,000	6	2.8		
At least $2,250,000 but less than $2,500,000	4	1.8		
At least $2,500,000 but less than $2,750,000	3	1.4		
At least $2,750,000 but less than $3,000,000	0	0		
More than $3,000,000	4	1.8		

Gallons of off-road and over-the-road fuel used (Questions 21 and 22)

The total estimated number of gallons of off-road road fuel used in 2011 was 3,745,825 (n = 169), an average of 22,165 and a median of 7,500 gallons per respondent (Question 21). For the 169 respondents who reported their 2011 volume (Question 7) and off-road fuel consumption (Question 21), an average of 1.92 gallons/cord of off-road fuel were consumed to deliver wood to the landing. The total estimated number of gallons of over-the-road road fuel used in 2011 was 4,032,913 (n = 115), an average of 34,177 gallons and a median of 10,000 gallons per respondent (Question 22). For the 33 respondents who reported that all of their 2011 volume (Question 7) was transported using trucks they owned (Question 18) and who also reported their over-the-road fuel consumption (Question 22), 2.72 gallons of over-the-road fuel were consumed per delivered cord. Thus, on average, 4.64 gallons/cord were required to harvest and deliver each cord of wood produced. Assuming that 2.5 million cords of wood were produced in Minnesota during 2011, the total amount of fuel needed to produce and deliver that volume to the marketplace was 11.6 million gallons. Also, each time fuel prices change by 25 cents, the impact on fuel cost/cord produced is $1.16.

To obtain more information about over-the-road fuel consumption, logging business owners were asked “What is a realistic miles per gallon rate for over-the-road fuel consumption?” during the focus groups. They indicated that the range was 4 to 6 miles per gallon (Appendix 11). Trucks with a center mounted loader tended to have fuel economy on the low end of that range.

Comparison of profitability in 2011 vs. 2008 (Question 23)

Respondents were asked to compare their profitability in 2011 vs. 2008. The rationale for selecting 2008 as the comparison year were that: 1) there had been several mill closures prior to 2008 (so it was important to assess profitability once some semblance of stability had been reestablished (MnDNR 2010), 2) statewide harvest levels in 2008 were down nearly 800,000 cords as compared to 2005 levels (MnDNR 2011), and 3) asking respondents to recall their profitability more than three years in the past seemed unlikely to provide reliable comparisons.

Nearly 61 percent of respondents said that their business' profitability was worse in 2011 compared to 2008 (Table 37). Approximately 20 percent said that their profitability was better in 2011 than in 2008.

Table 37. Summary of logging business' profitability in 2011 as compared to 2008 (n = 214). Percentages may not total 100 due to rounding error.

Profitability comparison	Number of respondents	Percent of respondents (%)
Much worse in 2011	80	37.4
Slightly worse in 2011	50	23.4
Same in 2011	40	18.7
Slightly better in 2011	39	18.2
Much better in 2011	5	2.3

The Michigan and Wisconsin surveys assessed profitability in 2003 and 2010. When asked to self-report profitability for 2010, 32 percent reported that it was "poor" or "very poor", 38 percent reported that they "broke even" and 31 percent reported that their profitability was "good" or "excellent" (Traver 2012). Results were generally similar for the 2003 assessment (Rickenbach et al. 2005, Traver et al. 2013). When Michigan and Wisconsin logging businesses were asked to compare how firm profit margins had changed over the 5-year period 1998-2003, 46 percent of firms believed their profit margins had remained the same or increased while 54 percent believed they decreased (Rickenbach et al. 2005). Fewer than 2 percent of respondents thought their profit margins had increased greatly the five-year period. These self-assessments of profitability in Michigan and Wisconsin suggest that one in three logging firms in those states experienced difficult financial conditions in those years.

Table 38. Summary of Michigan and Wisconsin logging business' self-assessment of profitability in 2003 (Rickenbach et al. 2005) and 2010 (Traver 2012). Percentages may not total 100 due to rounding error.

	Percent of firms (%)		
Self-reported profits	2003 survey of Michigan and Wisconsin logging businesses (Rickenbach et al. 2005)	2003 survey with only Wisconsin logging businesses (Traver et al. 2013)	2010 survey of Wisconsin logging businesses (Traver 2012)
Very poor	10	10	10
Poor	18	18	22
Broke even	37	35	38
Good	33	36	30
Excellent	1	1	1

Estimated production level at full capacity (Question 24)

As a business operates at a higher percentage of its full capacity, it should be able to spread its fixed costs (e.g., labor, equipment loan payments) over more units of production. Respondents were asked to estimate how much volume their logging business could have produced in 2011 if they were able to work at full capacity (e.g., no downtime loss due to weather conditions, site conditions, delivery quotas, stumpage availability). The 176 respondents produced 1,611,153 cords in 2011 and estimated that they could have produced 2,568,067 cords, an increase of 956,914 cords (59.4 percent additional capacity). Eleven respondents indicated that their full capacity volume was equal to their 2011 production level. Those 11 respondents produced 67,050 cords in 2011, an average of approximately 6,100 cords/business. The 118 respondents who reported their additional capacity (Question 24) and who reported that they do expect to be in business in 5 years (Question 26), indicated that they could have produced 712,736 additional cords operating at full capacity (an average of 6,040 additional cords per respondent). The 38 respondents who reported their additional capacity (Question 24) and who reported that they do not expect to be in business in 5 years (Question 26), indicated that they could have produced 145,180 additional cords operating at full capacity (an average of 3,821 additional cords per respondent).

In response to the focus group question "What are the three most important things which limit your ability to increase your production?," many issues were reported by logging business owners (Appendix 11). The top issues revolved around a) lack of markets where loggers can sell their wood, b) availability or stumpage that meets mills' quality specifications and is affordable (especially during the summer), and c) weather. Respondents generally didn't feel that they could expand their operations during the winter as they are already working at or near full capacity. Markets are currently weak for some species and the biomass markets are poor. Also, some logging businesses don't work in the summer because there is less available stumpage.

In response to the focus group question "In which season(s) do you have the greatest potential to increase your production?," logging business owners who are higher volume producers tended to suggest that they had the greatest potential to increase their production during the summer and fall (Appendix 11). For those businesses, they are already operating near capacity during the winter. But, stumpage availability and access to markets during the summer limit their operations. Smaller volume producers, who tend to only harvest during the winter, felt that they had the greatest potential to increase their production during the winter. Regardless of their annual production level, several respondents noted that markets were more limiting during the summer.

In response to the focus group question "For each season, what issues need to be addressed to help or allow you to increase your production?," logging business owners indicated that better roads are needed to provide access to summer wood (Appendix 11). Because of the limited amount of summer stumpage offered for sale, it is expensive. To address that problem, agency foresters need to be more flexible when setting up sales to offer more summer chance stumpage.

Equipment replacement plans in the next three years (Question 25)

The period of time over which equipment can operate at an acceptable cost and level of production, or economic life, for most in-woods logging equipment is 3 to 6 years (Brinker et al 2002). Economic life depends on various factors, including physical deterioration (e.g., corrosion, wear and tear), functional impairment (e.g., unable to meet demands, becoming economically or technologically obsolete), fuel prices, tax investment incentives, and interest rates (Miyata 1980, Akay and Sessions 2004). Equipment is generally traded/replaced when down time causes the entire logging system to lose productive time, or when the cost of lost production exceeds the cost of owning a new piece of equipment.

Respondents identified 359 pieces of equipment that they planned to replace within the next three years (Table 39). Approximately two-thirds of those replaced pieces of equipment are planned as used purchases. Given the current age of logging equipment (Tables 28 and 30), used equipment may be beyond its economic life by the time a business tries to replace it. Thus, while most businesses indicated that they were considering replacing current equipment with used equipment, the quality of that equipment may be suspect when it becomes available. Grapple skidders were the most frequently cited piece of in-woods equipment to be replaced with nearly 75 percent of those equipment replacements to be used equipment (Table 39). Few respondents plan to purchase either a chipper or a grinder. A tractor (semi) was the most frequently cited over-the-road piece of equipment to be replaced (62 percent as used equipment).

Table 39. Summary of equipment which was reported by respondents to be replaced within the next three years.

	Number of respondents	Number of respondents
Equipment	**Replace with new equipment**	**Replace with used equipment**
Cut-to-length (CTL) harvester	9	8
Drive to tree feller-buncher	5	18
Reach to tree feller-buncher	11	12
Cable skidder	0	7
Grapple skidder	15	44
Forwarder	5	8
Delimber	7	17
Chipper	0	3
Grinder	0	2
Slasher	13	19
Loader	12	20
Tractor (semi)	23	37
Pulp/sawtimber trailer	9	18
Lowboy	4	18
Van/walking floor trailer	5	6
Other[1]	4	0
Total	122	237

[1]The other equipment noted were chainsaws (3 respondents) and a skid loader (1 respondent).

Expect to be in the logging business in five years (Question 26)

A change in the number of businesses within any industry is inevitable over time due to changes in profit and loss, interest and ability of the business owners, difficulty in recruiting and retaining labor, family situation, competition, markets, etc. Within the logging industry, it is important to ensure that that there are businesses that have the knowledge, skills/ability, equipment, markets, etc. to profitably harvest the range of tract sizes (e.g., it may be economically inefficient for some businesses to harvest small tracts), silvicultural prescriptions (i.e., clearcutting, selection harvesting), and site conditions (e.g., steeper topography may require more manual systems) across the state.

Of the 199 businesses that responded to this question, 150 (approximately 75 percent) indicated that they expect to be in the logging business in 5 years (Table 40). Approximately 25 percent of the respondents stated they would not be in business in five years. Similar findings were reported for the 2003 (Rickenbach et al. 2005) and 2010 (Traver 2012) surveys for Michigan and Wisconsin logging businesses.

Table 40. Summary of logging business' assessment of whether they expect to be in business in 5 years for 2011 (n = 199), Wisconsin business owners in 2010 (Traver 2012), and Michigan and Wisconsin owners in 2003 (Rickenbach et al. 2005).

	Percent of respondents (%)		
Expect to be in logging business in 5 years	**2011 survey**	**2010 survey (Traver 2012)**	**2003 survey (Rickenbach et al. 2005)**
Yes	75.4	77	79
No	24.6	23	21

Both the businesses who reported that they would be in business in five years and the businesses who reported that they would not be in business in five years were operating at approximately 60 percent of their harvest capacity. Businesses which reported that they do not expect to be in the logging business in five years produced an average of 5,763 cords in 2011 (average reported capacity of 9,239 cords) and the average age of their newest piece of felling machinery (cut-to-length harvester or feller-buncher) was 15.6 years. In comparison, respondents who expect to be in business in five years produced an average of 10,796 cords (average reported capacity of 16,228 cords) and the average age of their newest piece of felling machinery was 12.1 years.

Businesses in northwest Minnesota were less likely to report that they would be in business in five years (66.7 percent, n=60) as compared to respondents from northeast (78.8 percent, n=118) and central/southern Minnesota (81.0 percent, n=21).

In response to the focus group question "What should logging business owners do today to help ensure their success tomorrow," logging business owners indicated that they need to make smart, conscious decisions so they log smarter and not just harder (Appendix 11). Furthermore, they indicated that some logging businesses will need to get out of logging to make the remaining logging industry more stable and viable for those who remain. Industry respondents indicated that businesses will need to 1) diversify their operations (e.g., build roads, install septic systems) to keep their equipment operating and retain employees outside of winter, 2) do a better job of

marketing their wood to mills (e.g., develop niche markets, deliver to a diversity of stumpage markets), 3) build strong relationships with industrial foresters to demonstrate that they can harvest summer sales and to learn how they can continuously improve their work, 4) develop better communication skills with everyone (e.g., landowners, foresters, mills), 5) develop better business management skills (e.g., develop a business plan that includes stumpage and availability, know more about income and expenses, determine equipment replacement schedules so that equipment remains dependable, identify ways to become more efficient), and 6) develop succession plans which allow the business to be passed on to a family member or someone inside of the business.

When asked to "Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging business," logging business owners indicated that key factors include being able to track cash flows (good business records) and use that information in decision-making so they can focus on harvesting tracts that have the best profit potential, maintaining a profit, good maintenance of equipment, steady markets that are available when the business is logging, and retaining a good employee base (Appendix 11). In response to the same questions, industry representatives indicated that logging is a tough business. They reported that key factors include having a good business manager who can maintain good business records and an owner who will use that information in decision-making; maintaining a profit; conduct preventative maintenance of equipment, steady/consistent/diverse markets that are available when the business is operating; ability to merchandise products to their highest value; plan sales to minimize move costs; building relationships with public agencies and mills; strong work ethic; ability to work efficiently with their equipment, money, and employees; ability to evaluate equipment options, to purchase affordable equipment and to purchase reasonably priced stumpage; interest in accepting and adopting new technologies (e.g., adding a sixth axle, GPS) and in being well-educated; and retaining a good employee base that operates safely.

When asked to "Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging industry," logging business owners indicated that it was important to maintain the health of the mills/markets and mill managers so that markets and wood supplies are stable, having and projecting a positive attitude/image, building good relationships, having better foresters to work with (less difficult to work with), equipment that does not have so much technology built into it so that it is easier to operate and maintain, and having fewer environmental regulations to deal with (Appendix 11). When asked the same question, industry respondents indicated that it was important to maintain the health of mills/markets, having access to an ample supply of affordable and quality timber, identifying and addressing policies that increase cost or limit land management, better training for new foresters, fuel prices which are more level, and work with young loggers to encourage them to stay in the business.

The primary public agencies that loggers deal with (MnDNR and the county land department) and industry could play a key role in helping to logging businesses ensure that logging businesses are successful in the future. In response to the focus group question "What are three things each of the following organizations could do to help logging businesses thrive in Minnesota through the next 5 years?," logging business owners indicated that the public agencies need to offer more wood for sale, especially during the summer; their wood needs to be higher quality than in the past as markets are demanding higher quality, younger (less rot) wood;

foresters need more flexibility to be able to offer more summer chance tracts for sale; and sales should have fewer restrictions (Appendix 11). Logging business owners indicated that industry should stop bidding against loggers at auctions, buy more wood and make it available to loggers as stumpage that they (industry) control, pay more for delivered wood, eliminate certification, and create more markets for species other than aspen and spruce.

In response to the focus group question "How do you think the logging industry may change in the next five years? (Think about things such as number of logging businesses, equipment used, characteristics of the people operating the businesses.)," logging business owners responded that in the next five years, there will be fewer logging businesses due to employees going to work in the mines, difficulty in finding good employees, little interest in starting a new logging business, and the workforce and logging equipment will continue to age (Appendix 11). There will not be any significant changes in equipment. There will be more businesses which use CTL and there will be more chippers.

In response to the focus group question "How do you think procurement may change in the next five years? (Think about things such as number of logging businesses, equipment used, characteristics of the people operating the businesses.)," industry responded that because procurement needs vary by mill, their response also varies (Appendix 11). As fuel costs rise, more biomass-using markets/facilities will emerge, increasing competition for wood. As logging businesses leave the industry, they will have to be replaced. That will require developing new relationships, encouraging some businesses to move from being open market producers to a higher status, and focusing on businesses which can meet mill requirements (e.g., season of harvest, ability to supply fresh wood). Procurement strategies will differ by species. For example, for black spruce, mills may go to Canada to get wood. Some mills may increase their focus on full-time loggers. Procurement foresters need to accept that some logging businesses will fail over time and that they need to focus their procurement on key businesses in their area that they want to help keep viable and healthy.

Future generations taking over business (Question 27)

Logging businesses tend to be family run operations which are passed from one generation to another. The average business in this survey had been in operation for 28.1 years (Question 3). Nearly half (47.1 percent) of the respondents indicated that it was very unlikely that a future generation (e.g., son, daughter, niece, nephew) of the owner's family would take over the business at some point in the future. Only 20 respondents (8.9 percent) reported that it was very likely that a future generation of their family would take over the business.

In the 2003 assessment of Michigan and Wisconsin logging business owners, approximately one-half (53 percent) indicated that a family member was likely to take over future control of the business (Rickenbach et al. 2005). The balance of respondents (47 percent) reported either no heirs or that it was unlikely future generations would be substantially involved in running the firm.

Table 41. Summary of logging business 'perspectives about whether future generations of the owner's family will take over the logging business at some point in the future (n = 225). Percentages may not total 100 due to rounding error.

Perspectives about future family involvement	Number of respondents	Percent of respondents (%)
Very unlikely	106	47.1
Somewhat unlikely	22	9.8
Somewhat likely	40	17.8
Very likely	20	8.9
No heirs	14	6.2
Don't know	23	10.2

In response to the focus group questions "Are you concerned that many of the existing logging businesses don't have a plan for passing the business on to another family member? If so, why might that be occurring and what are the implications?," industry respondents indicated that they are concerned about this issue (Appendix 11). Those respondents indicated that as markets shrink, some attrition of businesses is to be expected. In many businesses, there is one key individual who is crucial to the entire operation. Losing that one individual could cause the business to fail. Passing a business to a family member does not guarantee that the business will remain healthy and financially viable. Because of the difficulty in maintaining a successful business and opportunities elsewhere which offer higher pay, better benefits and more steady work, some owners are not encouraging family members to become involved with the business. While transferring ownership to a family member may make sense, every family does not have a logical relative with the skills necessary to guarantee success of the business. Thus, there may be the need to consider transferring ownership to an employee who demonstrates those skills.

Industry respondents also indicated that for someone who may want to enter the logging business, the start-up cost to begin the business is high, securing and maintaining a dependable labor force may be difficult, securing diverse and steady stumpage markets takes time, and there are better ways to invest those monies which will provide a higher rate of return with less risk (Appendix 11)

General plans for business in next five years (Question 28)

Seventy-three percent (161) of the responding businesses would like to maintain or increase their annual volume harvested over the next five years (Table 42). Forty-one businesses (18.6%) said that they plan to retire or sell the business. These results are similar to the 2003 survey where 74.8 percent of the respondents said that they would like to maintain or increase their annual volume over the next five years and 18.5 percent indicated that they planned to retire, sell the business or quit (Powers (2004).

To gain the perspective of logging business owners and industry representatives, focus group participants were asked to provide their thoughts about what Minnesota's logging sector might look like in the future. Three potential scenarios were presented which were based on the number of businesses by level of production (Table 43). Various questions which were based on those scenarios were then asked.

Table 42. Summary of logging business general plans over the next five years (n = 221) and compared to the 2003 survey (n = 119) (Powers 2004). Percentages may not total 100 due to rounding error.

General plans for the business over the next 5 years	2011 survey	Percent of respondents (%)	
	Number of respondents	2011 survey	2003 survey (Powers 2004)
Increase annual volume harvested	65	29.4	26.9
Maintain annual volume harvested	96	43.4	47.9
Decrease annual volume harvested	19	8.6	6.7
Retire or sell business	41	18.6	18.5

Table 43. Description of three potential future scenarios based on the distribution of logging businesses and their production in Minnesota as asked during the focus groups.

