

Status of the Minnesota Logging Sector in 2021¹

by

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Abstract

Logging businesses in Minnesota have been surveyed intermittently since the late 1970s to assess their status and health. A mail survey was conducted in spring 2022 to assess the status of Minnesota's logging sector during 2021. The survey was a follow up to previous surveys, the most recent of which were conducted in 2016 and 2011. A total of 162 usable responses were received (50.5% usable response rate). Many of the reported findings from the two prior surveys were repeated in this survey. For example, businesses and equipment continue to age. The average amount of capital invested in a business is under \$500,000. County forests, private woodlands, and the State of Minnesota were the most important sources of stumpage. Winter harvesting produces about half (53%) of the total annual volume harvested. Feller-bunchers and grapple skidders were the most common in-woods equipment. While there are many small volume logging businesses in Minnesota, collectively they produce a small percentage of the total annual harvest. Most harvest sites were within 60 miles of the business' location.

Minnesota's logging businesses faced new challenges in 2021 with the Covid-19 pandemic, mill closures and a shortage of truck drivers. Higher volume logging businesses tended to be more negatively impacted by each of those three challenges. While many businesses were impacted, approximately 81% reported that their business at least broke-even in 2021.

The most commonly cited concerns were the lack/loss of markets, difficulty in securing labor, rising costs for everything (e.g., stumpage, equipment, parts, fuel, labor), delivered prices which were relatively flat, regulations which hurt the industry, and displeasure that mills increased their competition for stumpage at auctions as that took away potential timber sales from small businesses.

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, wood-using mills, land management agencies, logger training organizations, and logging and forest products trade associations.

To provide an understanding of Minnesota's logging businesses, various entities 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). Subsequent studies assessed operations for 1996 (Puettmann et al. 1998), 2003 (Powers 2004), 2012 (Blinn et al. 2014) and 2017 (Blinn et al. 2019). A mail survey was conducted during spring 2022 to update our knowledge of Minnesota's logging businesses in 2021.

Approach

The mail survey was developed to solicit information from Minnesota's logging business owners. The Minnesota Logger Education Program (MLEP) defines a logging business as a sole-proprietorship, partnership, or corporation that purchases stumpage and/or is an independent contract logger, controls timber harvesting, and owns timber harvesting equipment.

Drafts of the survey were shared with representatives from the Minnesota Forest Industries, Minnesota Timber Producers Association, MLEP, Minnesota DNR (MnDNR), US Forest Service, and others for review and comment. The final survey included forty-six questions which assessed factors such as business demographics, equipment, stumpage sources, business operations during each season, the impact of the Covid-19 pandemic and the loss of markets on the business, future plans, issues which may impact Minnesota's forests, and use of technology within the business (Appendix 1).

The survey documentation received an exemption from review through the Institutional Review Board at the University of Minnesota. It was designed and conducted during the spring of 2022 following standard mail survey procedures (Dillman 2000). This design included a 4.25 x 5.5-inch pre-survey postcard to announce the study and to encourage participation (Appendix 2) in March, 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 about one week after the initial mailing (Appendix 4), a second full mailing which was sent to non-respondents two weeks after the initial full mailing (Appendix 5), a final letter sent to the remaining non-respondents two weeks after the previous correspondence to encourage them to submit a completed survey (Appendix 6), and a [VoiceDhot](#) to non-respondents sent around the same date as the last mailing (Appendix 7).

The survey was sent to the 383 addresses of which 321 were logging business owners in MLEP's March 2022 membership database. Additional mailings went to former MLEP logging business owners in an effort to confirm their status as active loggers. Any responses from non-MLEP logging business owners were not included in the analysis. The total out-of-pocket printing and mailing cost for the survey was \$5,602.99 (Appendix 8). MLEP provided significant in-kind assistance throughout the survey creation, mailing, data validation, and elsewhere. As an incentive to submit a response to the survey, [onX Hunt](#), a GPS-based navigation mobile device app, provided 10 free one-year subscriptions to their app. The winners were identified through a drawing at the conclusion of the survey and they were awarded with their subscription code.