Scenario letter	Short description of the scenario	Longer description of the scenario
A	Status quo scenario	We will continue to have many small logging businesses which produce a relatively small percent of the total volume and few large businesses which produce a relatively large percent of the total volume
B	Growth of smaller producers scenario	The number of and percent of total annual volume harvested by small producers will increase while the number of and percent of total annual volume harvested by large producers will decrease (Growth of smaller producers scenario)
C	Growth of larger producers scenario	The number of and percent of total annual volume harvested by small producers will decrease while the number of and percent of total annual volume harvested by large producers will increase (Growth of larger producers scenario)

When asked about the advantages of Scenario A (status quo), respondents indicated that by retaining a mix of small and large businesses, we will continue to be able to have producers who can work across a range of sites (e.g., small vs. large acreages, small vs. large volume tracts) (Appendix 11). The smaller logging businesses will be able to harvest the smaller sites more profitably, thus providing good access to stumpage from small private landowners. The cost of stumpage will be lowest when operating on those small private land holdings. The lone disadvantage cited for that scenario is that It is more difficult to procure timber from many small producers. The advantages cited for Scenario B (growth of smaller producers) were that wood buyers would need to treat all loggers more equally in terms of volume delivered and price paid/unit. We would continue to have capability to access small tracts of timber. In areas where there are many small private landowners, this may be a likely scenario. There would be more producers to choose from when procuring wood. Disadvantages of that scenario were that 1) there will be more people competing at the auctions, 2) it is more difficult to purchase timber from many small producers, who also tend to operate with older equipment which is more prone to breaking down, thus making procurement less reliable which could negatively impact a mill's ability to operate, and 3) the smaller producers do not tend to have access to bigger markets or markets for off-species because they cannot produce enough volume. Advantages cited for Scenario C (growth of larger producers) were it is easier to control and track procurement through fewer large producers. Mills are more likely to take care of fewer large producers through better contracts than they are small producers. Those large producers have an easier time

getting a loan from the bank to help purchase new equipment and can harvest a relatively large volume of timber in a short period of time, if it is needed by a mill. Disadvantages reported for that scenario were that as the volume of wood harvested in Minnesota continues to decline, there is not enough wood to continue growing the large producers. While mills prefer to work with large producers, they do not want to end up in a situation where they have few suppliers as they might lose control of the supply chain or a hardship faced by one logging business could have a large impact on procurement. Stumpage costs would tend to rise, especially on better tracts and summer stumpage. It is more difficult for larger businesses to operate on smaller tracts.

When asked which of the three scenarios seemed most likely to occur in the future, there were different perspectives reported by logging business owners. The focus group which was dominated by smaller logging businesses tended to think that we would tend to maintain status quo (Scenario A) as we did not need to get more high production logging businesses (Appendix 11). In contrast, the logging business owner focus groups that was dominated by larger businesses needed to think that there would be a growth of larger businesses (Scenario C). Thus, each size producer saw benefits of their firm size and tended to appreciate less the benefits provided by businesses at the other extreme of production. While most of the industry participants identified Scenario A as being most likely, some felt that we would continue to see more growth of the large producers.

When asked if there any conditions (e.g., markets, stumpage availability, labor, equipment) which might lead us in the direction of one scenario or another, logging business owners at the focus groups indicated that the direction will largely be determined by markets and equipment (Appendix 11). The owners indicated that if we continue to lose markets and/or as markets downsize, it will become easier for smaller producers to exist. The high cost of owning and operating equipment may make it difficult for larger producers to maintain their level of production.

Industry focus group participants indicated that the response to the question about conditions which might lead us in the direction of one scenario or another would vary by mill size as smaller mills may prefer either Scenario A (maintain status quo) or B (growth of smaller producers) while larger mills may prefer Scenario A or C (growth of larger producers) (Appendix 11). The answer also varied based on location in the state. In areas closer to the forest/agriculture transition zone, there may be a preference for smaller loggers who only harvest timber during the winter and farm at other times. Similarly, in areas where there are more small private landholdings, we will tend to see smaller operators. In northeast Minnesota, the preference might be for more year-round operations (Scenario C). The size of markets will dictate directions as the loss of more paper mills will tend to eliminate many small loggers who have few markets. Smaller logging businesses will be attracted by the mining industry where wages are higher and benefits are secure. Smaller logging businesses who will not be able to procure sufficient stumpage may subcontract with a larger business.

Issues facing the logging business (Question 29)

Fourteen items were listed within the survey as potential major issues respondents were asked to consider. They also could write in additional issues. Respondents were asked to rate each issue

as 1 (most important), 2 (important), 3 (somewhat important) or 4 (not important). Respondents said that all of the issues were at least somewhat important (rated 2.74 or higher) (Table 44). In general, the highest rated issues facing the future of logging businesses in 2011 are external factors over which the business has no influence. Of the 14 listed issues, *Rising operating costs*, *Market prices for wood* and *Stumpage prices* were the top three. Seven issues (50%) received a rating less than 2, indicating that they are at least "important." Thirty-seven respondents provided a total of 57 "Other" issues, all of which were either rated "most important" (55 issues) or "important" (2 issues). Fuel prices was the most frequently cited "Other" major issue. A complete listing of the 57 "Other" issues is presented in Appendix 12.

Table 44. Summary of major issues facing the future of the responding logging businesses presented in descending order by average score of the responses (1=most important; 2=important; 3=somewhat important; and 4=not important)[1] (n = 222).

Issue	Average score
Rising operating costs (e.g., fuel)	1.24
Market prices for wood	1.27
Stumpage prices	1.45
Cost to replace equipment	1.52
Insurance costs	1.71
Competition for stumpage	1.72
Volume of stumpage offered by public agencies	1.74
Too many regulations and guidelines on harvesting	2.06
Small contracts from the mills for products	2.10
Difficulty in accessing timber sales (roads, permission, etc.)	2.38
Volume of private stumpage offered for sale	2.50
Retaining in the woods employees	2.56
Increasing the amount of benefits to retain workers	2.73
Difficulty attracting and hiring new in the woods employees	2.74

[1]While the "Other" issue was most highly rated (average of 1.04), it is not included in the above table. A complete listing of the "Other" major issues is presented in Appendix 12.

The top five specific issues in 2011 dealt with costs while the next two were related to stumpage (Table 44). The three lowest rated issues in 2011 dealt with attracting, hiring, retaining and providing benefits to employees, all issues over which logging businesses have some ability to control.

In the 2003 survey, the top three issues were similar as "High stumpage prices," "Rising operating costs," and "Not enough stumpage being sold" were most often cited (Powers 2004). The issue "Low market prices for wood" was the fifth highest rated concern in 2003. In the 1979 survey, the top two issues were "Rapidly rising costs" and "Price received for wood" (Bolstad 1980). The issues "Stumpage" and "Fuel availability and cost" were the fourth and fifth highest ranked concerns in the 1979 survey. In the 2003 survey of logging businesses in Michigan and Wisconsin, the top five factors influencing logging firm profitability were "Mill prices," "Stumpage prices," "Equipment maintenance," "Fuel prices," and "Stumpage availability" (Rickenbach et al. 2005).

Similar to the 2011 survey, the issues "Ability to attract and hire new in-woods employees" and "Retaining in-woods employees" were the two lowest rated issues in 2003 (Powers 2004). The issues "Finding trained help" and "Record keeping - money management" were the two lowest rated issues in the 1979 survey (Bolstad 1980). The two lowest rated factors influencing logging firm profitability in the 2003 survey of Michigan and Wisconsin loggers were "Benefits" and "Logger training" (Rickenbach et al. 2005).

Most critical issues facing the logging business (Question 30)

Respondents were asked to consider the list of major issues presented in Question 29 and to identify the five most critical issues facing their business today. Responses were summarized by number of respondents who noted each issue as well as by weighting the response such that the most critical issue noted by a respondent received a score of 5, the second most critical issue received a score of 4, etc. and summing those scores. Results were similar to those for Question 29, with "Rising operating costs," "Market prices for wood," and "Stumpage prices" being the top three most critical issues both in terms of number of respondents as well as by its weighted rank (Table 45). In fact, after those top three issues, there was a rapid decline in the number of weighted votes for other issues.

Table 45. Summary of rating of the five most critical issues facing logging businesses today by number of respondents who listed each issue and weighted by rank (n = 178). Issues are presented in decreasing rank order according to responses to Question 29.

Issue	Number of respondents that ranked issue somewhere within their "Top 5"	Rank by number of respondents	Weighted rank[1]
Rising operating costs (e.g., fuel)	147	1	2
Market prices for wood	143	2	1
Stumpage prices	128	3	3
Cost to replace equipment	90	4	4
Competition for stumpage	75	5	5
Volume of stumpage offered by public agencies	57	6	6
Too many regulations and guidelines on harvesting	42	7	8
Insurance costs	41	8	7
Retaining in the woods employees	33	9	9
Small contracts from the mills for products	29	10	10
Difficulty attracting and hiring new in the woods employees	11	11	12
Volume of private stumpage offered for sale	23	12	13
Other[2]	17	13	11
Difficulty in accessing timber sales (roads, permission, etc.)	15	14	14
Increasing the amount of benefits to retain workers	13	15	15

[1]Weighting was done by assigning a score of "5" to a respondent's first most critical issue identified, "4" to their second most critical issue, etc. and then summing the scores for each issue.
[2]A complete listing of the "Other" major issues is presented in Appendix 12.

The 2003 survey of Michigan and Wisconsin logging businesses asked respondents to identify the two factors that were most important to remaining profitable. Thirty-one percent of respondents identified stumpage prices as the single most important factor; 30 percent identified mill prices, and 12 percent identified stumpage availability (Rickenbach et al. 2005). Regarding the second-most important factor, once again stumpage prices, mill prices, and stumpage availability were most frequently cited.

Training needs (Question 31)

MLEP members are required to attend training addressing Minnesota's forest management guidelines, first-aid and cardiopulmonary resuscitation (CPR) as a provisional and first-year applicant. To maintain MLEP membership, a business owner and/or an "in-woods" person actively responsible for the logging site must attend safety training and continuing education which addresses sustainable forest management, transportation, safety or business management topics. To get a better understanding of specific training topics for business owners, employees and managers, a list of 19 topics was provided. Respondents could write in other training topics.

Based on the frequency of responses, the top three training topics for owners were timber market update, marketing opportunities, and logger and forester partnerships (Table 46). The top three training topics for employees were safety, identifying and operating around wetlands, and GIS/GPS training. The three highest rated topics for managers were safety, GIS/GPS training, and timber sale planning and layout. The relatively low interest in training for managers may be related to the relatively small number of office/clerical (99.5) and supervisor/manager (67.5) employees working for the responding firms (they represent 10.4 percent of the employees reported in Question 2). A listing of the Other training topics identified is presented in Appendix 13.

Because the list of topics presented in the 2011 and 2003 surveys were different, there were different top training needs identified in the 2003 survey of Minnesota logging business owners (Powers 2004). In that 2003 survey, the top three training needs for Owners were 1) new technology (e.g., GPS, GIS), 2) timber sale pricing and bidding, and 3) planning for retirement. The top three training needs for Employees in the 2003 survey were 1) marketing your business to new clients, 2) accounting, and 3) assessing buy vs. lease for equipment, all three tied for the most number of responses. The top four training needs for Business managers in the 2003 survey were 1) accounting, 2) business taxes, 3) safety, and 4) job costing (tied with safety for the third most votes).

Several respondents in the 2011 survey provided open-ended comments about training in response to Question 32 (Appendix 14). The tenor of several of those comments suggested that some respondents feel they do not need any more training. Similar responses were noted in the 2003 survey (Powers 2004).

Logging business owners who participated in the focus groups indicated that they will need training related to business planning for continued operations as well as transitioning from the business to the next phase of life if we are to maintain the status quo (Scenario A) (Appendix 11). Business planning, includes understanding markets and how successful businesses tie

together their stumpage procurement with markets (i.e., knowing species, volumes and markets for your species and how profit varies by tract characteristics). Having a good bookkeeper is important. Transitioning education would include how to transfer the business to a relative or employee, estate planning, and retirement planning.

Table 46. Summary of training topics for owners, employees and managers by number of respondents (n = 171).

	Number of respondents by role of the individual within the business		
Training topic	**Owner**	**Employee**	**Manager**
Timber market update (local and global)	95	2	9
Lubricant and emission advancements	51	35	11
Safety	52	67	17
Identifying and operating around wetlands	36	44	10
Logger and forester partnerships	72	18	12
Business owner roundtable/summit	35	2	5
Human resource issues (hiring, retention & firing)	35	4	11
Timber sale planning and layout	58	24	14
Marketing opportunities	83	4	7
Smartphones and tablets (iPad, Droid, iPhone)	33	18	12
Accounting/QuickBooks	48	5	13
Inspiring/motivating employees	31	14	10
New employee training (OSHA)	23	35	9
Customized onsite training	17	16	7
GIS/GPS training	62	37	16
Taxes	48	2	5
Harvester bars and chains	22	19	4
Effective leadership	29	10	9
Forest policy for loggers	57	15	12
Other[1]	6	2	0

[1]A complete listing of the Other major issues is presented in Appendix 13.

In response to the focus group question "Is there additional training loggers will need to deal with current and future conditions in the industry?," industry participants indicated that loggers will need training about road building and maintenance, marketing (e.g., what are potential markets, how to find them, what markets are looking for), successional planning of a business or transferring the business to an employee, business management (including tracking costs), communicating/relationship building with lenders and mills (Appendix 11).

Open-ended comments (Question 32)

Fifty-seven respondents provided open-ended comments they thought would be helpful to the study. Some of the comments reinforced their opinions regarding other issues addressed earlier in the survey. Some respondents provided typed input because their comments needed more space than was provided on the survey and/or to help them organize their response. Comments were arranged by the themes noted below (Appendix 14). Where a respondent's input fit into multiple themes, the appropriate portion of their comment was placed with the corresponding theme.

- Difficulties maintaining profitability
- Difficulties operating a small business
- Problems finding qualified labor
- Regulations
- Stumpage availability/timber sale policies
- Issues associated with agencies and foresters
- Issues associated with markets
- Training
- Other/Miscellaneous

The theme which received the most comments was "Difficulty maintaining profitability" (Appendix 14). There were also many comments for the "Stumpage availability/timber sale policies," "Issues associated with agencies and foresters," "Issues associated with markets," and "Training" themes.

Looking back at the 2003 (Powers 2004) and 1996 (Puettmann et al. 1998) surveys of Minnesota loggers, respondents did provide open-ended comments on the increasingly tough business of logging and how smaller loggers were finding it difficult to compete with large businesses. However, it appears that there were many more comments covering a broader array of issues received in the 2011 survey which portrayed increased difficulties being faced by logging business owners today. The increased number of comments and expanded scope of concerns expressed by the 2011 respondents suggests that the profitability and business environment for logging business owners is worsening.

Potential improvements for future surveys

A listing of potential way to improve the mail survey are noted in Appendix 15.

Summary of how various factors are influenced by purchaser type, annual production level and in-woods transportation method

To better understand the effects of percentage of stumpage purchased by someone else (Question 6), annual production level (Question 7) and in-woods transportation method from the stump to the landing (Question 11) on various factors, various statistical tests were performed. The results of those analyses are presented below.

Influence of Percentage of Stumpage Purchased by Someone Else (Question 6) on Various Factors

The following two levels of stumpage provided by someone else (e.g., a mill, a broker) were defined based on the survey responses: 1) at least 75 percent provided by someone else vs. everyone else and 2) more than 50 percent provided by someone else vs. everyone else. Separate analyses were performed for each level. Those levels were defined because they compare responses from businesses which are highly dependent on stumpage provided by someone else (at least 75 percent) and more than 50 percent dependent as compared to other respondents.

Some general (nonstatistical) trends associated with respondents who had the higher percentage of stumpage provided in each comparison are noted below.

- They are higher volume producers.
- They have been in operation longer.
- They harvest larger tracts.
- They have a higher percentage of being better in 2011 than 2008.
- They have a lower expectation for being in business in 5 years.
- They produce a larger percentage of their wood during the summer.
- They operate at a higher percentage of their reported capability (Question 7/Question 24).
- They are less dependent on family forest, state, and county stumpage.

Few analyses showed significant differences ($p > 0.05$) (Table 47). County and state stumpage are an important source of stumpage for every in-woods transport method regardless of the percent of stumpage provided by someone else.

Table 47. Summary of influence of 2011 percent of stumpage provided by someone else (Question 6) on various factors.

		Percent of stumpage provided by someone else			
Factor	**Overall mean[1] (*n*)**	**≥ 75%**	**< 75%**	**> 50%**	**≤ 50%**
Volume produced (cords)	9,504 (204)	11,730 (35)	9,043 (169)	12,372 (52)	8,523 (152)
Years in business	28.2 (208)	30.2 (36)	27.8 (172)	30.5 (53)	27.4 (155)
Average tract size harvested (acres)	31.6 (179)	35.2 (28)	31.0 (151)	35.5 (43)	30.4 (136)
Percent of total stumpage from family forest lands	31.6% (201)	20.4% (35)	34.0% (166)	19.8%[a] (51)	35.6%[b] (150)
Percent of total stumpage from county forest lands	23.3% (201)	16.7% (35)	24.7% (166)	17.9% (51)	25.1% (150)
Percent of total stumpage from state forest lands	33.4% (201)	25.7% (35)	35.0% (166)	27.3% (51)	35.4% (150)
Percent of volume produced during the summer	15.8% (202)	18.5% (34)	15.3% (168)	18.5%[a] (51)	15.0%[b] (151)
In-woods fuel consumed/cord (gallons/cord)	1.9 (167)	1.8 (24)	1.9 (143)	1.9 (37)	1.9 (130)
Percent reporting profitability was slightly/much better in 2011 vs. 2008	25.7% (167)	35.7% (10)	23.7% (33)	35.6% (16)	22.1% (27)
Percent of total capability	60.0% (175)	68.6%[a] (29)	58.3%[b] (146)	65.5%[a] (43)	58.2%[b] (132)
Percent who expect to be in business in 5 years	76.3% (190)	59.4%[a] (19)	79.7%[b] (126)	68.0%[a] (34)	79.3%[b] (111)
Percent who plan to increase or maintain volume within 5 years	74.9% (201)	72.2% (26)	75.4% (132)	75.9% (41)	74.5% (117)

[1]Means within a given factor followed by the same letter are not significantly different ($P \leq 0.05$).

Where significant differences existed, respondents in one level were different from the other level in the following ways (Table 47).

- Businesses which have at least 75 percent of their stumpage provided by someone else have a significantly lower expectation of being in business in 5 years than businesses which purchase more than 25 percent of their stumpage ($p = 0.025$),
- Businesses which have more than 50 percent of their stumpage provided by someone else have a significantly lower expectation of being in business in 5 years than businesses which purchase at least 50 percent of their stumpage ($p = 0.023$),
- Businesses which have more than 50 percent of their stumpage provided by someone else produce a significantly higher percentage of their volume during the summer as compared to businesses which purchase at least 50 percent of their stumpage ($p = 0.042$),
- Businesses which have at least 75 percent of their stumpage provided by someone else operate at a significantly higher percent of their total capability as compared to businesses which purchase more than 25 percent of their stumpage ($p = 0.004$),
- Businesses which have more than 50 percent of their stumpage provided by someone else operate at a significantly higher percent of their total capability as compared to businesses which purchase at least 50 percent of their stumpage ($p = 0.032$), and
- Businesses which have more than 50 percent of their stumpage provided by someone else purchase a significantly smaller percent of their stumpage from family forest landowners as compared to businesses which purchase at least 50 percent of their stumpage ($p = 0.043$).

Influence of Annual Production Level (Question 7) on Various Factors

Based on the reported 2011 production (Question 7), five annual production categories were defined based on the 2011 survey responses: 1) 100 to 1,000 cords, 2) 1,001 to 5,000 cords, 3) 5,001 to 10,000 cords, 4) 10,001 to 15,000 cords and 5) more than 15,000 cords. Those categories were selected because they are similar to the groupings used in previous surveys (Puettmann et al. 1998, Powers 2004, Rickenbach et al. 2005).