Data were entered into an Excel template. All entries for every survey were error checked and errors were corrected. Non-response bias tests were conducted, comparing the early to late responders (i.e., the first quarter of responses received to the last quarter) for the following questions:

- A. Years in operation (Question 2),
- B. Profitability of the business in 2021 (Question 3),
- C. Amount of capital invested in the logging business in 2021 (Question 6),
- D. Expectation to be in the logging business in 5 years (Question 8),
- E. General plans for the business in the future (Question 10),
- F. Cord equivalents harvested in 2021 (Question 14),
- G. Percent of stumpage purchased in 2021 by the business (Question 16),
- H. Percent of volume harvested in 2021 during the winter (Question 18),
- I. Percent of volume transported to the landing in 2021 using a grapple skidder (Question 20),
- J. Percent of volume transported to mills in 2021 by trucks owned by the business (Question 23), and
- K. Percent of volume harvested in 2021 from private woodlands (Question 30).

T-tests, which were conducted to compare means, did not identify any statistically significant differences between early and late responders for these variables ($\alpha = 0.05$).

All production volume was converted to cord equivalents 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) (Jon Drimel, personal communication July 13, 2022). Those are the same conversions that were used in the 2016 and 2011 assessments.

Basic summary statistics and figures were calculated and created using Excel. The unit of analysis was the individual respondent. Where comparable data was collected as a part of the 2016 and 2011 surveys, comparisons with those survey results are presented. When making comparisons between surveys, the reader should be cautious as response rates and the percent of total statewide harvest volume differ and it is unknown if the same businesses responded over time.

Results

A total of 167 responses were received (52% overall response rate) of which 162 provided usable information for the survey (50.5% usable response rate). A question-by-question summary is presented below.

Question 1. In what county is your business located?

Table 1. Summary of the number of 2021 survey respondents by MnDNR Forestry region and county (n=162).

County	Number of responses
DNR Northwest Region (n=69)	
Becker	4
Beltrami	27
Cass	7
Clearwater	4
Crow Wing	2
Hubbard	11
Lake of the Woods	4
Roseau	8
Wadena	2
DNR Northeast Region (n=74)	
Aitkin	7
Carlton	10
Cook	5
Itasca	15
Koochiching	15
Lake	5
St. Louis	17
DNR Central/Southern Region (n=19)	
Blue Earth	1
Fillmore	1
Goodhue	1
Mille Lacs	1
Morrison	6
Olmsted	1
Pine	5
Ramsey	1
Wabasha	1
Washington	1

Table 2. Summary of 2021 survey respondents by MnDNR Forestry region and county as compared to the number of MLEP logging businesses within each county (n=162).

County	Number of responses	Number of MLEP members	Response rate percentage (%)
DNR Northwest Region (n=69) (59% response rate)			
Becker	4	5	80.0
Beltrami	27	43	62.8
Cass	7	14	50.0
Clearwater	4	9	44.4
Crow Wing	2	8	25.0
Hubbard	11	13	84.6
Lake of the Woods	4	7	57.1
Mahnomen	0	1	00.0
Marshall	0	1	00.0
Roseau	8	12	66.7
Wadena	2	4	50.0
DNR Northeast Region (n=74) (response rate 45.4%)			
Aitkin	7	17	41.1
Carlton	10	20	50.0
Cook	5	7	71.4
Itasca	15	31	48.4
Koochiching	15	33	45.5
Lake	5	10	50.0
St. Louis	17	45	37.8
DNR Central/Southern Region (n=19) (response rate 46.3%)			
Anoka	0	1	00.0
Blue Earth	1	1	100
Chisago	0	1	00.0
Fillmore	1	1	100
Goodhue	1	1	100
Houston	0	1	00.0
Kanabec	0	4	00.0
Mille Lacs	1	6	16.7
Morrison	6	6	100
Olmsted	1	1	100
Pine	5	13	38.5
Ramsey	1	1	100
Wabasha	1	2	50.0
Washington	1	2	50.0

Table 3. Summary of percent response rate to the 2021 survey by county.