Despite the difference in annual production, the categories were not significantly different from each other ($p > 0.05$) for many of the factors (i.e., years in business, average tract size harvested, percent of total stumpage harvested from state forest lands, in-woods fuel consumed/cord produced, percent reporting profitability was slightly/much better in 2011 vs. 2008, percent who expect to be in business in five years, and percent who plan to increase or maintain volume within 5 years) (Table 48). State stumpage is an important source of stumpage for every size of business.

Some general (nonstatistical) statements about the lowest and highest volume producers are noted below.

- The smallest producers (100 to 1,000 cords produced in 2011) have been in business for the fewest number of years, harvest the smallest tracts, report the lowest percentage of being better in 2011 as compared to 2008, have the lowest percentage who plan to maintain or increase their level of production within five years, produce the smallest percentage of their wood during the summer, operate at the lowest percentage of their reported capability, obtain nearly half of their stumpage from family forests and a relatively small percent of their stumpage from the counties.

- The highest volume producers (produced more than 15,000 cords in 2011) have been in business the longest, harvest the largest tracts, have the highest in-woods fuel consumption, have the highest expectation of being in business in 5 years and to maintain or increase their production within five years, and have a generally balanced procurement strategy across family forests, county and state sources.

Table 48. Summary of influence of 2011 annual production level (Question 7) on various factors.

		2011 Production level (cords)				
Factor	**Overall mean[1] (*n*)**	**00–1,000**	**1,001–5,000**	**5,001–10,000**	**10,000–15,000**	**> 15,000**
Volume produced (cords)[2]	9,518 (209)	545 (55)	3,053 (67)	7,842 (32)	12,983 (17)	33,764 (38)
Years in business	28.1 (204)	24.7 (53)	29.9 (67)	29.0 (31)	26.3 (17)	30.0 (36)
Average tract size harvested (acres)	31.6 (177)	26.4 (48)	31.4 (53)	32.3 (28)	31.9(13)	37.9 (35)
Percent of total stumpage from family forest lands	31.6% (204)	49.6%[a] (54)	33.7%[b] (67)	19.8%[b] (32)	10.1%[b] (16)	20.7%[b] (35)
Percent of total stumpage from county forest lands	23.0% (204)	13.1%[a] (54)	24.4%[ab] (67)	27.1%[ab] (32)	26.3%[ab] (16)	30.0%[b] (35)
Percent of total stumpage from state forest lands	33.5% (204)	32.6% (54)	32.9% (67)	32.8% (32)	44.6% (16)	31.5% (35)
Percent of volume produced during the summer	15.8% (205)	8.6%[a] (54)	15.2%[b] (66)	19.4%[b] (32)	23.9%[b] (15)	20.8%[b] (38)
In-woods fuel consumed/cord (gallons/cord)	1.9 (169)	1.7 (43)	2.0 (53)	1.9 (28)	1.7 (13)	2.2 (32)
Percent reporting profitability was slightly/much better in 2011 vs. 2008	20.5% (202)	14.8% (54)	16.7% (66)	25.8% (31)	37.5% (16)	25.7% (35)
Percent of total capability	60.0% (176)	48.7%[a] (42)	57.6%[ab] (63)	69.6%[b] (29)	68.5%[b] (15)	68.0%[b] (27)
Percent who expect to be in business in 5 years	75.4% (185)	73.9% (46)	70.4% (61)	76.7% (30)	69.2% (13)	88.6% (35)
Percent who plan to increase or maintain volume within 5 years	73.0% (206)	70.9% (55)	71.6% (67)	71.0% (31)	73.3% (15)	81.6% (38)

[1]Means within a given factor followed by the same letter are not significantly different ($P \leq 0.05$).
[2]Volume production data is presented for descriptive purposes only. No statistical analyses were performed.

Where significant differences existed, the smallest volume producers (100 to 1,000 cords) were generally most different from the other categories (Table 48). Those businesses:

- Obtain a significantly higher percentage of their stumpage from family forest lands than do businesses in all other production level categories ($p < 0.001$),
- Obtain a significantly lower percentage of their stumpage from county forest lands than do the largest volume producers ($p = 0.035$),
- Harvest a significantly lower percentage of their volume during the summer as compared to businesses in all other production level categories ($p < 0.001$), and
- Operate at a significantly lower level of their reported capability as compared to businesses in the three highest production level categories ($p < 0.001$).

Thus, those smallest volume producers are very dependent on family forest lands for their stumpage, don't tend to operate on a year-round basis and operate at less than 50 percent of their total capability.

While 15.8 percent of respondents who produced up to 5,000 cords indicated that 2011 was slightly or much better than 2008, 28.0 percent of respondents who produced more than 5,000 cords indicated that 2011 was slightly or much better than 2008. In response to the focus group question "How might the factors limiting the ability to increase production differ for someone producing up to 5,000 cords as compared to someone who produces more than 5,000 cords?," logging business owners indicated that larger producers 1) receive a higher price per cord (unit) of material that they deliver to mills, 2) are more efficient in their operations, 3) are better able to retain their employees, facilitating higher levels of production, and 4) are more likely to have established a relationship with a mill that purchases some of the logging business' stumpage that they harvest, saving the business time and having to invest in purchasing and holding stumpage (Appendix 11).

In response to the focus group question "Why would in-woods fuel consumption be higher for the highest volume producers?," logging business owners indicated that as compared to smaller businesses, larger volume producers 1) generally have newer, larger, more powerful equipment which tends to have reduced fuel economy due to newer emission standards, 2) have more equipment per unit of production, 3) tend to build less road distance within tracts and operate on larger tracts which require longer skid distances, and d) can lose control of what operators are doing across a site (Appendix 11).

While it was not significant, the data in Table 47 suggest that owners who produced more than 5,000 cords in 2011 thought that their profitability was better in 2011 as compared to 2008. Thus, logging business owners were asked "Why would a higher percentage of respondents who produce more than 5,000 cords indicate that their profitability was better in 2011 vs 2008 as compared to respondents who produce up to 5,000 cords?" during the focus groups. Respondents indicated that as compared to smaller producers, larger producers 1) receive a higher price per cord (unit) of material that they deliver to mills, 2) are more efficient in their operations, 3) are better able to retain their employees, facilitating higher levels of production, and 4) are more likely to have established a relationship with a mill that purchases some of the logging business' stumpage that they harvest, saving the business time and having to invest in purchasing and holding stumpage (Appendix 11).

Influence of In-woods Transportation Method (Question 11) on Various Factors

Decisions about how to organize a business in-woods operations can impact a variety of factors. For example, a cut-to-length system with a forwarder carries shortwood pieces from the stump to the landing while cable and grapple skidders generally drag their material either in tree-length (top and branches have been removed from the tree bole) or full-tree (includes the tree bole, top and branches) form. One way to assess their in-woods operations is to categorize businesses according to how they move harvested material from the stump to the landing. In Minnesota, the three primary ways in which harvested material is transported to the landing is through the use of cable skidders, grapple skidders, and forwarders (Table 17). For the purpose of this analysis, the following six equipment configurations were defined:

- Cable skid – Businesses used a cable skidder for 100% of their volume
- Grapple skid
  - $\leq$ 5,000 cords – Businesses used a grapple skidder for 100% of their volume and produced up to 5,000 cords
  - 5,001 to 15,000 cords – Businesses used a grapple skidder for 100% of their volume and produced 5,001 to 15,000 cords
  - > 15,000 cords – Businesses used a grapple skidder for 100% of their volume and produced more than 15,000 cords
- Forwarder – Businesses used a forwarder for 100% of their volume
- Mixed – Businesses used two in-woods transport methods and produced more than 5,000 cords.

The 24 mixed businesses which produced as many as 5,000 cords in 2011 were excluded from this analysis because they were relatively small producers (range was 100 to 4,000 cords, average production was 1,298 cords, and median production was 858 cords). An overview of the 17 mixed businesses included in this analysis is presented below.

- Production range: 5,100 to 110,000 cords (Average: 26,636, Median: 14,000)
- Number of businesses by combination of the two methods
  - 6 businesses grapple skid (primarily) and forward
  - 6 businesses forward (primarily) and grapple skid
  - 2 businesses grapple skid (primarily) and cable skid
  - 2 businesses forward (primarily) and cable skid
  - 1 business cable skids (primarily) and grapple skids
- Percentage of volume within the two methods range from 99/1 to 60/40

Some general (nonstatistical) statements about some of the in-woods equipment configurations are noted below.

- Cable skidding businesses have been in business for less time, harvest larger tracts, have good in-woods fuel economy per cord produced, have a high expectation for being in business in five years, and obtain nearly half of their stumpage from family forests.
- The largest grapple skidding businesses (produce more than 15,000 cords) harvest the largest tracts, have the highest in-woods fuel consumption/cord, have a high expectation

for being in business in five years, and have a generally balanced procurement strategy across family forests, county and state sources.

- CTL businesses are the youngest, harvest the smallest tracts, have good in-woods fuel economy/cord, had the highest percentage of being better in 2011 than 2008, have a high expectation for being in business in five years, a high percentage plan to maintain or increase their production within five years, produce a larger percentage of their wood during the summer, operate at the highest percentage of their reported capability, and have a generally balanced procurement strategy across family forests, county and state sources.
- Mixed businesses have been in operation the longest, harvest larger tracts, and have the highest percentage of their volume produced during the summer.

The in-woods transportation categories were not significantly different from each other ($p > 0.05$) for many of the factors (i.e., years in business, average tract size harvested, percent of total stumpage harvested from county and state forest lands, in-woods fuel/cord produced, percent reporting profitability was slightly/much better in 2011 vs. 2008, and percent who plan to increase or maintain volume within five years) (Table 49). County and state stumpage are an important source of stumpage for every in-woods transport method.

Where significant differences existed, the lowest grapple skidder production category (harvested $\leq$ 5,000 cords) were generally most different from the other categories (Table 49).

- Grapple skidder businesses which produce more than 15,000 cords and mixed operations produce significantly more volume than all other in-woods transport methods ($p < 0.001$),
- Cable skidder businesses and grapple skidder businesses which produce $\leq$ 5,000 cords obtain a significantly higher percentage of their stumpage from family forest lands than do grapple skidder businesses which produce 5,001 to 15,000 cords ($p < 0.001$),
- Grapple skidder businesses which produce $\leq$ 5,000 cords produce a significantly smaller percent of their volume during the summer than the largest grapple skidder businesses, forwarder businesses, and mixed system businesses ($p < 0.001$),
- Grapple skidder businesses which produce $\leq$ 5,000 cords operate at a significantly lower percent of their total operating capability than businesses which forward ($p = 0.006$), and
- Cable skidding businesses, grapple skidding businesses which produce more than 15,000 cords and forwarding businesses have a significantly higher expectation that they will be in business in five years than grapple skidder businesses which produce $\leq$ 5,000 cords ($p = 0.005$).

Thus, the smallest volume grapple skidder producers are very dependent on family forest lands for their stumpage, do not tend to operate on a year-round basis and operate at less than 50 percent of their total capability.

Table 49. Summary of average values for various factors by in-woods transport method.

Factor	Overall mean[1] (*n*)	Cable skid	Grapple skid			CTL	Mixed ≥ 5,000 cords
			≤ 5,000 cords	5,001–15,000 cords	> 15,000 cords		
Volume produced (cords)	10,621 (179)	1,063[a] (22)	2,343[a] (64)	9,602[a] (29)	30,772[b] (28)	7,100[a] (19)	26,636[b] (17)
Years in business	28.2 (174)	25.4 (20)	29.7 (64)	30.2 (28)	30.2 (27)	20.6 (19)	32.1 (16)
Average tract size harvested (acres)	32.7 (151)	35.0 (20)	29.0 (51)	33.6 (24)	38.5 (25)	28.5 (16)	35.8 (15)
Percent of total stumpage from family forest lands	29.3% (175)	47.4%[a] (22)	37.5%[a] (63)	11.8%[b] (29)	22.5%[ab] (26)	26.2%[ab] (18)	19.5%[ab] (17)
Percent of total stumpage from county forest lands	23.7% (175)	19.5% (22)	19.7% (63)	31.0% (29)	29.9% (26)	20.1% (18)	25.8% (17)
Percent of total stumpage from state forest lands	34.0% (175)	30.8% (22)	32.9% (63)	39.7% (29)	30.1% (26)	36.5% (18)	35.4% (17)
Percent of volume produced during the summer	16.3% (176)	13.3%[ab] (21)	11.5%[a] (64)	19.9%[ab] (28)	19.3%[b] (28)	20.7%[b] (18)	22.2%[b] (17)
In-woods fuel/cord (gallons/cord)	1.9 (148)	1.3 (17)	2.1 (53)	2.0 (25)	2.2 (23)	1.7 (15)	2.1 (15)
Percent reporting profitability was slightly/much better in 2011 vs. 2008	21.4% (173)	9.5% (21)	15.9% (63)	28.6% (28)	26.9% (26)	36.8% (19)	18.8% (16)
Percent of total capability	61.5% (152)	59.5%[ab] (17)	53.3%[a] (57)	66.4%[ab] (26)	68.2%[ab] (21)	71.4%[b] (16)	66.2%[ab] (15)
Percent who expect to be in business in 5 years	75.6% (160)	88.9%[a] (18)	60.3%[b] (58)	68.0%[ab] (25)	92.0%[a] (25)	94.1%[a] (17)	82.4%[ab] (17)
Percent who plan to increase or maintain volume within 5 years	72.9% (177)	72.7% (22)	65.6% (64)	66.7% (27)	82.1% (28)	89.5% (19)	76.5% (17)

[1]Means within a given factor followed by the same letter are not significantly different ($p \leq 0.05$).

Summary of focus group discussions with logging business owners and industry procurement staff

A total of 42 individuals participated in the nine focus groups. Twenty-one industry procurement staff and mill managers participated in the six industry focus groups. Twenty-one individuals participated in the three focus groups with loggers. Of those 21 participants at the logger focus groups, two were not loggers but were members of the MLEP Board of Directors. One logger focus group contained a higher percentage of small business owners than the other two logger focus groups. While all of the focus group responses are presented in Appendix 11, summarized responses for many of the questions are included in the text above.

Summary

This assessment provides a comprehensive review of the status of Minnesota's logging sector in 2011. A response rate of 57 percent for the mail survey, plus additional focus group input from 42 logging business owners and industry representatives yielded considerable information.

Prior to this 2011 survey, the last review assessed conditions for 2003 (Powers 2004). Much has changed since then. Harvest levels dropped from approximately 3.6 million cords in 2003 (MnDNR 2006) to 2.6 to 2.9 million cords in 2011 (MnDNR 2012). In between the two surveys, four oriented strand/structural board mills were closed permanently and one roof felt mill was shut down for several years. Thus, harvest levels were reduced and there were fewer markets available in 2011 as compared to 2003.

In 2011, there continued to be a high percentage of logging businesses based in the MnDNR's northeast region. Those businesses tended to be the largest within the state and to work on a more year-round basis (i.e., continue logging during the summer). While the average number of years that a logging business has been in operation continues to increase as compared to prior surveys, most business owners don't have a succession plan to transfer the business to someone else in their family. Reasons cited for why young people do not tend to want to enter the logging profession include a poor work ethic of young people, an abundance of other opportunities for employment which require less strenuous work and provide a higher salary with more benefits, the low profit margin relative to the amount of work and risk involved, and the high cost to get into the business. While industry is concerned that most owners do not have a succession plan for their business which includes a family member, they indicated that some attrition of businesses is to be expected as markets shrink. In fact, some owners are encouraging their children not to get into logging. Also, passing a business to a family member does not automatically guarantee that the business will remain healthy and financially viable. In some businesses, there may be the need to consider transferring ownership to an employee who demonstrates the skills necessary to run the business. Regardless of whether a business is to be transferred to a family member or an employee, it is important to make that transition occur slowly over time to allow the successor to learn all of the aspects of the business (e.g., bookkeeping, procuring stumpage, in-woods operations and trucking, markets) and to be seen as a reliable owner by agency foresters, lending institutions and procurement mills.

While the average respondent produced 9,518 cords in 2011, there continue to be many small producers who collectively harvest a relatively small percentage of the wood in Minnesota and few businesses which collectively supply a large percentage of the annual harvest. Fifty-eight percent of the businesses produced 5,000 or fewer cords, supplying almost 12 percent of the total volume reported. The ten largest producers harvested 32.6 percent of the volume in 2011. The trend toward larger producers, harvesting more than 15,000 cords annually, is continuing.

Respondents reported that their production in 2011 was 60 percent of their total operating capacity. Thus, sufficient capacity still exists to harvest timber if there were an increase in the amount of available stumpage and expansion of markets. Businesses which harvested up to 1,000 cords reported operating at less than 50 percent of their capability. Businesses which have more than 50% of their stumpage provided by someone else (e.g., a broker, a mill) operated at a

significantly higher percent of their total capacity as compared to businesses which procure up to half of their stumpage.

The lack of markets for wood, available stumpage that meets quality specifications and is affordable and weather are the three factors most commonly cited by business owners for limiting their production. While larger volume producers report having the greatest capacity for increasing production during the summer and fall, lack of available stumpage and markets limit their ability to realize that opportunity. Because less summer wood is available, there is more competition for it, driving up the price of that stumpage. There also tend to be more regulations on summer wood. Smaller volume producers feel that they have the greatest ability to expand their operations during the winter, the primary season of operation for many of those businesses.

While the percentage of wood harvested using a CTL system is increasing, more than 80 percent of the volume harvested continues to be felled using a feller-buncher. Thus, most businesses use conventional equipment (i.e., feller-buncher, grapple skidder, delimber, slasher) to harvest their timber. Equipment is aging as compared to previous surveys. Equipment age is inversely related to the level of annual production. Logging business owners indicated a preference for older equipment because they feel that it is better built, easier to maintain and repair, and that it lasts longer than new equipment; purchasing new equipment will require additional debt which they want to avoid; there is a lot of uncertainty today given the changing marketplace; you can afford to leave older equipment idle for a while if you do not log year round or if you do not have sufficient markets because it is paid for; and owners want to avoid purchasing equipment with the new emission standards because they feel that it is expensive to purchase, more complex to operate and repair themselves and because they feel that it will require more fuel to operate. Industry representatives added that older equipment has more down time for repairs and maintenance, thus making it more difficult to fill mill contracts and replacement parts for that equipment have become more expensive. For those owners who have been purchasing new equipment, industry representatives indicated that it provides increased reliability as it may require less maintenance, it helps build and retain a good reputation with private landowners and newer equipment provides the ability to take depreciation on taxes, offsetting income.

The increased age of the equipment has tended to keep the value of in-woods equipment low, currently less than $500,000 for about 71 percent of the respondents. Much of the equipment which is planned to be replaced in the next three years will be used purchases, with grapple skidders being most commonly cited for replacement.

Family forest lands are a very important stumpage source for businesses which harvest up to 1,000 cords annually and state stumpage is important an important source to all respondents, regardless of their production size. Although the percentage of stumpage purchased by the logging business continues to grow as compared to previous surveys, slightly more than one-third (34.3%) of the businesses have at least 25 percent of their stumpage provided by someone else (e.g., a broker, a mill).