Percent response rate (%)	Counties
100	Blue Earth, Goodhue, Morrison, Olmsted, Ramsey
80-99	Becker, Hubbard
60-79	Beltrami, Cook, Roseau
50-59	Carlton, Cass, Lake, Lake of the Woods, Wabasha, Wadena, Washington
40-49	Aitkin, Clearwater, Itasca, Koochiching
30-39	Pine, St. Louis
Below 30	Anoka, Chisago, Crow Wing, Houston, Kanabec, Mahnommen, Marshall, Mille Lacs

Question 1 summary: The highest response rate was in the DNR’s Northwest Region and the lowest in their Northeast Region.

Question 2. As of 2021, how many years has the business been in operation?

Table 4. Summary of the number of years the logging business has been in operation in 2021 (n=155), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Number of years	2021 Number of responses	Percent of responses (%)		
		2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
0 – 10	29	18.7	15.0	12.9
11 – 20	20	12.9	13.5	16.6
21 – 30	33	21.3	25.6	29.0
31+	73	47.1	45.9	41.5

2021 Average = 31.0 years, median = 20 years.

Question 2 summary: Approximately two-thirds of the responding logging businesses have been in operation for more than 20 years (average 31.0 years, median 20 years). These results are similar to the 2016 (average 30.5 years, median 30 years) (Blinn et al. 2019) and 2011 (average 28.1 years, median 29 years) (Blinn et al. 2014).surveys. The median number of years the business had been in operation was lower in 2021 than in either of the two previous surveys.

Question 3. In 2021, how would you rate the profitability of your business?

Table 5. Summary of logging business profitability rating in 2021 (n=155).

Rating of profitability	Number of responses	Percent of responses (%)
Very unprofitable	7	4.5
Unprofitable	23	14.8
Broke even	60	38.7
Profitable	63	40.6
Very profitable	2	1.3

Assigning a value of 1 = 'Very unprofitable' and 5 = 'Very profitable', the average profitability rating was 3.19 which is closer to the profitability rating 'Broke even' (3) than to 'Profitable' (4). Median = 3 ('Broke even').

Table 6. Summary of logging business profitability rating in 2016 (n=129).

Rating of profitability	Number of responses	Percent of responses (%)
Very poor	9	7.0
Poor	24	18.6
Average (broke even)	45	34.9
Good	47	36.4
Excellent	4	3.1

2016 Average = 3.1 (Closer to 'Average (broke even)' than to 'Good'), Median = 3 ('Average (broke even)').

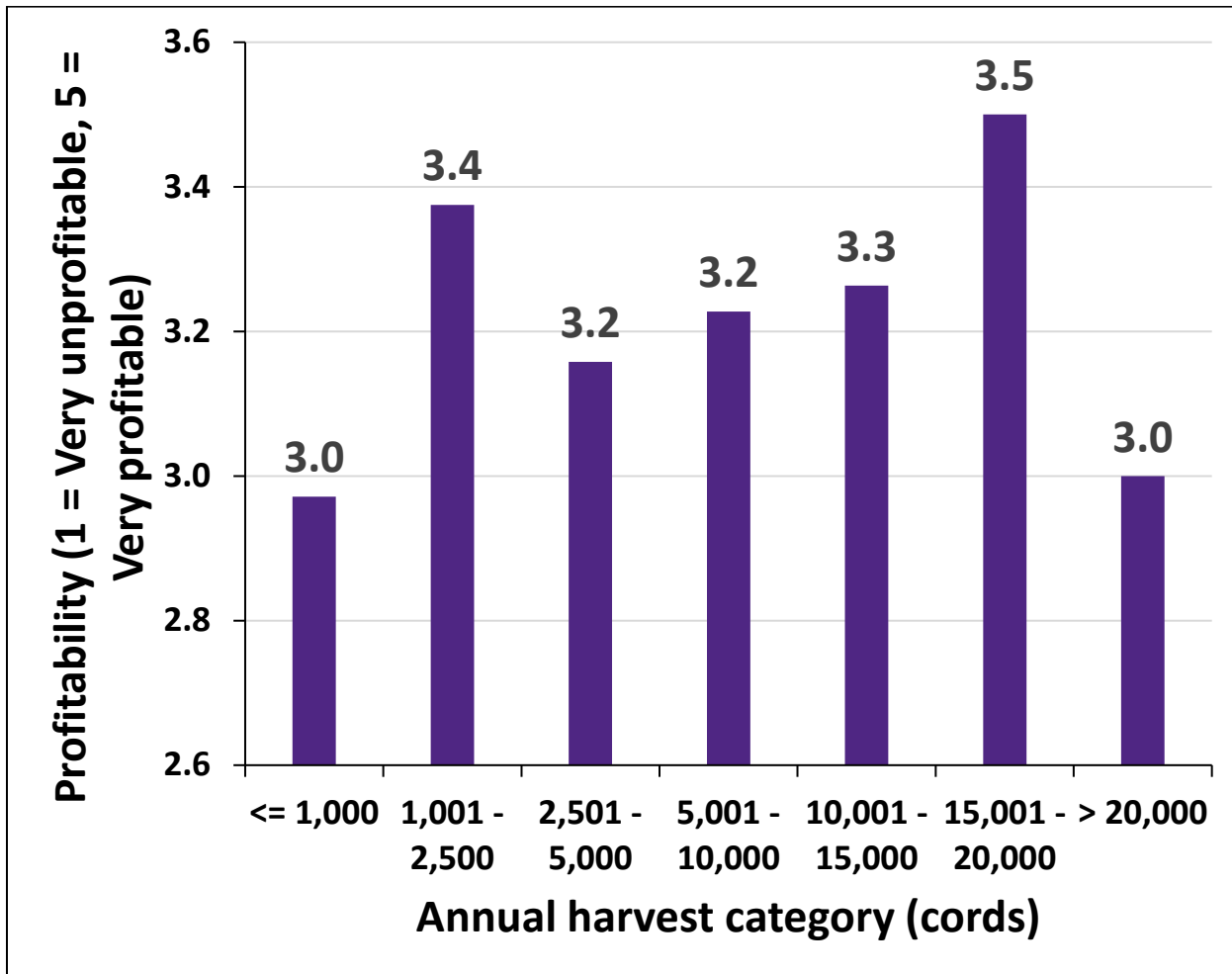


Figure 1. Logging business profitability in 2021 by annual harvest category.

Question 3 summary: Approximately 81% of the respondents indicated that they at least broke even in 2021. That level is higher than in the 2016 survey where approximately 74% of respondents reported that they at least broke even (Blinn et al. 2019). In 2021, the two lowest average values of profitability were reported by the smallest and largest producers. The average profitability in 2021 was 3.2, which is closer to broke even (3) than profitable (4).

Question 4. Compared to 2016, how would you rate your logging businesses' profitability in 2021?

Table 7. Summary of logging business profitability in 2021 as compared to 2016 (n=156).

Profitability comparison	Number of responses	Percent of responses (%)
Much worse in 2021 than in 2016	42	26.9
Slightly worse in 2021 than in 2016	38	24.4
Same in 2021 as in 2016	34	21.8
Slightly better in 2021 than in 2016	31	19.9
Much better in 2021 than in 2016	6	3.8
Was not in business in 2016	5	3.2

For those who were in business in 2016 (n=151): Average = 2.5 (halfway between 'Slightly worse' in 2021 than in 2016 and 'Same' in 2021 as in 2016; Median = 2 ('Slightly worse' in 2021 than in 2016).

Question 4 summary: Slightly more than half (51%) of the respondents indicated that their profitability in 2021 was worse than 2016 respondents reported. In 2016, 38.6 percent of respondents felt that 2016 was much or slightly worse than 2013 while 60.8 percent of respondents in the 2011 survey felt the same way in 2011 about 2008 (Blinn et al. 2019). Note that the 2021 survey asked about a comparison with a time five years prior to the survey year which is two years longer than the prior two surveys.

Question 5. In general, how difficult is it for your business to access capital, such as loans and letters of credit?

Table 8. Summary of ease of access to capital in 2021 (n=155) and 2016 (Blinn et al. 2019).