Winter continues to be the most important season for harvesting timber. Since 1991 (Jaakko Pöyry Consulting, Inc. 1992), there has been a continued increase in the percent of volume

harvested during the winter with a reduction in all other seasons. There continue to be many small logging businesses which do not harvest any timber during the summer.

More than 60 percent of the volume was hauled to the mill using trucks owned by the logging business. The average one-way haul distance for about 75 percent of the respondents was 90 miles or less. Between 2003 and 2011, No. 2 diesel fuel prices rose from $1.51/gallon to $3.85/gallon across the US (US DOE 2013). With an average cord requiring about 4.6 gallons of fuel to be produced in-woods and delivered to the mill, the impact of those increased fuel prices on profit margins could have been significant. Thus, given the impact of reduced markets and harvest levels, combined with the price for diesel fuel, approximately 60 percent of respondents said that their profitability was worse in 2011 than in 2008. The major issues faced by logging businesses today are rising operating costs (e.g., fuel), market prices for wood, and stumpage prices. Those issues, which are largely out of the control of a logging business owner, are similar to what has been reported in previous surveys. There were many open-ended comments which suggested that logging businesses are having a difficult time maintaining their profitability.

Businesses which have more than 50% of their stumpage provided by someone else (e.g., a broker, a mill) had a significantly lower expectation of being in business in five years than those which procure up to half of their stumpage. That result may reflect the impact of loss of markets on businesses which were more dependent on timber provided by those mills now having to find both stumpage and markets for their wood.

One quarter of the logging businesses do not expect to be in business in five years. Those businesses tend to be smaller than average producers and to have older felling equipment.

Conclusions

The continued health of Minnesota's logging sector is vitally important to the forest products industry and many local communities. While there have been shifts in firm demographics since 2003, factors outside of the control of a logging business owner (e.g., loss of markets, increased fuel prices, decreased availability of stumpage in the summer and fall, rising stumpage prices, increased demand by mills for quality timber, increased competition for labor from the mining industry in Minnesota and the natural gas industry in North Dakota) have contributed to raise concerns about the overall health of the sector.

The logging sector in Minnesota appears to be evolving, headed in a similar direction as agriculture with fewer/larger businesses. While there is still a need for smaller businesses to harvest small tracts, especially on family forests, changing market dynamics may make it increasingly difficult for those businesses to survive. Other businesses will cease operations due to the lack of a succession plan.

To maintain a healthy logging sector and wood supply chain in Minnesota, the sector needs to help itself and will need assistance from others. Logging businesses in Minnesota may need to modify their operations to remain competitive in the future. In particular, businesses will need to demonstrate that they are dependable both to landowners and their markets, recruit and retain

dependable labor and provide them with appropriate benefits, purchase efficient/dependable equipment which allows them to be productive across the range of sites and conditions where they procure stumpage, maintain better records and increase use of the data in decision-making, build relationships and become better communicators with landowners and procurement mills, diversify their markets and their operations during the summer, ask agency and procurement foresters how they can improve their operations, identify whether there is someone within the business who can take over the operation in the future and work with that person prior to transferring the business to make sure that they are as ready as possible for that step, and to become more passionate about their industry such that they actively advocate for their profession within their community, schools, and all levels of government. Being more involved and engaged will help raise the awareness of the profession.

While Minnesota will continue to see a range of logging business sizes, it seems likely that there will be continued growth of larger businesses (produce more than 15,000 cords annually). There will be an ongoing need for small businesses to harvest small tracts and to provide surge capacity during the winter, when the large businesses are already operating at or near capacity. However, because those smaller businesses tend to have fewer markets and to operate older equipment, they are more vulnerable to any additional loss of markets.

The ability to increase production during the summer would make it easier for business owners to retain skilled labor year-round, invest in new equipment and to repay loans. Currently, concerns about site impacts (i.e., rutting) cause some agency foresters to require frozen soil conditions for many of their harvest sites. Forest management agencies need to assess existing road networks and determine opportunities for improved access or constructions of new roads to increase "summer" chance harvest sites. Identifying these areas may require agencies to develop a soil operability rating system to allow foresters to assess soil impacts based on current local (e.g., soil, site, moisture) and operator (e.g., equipment, harvesting system) considerations. Once these areas are identified and financial needs estimated, state and county agencies should coordinate efforts to maximize legislative funding to improve existing or construct new roads.

Consuming mills and lending institutions also need to reconsider how they support logging businesses to ensure the stability of this sector. Long-term contracts would provide more stability to the logging sector. Longer term contracts will make it easier for businesses to get letters of credit and financing from banks and to maintain their workforce and equipment. Consuming mills should determine which logging businesses are viable and can maintain a consistent supply of stumpage to meet production needs. By keeping all of the existing logging businesses in operation, it may make it more difficult for higher quality businesses to make investments to grow and thrive in a rapidly changing economic environment.

Conducting future surveys on a regular schedule (e.g., every five years) is important to continuously track the health of this important sector.

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Appendices

Appendix 1. Minnesota logging business owners survey 2011 calendar year.

Appendix 2. Survey pre-mailing letter printed on Minnesota Logger Education Program (MLEP) letterhead and sent to all logging business owners.

Appendix 3. Correspondence printed on University of Minnesota letterhead for the initial mailing of the survey.

Appendix 4. Follow-up postcard sent to all logging business owners one week after the initial mailing of the survey.

Appendix 5. Correspondence printed on University of Minnesota letterhead for the second mailing of the survey to nonrespondents.

Appendix 6. Final letter printed on Minnesota Logger Education Program letterhead sent to all logging business owners.

Appendix 7. E-mail message sent to logging business owners to invite them to one of the focus groups.

Appendix 8. Script which was read to participants before beginning each focus group.

Appendix 9. Focus group questions asked of logging business owners.

Appendix 10. Focus group questions asked of industry procurement staff.

Appendix 11. Focus group responses by question and by type of respondent (logging business owner or industry).

Appendix 12. Listing of "Other" responses submitted by 37 respondents indicating major issues facing the future of their logging business (Question 29).

Appendix 13. Listing of "Other" responses submitted by respondents indicating training topics for owners and employees (Question 31).

Appendix 14. Listing of open-ended comments (Question 32), arranged by theme. Where a respondent provided multiple thoughts in their comments, each portion of their insight is reported in the appropriate theme.

Appendix 15. Potential improvements for future surveys.

Appendix 1. Minnesota logging business owners survey 2011 calendar year.

Minnesota Logging Business Owners Survey
2011 Calendar Year

Thank you for participating in our study. This information will help us better understand the status of the timber harvesting industry in Minnesota during 2011. You may decline to answer any question. If you wish to comment on any questions or expand on your responses, please feel free to use the space in the margins or attach a separate sheet of paper, if needed. Your responses will be kept confidential. Please fold and return the survey in the enclosed envelope within the next few days.

Thank you in advance for your assistance!

Please return your completed survey as soon as possible in the enclosed postage paid envelope to the address below. *Note: When complete, a report summarizing the results of the study will be available at MLEP.org*

Charlie Blinn
Department of Forest Resources
University of MN
1530 Cleveland Ave North
St. Paul, MN 55108-1027

Part 1: Business Information/Background

We would like to begin with some general questions about your business. When answering these questions, please provide your best estimates. Remember, all of your responses will be kept confidential.

1. In what county was your business located during 2011?

	County

2. How many workers or subcontractors did your logging business employ or work with during 2011? Positions should be reported on the basis of each employee's primary responsibility. Please include yourself in the count.

Type of worker	*Full Time*	*Part Time*	*Subcontract*
a. Woods workers			
b. Truck drivers			
c. Procurement/Forester/ Landowner Assistance			
d. Mechanics			
e. Office / clerical			
f. Supervisor/manager			

3. How many years had your logging business been in operation in 2011?

	years

Part 2: Harvest Operations

The next questions are about your stumpage and how you felled, skidded, and processed your wood in 2011.

4. Please indicate the approximate average tract size in acres that your logging business harvested in 2011. If there were multiple cutting blocks within a timber sale, consider each block separately.

	acres

5. Of your 2011 timber sales, how many were in each of the following acreage categories?

Acreage range	Total Sales
a. 1 – 5 acres	
b. 6 – 10 acres	
c. 11 – 20 acres	
d. 21 – 40 acres	
e. 41 – 80 acres	
f. 81 – 160 acres	
g. 161 acres or more	

6. Of the timber your logging business harvested in 2011, what percentage of your harvest was purchased by someone else (for example a mill) and what percentage was stumpage you purchased? (Please ensure that the total equals 100%.)

Purchaser Type	***Percent***
a. Stumpage you purchased	%
b. Stumpage purchased by someone else	%
Total	***100%***

7. Using your best estimate, what was the total volume of timber that your logging business harvested in 2011? Please use the units that best fit your operation. For example, "10,000 cords and 20,000 board feet."

Unit	***Roundwood***	***Chips***
a. Cords		
b. (thousand board feet)		
c. Cunits (100 cubic feet)		
d. Green tons		
e. Other (please specify measurement unit)		

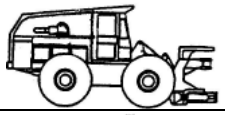
8. Considering all of the stumpage sources, please indicate the percentage that your logging business harvested from each of the landowner groups during 2011. **Please indicate the landowner, not the permit holder.** (Please ensure that the total equals 100%.)

Timberland Owner	***Percent***
a. Private, non-industrial	%
b. County/municipal	%
c. State	%
d. Forest Service	%
e. American Indian	%
f. Industrial	%
g. Other	%
Total	***100%***

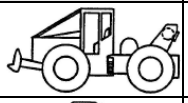
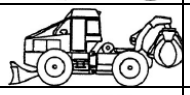
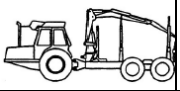
9. Please indicate the percentage of the total volume that your logging business harvested during 2011 in each season listed below. (Please ensure that the total equals 100%.)

Season	***Percent***
a. Winter (Dec-Feb)	%
b. Spring (Mar-May)	%
c. Summer (Jun-Aug)	%
d. Fall (Sep-Nov)	%
Total	***100%***

10. For each of the following felling methods, please indicate the approximate percentage of your logging business' total harvest volume that was felled by each method in 2011. (Please ensure that the total equals 100%.)

Felling Method	***Diagram***	***Percent***
a. I did not fell timber. Please put 100 in the percent column to the right.		%
b. Chainsaw		%
c. Cut-to-length (CTL) harvester		%
d. Drive to tree feller-buncher		%
e. Reach to tree feller-buncher		%
Other (please specify below)		
f.		%
g.		%
h.		%
i.		%
Total		***100%***

11. For each of the following in-woods transportation methods, please indicate the approximate percentage of your logging business' total harvest volume that was transported by each method in 2011. (Please ensure that the total equals 100%.)

In-Woods Transportation	***Diagram***	***Percent***
a. I did not transport timber. Please put 100 in the percent column to the right.		%
b. Cable skidder		%
c. Grapple skidder		%
d. Forwarder		%
Other (please specify below)		
e.		%
f.		%
g.		%
Total		***100%***

12. Please indicate the approximate percentage of your logging business' 2011 total harvest volume that was delimbed and/or topped at each of the following locations. (Please ensure that the total equals 100%.)

Delimbing/Topping Location	***Percent***
a. I did not delimb/top timber. Please put 100 in the percent column to the right.	%
b. In the cut-over	%
c. At the landing/roadside	%
d. Not delimbed/topped	%
Other (please specify below)	
e.	%
f.	%
Total	***100%***

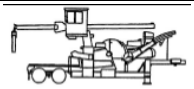
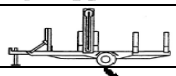
13. Please indicate the approximate percentage of your logging business' 2011 total harvest volume that was bucked/slashed by each of the following methods. (Please ensure that the total equals 100%.)

Bucking/Slashing Method	***Percent***
a. I did not buck/slash timber. Please put 100 in the percent column to the right.	%
b. Chain saw	%
c. Mechanical	%
d. Full-tree	%
e. Tree-length	%
Other (please specify below)	
f.	%
g.	%
h.	%
Total	***100%***

14. This question considers the volumes that your logging business harvested in 2011 which were not delimbed/topped and/or not bucked/slashed. Please indicate the approximate percentage of your logging business' total harvest volume that were harvested during 2011 for each of the following processing methods. (Please ensure that the total equals 100%.)

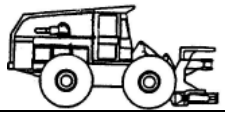
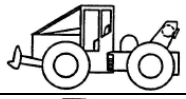
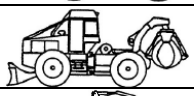
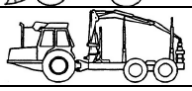
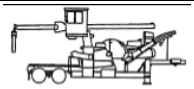
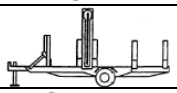
Other Processing Methods	***Percent***
a. I did not use other methods to process timber. Please put 100 in the percent column to the right.	%
b. Full-tree chipping	%
c. Chain flail-delimber/debarker/chipper	%
d. Full-tree grinding	%
Other (please specify below)	
e.	%
Total	***100%***

15. For each of the following processing methods, please indicate the approximate percentage of your logging business' total harvest volume that was processed by each method in 2011. (Please ensure that the total equals 100%.)

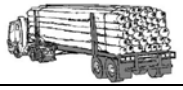
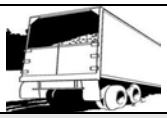
Processing Method	***Diagram***	***Percent***
a. I did not process timber. Please put 100 in the percent column to the right.		%
b. Delimber		%
c. Chipper		%
d. Grinder		%
e. Slasher		%
f. Cut-to-length (CTL) harvester		%
g. Chainsaw		%
Other (please specify below)		
h.		%
i.		%
j.		%
k.		%
Total		***100%***

Part 3: Harvest and Transportation Equipment

16. How many of the following pieces of in-woods equipment did your logging business own and actively use during 2011? If none, write "0" in the "# of Pieces" column. Do not include older pieces of machinery that were non-operational or used only for spare parts. Also, please indicate the age in years of the newest piece of equipment for each category.

Equipment	***Diagram***	***# of Pieces***	***Age of Newest piece***
a. Chainsaw/hand delimbing			
b. Cut-to-length (CTL) harvesters			
c. Feller-bunchers			
d. Cable skidders			
e. Grapple skidders			
f. Forwarders			
g. Mechanical delimber			
h. Chipper			
i. Grinder			
j. Slasher			
k. Loaders			
Other (please specify below)			
l.			
m.			
n.			
o.			
p.			
q.			
r.			
s.			

17. How many of the following pieces of over the road equipment did your logging business own and actively use during 2011? If none write "0" in the "# of Pieces" column." Do not include older pieces of machinery that were non-operational or used only for spare parts. Also, please indicate the age in years of the newest piece of equipment for each category.

Equipment	***Diagram***	***# of Pieces***	***Age of Newest piece***
a. Tractor (Semi)			
b. Pulp/Sawtimber trailer			
c. Lowboy			
d. Van/walking floor trailer			
Other (please specify below)			
e.			
f.			
g.			

18. Please indicate what percentage of your logging business' 2011 harvest volume was transported to mills by trucks you own versus trucks you contracted. (Please ensure that the total equals 100%.)

Category	***Percent***
a. Owned	%
b. Contracted	%
Total	***100%***

19. In 2011, what was the average one-way travel distance from your logging business' timber harvest sites to the mill? (Check only one response.)

✓	***Mileage Range***
	a. Up to 30 miles
	b. 31-60 miles
	c. 61-90 miles
	d. 91-120 miles
	e. 121-150 miles
	f. More than 150 miles

20. Please estimate the current value as of December 31, 2011 of all of your in-woods logging equipment. (Check only one response.)

✓	***Value Range***
	a. Less than $100,000
	b. At least $100,000 but less than $250,000
	c. At least $250,000 but less than $500,000
	d. At least $500,000 but less than $750,000
	e. At least $750,000 but less than $1,000,000
	f. At least $1,000,000 but less than $1,250,000
	g. At least $1,250,000 but less than $1,500,000
	h. At least $1,500,000 but less than $1,750,000
	i. At least $1,750,000 but less than $2,000,000
	j. At least $2,000,000 but less than $2,250,000
	k. At least $2,250,000 but less than $2,500,000
	l. At least $2,500,000 but less than $2,750,000
	m. At least $2,750,000 but less than $3,000,000
	n. More than $3,000,000

21. Please estimate how many gallons of off-road fuel your logging business used in 2011.

	Gallons

22. Please estimate how many gallons of over-the-road fuel your logging business used in 2011 for the purpose of hauling products to mills.

	Gallons

23. Compared to 2008, how would you rate your logging business' profitability in 2011? (Check only one response.)

✓	***Profitability 2008 to 2011***
	a. Much worse in 2011
	b. Slightly worse in 2011
	c. Same in 2011
	d. Slightly better in 2011
	e. Much better in 2011

Part 4: Future Considerations and Needs

These questions are about the future of the logging industry and your business as well as your logging business' training needs.

24. During 2011, how much volume could your logging business have produced working at full capacity? Please use the units that best fit your operation.

Unit	*Volume*
a. Cords	
b. MBF (thousand board feet)	
c. Cunits (100 cubic feet)	
d. Green tons	
Other (please specify measurement unit)	
e.	

25. Which of the following pieces of equipment will you replace in the next three years? Please use a check (✓) to indicate if the replacement equipment will be new or used.

Equipment to be Replaced within 3 yrs	*New*	*Used*
a. Cut-to-length (CTL) harvester		
b. Drive to tree feller-buncher		
c. Reach to tree feller-buncher		
d. Cable skidder		
e. Grapple skidder		
f. Forwarder		
g. Delimber		
h. Chipper		
i. Grinder		
j. Slasher		
k. Loader		
l. Tractor (Semi)		
m. Pulp/Sawtimber trailer		
n. Lowboy		
o. Van/walking floor trailer		
Other (please specify below)		
p.		
q.		

26. Do you expect to be in the logging business in 5 years?

	Yes
	No

27. Do you anticipate that future generations (e.g., son, daughter, niece, nephew) of the owner's family will take over your logging business at some point in the future? (Check only one response.)

	a. Very unlikely
	b. Somewhat unlikely
	c. Somewhat likely
	d. Very likely
	e. No heirs
	f. Don't know

28. Please indicate your general plans for your logging business over the next 5 years. (Check only one response.)

✓	***Objective***
	a. Increase annual volume harvested
	b. Maintain annual volume harvested
	c. Decrease annual volume harvested
	d. Retire or sell business

29. In your opinion, what are the major issues facing the future of your logging business? Please rank each of the following issues using the scale of 1=most important; 2=important; 3=somewhat important; and 4=not important.

Rating	***Issues Facing Logging / Transportation Industry***
① ② ③ ④	a. Stumpage prices
① ② ③ ④	b. Market prices for wood
① ② ③ ④	c. Volume of private stumpage offered for sale
① ② ③ ④	d. Difficulty attracting and hiring new in the woods employees
① ② ③ ④	e. Retaining in the woods employees
① ② ③ ④	f. Increasing the amount of benefits to retain workers
① ② ③ ④	g. Rising operating costs (e.g., fuel)
① ② ③ ④	h. Insurance costs
① ② ③ ④	i. Cost to replace equipment
① ② ③ ④	j. Competition for stumpage
① ② ③ ④	k. Too many regulations and guidelines on harvesting
① ② ③ ④	l. Small contracts from the mills for products
① ② ③ ④	m. Volume of stumpage offered by public agencies
① ② ③ ④	n. Difficulty in accessing timber sales (roads, permission, etc.)
	Other (please specify below)
① ② ③ ④	o.
① ② ③ ④	p.
① ② ③ ④	q.
① ② ③ ④	r.
① ② ③ ④	s.
① ② ③ ④	t.