Difficulty rating	2021 Number of responses	Percent of responses (%)	
		2021	2016 (Blinn et al. 2019)
Very easy	42	27.1	36.4
Somewhat easy	42	27.1	25.0
A little easy	8	5.2	---
Neither easy nor difficult	35	22.6	22.0
A little difficult	11	7.1	---
Somewhat difficult	10	6.5	9.8
Very difficult	7	4.5	6.8

2021 Average = 2.9 (Closer to ‘A little easy’ than to ‘Somewhat easy’), median = 2 (‘Somewhat easy’).

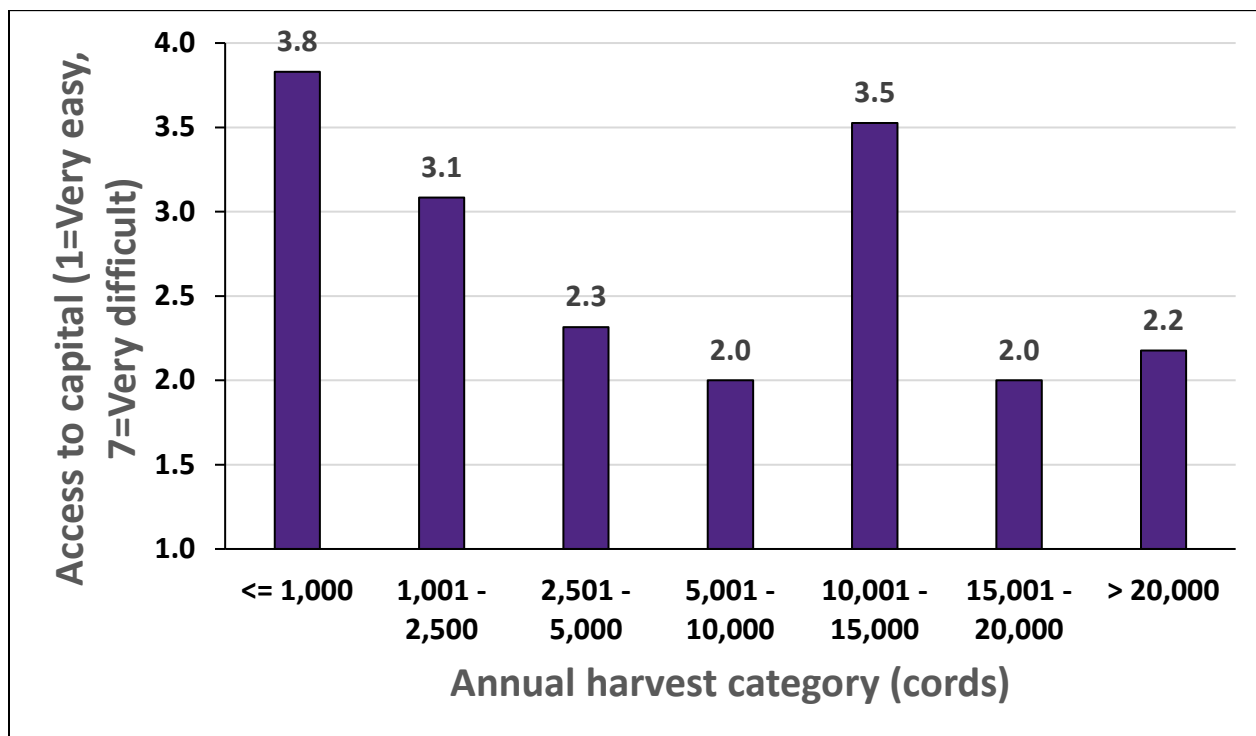


Figure 2. Ease of access to capital in 2021 by annual harvest category.

Question 5 summary: Fifty-nine percent of respondents indicated that their access to capital was “a little easy” or easier. Only 18 percent indicated that it was “A little difficult” or more difficult. These results are similar to the 2016 assessment when 61 percent indicated that their access was “Somewhat easy” or easier and 17 percent said that it was “Somewhat hard” or more difficult (Blinn et al. 2019). Note that the categories ‘A little easy’ and ‘A little difficult’ were added to the 2021 survey and the word ‘difficult’ was used in 2021 and ‘hard’ in 2016. Access to capital generally increased in 2021 with the level of production, which is similar to the results from the 2016 survey (Blinn et al. 2019).

Question 6. In 2021, in total, how much capital was invested in your logging business?

Table 9. Summary of amount of capital invested in 2021 (n=106), 2016 (Blinn et al 2019) and 2011 (Blinn et al. 2014).

Amount of capital (\$)	2021			Percent of responses (%)	
	Number of responses	Percent of responses (%)	Cumulative percent of responses (%)	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Less than \$10,000	8	7.5	7.5	47.4	34.1
\$10,000 - \$24,999	11	10.4	17.9		
\$25,000 - \$49,999	10	9.4	27.4		
\$50,000 - \$74,999	6	5.7	33.0		
\$75,000 - \$99,999	4	3.8	36.8		
\$100,000 - \$149,999	10	9.4	46.2	15.8	22.6
\$150,000 - \$199,999	9	8.5	54.7		
\$200,000 - \$249,999	4	3.8	58.5		
\$250,000 - \$299,999	9	8.5	67.0		
\$300,000 - \$349,999	7	6.6	73.6	15.8	14.7
\$350,000 - \$399,999	3	2.8	76.4		
\$400,000 - \$449,999	6	5.7	82.1		
\$450,000 - \$499,999	2	1.9	84.0		
\$500,000 - \$549,999	5	4.7	88.7		
\$550,000 - \$599,999	0	0.0	88.7	6.8	7.4
\$600,000 - \$649,999	1	0.9	89.6		
\$650,000 - \$699,999	0	0.0	89.6		
\$700,000 - \$749,999	1	0.9	90.6		
\$750,000 - \$799,999	1	0.9	91.5		
\$800,000 - \$849,999	0	0.0	91.5	4.5	4.1
\$850,000 - \$899,999	2	1.9	93.4		
\$900,000 - \$949,999	0	0.0	93.4		
\$950,000 - \$999,999	1	0.9	94.3		
\$1,000,000 – \$1,999,999	3	2.8	97.2		
\$2,000,000 – \$2,999,999	2	1.9	99.1	6.8	9.3
\$3,000,000 – \$3,999,999	0	0.0	99.1	0.0	6.0
\$4,000,000 – \$4,999,999	1	0.9	100	3.0	1.8