30. Of the issues identified in Question 29 please identify the 5 most critical issues facing your logging business today by placing the letter of the corresponding issue (a-u) below the appropriate number where 1= most critical issue today and 5= fifth most critical issue today.

Rank of issues	1	2	3	4	5
Letter of issue					

31. What training topics would you like your employees and/or you to receive in order to improve the productivity, effectiveness, and profitability of your logging business?

Training Topic	***Owner***	***Employee***	***Manager***
a. Timber Market update (local and global)			
b. Lubricant & emission advancements			
c. Safety			
d. Identifying & operating around wetlands			
e. Logger & forester partnerships			
f. Business owner roundtable/summit			
g. Human resource issues (hiring, retention & firing)			
h. Timber sale planning and layout			
i. Marketing opportunities			
j. Smartphones & tablets (iPad, Droid, iPhone)			
k. Accounting/QuickBooks			
l. Inspiring/motivating employees			
m. New employee training (OSHA)			
n. Customized onsite training			
o. GIS/GPS training			
p. Taxes			
q. Harvester bars and chains			
r. Effective leadership			
s. Forest policy for loggers			
Other (specify below)			
t.			
u.			

32. If there is any additional information you feel would be helpful to this study regarding your logging business, please write your comments here.

_____

_____

_____

Thanks again for your time and participation!

Appendix 2. Survey pre-mailing letter printed on Minnesota Logger Education Program (MLEP) letterhead and sent to all logging business owners.

March 16, 2011

Dear MLEP Member:

In a couple of weeks, you will be receiving a survey that is being conducted in an effort to better understand the current status of the logging industry in Minnesota. Your input is vital and will be used to help ensure a strong future for the logging industry in Minnesota. I strongly encourage you to complete and return the survey.

Please be assured that all survey information will be kept confidential, and no information will be released that can be linked to you. The survey is being conducted by the University of Minnesota in conjunction with MLEP and the Minnesota Timber Producers Association. A "double-blind" process will be used to ensure respondents are only known by survey code.

Your participation in this survey is highly encouraged. When complete, a report summarizing the results of the study will be available at www.mlep.org.

If you have any questions about this study, please don't hesitate to contact me. If you would like to talk to someone other than the researchers, contact the Research Subjects' Advocate Line, at D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Sincerely,

Dave Chura
Executive Director

Appendix 3. Correspondence printed on University of Minnesota letterhead for the initial mailing of the survey.

Office (612) 624-3788
E-Mail: cblinn@umn.edu

April XX, 2012

First Name Last Name
Address 1
Address 2
City, MN ZipCode

Dear Business Owner Name:

A healthy logging industry is critical to Minnesota's forestry sector. Without a healthy logging industry, it is impossible to sustain our forests. Many of our Minnesota communities and businesses are also dependent on the health of the forest products industry. For that reason, we would like your help to understand the current status of your logging business so that we can compile an assessment of Minnesota's logging industry.

As a logging business owner who is a member of the Minnesota Logger Education Program (MLEP), you have been chosen to participate in a research study being conducted by the University of Minnesota in conjunction with MLEP and the Minnesota Timber Producers Association. In the enclosed survey, we ask you a variety of questions about the background of your business, the operations you perform, your equipment, and your thoughts about the future of your business and the industry as a whole. The survey should take about 20 minutes to complete.

Please be assured that all survey information will be kept confidential, and no information will be released that can be linked to you. The code number on your survey will only be used to make sure that you don't receive reminders once you have returned your completed questionnaire to us. Your participation in this survey is voluntary and you do not have to answer all the questions. However, you can help us a lot by sharing the information about your business. When complete, a report summarizing the results of the study will be available on the internet at MLEP.org.

If you have any questions about this study, please email me at cblinn@umn.edu. If you have any questions or concerns regarding this study and would like to talk to someone other than the researchers, contact the Research Subjects' Advocate Line, at D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Thank you very much for helping with this very important study!

Sincerely,

Charlie Blinn
Professor and Extension Specialist

Enc.

Appendix 4. Follow-up postcard sent to all logging business owners one week after the initial mailing of the survey.

April XX, 2012

Dear Logging Business Owner:

Last week, I mailed you a survey asking for information about your logging business. If you have already completed and returned it – thank you! Your response is appreciated and will provide a better understanding of the logging industry in Minnesota.

If you have not yet completed the survey, I encourage you to do so as soon as you are able. Your response is crucial to helping build an accurate understanding of Minnesota's logging industry. If you have any questions, please do not hesitate to contact me at (612) 624-3788 or cblinn@umn.edu.

Thank you for your help!

Charlie Blinn

Appendix 5. Correspondence printed on University of Minnesota letterhead for the second mailing of the survey to nonrespondents.

Office (612) 624-3788
E-Mail: cblinn@umn.edu

April XX, 2012

First Name Last Name
Address 1
Address 2
City, MN ZipCode

Dear Business Owner Name:

About three weeks ago, a survey was sent to you asking for information about your logging business. As of today, we have not received your questionnaire. If you have already completed the survey, please let us know so that we can double-check our records.

The University of Minnesota is conducting this survey in conjunction with the Minnesota Logger Education Program and the Minnesota Timber Producers Association to understand the current status of Minnesota's logging industry. In order for the results to truly reflect the status of the industry, it is very important that we receive your completed questionnaire. The survey should take about 20 minutes to complete.

All responses will be kept confidential. The code number on your survey is used only to make sure that you don't receive reminders once you have returned your completed questionnaire to us. Your participation in this survey is voluntary and you do not have to answer all the questions. However, you can help us a lot by sharing the information about your business. When complete, a report summarizing the results of the study will be available on the internet at MLEP.org.

If you have any questions about this study, please email me at cblinn@umn.edu. If you have any questions or concerns regarding this study and would like to talk to someone other than the researchers, contact the Research Subjects' Advocate Line, at D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Your participation is greatly appreciated!

Sincerely,

Charlie Blinn
Professor and Extension Specialist

Enc.

Appendix 6. Final letter printed on Minnesota Logger Education Program letterhead sent to all logging business owners.

May 11, 2012

First Name Last Name
Address 1
Address 2
City, MN ZipCode

Dear Business Owner Name:

I am writing to you about the survey on Minnesota's logging industry which you should have received several weeks ago. If you have already returned your questionnaire – ***thank you!*** If you have not yet completed the survey, please do so today. Your response is crucial to helping build an accurate understanding of Minnesota's logging industry.

If you need a replacement questionnaire, please contact me at (218) 722-5442 or dchura@mlep.org.

Although we have received a large number of completed questionnaires, our understanding of the logging industry in Minnesota improves with each response. Therefore, your completed questionnaire is very important to the success of this survey.

The survey is being conducted by the University of Minnesota in conjunction with the Minnesota Logger Education Program and the Minnesota Timber Producers Association to understand the current status of Minnesota's logging industry. The survey should take about 20 minutes to complete.

All responses will be kept confidential. Your participation in this survey is voluntary and you do not have to answer all the questions. However, you can help us a lot by sharing the information about your business. When complete, a report summarizing the results of the study will be available on the internet at MLEP.org.

If you have any questions about this study, please don't hesitate to contact me. If you have any concerns regarding this study and would like to talk to someone other than the researchers, contact the Research Subjects' Advocate Line, at D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Your participation is greatly appreciated!

Sincerely,

David Chura

Appendix 7. E-mail message sent to logging business owners to invite them to one of the focus groups.

You are one of a small group of loggers I am contacting to ask for your participation in a focus group on May [21 or 23] from 7:00PM - 8:30PM in [insert city] at the [insert facility] regarding the findings from the 2011 Logging Business Survey. The focus group will be facilitated by Charlie Blinn, Department of Forest Resources, University of Minnesota. The focus group will consist of 6 - 8 loggers.

Your input will assist us in better understanding the findings and allow us to explore some additional, related matters. Your participation in the focus group is voluntary. Please be assured that all focus group information will be kept confidential, and no information will be released that can be linked to you.

Participants will receive MLEP credit. Please confirm your participation by calling the MLEP office at (218) 722-5442 or via email (dchura@mlep.org) by May 17th. Thank you in advance for your willingness to assist with this effort. If you have any questions, please don't hesitate to contact me. If you would like to talk to someone other than the researchers, contact the Research Subjects' Advocate Line, at D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

Sincerely,

Dave Chura
Executive Director
Executive Director, Minnesota Logger Education Program
301 W 1st Street; Suite 510
Duluth, MN 55802
218.722.5442 tel
dchura@mlep.org

Appendix 8. Script which was read to participants before beginning each focus group.

Good morning/afternoon/evening (select one). I am Charlie Blinn with the Department of Forest Resources, University of Minnesota. Our 2011 survey of logging business owners provided significant insight into the current status of Minnesota's logging sector. It also raised some questions that we hope to get answered through a few focus groups scheduled with loggers and industry procurement staff.

Because you are a logging business owner (industry procurement forester), we believe that you have important insight which will help answer those questions. I am hoping that you are willing to provide your input for approximately the next ninety minutes through a focus group. In the focus group, I will ask questions and facilitate a discussion while Dave Chura from the Minnesota Logger Education Program and Tim O'Hara from Minnesota Forest Industries will record your comments on notebook paper. Please be assured that all focus group information will be kept confidential, and no information will be released that can be linked to you.

Your participation in the focus group is voluntary. If you don't wish to participate in the focus group, you can leave at any time.

Before we begin, does anyone have any questions?

Appendix 9. Focus group questions asked of logging business owners.

1. Do any of the survey findings surprise you? If so, what and why?

2. What should logging business owners do today to help ensure their success tomorrow?

3. What are the advantages and disadvantages of operating with older equipment? Given those disadvantages, why is equipment aging as compared to past surveys?

4. What are the three most important things which limit your ability to increase your production?

5. Consider each of the following three scenarios for Minnesota's logging business sector
    a. We will continue to have many small logging businesses which produce a relatively small percent of the total volume and few large businesses which produce a relatively large percent of the total volume (Status quo scenario)

    b. The number of and percent of total annual volume harvested by small producers will increase while the number of and percent of total annual volume harvested by large producers will decrease (Growth of smaller producers scenario)

    c. The number of and percent of total annual volume harvested by small producers will decrease while the number of and percent of total annual volume harvested by large producers will increase (Growth of larger producers scenario)

    - What are the pros and cons of each scenario?
    - Which scenario do you think is most and least likely? Why?
    - Are there any conditions (e.g., markets, stumpage availability, labor, equipment) which might lead us in one direction or another?
    - If Scenario "_____" is most likely, what new training might be needed to help logging businesses adapt?

6. How might the factors limiting the ability to increase production differ for someone producing up to 5,000 cords as compared to someone who produces more than 5,000 cords?

7. In which season(s) do you have the greatest potential to increase your production? For each season, what issues need to be addressed to help or allow you to increase your production?

8. What are three things each of the following organizations could do to help logging businesses thrive in Minnesota through the next 5 years?
   a. State DNR
   b. Counties
   c. Industry

9. Why would in-woods fuel consumption be higher for the highest volume producers?

10. What is a realistic miles per gallon rate for over-the-road fuel consumption?

11. Why would a higher percentage of respondents who produce more than 5,000 cords indicate that their profitability was better in 2011 vs 2008 as compared to respondents who produce up to 5,000 cords?

12. Why aren't more young people entering the logging business today?

13. How do you think the logging industry may change in the next five years? (Think about things such as the number of logging businesses, equipment used, characteristics of the people operating the businesses)

14. Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging business.

15. Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging industry.

16. Will you use the information collected from this survey? If so, how? If not, why?

17. How often should we conduct this survey?

Appendix 10. Focus group questions asked of industry procurement staff.

1. Did any of the survey findings surprise you? If so, what and why?

2. What should logging business owners do today to help ensure their success tomorrow.

3. Are you concerned that many of the existing logging businesses don't have a plan for passing the business on to another family member? If so, why might that be occurring and what are the implications?

4. What are the advantages and disadvantages of operating with older equipment? Given those disadvantages, why is equipment aging as compared to past surveys?

5. Consider each of the following three scenarios for Minnesota's logging business sector
   a. We will continue to have many small logging businesses which produce a relatively small percent of the total volume and few large businesses which produce a relatively large percent of the total volume (Status quo scenario)

   b. The number of and percent of total annual volume harvested by small producers will increase while the number of and percent of total annual volume harvested by large producers will decrease (Growth of smaller producers scenario)

   c. The number of and percent of total annual volume harvested by small producers will decrease while the number of and percent of total annual volume harvested by large producers will increase (Growth of larger producers scenario)

   - What are the pros and cons of each scenario?
   - Which scenario do you think is most and least likely? Why?
   - Are there any conditions (e.g., markets, stumpage availability, labor, equipment) which might lead us in one direction or another?
   - Is there additional training loggers will need to deal with current and future conditions in the industry?

6. Why aren't more young people entering the logging business today?

7. How do you think procurement may change in the next five years? (Think about things such as number of logging businesses, equipment used, characteristics of the people operating the businesses)

8. Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging business.

9. Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging industry.

10. How will you use the information collected from this survey to modify your procurement strategies?

11. How often should we conduct this survey?

12. What additional questions should we include on future surveys?

Appendix 11. Focus group responses by question and by type of respondent (logging business owner or industry).

Question: Did any of the survey findings surprise you? If so, what and why?

Logging business owner responses:

- Thought cut to length volume would have been higher.
- Large loggers harvest more. 38 harvest 65%, smaller harvest less.
- Surprised by smaller operations – they harvest such a small percentage of the total volume. Smaller loggers have more difficulty getting stumpage.
- Ainsworth had an impact on logging community in region. Especially smaller producers.
- Smaller loggers will more likely go out of business. Also they are doing some other work like farming, road work, etc. Some thought that this sector may hang on, because of diversity.
- Small producers may want to hang on for a few more years to pay more into Social Security.

Synthesis: The loss of mills, especially Ainsworth, has negatively impacted the logging community. The impact may be greatest on the smaller producers. While those smaller producers are more at risk or likely to go out of business, a number of them will continue their operations because of the diversity they provide to the industry (e.g., ability to harvest small tracts, ability to harvest during the winter) and because owners want log a few more years so that they can pay more into Social Security.

Industry responses:

- Increases in winter logging. Green foresters, delayed start dates on jobs. Less wood harvest in summer. Stocked piled wood agreements. Certification prefer winter harvest.
- Logger health, where is that coming from...regionalize by county?
- Family member, pass on equipment. Is that question misleading?
- Surprised about the number of loggers, 25% not being in business in five years. Reasons loggers aging, not encouraging relations to get into the business. Future of loggers in certain areas may be worse. Hard for them to get stumpage. Parents haven't encouraged next generation due to amount of work involved and poor profits.
- Responses range of production of loggers, surprised that some loggers were so great. Excess capacity number may assume year round stumpage availability. Winter volume 70% .
- Amount of contracts became less. Now dealing with larger loggers and less with small logger less than 5000 cords per year.
- Lost a lot of surge capacity, additional capacity would be summer capacity.
- Age of equipment. Loss of depreciation. Shows not having enough money to purchase new equipment. (Logging business name) is a good example.
- With fewer markets, loggers becoming more diversified. Road building, dirt work common.
- Trucking business is less. Hard to get trucks. Trying to find more back hauls with a payload, instead of driving empty.
- Average haul distance seemed right.
- No real surprises.
- Costs of parts, fuel, etc.
- Company has made adjustments, (mill name) does make adjustments yearly or more frequently.
- (Mill name) provides incremental increases more frequently, as opposed to large increases more occasionally.
- (Mill name) cords usage....small producers, all the way to large producers.

- Provide long term contracts.
- Number of loggers by production level (only wood delivered to Mill Name)
  - 3-5k or less
  - 6- 5-10k
  - 4-10-15k
  - 1-- 15-20k
  - 2 > 20k
- Just wood delivered to mill.
- Million cords of excess capacity.
- FRA supplier meeting in AL. Similar concerns about folks/relatives taking over or entering the business.
- Track size of harvest unit is smaller than expected.
- Old equipment running.
- Number of loggers providing a large amount of timber volume.
- Cut to length operations haven't caught on in MN as much as in WI.
- Amount of excess capacity loggers reported.
- WI more CTL systems. Usually owner operator, family. Two machines two operators.
- Not a lot of loggers coming in to business.

Synthesis: A few logging businesses harvest a large percentage of the annual production in Minnesota (mills more dependent on smaller, less diverse supplier base). There is a lot of excess capacity. Equipment is aging. As that equipment ages, businesses end up with a fully depreciated asset which makes it more difficult to have cash reserves to purchase new equipment.

Question: What should logging business owners do today to help ensure their success tomorrow?

Logging business owner responses:

- Log smarter instead of harder. Sort wood, buy cheaper timber or larger sales. Loss of small sawmills has hurt sorting market.
- Bottom line, need more markets, more FOB price.
- Leave business.
- How to leave the business.
- Younger loggers can't get into the business.
- Equipment was cheaper.
- Make smart, conscious decisions.
- There are no more corners for businesses to cut to make their business more efficient.

Synthesis: Logging businesses need to make smart, conscious decisions so they log smarter and not just harder. Some logging businesses will need to get out of logging to make the remaining logging industry more stable and viable for those who remain.

Industry responses:

- Better understanding of markets/niche markets. Need to evaluate entire business plan. Businesses need to continually improve. Need to improve business to lower costs.
- Successional planning for loggers. Younger loggers tend to define success differently than other loggers.

- Operating costs of equipment, is it really cheaper to run old equipment. How many loggers are being turned down for new purchases. Do long term agreements make loggers more successful in competing for loans?
- Vast majority of loggers do not have contracts. Memorandum of Agreement...Operates on a month to month contract.
- Need to diversify business, road building, farming, digging/installing septic systems or other trades. Need to keep employees on hand. Or risk of losing quality employees.
- Some need to improve on efficiencies. Some loggers are very efficient others are not very efficient. Loggers are generally not very receptive to advice. Hard to get them to change. Good employees lead to better efficiencies in the operation
- Good loggers are diversified. No longer does logging support a 12 month operation. More road building.
- Building relationships with procurement staff and agencies to show that you can harvest summer sales. Need good communication skills. Build trust with actions and trust with purchasers of harvested timber.
- Loggers need to better understand why foresters do what they do.
- Good business knowledge/takes more than a piece of equipment.
- Put the best operator on the best piece of machinery.
- Build relationships with foresters (ask how does this look, are you happy with my work, what could I do better?
- Support cut to length system, more costly but can operate more days out of the year.
- Survey showed cut to length will be in business longer.
- 70% of harvesting on (mill name) lands occurs during the summer.
- Healthy diverse stumpage markets.
- Good, experienced and reliable employees.
- Dependable equipment.
- Strong relationship/reputation with everyone (agencies, procurement, decision makers).
- Good business management skills.
- Logging professionalism, raise the bar. Learn business from all points of view.
- Need a good business plan that includes stumpage and availability in the areas they work.
- Very few sharp businessmen that know the true costs of logging and their revenues. Money in the checkbook.
- No stumpage availability plan.
- CTL operators appear to be better business operators.
- Review production metrics with loggers, cords per hour, skidding distance, fuel, etc.
- Foresters looks at logging metrics.
- Need to have access to more markets. More markets in the past lead to healthier logging community. Do not have as many places to market timber.
- Succession plans are important. Looked at 25 contractor and tiered them, may transition volume to other operators. Less than half do not have succession plans. Next generation may not be as active in the woods.
- Take the most healthy contractors and double the size of their business
- What role does the company play in keeping loggers successful. Finance equipment. Successful contractors are supported by mill. People want more and want to work less.

- Contracts are viable, long term, need that to get loans for equipment. Provide contracts that allow businesses to go to the bank and get a loan. Provide stumpage and fiber. Mills need to compete with the southern mills. Everything you suggest will add costs.

Synthesis: Businesses will need to a) diversify their operations (e.g., build roads, install septic systems) to keep their equipment operating and retain employees outside of winter, b) do a better job of marketing their wood to mills (e.g., develop niche markets, deliver to a diversity of stumpage markets), c) build strong relationships with industrial foresters to demonstrate that they can harvest summer sales and to learn how they can continuously improve their work, d) develop better communication skills with everyone (e.g., landowners, foresters, mills), e) develop better business management skills (e.g., develop a business plan that includes stumpage and availability, know more about income and expenses, determine equipment replacement schedules so that equipment remains dependable, identify ways to become more efficient), and f) develop succession plans which allow the business to be passed on to a family member or someone inside of the business.

Question: Are you concerned that many of the existing logging businesses don't have a plan for passing the business on to another family member? If so, why might that be occurring and what are the implications?

Industry responses:

- Aging business and no heirs a concern. (Logging business name) example of son not wanting the business although he works for him.
- A lot of businesses will go the route of (Logging business name), sold to an employee, where the owner assisted the employee who purchased the business. Some will just go out of business.
- Some employees may start own business.
- Younger businesses have little access to capital to own equipment and stumpage. Companies may finance equipment if forced into it.
- Mills won't help businesses finance equipment.
- It takes at least $1 million to start a business. There are better ways to invest that amount of money which will provide a higher rate of return with less risk .
- Risk with long term contracts. May be needed to get credit to purchase equipment.
- It is unknown how to get contracts or how to buy stumpage.
- Concerned that succession planning is not going on in this business.
- In many businesses, there is one individual who is key to the success of the business. Those businesses are one failed heartbeat away from losing the business.
- Family member does not guarantee good operations.
- Yes, they are concerned in the short-term. Concerned that family members are not entering. Family members familiar with business.
- There is a longer and steeper learning curve for someone outside to take over an existing business or to start a new business.
- Better paying jobs with better benefits elsewhere taking employees and family.
- High initial investment/payments on equipment.
- The market is shrinking, raising concern about future from potential new owners.
- Long hours of work.
- Industry is shrinking as well, seems logical that logging sector would shrink.
- What impact of less people taking over a business impacts.

- Short-term supply shortages.
- Mills more dependent on smaller, less diverse supplier base.
- Could lead to shrinking markets, could be long term production shortages from loggers.
- Summer shortages of timber supply with less logger base.
- Logging industry is more tied together now than in the past.

Synthesis: Yes, respondents are concerned that succession planning isn't occurring. But, as markets shrink, some attrition of businesses is to be expected. In many businesses, there is one key individual who is crucial to the entire operation. Losing that one individual could cause the business to fail. Passing a business to a family member doesn't guarantee that the business will remain healthy and financially viable. Because of the difficulty in maintaining a successful business and opportunities elsewhere which offer higher pay, better benefits and more steady work, some owners are not encouraging family members to become involved with the business. While transferring ownership to a family member may make sense, every family doesn't have a logical relative with the skills necessary to guarantee success of the business. Thus, there may be the need to consider transferring ownership to an employee who demonstrates those skills.

For someone who may want to enter the logging business, the start-up cost to begin the business is high, securing and maintaining a dependable labor force may be difficult, securing diverse and steady stumpage markets takes time, and there are better ways to invest those monies which will provide a higher rate of return with less risk

Question: What are the advantages and disadvantages of operating with older equipment? Given those disadvantages, why is equipment aging as compared to past surveys?

Logging business owner responses:

- Advantages of older, may be able to maintain and repair equipment. equipment is built better. A lot of reason is loggers trying to stay out of debt. Equipment runs longer.
- In the past loggers carried more debt.
- Advantage less repair work on equipment.
- Lot of loggers worried about markets, a lot of uncertainty.
- Easier to maintain.
- Some of the older stuff, is now becoming more difficult to repair.
- Newer equipment more difficult to repair and techs not able to keep up with technological changes.
- Cost of equipment has doubled in price.
- Disadvantage is break down more., not as user friendly takes more work to operate.
- Force into new equipment with depreciation laws.
- Used equipment is not worth anything.
- Equipment is aging, can't afford new equipment, markets are not available.
- Smaller loggers tend to use older equipment.
- Advantages – smaller payments, you can fix things yourself because the engines are simpler, if you don't have a market, the equipment can stay parked for a while because it is fully paid for, scared of equipment with the new emissions.

- Disadvantages – More down time, finding parts, hard to produce a lot of volume in a short period of time (weather may turn good for a short period of time) if you need to.
- Parts replacement is slow. You are lucky if you can get a replacement part the next day as the inventory of parts is smaller and may be farther away.

Synthesis: Some of the reasons that loggers may operate with older equipment include that older equipment is better built, it is easier to maintain and repair because the engines are simpler, and it lasts longer; loggers don't want to go into debt purchasing new equipment; loggers don't want to carry as much debt today as they did in the past; there is a lot of uncertainty among loggers today given the changing marketplace; smaller logging businesses tend to operate older equipment; you can afford to leave equipment idle for a while if you don't log year round or if you don't have sufficient markets; and owners are scared of equipment with the new emission standards.

Disadvantages of operating with older equipment include it breaks down more often and can become more difficult to repair, it isn't worth anything in the trade-in market so why trade it in, it is more difficult to find spare parts and they cost more, it is difficult to produce a lot of volume in a short period of time if you need to do so (e.g., good weather) and replacement parts take longer to obtain.

Disadvantages of newer equipment are that its cost has doubled in price and it is more difficult to repair, requiring technicians. As those technicians can't always keep up with the technological changes, they can't repair equipment sometimes.

Industry responses:

- More down time.
- Equipment is better today and can be held longer.
- Old equipment has higher costs of operation.
- Price of delivered product flat, equipment prices are escalating.
- Afraid of new technology.
- Tires, parts fuel and other variables increased dramatically.
- Not worried about tax benefits from depreciation to cover income.
- Tier 4 engines are more expensive to purchase, have lower fuel economy and require more maintenance.
- Equipment is getting better more reliability. May require less maintenance.
- Want equipment to be well maintained, especially with private landowners (maintain reputation).
- Some new machines being purchased.
- Price of cut to length systems are becoming very expensive
- Loggers are turning over equipment at a faster pace survey. Lend this to "taking" care of loggers, paying fair prices for delivered timber.
- General meetings management addresses the loggers. Top management recognizes the importance of loggers.
- Good business by loggers good spouse. Knowing how to manage production well. Some loggers more efficient than others.
- Maintenance and keeping machines more than one operator.
- Well maintained old equipment is more affordable to operate.
- Newer equipment provides higher depreciation, better for taxes.

- Old equipment needs to be maintained more.
- Less production, may not be able to meet mill production quotas, more down time.
- Employees not cutting trees and adding to production if higher down time.
- Slower production.
- May need to hire people to work on equipment.
- No capital available to reinvest in equipment. Return on investment is not there.
- How to help contractor work with financial community.
- Advantage reducing overall costs due to less capital investment.
- Breaking down/more down time.
- May not be able to fill contract with mills.
- More parts need to be replaced. Prices of parts have increased a great deal.
- Uncertainty about new equipment makes them not want to purchase it.
- Some indication over the past year that loggers are buying new equipment. Those buying equipment are better business operators. Most purchasing are conventional systems.

Synthesis: Disadvantages of operating with older equipment include increased down time to repair and maintain the machinery; because the machinery has more down time, it is less productive and thus it may be more difficult to fill contracts with mills; the cost of replacement parts has increased a lot; higher costs of operation; and employees aren't producing wood when the machine isn't operating.

Some of the reasons that loggers may operate with older equipment include equipment is built to last a long time; an owner isn't worried about the tax benefits provided by depreciation to reduce their income; you can reduce your overall costs due to having a lower capital investment; older equipment which is well-maintained is more affordable to operate; while it commonly is possible to fix a problem on an old machine, repairs to a new machine require calling in a repair person who may not be available for one or more days; delivered prices from mills have been relatively flat while the cost of new equipment has been rising; owners are afraid of the new technology on the new equipment; the new Tier 4 engines which became available in 2011 are more expensive to purchase, have lower fuel economy, their requirement for ultra-low sulfur diesel and low ash oil, and require more maintenance; a business may need to hire additional people to work on new equipment to keep it running; and there is a general uncertainty about the new equipment, making owners want to stick with their old equipment longer.

Some of the better business operators have been purchasing new equipment over the past year. The new equipment tends to be for conventional systems. Some of the reasons that loggers are purchasing new equipment include increased reliability with new equipment as it may require less maintenance; you want equipment to be well-maintained, especially working with private landowners, to maintain a good reputation; and newer equipment provides the ability to take depreciation on taxes, offsetting income.

Question: What are the three most important things which limit your ability to increase your production?

Logging business owner responses:

Focus Group A Top reasons

- Markets primary reason for not meeting capacity.
- Costs/paying overtime may be an issue.

- Many factors are not mutually exclusive. All timber sales are different.

Focus Group B Top reasons

- Market availability to sell wood.
- Weather second biggest issue, shut down operations if you rut area.
- People do other work in the summer, availability of labor.
- A lot of loggers do not work in the summer.
- Markets is the biggest reason.
- Summer wood availability is less.
- Wood quality/affordable stumpage.
- Pace of winter logging could not be sustained throughout the year. Number may be skewed if loggers could thought they could work other months at same pace.
- Winter months most loggers are at full capacity.
- Where did excess capacity come from...what region what counties.
- Weather.
- Availability of labor is also an issue.
- Too long of a haul. Transportation costs are an issue/wood closer to home near logger markets.
- Markets and economy are an issue.
- Weather related harvest.
- Profit margin not high enough.
- Markets are weak for certain species, balsam species worse. Biomass markets are now bad.
- Getting someone on-site to service equipment, 3 days to a week. Low parts inventory.
- Older equipment.
- Wood quality.
- Wood available, a lot of old blow down timber.
- Summer wood needs to become more available, public foresters easier to check box winter only.
- Sales should be marked contingent to the weather and operability.
- Efficiencies, preventative maintenance on a daily basis as well as at the end of winter is important, perhaps information on the importance of preventative maintenance. Better operations in the winter time, felling, skidding, hauling. Timing faller a week ahead of everyone else. If you are waiting for wood you are not efficient. Need to match site with equipment, wood needs to be in front of every piece of equipment. Roads need to be built before harvesting to allow it to settle (could do this during breakup in some areas). Start the freezing process early Match equipment to production so that no one waits for wood.
- Insurance of equipment. is it declining?
- Roads are put in by foresters may lead to better efficiencies, than loggers laying out roads. Tree length wood leads to better utilization. Remove slashing step.
- Grouping timber sales in one area. Agencies could assist in setting up larger timber sales larger sales and species match are important.

Synthesis: While many issues were reported, the top issues revolved around a) lack of markets where loggers can sell their wood, b) availability or stumpage that meets mills' quality specifications and is affordable (especially during the summer), and c) weather. Respondents generally didn't feel that they could expand their operations during the winter as they are already working at or near full capacity. Markets are currently weak for some species and the biomass markets are poor. Some logging businesses don't work in the summer because there is less available stumpage.

Scenario Considerations for Size of Logging Businesses in the Future

a) We will continue to have many small logging businesses which produce a relatively small percent of the total volume and few large businesses which produce a relatively large percent of the total volume (Status quo scenario)

b) The number of and percent of total annual volume harvested by small producers will increase while the number of and percent of total annual volume harvested by large producers will decrease (Growth of smaller producers scenario)

c) The number of and percent of total annual volume harvested by small producers will decrease while the number of and percent of total annual volume harvested by large producers will increase (Growth of larger producers scenario)

1. **What are the pros and cons of each scenario?**

Pros of A

Logging business owner response:

- Smaller loggers will harvest smaller sites profitably. Smaller operator may provide better product.

Industry responses:

- Any business can figure out how to survive. Differences in MN. Limits on sale to businesses by size. Restricting timber sales by size may impact loggers. Out west most of timber procurement purchased by mill. Small guys financially set. large consumer mill purchase tends to be from larger loggers.
- Middle group will continue to dip into the future. 5k-10k per year area where challenges appear to be greatest.
- With A you have you lowest cost wood. Unlikely to happen.
- Small logging businesses provide good access to small private landowners.
- Status quo works in the present time. Have enough timber to operate mill.
- It is nice to have a variety of producers who can work on a variety of sites.

Synthesis: By retaining a mix of small and large businesses, we will continue to be able to have producers who can work across a range of sites (e.g., small vs. large acreages, small vs. large volume tracts). The smaller logging businesses will be able to harvest the smaller sites more profitably, thus providing good access to stumpage from small private landowners. The cost of stumpage will be lowest when operating on those small private land holdings.

Cons of A

Logging business owner response:

- Less market access.

Industry responses:

- Smaller loggers have challenges. Over time will move to C. A will move closer to scenario C.
- Little loggers all over the place. Do not produce a lot of volume. Takes more time to manage.

Synthesis: It is more difficult to procure timber from many small producers.

Pros of B

Logging business owner responses:

- Even the playing field, wood buyer treat loggers equally.
- Access to small landowners and tracts. Wouldn't want small loggers to disappear. Areas with more private land holdings may retain a higher percentage of smaller businesses.

Synthesis: Wood buyers would need to treat all loggers more equally in terms of volume delivered and price paid/unit. We would continue to have capability to access small tracts of timber. In areas where there are many small private landowners, this may be a likely scenario. There would be more producers to choose from when procuring wood.

Cons of B

Logging business owner responses:

- More people to compete with at auctions.
- Need both larger loggers as well as small sales.

Industry responses:

- Trend is growing loggers, scenario b not likely to happen. Risks associated with all scenarios. Mills diversity in how they procure timber is better.
- Hassle of dealing with many small producers
- Smaller producers don't have access to bigger markets because they can't produce the volume needed.
- Growth towards smaller loggers would lead to a less reliable market, but would have more producers to choose from. Less reliable businesses. Older equipment which breaks down more. Tend to have fewer markets for off-species.

Synthesis: There will be more people competing at the auctions. It is more difficult to purchase timber from many small producers, who also tend to operate with older equipment which is more prone to breaking down, thus making procurement less reliable. That could negatively impact a mill's ability to operate. The smaller producers don't tend to have access to bigger markets or markets for off-species because they can't produce enough volume

Pros of C

Logging business owner responses:

- The chain of custody is simplified if you have fewer businesses (more larger businesses)
    - Companies take care of larger producers.

Industry responses:

- With C you have ease and control of management, but it is more costly.
- Big producers have more cash flow and thus more ability to go to a bank for a loan.
- Larger producers can put up a large amount of timber in a short period of time.

Synthesis: It is easier to control and track procurement through fewer large producers. Mills are more likely to take care of fewer large producers through better contracts than they are small producers. Those large producers have an easier time getting a loan from the bank to help purchase new equipment and can harvest a relatively large volume of timber in a short period of time , if it is needed by a mill.

Cons of C

Logging business owner responses:

- Not enough wood to grow larger producers.
- Mills will favor larger producers
- Mills do not want all larger producers
- Costs of stumpage.
- Concern about a few businesses running the show.

Industry responses:

- Larger loggers may lead to more expensive stumpage, especially on higher quality sales and summer timber.
- Harder for large producers to operate small tracts, especially when weather is adverse and they need to keep operating.

Synthesis: As the volume of wood harvested in Minnesota continues to decline, there isn't enough wood to continue growing the large producers. While mills prefer to work with large producers, they don't want to end up in a situation where they have few suppliers as they might lose control of the supply chain or a hardship faced by one logging business could have a large impact on procurement. Stumpage costs would tend to rise, especially on better tracts and summer stumpage. It is more difficult for larger businesses to operate on smaller tracts.

1. **Which scenario do you think is most and least likely? Why?**

Logging business owner responses:

- More bigger loggers and less smaller loggers
- Medium size loggers will move to become larger loggers
- Status quo will be the norm as we move forward.
- No need to get larger.
- More likely to have larger producers and fewer smaller producers.
- There will be fewer logging jobs if we lose the smaller producers. There won't be anyone around to purchase used equipment if the smaller businesses disappear.

Synthesis: During the focus groups, the one dominated by smaller logging businesses tended to think that we would tend to maintain status quo (Scenario A) as we didn't need to get more bigger operations. In contrast, the focus groups that was dominated by larger businesses needed to think that there would be a growth of larger businesses (Scenario C). Thus, each size producer saw benefits of their firm size and tended to appreciate less the benefits provided by businesses at the other extreme of production.

Industry responses:

- A most likely
- A most likely
- Smaller loggers will drop out of business. one opinion. Likely loose loggers across the population.
- Have a good mixture of all.
- Scenario C would not be favored.
- A - Status quo scenario is favored. Larger users are more dependent on large producers that operate seasonally, can produce a lot of timber in a short period of time.

- Likely trend to scenario C. Larger producers will grow.
- Likely future is heading towards C with a combination of status quo.

Synthesis: While Scenario A was identified as being most likely (maintain status quo), some felt that we would continue to see more growth of the large producers.

1. **Are there any conditions (e.g., markets, stumpage availability, labor, equipment) which might lead us in one direction or another?**

Logging business owner responses:

- Scenario depends on the market.
- How do you become larger without markets.
- It is difficult for larger producers to maintain their level of production due to the high cost of equipment.
- It is easier to sell used equipment with up to 8,000 hours on it as the reliability decreases.

Synthesis: Our direction will largely be determined by markets and equipment. If we continue to lose markets and/or as markets downsize, it will become easier for smaller producers to exist. The high cost of owning and operating equipment may make it difficult for larger producers to maintain their level of production.

Industry responses:

- Provide a market for all. Do not make decisions to favor size. Need timber availability throughout the year. Let science take over not dates on calendar. A lot of small operators just harvest in the winter as they do other things during the summer (e.g., farm) or can't afford summer stumpage.
- Age of equipment in smaller owners
- Production rate of cutting, need higher quality timber. Seasonality is a larger problem in the I-Falls area. Timber quality is an issue. Need to look at better tracts of wood. Larger harvest units. Dead tamarack won't sell.
- Will large mills differ from smaller mills on scenarios. Agencies selling timber moving to sealed bids has had an opposite effect on bidding. Agencies need to put up better timber.
- On the ag fringe it may be different smaller loggers may be located. Geography may be located.
- Look at regions and compare larger versus smaller loggers.
- Markets will dictate the size and number of loggers. If paper mills continue to shutdown loggers will lose markets.
- Need more markets while retaining existing markets.
- Equipment has allowed producers to become more efficient.
- (Mill name) looks at production capabilities of each producer, attempt to encourage producers to incrementally increase timber harvest with existing equipment.
- With CTL, you don't have to worry as much about weather or need a lot of employees.
- Individual track available to market...need for smaller business to manage NIPF land.
- NIPF lands come more into the picture smaller loggers may grow or at least maintain.
- Do we have more bigger producers, do small guys just become sub-contractors.
- Stumpage prices are important drivers.
- Smaller loggers do not have the staff to keep up with stumpage and may go to subcontracting.
- Access to capital is very difficult.