2021 Average = \$313,825, median = \$154,000.

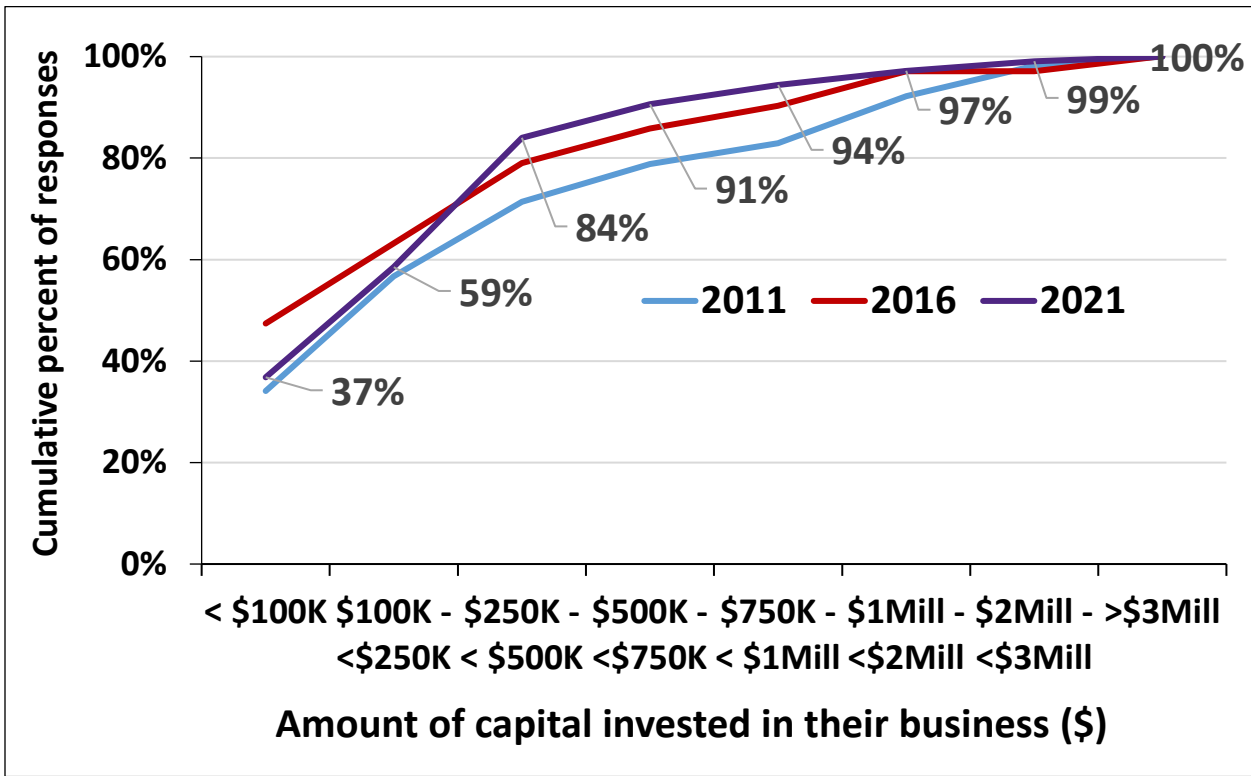


Figure 3. Cumulative percent of responses indicating the amount of capital (\$) invested in the respondent’s logging business in 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Question 6 summary: Slightly more than one-third (36.8%) of the respondents indicated that the amount of capital invested in their business was under \$100,000, two-thirds (67.0%) indicated that it was under \$300,000 and 84% indicated that it was under \$500,000. The percent of businesses reporting that their amount of capital invested was below \$500,000 continues to increase as it was 71.4% in 2011 and 79.0% in 2016 (Blinn et al. 2019).

Question 7. What percentage of that capital was invested in each of the following categories?

Table 10. Summary of how capital was invested in 2021 by category (n=109).

Category	Average percent (%)
Harvesting equipment	48.0
Off-road transport equipment	7.8
Over-the-road hauling equipment	11.1
Stumpage	28.6
Staff training	1.4
Other*	3.2

*The 12 individuals who responded “Other” with a percentage include the following where the percentage value represents the percent of their business’ capital allocated to the ‘Other” category: Loader/slasher (27%); Snowplow (15%); Replace worn pumps (10%); Fuel (50%); Dozer (10%); Bills and expenses (40%); Firewood handling equipment (80%); Gas, diesel, oils (25%); Value added processing (20%); Higher wages (20%); Repairs (15%); and Trucking (35%).

Question 7 summary: Respondents indicated that nearly half of their capital (48%) was invested in equipment. The next largest category was stumpage (28.6%).

Question 8. Do you expect to be in the logging business 5 years from now?

Table 11. Summary of logging business owners’ expectation for being in business in 5 years in 2021 (n=153), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Response	2021 Number of responses	Percent of responses (%)		
		2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Yes	111	72.5	73.1	75.4
No	42	27.5	26.9	24.6