- Bankers don't know/understand the logging industry because of changes within their (bank) ownership -- introduction to logging industry workshops.
- What will happen to mid-sized loggers. They tend to either increase in size or to downsize/go out of business
- CTL operators breakdown by controlled timber?
- Better jobs that smaller loggers may move to, rather work in the mines with secure benefits and wages.

Synthesis: The response to this question may vary by mill size as smaller mills may prefer either Scenario A or B while larger mills may prefer Scenario A or C. The answer also varied based on location in the state. In areas closer to the forest/agriculture transition zone, there may be a preference for smaller loggers who only harvest timber during the winter and farm at other times. Similarly, in areas where there are more small private landholdings, we will tend to see smaller operators. In northeast Minnesota, the preference might be for more year-round operations (Scenario C). The size of markets will dictate directions as the loss of more paper mills will tend to eliminate many small loggers who have few markets. Smaller logging businesses will be attracted by the mining industry where wages are higher and benefits are secure. Smaller logging businesses who won't be able to procure sufficient stumpage may subcontract with a larger business.

1. **If Scenario "_____" is most likely, what new training might be needed to help logging businesses adapt?**

   <u>Logging business owner responses:</u>

- How to go through a buyout.
- Estate and succession planning.
- Retirement planning.
- Need a business plan, understand markets and how successful businesses tie together their stumpage procurement with markets. Know your numbers, species, volumes and markets for your species. Good bookkeepers like a spouse.
- Loggers that are doing well tend to be better salesmen and build better relationships.
- Would not likely to extend contracts to a year, too much uncertainty.

Synthesis: Logging businesses will need training related to business planning for continued operations as well as transitioning from the business to the next phase of life. Business planning, includes understanding markets and how successful businesses tie together their stumpage procurement with markets (i.e., knowing species, volumes and markets for your species and how profit varies by tract characteristics). Having a good bookkeeper is important. Transitioning education would include how to transfer the business to a relative or employee, estate planning, and retirement planning.

1. **Is there additional training loggers will need to deal with current and future conditions in the industry?**

   <u>Industry responses:</u>

- Need more education on road conditions.
- Need more emphasis on permanent road building.
- Marketing other products. Smaller loggers tend to manage by "checkbook."
- Successional planning of business.

- Employees need to be brought up in hope of running business. Role of community colleges in putting out folks in jobs in the woods. Competition with mines and other manufacturing sectors, mining, oil, etc.
- Folks 5-15k are likely the most efficient, operating in range that suits their individual economy of scales. May be more profitable.
- Additional training needs for loggers. employee shortage, more recruiting of logging force. Trucking is an issue. A lot of trucks sit for 5 months out of the year. Training opportunities for agencies. Coordinate field tour of new foresters. Procurement class, field visit.
- Arrange a field trip with new DNR foresters. New timber sale up, financial impact. Timber sale design. VonGroven site visits. St. Paul requirement that a DNR employee to go through a certain training.
- Loggers need additional business management skills to become and remain successful.
- Loggers need to track their costs. Business specific costs.
- Successful loggers have accountants, how to spend more money to improve business.
- Business training is important. Banks/equipment purchasing and financing, communications/relationship building and maintenance.

Synthesis: Loggers will need training about road building and maintenance, marketing (e.g., what are potential markets, how to find them, what markets are looking for), successional planning of a business or transferring the business to an employee, business management (including tracking costs), communicating/relationship building with lenders and mills. Outside of the scope of this question, it was recommended that agency foresters need to be better connected to product markets/mills to enhance their understanding of wood quality needs within the marketplace.

Question: How might the factors limiting the ability to increase production differ for someone producing up to 5,000 cords as compared to someone who produces more than 5,000 cords?

Logging business owner responses:

- Smaller producers are challenged by averaging costs. Not as many sales to operate in. Private landowners are seeing public stumpage prices and expect that on their property as well.
- More fragmentation in private landownership makes it tougher for many larger producers to access that landownership.
- Cut to length systems are better suited to harvest smaller sales.
- Higher volume producers may have difficulty getting markets for timber.
- Mix of species, aspen markets up and down. Steadier markets.
- Equipment availability, and operability.

Synthesis: Smaller producers will continue to have an advantage accessing small private landowner stumpage because many of those businesses are not capable of harvesting larger tracts. However, operating on those ownerships has its own set of problems. For example, those landowners expect to receive stumpage prices comparable to sales on public lands where there may be more bidding competition, more volume being offered for sale, more sale design work already done by the forester (e.g., boundary marking, contract preparation, identification of forest management guidelines for the site), etc. accomplished by the agency. Also, the average cost/unit of production for operating on small tracts is

generally higher as fixed costs are spread across fewer units produced. The net effect is that profit margins may be lower for smaller businesses. A higher volume producer needs to have access to multiple markets to sell their wood.

Question: In which season(s) do you have the greatest potential to increase your production?

Logging business owner responses:

- Summer and fall is the greatest potential to increase harvest levels. Summer has more potential, longer days drier.
- Increase volume in winter months more likely.
- Good winters better to ramp up production.
- Not enough summer wood, species markets.
- If guaranteed markets more wood could be harvested in summer and winter.
- Unstable markets.
- Winter harvests are more productive, also work 6-7 days a week, summer may work less days.
- A lot of mills take timber in the winter. A lot of mills harvest majority of timber in winter.
- Markets are main reason to increase winter.

Synthesis: Larger volume producers tended to suggest that they had the greatest potential to increase their production during the summer and fall. For those businesses, they are already operating near capacity during the winter. But, stumpage availability and access to markets during the summer limit their operations. Smaller volume producers, who tend to only harvest during the winter, felt that they had more potential to increase their production during the winter. Regardless of their annual production level, several respondents noted that markets were more limiting during the summer.

Question: For each season, what issues need to be addressed to help or allow you to increase your production?

Logging business owner responses:

- Lack of summer roads limits access to some summer wood.
- Availability of summer stumpage is critical to increase. Road building is necessary to increase summer wood access. More permanent roads are needed.
- Flexibility of agency foresters is important to increase summer harvest.
- Summer timber is more expensive and low supply has been offered.
- Price of summer wood is too high.

Synthesis: Better roads are needed to provide access to summer wood. Because of the limited amount of summer stumpage offered for sale, it is expensive. Foresters need to be more flexible when setting up sales to offer more summer chance stumpage.

Question: What are three things each of the following organizations could do to help logging businesses thrive in Minnesota through the next 5 years?

1. **State DNR/Counties**

Logging business owner responses:

- More summer timber, language in contracts, put up more timber on the market, especially counties. Give foresters the flexibility to make decisions on a case-by-case basis. More realistic

(shorter) rotations so that the wood doesn't become overmature. Don't offer poor quality wood for sale (walk away from those tracts).

- Agencies put up more wood.
- More summer wood.
- Less restrictions.
- State needs more common sense, (county name) is becoming difficult to work with.
- Make more wood available.
  - Public agencies need to offer more timber.
  - Improve quality wood, set up 50 year old wood, less 80 year old wood.
  - Do a better job maintaining roads, offer more summer wood for sale, build more roads to provide summer access to timber, increase wood quality. There is enough winter wood available now.

Synthesis: Agencies need to offer more wood for sale, especially during the summer; their wood needs to be higher quality than in the past as markets are demanding higher quality, younger (less rot) wood; foresters need more flexibility to be able to offer more summer chance tracts for sale; and sales should have fewer restrictions.

1. **Industry**

<u>Logging business owner responses:</u>

- Market prices.
- Industry should buy more wood and make it available to loggers.
- Don't bid against loggers at timber sales
- Certification is a big issue, get rid of certification.
- Improved prices for timber.
- Provide more markets for off-species (species other than aspen and spruce)

Synthesis: Stop bidding against loggers at auctions, buy more wood and make it available to loggers as stumpage that they (industry) control, pay more for delivered wood, eliminate certification, and create more markets for species other than aspen and spruce.

Question: Why would in-woods fuel consumption be higher for the highest volume producers?

<u>Logging business owner responses:</u>

- Size of machinery uses more gas than smaller machinery. Newer machinery burns more fuel. Bigger operators tend to have bigger machines.
- Emission controls reduce gas mileage by 50% in some cases.
- Some focus groups use more fuel than most, smaller users tend to use less.
- Skidding further and not building as much road.
- Cut to length equipment will save about 30% in fuel usage.
- String of pearls sale on (County Name) property?
- Fuel is worse these days.
- High volume producers have more equipment per unit of production than smaller producers.
- High volume producers have bigger equipment which uses more fuel.
- Loss of control. The larger the business, the more you lose control of what everyone is doing.

- Larger businesses tend to have newer equipment which tends to have worse fuel economy due to newer emission standards.
- Larger businesses tend to operate on larger tracts which also have longer skid distances.

Synthesis: As compared to smaller businesses, larger volume producers a) generally have newer, larger, more powerful equipment which tends to have reduced fuel economy due to newer emission standards, b) have more equipment per unit of production, c) tend to build less road distance within tracts and operate on larger tracts which require longer skid distances, and d) can lose control of what operators are doing across a site.

Question: What is a realistic miles per gallon rate for over-the-road fuel consumption?

Logging business owner responses:

- 4.1 miles per gallon...5.5 MPG, center mounts averaged 4 MPG. 4.7 MPG, down to 4.2. different fuel may be an issue.
- 5 miles per gallon over the road, good average year round.
- Newer trucking equipment uses more fuel.
- 50% of pay goes to fuel usage.
- 4 – 6 mpg.
- There is lower fuel mileage with newer trucks due to emission standards.
- With newer over-the-road equipment, it is more difficult to maintain and repair the truck yourself

Synthesis: The range was 4 - 6 miles per gallon. Trucks with a center mounted loader tended to have fuel economy on the low end of that range.

Question: Why would a higher percentage of respondents who produce more than 5,000 cords indicate that their profitability was better in 2011 vs 2008 as compared to respondents who produce up to 5,000 cords?

Logging business owner responses:

- Question may be slightly misleading, businesses were doing better when more mills were here.
- Some thinking that larger producers were not better off, just reported that they were.
- Large producers get better prices, smaller loggers get less of a price. Disparity of mills depending on size of operation.
- Larger loggers are more efficient operators.
- Larger loggers retain employees save time and keep high levels of production.
- Folks with larger amount of timber purchased are older and will be getting out of business and/or retiring.
- When someone else (a mill) buys the wood for a business, you can keep your production busy, save time. Don't have to average costs over sales, get the same amount per cord and do not have dollars invested in timber.

Synthesis: As compared to smaller producers, larger producers a) receive a higher price per cord (unit) of material that they deliver to mills, b) are more efficient in their operations, c) are better able to retain their employees, facilitating higher levels of production, and d) are more likely to have established a relationship with a mill that purchases some of the logging business' stumpage that they harvest, saving the business time and having to invest in purchasing and holding stumpage.

Question: Why aren't more young people entering the logging business today?

Logging business owner responses:

- Attempting to get a contract is difficult.
- Cost to get into business is too great.
- Cost of equipment is a huge barrier to entry.
- Work ethic is not as strong, system is loaded against starting small loggers, can't start small to get into business.
- Procurement do not want to deal with a lot of loggers.
- Mills do not want to deal with a large amount of timber suppliers.
- Certification may be an issue.
- Other opportunities for employment.

Synthesis: There is no single reason why young people aren't entering the logging business today. Reasons cited included a poor work ethic of young people, the cost to get into the business/purchase equipment is too great, unlike in the past where you might be able to start small and expand a business over time that is difficult to do today because a new business is unlikely to get a good contract from a mill as a starting business, mills don't want to have more suppliers to deal with, the rules associated with certification discourage entry, and there are other opportunities for employment which require less strenuous work and which provide a higher salary and more benefits.

Industry responses:

- Think there are a lot of young people in the business, less than 30 years. Some barriers to success, may be opportunity for trucking. Loggers entering the business as employees. Are not capable of becoming a logger, main barrier is cost of equipment.
- Longer term business relationships are better for business on both sides. Risk with new business agreements.
- Should we be looking at assisting loggers to get into business? Hard to get in to logging business. "dirt working" business to logger example. Private leads on timber assists. The best way to maintain business is to keep the ones you have. Succession or selling a business.
- Will not finance loggers to get into the business. Loggers procuring timber from private sources of stumpage may get opportunity to harvest.
- Innovative business plans. Best way to keep logging businesses are to sell business to an employee or other individual. Barrier for new loggers are too great to overcome.
- Contracts not difficult to get a contract from (Mill name).
- Some mills depend on primary producers.
- Borrowing capital is difficult. Need large amount money to start a business.
- Youth is unwilling to work as hard as past folks.
- One can receive a decent amount of money on unemployment, thus why work.
- Who does a young person contact to make decisions on whether or not to get in to logging business.
- Will be dealing with fewer producers in the future. The future will hold more larger suppliers and less loggers. Large loggers are dependable and follow through on commitments. Larger 20,000 cords or more.
- Trucking is an issue in MN.
- Losing people to better paying jobs in the mines/Dakotas.

- Lack of money (profit, capital required).
- Hard work.
- Lack of benefits.
- Try to backhaul, finding them for truckers.
- Openings at mines will draw away better employees.
- Banking industry needs to get a better understanding of logging businesses (go to auctions to see what it takes to run a logging business).
- There is a negative perception about logging. Need to change sentiment of folks and perception.
- Poor work attitude/ethic of younger people.
- Young people don't even know that this is an opportunity (lack of awareness). Need more outreach into schools.
- Competing with the social system where unemployment pays enough and you don't have to work (If you can get unemployment, why work, even if it is slightly less money).
- Very few loggers have family members that work for them.
- Wood procurement would definitely be hurt.
- If company does find the right operator and business succession they would assist in helping the transition occur. Extended contracts, etc.

Synthesis: There are many reasons why young people aren't entering the logging business. Reasons cited included a poor work attitude and ethic of young people, the cost to get into the business/purchase equipment/borrow capital is too great, the profit margin is too low for the amount of work and risk involved, there are other opportunities for employment which require less strenuous work and which provide a higher salary and more benefits (e.g., working in the mines in Minnesota or trucking in North Dakota), unemployment benefits which don't require one to work are nearly as high as what they would receive by working, most mills will not help finance anyone that they are not familiar with, and there is a negative perception about logging.

Question: How do you think the logging industry may change in the next five years? (Think about things such as number of logging businesses, equipment used, characteristics of the people operating the businesses.)

Logging business owner responses:

- Fewer loggers in 5 years/fewer businesses.
- Less mills.
- Too many loggers, will lose logging businesses.
- Employees will move to mines.
- Harder to find better employees.
- Less interest in new businesses start-ups.
- Older equipment and people.
- Not many new faces.
- Fewer operators. No real equipment changes.
- More CTL and chippers.

Synthesis: In the next five years, there will be fewer logging businesses due to employees going to work in the mines, difficulty in finding good employees, little interest in starting a new logging business, and the workforce and logging equipment will continue to age. There won't be any significant changes in equipment. There will be more businesses which use CTL and there will be more chippers.

Question: How do you think procurement may change in the next five years? (Think about things such as number of logging businesses, equipment used, characteristics of the people operating the businesses.)

Industry responses:

- Mill needs will be the dictator on procurement changes, market driven. Equipment looked old, aging equipment will become an issue. People will keep equipment longer. Equipment runs better and longer, will not be an issue if it gets older. Raw material supply needs to be there and loggers will survive. Example of Canadian market failure due to government supporting logger operations. Again training new public foresters. Workshop just for the new forester, introduction to the forest products industry. New employees.
- What makes a business successful is good dedicated employees. Good employer is also essential. Fairness of employer, benefits, etc.
- Will be competing against the growth of biomass markets.
- Rising fuel costs. Will we become more of a regional economy?
- Will need to develop new relationships. Need to move some open market producers to a higher status.
- Procurement strategy depends on species. Use black spruce, will go a good distance including Canada to harvest spruce.
- As we lose loggers we will be active to replace them, (mill name) focuses on summer wood and fresh wood.
- Contract 100 percent with full time loggers.
- More and more mills close harder to keep logging industry healthy.
- Not surprised by distance of travel to transport timber.
- Realize that you won't be able to save all businesses.
- Need to take care of the logging businesses in your area (keep them healthy).
- If more summer wood does not become available loggers may need to stockpile more wood. Agencies should have as many bidders at the table. Will industry buy more timber? More purchased wood could allow more investments in loggers.
- Anomaly of larger amount of purchased timber did better in 2011 but less expect to be in business in 5 years.
- Smaller loggers are more optimistic about business future.

Synthesis: Because procurement needs vary by mill, their response also varies. As fuel costs rise, more biomass-using markets/facilities will emerge, increasing competition for wood. As logging businesses leave the industry, they will have to be replaced. That will require developing new relationships, encouraging some businesses to move from being open market producers to a higher status, and focusing on businesses which can meet mill requirements (e.g., season of harvest, ability to supply fresh wood). Procurement strategies will differ by species. For example, for black spruce, mills may go to Canada to get wood. Some mills may increase their focus on full-time loggers. Procurement foresters need to accept that some logging businesses will fail over time and that they need to focus their procurement on key businesses in their area that they want to help keep viable and healthy.

Question: Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging business.

Logging business owner responses:

- Survival need good maintenance, need to watch debt.
- Need to keep good records of cash flow, use Quickbooks.
- Need to know where you make money.
- Primary mill tend to take care of logging business. Not as profitable/but more security.
- Profitability.
- Has a steady market so you can afford to purchase stumpage.
- Has good employees.
- Year-round markets.
- Enjoys the lifestyle and wants to make the business work.
- Steady markets.

Synthesis: Key factors include being able to track cash flows (good business records) and use that information in decision-making so they can focus on harvesting tracts that have the best profit potential, maintaining a profit, good maintenance of equipment, steady markets that are available when the business is logging, and retaining a good employee base.

Industry responses:

- Optimistic, better handle on financial costs, knowledge of markets, different market sources. build relationships with public agencies.
- Maintain a good healthy logging force. Markets needed place to sell wood, reliable dependable supply of timber. May need to extend contracts term for harvest, 3-5 years better. 2 year contracts are difficult to work with minimum of three years.
- Healthy business have ability to build relationships with a wood buyer, seller, they have a good business sense/skills, and strong work hard.
- Accept/adopt new technologies (e.g., adding a 6^{th} axle).
- Loggers need to be efficient with equipment, money and people. Invest resources back into equipment.
- Loggers should vary markets and have more than one market.
- Procurement assists loggers in finding new markets for species, encourage sorting to other mills.
- Merchandise your products to highest value.
- Need to accept and utilize new technology (e.g., GPS).
- If loggers respect industry they will manage the land better.
- Able to recognize and produce other products (higher value products).
- Some loggers are good at sorting others are not.
- Understand forestry/respect the land.
- Being productive. Have safe employees.
- Purchase affordable equipment and purchase reasonably priced stumpage.
- Consistent/diverse markets for forest products. Look at mills and products and negotiate a contract to deliver timber.
- Good business skills and a desire to continuously improve their operations.
- Loggers may need to sort more, bolts to sawmills, firewood, etc.
- Where markets collapse businesses will begin to fail. Some will exit.
- Loggers need to consider how to exit the business.

- Diversify markets. Do not get tied up in one company, diversify services.
- Stay educated - technology, forestry, business management.
- Need to better understand how costs influence the bottom line.
- Plan your sales to minimize move costs, maximize the volume to most profitable markets. Know your costs. Need for a good business manager, do research on purchasing equipment. Talk to other loggers about equipment. Preventative maintenance. Loggers on a logger tour, business operations are different.
- Tough business.

Synthesis: Logging is a tough business. Key factors include having a good business manager who can maintain good business records and an owner who will use that information in decision-making; maintaining a profit; conduct preventative maintenance of equipment, steady/consistent/diverse markets that are available when the business is operating; ability to merchandise products to their highest value; plan sales to minimize move costs; building relationships with public agencies and mills; strong work ethic; ability to work efficiently with their equipment, money, and employees; ability to evaluate equipment options, to purchase affordable equipment and to purchase reasonably priced stumpage; interest in accepting and adopting new technologies (e.g., adding a sixth axle, GPS) and in being well-educated; and retaining a good employee base that operates safely.

Question: Describe the factors which you think lead to (or the characteristics of) a successful/healthy logging industry.

Logging business owner responses:

- If mills are profitable then loggers will be successful. World economy has hurt locally.
- Global economy.
- Need good industry managers.
- Having a positive attitude/image. Build good relationships.
- Wood availability and markets.
- Better foresters to work with, most new foresters are difficult to work with.
- Steady wood supply is provided.
- Stable markets are available.
- Less technology is built into equipment, making it easier to maintain and operate.
- Less environmental regulations and standards (such as fuel emissions).
- Seeing more tourism and recreational vehicles than logging trucks.

Synthesis: Maintaining the health of the mills/markets and mill managers so that markets and wood supplies are stable, having and projecting a positive attitude/image, building good relationships, having better foresters to work with (less difficult to work with), equipment that doesn't have so much technology built into it so that it is easier to operate and maintain, and having fewer environmental regulations to deal with.

Industry responses:

- Access to markets and products, ample supply of timber and markets. Concern about the supply of timber. Policies that increase cost or limit land management. Public land management historically because of lack of public timber supply.
- Need to train new foresters. loggers are buying out of state equipment.

- Summer wood is worth more than winter wood.
- Logging industry crashes after mills collapse. Mills collapse because they can't get wood at a reasonable price.
- Need to do all the little things right to be successful. Took specific topic and review. Skid with tops on landing. Other types of operations.
- Need more markets and market growth.
- Loggers need markets.
- If industry is in good health loggers will be in good health.
- Testing head on CTL to process basswood.
- Agencies need to better understand the wood that mills need to make their products.
- Need healthy mills/markets.
- More level fuel prices.
- Continue to work with young loggers.
- Paper markets will continue to decline.
- Training needs...sorting matters.
- Consistent and diverse markets needed for healthy sector.
- Increase prices of equipment, fuel, railroad, parts.

Synthesis: Maintaining the health of mills/markets, having access to an ample supply of affordable and quality timber, identifying and addressing policies that increase cost or limit land management, better training for new foresters, fuel prices which are more level, and work with young loggers to encourage them to stay in the business.

Question: Will you use the information collected from this survey? If so, how? If not, why?

Logging business owner responses:

- Survey helps compare your business with the average.
- Information is useful.
- Local mill managers are concerned. Corporation may not be so concerned about the mill or impacts to loggers.
- Contracts mean absolutely nothing, wood agreements.
- Loggers cannot sell contracts.
- Provides information on how people compare.
- Understand that things won't get better soon. There is no light at the end of the tunnel.
- It is good to know that everyone else is in the same boat/predicament.
- Not sure that they want to pass the business on to their children.
- Will share the information with local legislators.
- The value of the survey is largely to the mills, not to logging businesses.
- The DNR and counties should be worried.

Synthesis: The information is useful because it allows a business to compare itself to other businesses, it helps them see that others are in a similar situation and that there may not be a light at the end of the tunnel to indicate that things are getting better, it provides information that they can share with their local legislators, it helps them see that they may not want to pass their business along to their children, and public agencies should be worried. One respondent felt that the information is not useful and is only useful to mills.

Question: How will you use the information collected from this survey to modify your procurement strategies?

Industry responses:

- Survey trends not surprising. Did not tell us anything we did not know. Species, markets and consumption drives markets. Will use survey findings in working with budget. and dealing with mill on logger costs.
- Will help maintain status quo of logging industry. and provide awareness to upper management.
- Solidify approach to procurement, buy from all loggers.
- Feel we are addressing this issue.
- Forest management group will use slides to help in improving business for loggers.
- Planning tool. Validates assumptions. While it reinforces some things they already knew, it is good to receive the information from an outside source as it is easier for management to believe a study like this than one conducted by the mill.
- The more management can understand the issues that their suppliers face, the better they can work with them and manage relationships with them.
- Goal is to bring raw materials at lowest price.
- Survey is worth doing, good planning tool for company.
- Help prepare for the future, realize suppliers will be less in the future.
- (Mill name) procurement software makes it easy to track timber.
- Learned about equipment age.
- Gives them fewer options for buying wood.
- Reinforced what they already knew.

Synthesis: While the survey is worth doing and it is a good planning tool for the company, it largely confirmed what mill procurement staff already knew. But, because it was done by entities from the outside, procurement managers can make mill management aware of the status of the logging industry. Because of their existing awareness of the status of the logging industry, mills are already doing something to help loggers. The survey results reinforced a company's approach to procurement, buying wood from all loggers.

Question: How often should we conduct this survey?

Logging business owner responses:

- Things change quickly...need to do survey 3-5-years.
- Every 5 years conduct study.
- Since 2011 logging industry has gotten worse.
- Every 5 years.

Synthesis: Every 3 - 5 years

Industry responses:

- Every 3-5 years.
- Every 3-5 years.
- Every 3-5 years.
- 5 years - appear markets will be stable for next 5 years.

Synthesis: Every 3 - 5 years.

Question: What additional questions should we ask on future surveys?

Industry responses:

- Biomass markets fuels plants, biodiesel.
- Benefit of training program to transition a business to a family member or employee or other possible purchaser.
- Fuel consumption usage right on.
- Stumpage availability.
- Manage relationship to costs of logger to end product.
- Do you have a Succession plan?
- Quantify how much timber increases in the future, range of choices.
- Land in the south is more privately owned.
- Average haul distance is greater...working on getting timber closer to mill.
- More guideline restrictions.

Synthesis: A variety of ideas were identified with no central themes.

Appendix 12. Listing of "Other" responses submitted by 37 respondents indicating major issues facing the future of their logging business (Question 29)

- stumpage volumes per sale on public land
- Difficulty obtaining permission to construct roads in wet areas
- Combined wood producing enterprises bidding up stumpage beyond reach of others by having a better deal with mills because of the volume they can produce.
- difficulty to get timber to cut
- trucking prices
- road restrictions
- cost of everything
- need more summer sale offerings - too much competition here - not making enough $ to log only 6-7 most of year.
- fuel
- trucking
- to be able to provide med ins for employee
- Mills will not buy private uncertified wood
- loggers will not sell us logs (comment provided by someone associated with a sawmill)
- state will not sell required timber for our sawmill
- disease in timber
- # of mills operating
- season of operation
- regulations on harvesting
- parts
- my age
- tired of all the hassle
- tired of working
- DNR, Counties, mills & Industrial Landowners paying FSC & SFI money that should be paid to us for producing wood! They produce nothing! Too many leeches living off our productivity!! See add'l 2 page note.
- lack of summer operations
- new foresters w/no summer cut ideas
- difficulty working with MN-DNR new foresters.
- DNR not listening to loggers input on sale access, operational dates & use of common sense in operating on sales.
- DNR lands turned over to county for better mgmt & more revenue for schools & counties.
- mill taking on new loggers
- parts availability for old machines
- technical support for CTL machines
- credit/banking
- availability of good, not worn out, used equipment
- independent truckers
- fuel prices
- quality of stumpage offered by public agencies
- location of stumpage offered by public agencies
- fuel costs
- summer stumpage
- forester willing to work w/loggers
- better on different sites
- fuel cost

- lack of markets
- fuel price
- mills competing for same stumpage
- shorten breakup
- foresters controlling your costs - need to get it under control!
- Summer access, poor markets
- Govt red tape & rules
- Guidelines
- new foresters arrogance, no common sense, not knowledgeable about how to work with loggers
- fuel alone
- DOT rules & harassment
- Truck weight limits
- Loss of mills & markets
- cost to join MLEP doesn't give value added product/another reason to quit
- bank willing to loan $
- fuel prices killer

Appendix 13. Listing of "Other" responses submitted by respondents indicating training topics for owners and employees (Question 31)

Owner comments (6 comments provided by 6 respondents)

- other employment opportunities
- cut down on regs/fees every time we turn around
- DOT
- help in lending practices from banking community
- grants
- info for smaller logger

Employees (3 comments provided by 2 respondents)

- DOT
- Cut-to-length (CTL) operator training
- Forwarder operator training

Appendix 14. Listing of open-ended comments (Question 32), arranged by theme. Where a respondent provided multiple thoughts in their comments, each portion of their insight is reported in the appropriate theme

Difficulties maintaining profitability

- Should put us all in the nuthouse for even trying!
- Very tough business if you're not efficient.
- Forced out of business.
- Fuel costs are killing everybody - and rising costs of parts & new machines vs price of wood -- way too cheap.
- There is no money in this business. It appears too risky to even update equipment. I look at other companies that are older and they do not seem to be buying anything. They are running their equipment out to the end. I suspect they will then retire.
- The cost of everything in this business is getting higher and higher.
- Parts are skyrocketing because manufacturers are selling fewer pieces of new equipment and are making up some of the loss on parts. Many parts stores do not keep an inventory like they used to. If parts are two days out you are down for at least two days.
- I pay more for fuel in a year than I ever thought I would make in a year.
- My profit margin slips down every year. I suppose in a few years, it will be considered a hobby, not a business.
- If someone wanted to buy my company and went to the bank with my books the bank would tell them they are crazy and laugh them out of the doors.
- You are lucky that so many loggers over 65 years of age have enough debt that they can't get away until they go under. (One way or another.)
- I am utterly amazed to read how critical a healthy logging industry is to Minnesota's forests. For the past 20 years about everything possible that could be done to drive us into the ground has taken place and shows no sign of giving us a break.
- We have to be able to produce wood for less cost than the price we receive for our products. If we can't do that it is over.
- Just about everyone that understands how it works and knows how to make it work is going soon or already gone. Lots of luck with that healthy logging industry thing.

Difficulties operating a small business

- I think the small logger is going the way of the small farmer. We are likely the most endangered species in the woods.
- Hard for a smaller operation to obtain timber.
- Wood prices, fuel costs and taxes hurt smaller businesses.
- Need some help for the smaller logger to put up a few small sales either private or public lands.
- Don't forget about the little guy.

Problems finding qualified labor

- Too many people wanting jobs that sit on their butts
- Can't find good young help.

- I see staffing being a major problem in the future. There are other jobs out there with better pay, benefits, and easier work environment. Many loggers I know have gone to work in the mines or construction for better pay, benefits, and hours. I ask them how they like it. They say money is good but they don't like the work. They would rather be in the woods. We can't compete with these jobs. The ones who stay in the woods are the ones that are fine making less to be happy with what they do, but sure would like, and deserve, a raise.

Regulations

- I feel that the wetlands restrictions for roads contribute to a lot of extra problems in constructing roads for access.
- I realize the need for regulations on harvesting, but let's use common sense. Is what we do really that bad for the ground and water?

Stumpage availability/Timber sale policies

- More summer wood availability.
- It would help if DNR & USFS put some smaller sales up as the bigger logger co's are buying all the sales.
- I will not buy large tracts of state certified wood because there is too much roundwood (pulp) to market at below break-even price.
- State & Counties should sell more stumpage to drive price down they are creating a shortage of stumpage, thus driving the price up
- Would like to see a return to limits on the # of permits we're able to hold. Limiting sales would help keep us more profitable.
- Elimination of 3 sale limit on intermediate auctions. Change from 20 to 30 employees on intermediate auctions. Certified wood only at some mills: large % is non-cert private in MN.
- Public agencies continue to reduce dense hardwood sales in Aitkin Co which inflates competition & stumpage prices.
- Not enough stumpage offered by public agencies. Have to pay a premium for wood just to keep going.
- Availability of stumpage, especially summer wood, is killing everybody.
- More wood falls down & becomes killed than state, fed, co sells every year – sucks.
- There should be more incentives for micro-mgmt on parcels smaller than 10 acres.
- Stumpage is getting more expensive. You have to compete pretty hard for summer sales.

Issues associated with agencies and foresters

- Forester Training - i.e. marking tree boundaries & having general idea that trees die naturally of infections i.e. pests, etc.
- Have better trained state foresters, foresters that follow contracts and don't make up their own rules.
- Having all govt agencies operate on same page when it comes to forest practice issues, there is a huge gap in the way agencies operate & distinguish rules & regs.
- There is a great separation between forester and logger and it's getting bigger with each graduating class. We must bring these together somehow to make life easier for all of us.
- Itasca Co now says we need add'l ins policy to protect them when they are on one of their own sales that we would be cutting.
- The state has controlled stumpage quantities and made prices go up.

Issues associated with markets

- Mills pricing not keeping up with my increased costs. Must modernize (CTL) or downsize, if I could get paid more feel I could get better equipment and find better help.
- Price at mills are ridiculous!
- Mills and markets need to work with us. Let us work when conditions allow. Recognize bottom line for them is sometimes at odds with stable producers, good forestry, stewardship.
- Wood prices from paper mills need to go up - we can't keep going at today's prices. The price we're getting today is same as 9 yrs ago.
- Bottom line is if mill prices do not compensate for rising operating costs (fuel, repairs, new equip etc.) more loggers will be going out of business, mine included.
- The worth of my product has not changed at the mills. It fluctuates 3 or 4% but never to keep up with the rising costs of running the business. To make this industry healthy and profitable we NEED at least a 25% increase for our product. That is how far out of whack things are. If I worked this hard at any other business, I would be on my way to wealth.
- We now have 3 times as many loggers than needed and we are all fighting each other for work. Mills are aware of this and pay us poorly.
- We haven't had a real price increase for what we do for 17 years so the next generation for my business has been gone on to something else for five years now.

Training

- MLEP training is strongly discouraging chainsaw use. I feel this is wrong, proper training on technique is the priority not sitting on your butt
- Updates on new DOT regulations.
- Need more training on hands on chainsaws, roadbuilding tactics, less I know everything everybody else knows nothing!!
- Good Gosh! My crew & I do not need any more training!!
- Less training.
- RE: Training - I have been in business for 33 years this spring, if we as business owners don't know these things we are no longer in business so stay out of it!
- Trucking laws. Chain saw and skidder safety classes for new workers.
- Trucking-laws-DOT.
- We have logged since 1974. This training is in place to give government employees something to do. This is useless to us as a small business owner!! We figured out our business needs a long time ago!! Our training came directly out of our pocketbook!!
- I have been in business for 33 years this spring. If we as business owners don't know these things [training needs listed] we are no longer in business so stay out of it!
- I don't believe the "logger" is in need of more education, I believe the educators, mill management, forest landowners and "certification groups" or anyone else that believes that they have a right live off of our productivity are overdue for an education.

Other/Miscellaneous

- I just use a tractor and get what no one else wants. I do it the old way, like 50 years ago. I work for all my wood.
- Most of my cutting is in WI.

- We're a limited partnership -2 bros., we also run a beef farm.
- I'm still profitable, but getting older.
- 40 yrs in logging industry. Call me anytime.
- Should consider pickup fuel & expense transporting fuel & tools & oil, parts runs.
- Survey question #15 not good question, wood must be delimbed before it is slashed.
- Very good survey!
- Son would like to take over, I told him no future - can't support family on it.
- The only thing stuff like this does is give you people a job, let's face it.
- Semi-Retired.
- I am a salvage cutter, blowdown, dead wood etc.
- Tell landowners it's important to manage their woods and not to always expect a profit to do so. It may be a later harvest that shows a profit.
- There needs to be a way to reward loggers who do the job right like cash back on a job well done.
- Get rid of $350 dues for MLEP.
- First, Dad has really only been the one I ever learned anything from - too much BS really is a waste of time. I don't have enough time to run this business and be profitable to take any time off other than what little I have left for my family.
- New state statute allowing tax forfeit lands to sell timber thru intermediate auction sales.
- Wasting money on studies like this!
- I just finished your survey and find you have missed the mark. Your focus on the survey is not going to be helpful to anyone. Questions 1 – 28 are not very important, and question 29 is the only one that gets at where our industry is at. These are all the important issues, but you failed to mention the single biggest problem, it being “there are no markets”. In my 41 years in the industry, we have never been so short of markets. We have seen a large number of pulp mills close forever. About 35% of the volume is gone. Also, over the last 25 years, all sawmills that buy grade hardwood logs are gone. We only have a few small pallet lumber mills left.

Appendix 15. Potential improvements for future surveys

Survey design:

For average sale size question - consider new table for format for input to try and eliminate the confusing responses.

Question 3 - Consider asking them how long they personally have owned the business as well as the number of years the business has been in operation (separate questions).

Question 8 – Change the first sentence to say "Considering all of the stumpage sources, please indicate the percentage of volume that your logging business harvested from each of the landowner groups during 2011". (This would insert the words "of volume" into the question)

Question 9 - In future surveys, we should ask those that don't harvest any volume during a particular season what else they do during that time (road building, septics, nothing).

Questions 12-15 – Look at the diversity of responses provided for the "Other" options for these questions. There was confusion about what we were looking for through these questions and how they were asking for different information in each question. Consider reducing the number of questions.

Question 16 - Add bulldozer as an option.

Question 17 - Add "pole trailer" as an option.

Question 24 – Clarify that we are looking for total capacity, not the additional cords beyond what they produced in Question 7. Avoid instances where the response to Question 24 is less than the response to Question 7.

Question 25 -- Include an option which will allow respondents to indicate that they don't plan to replace any equipment.

Question 26 – For those that don't expect to be in the logging business in 5 years, ask them why (e.g., plan to retire, health-related issues, economy-related difficulties).

Question 31 - In future surveys we should ask respondents who chose "safety" to list some specific safety issues (slips/falls, punctures, etc.)

New question - What is your current debt load and then provide a range of answers similar to what was done for Question 20.

New question - How has your business grown? How has your profitability changed from then to now?

New question - How much merchandising do you do on the landing?

New question - Try and ask something along lines of cost per cord for CTL versus Conventional

Ask policy makers for input on questions in future surveys

Survey mailing:

Note - Recommend not using UDAC in Duluth to compile the mailings. While they do an excellent job, there were enough errors in the mailings (e.g., surveys inserted in the envelope upside down, surveys mailed to the incorrect business owners) to consider doing everything in-house. The instructions which were provided to UDAC are noted below.

Logger survey mailing instructions provided by MLEP

1. I have included a mailing list and survey code which each person was assigned (in zip code order) for the purpose of cross-referencing.
2. Each letter and survey are collated in zip code order, and *must* remain in that order. Each address has its own coded survey. The boxes are labeled "1 of 2" and "2 of 2"
3. The postage paid 6x9 kraft return envelopes must have the return address label affixed to the center of the envelope and the 6x9 envelope must be metered at the rate for over 1 ounce but not over 2.
4. The letter and collated survey along with the metered/labeled 6x9 envelope should be inserted into the 9 x 12 window envelope in the following order:
   a. Letter
   b. Survey
   c. Return envelope
5. The completed 9 x 12 window envelope should be sealed and metered at the rate for over 2 ounces but not over 3.

If there are any questions, please contact me – Chris DeRosier at 722-5442