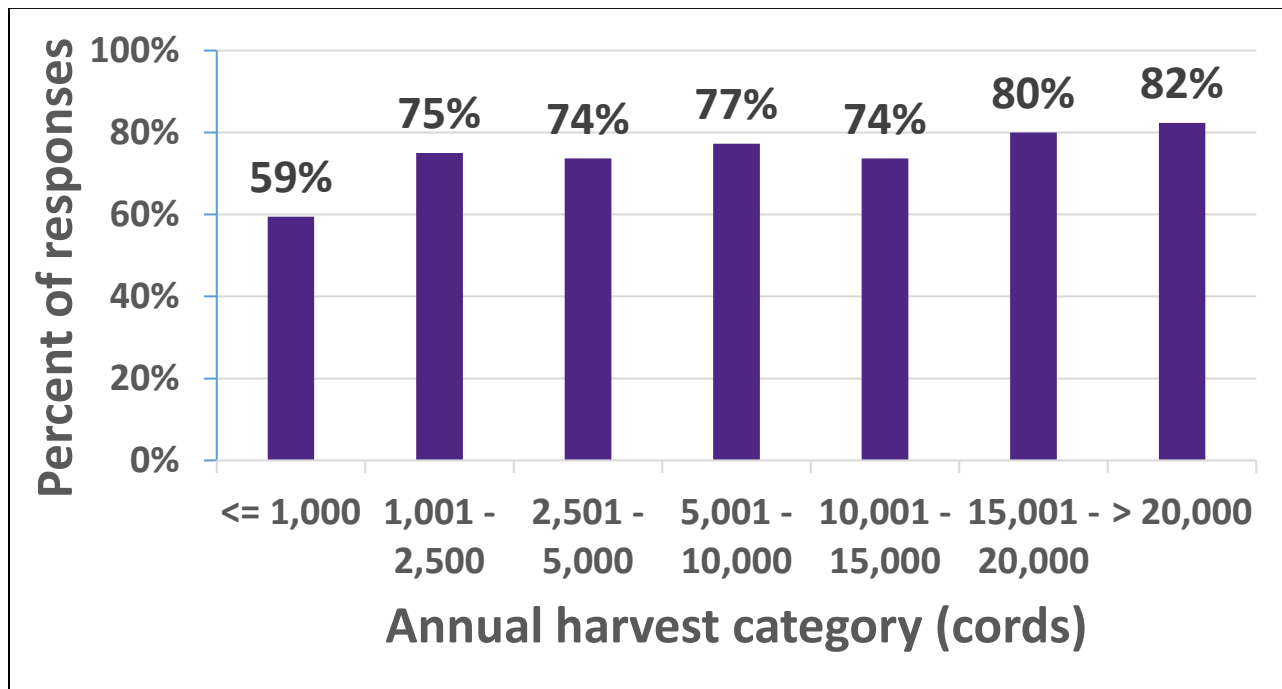


Figure 4. Percent of responding businesses who expect to be in business in five years by annual harvest category reported for 2021.

Question 8 summary: Just over one-quarter (27.5%) of the respondents reported that they don’t expect to be in the logging business in 5 years. The smallest volume producers reported the lowest expectation to be in business and the highest volume producers the highest expectation to be in business in 5 years. The percentage of businesses reporting that they don’t expect to be in business in 5 years is slightly higher than in the 2016 (Blinn et al. 2019) and 2011 surveys (Blinn et al. 2014).

Question 9. Why do you expect you will not be in the logging business 5 years from now?

Table 12. Summary of coded reasons why a logging business does not expect to be in business 5 years from 2021 (n=46). Some respondents provided more than one reason.

Reason provided	Number (and percent) of responses
Too old/Declining health/Plan to retire	23 (46.0%)
Can't make enough money/Costs too high	19 (38.0%)
Difficulty in hiring labor	3 (6.0%)
Lack of markets	3 (6.0%)
Someone else is taking over the business	1 (2.0%)
Too many regulations	1 (2.0%)

Question 9 summary: A complete listing of the reasons provided by respondents for why they don't expect to be in the logging business in 5 years appears in Appendix 9. Forty-six respondents provided 61 different reasons why they do not expect to be in business in 5 years. For those who reported that they didn't expect to be in the logging business in 5 years, 37.7% indicated that their reason related to their age, health or their plan to retire. Rising expenses that made their business unprofitable was reported in 32.8% of the comments. The reasons provided by respondents were similar to those noted by respondents to the 2016 survey with age and rising expenses also being top reasons (Blinn et al. 2019).

Question 10. Looking into the future, what are the general plans for your business?

Table 13. Summary of their 2021 general plans for the logging business in the future for owners who expect to be in business in 5 years (n=109) as compared to 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Response option	2021 Number of responses	Percent of responses (%)		
		2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Increase annual volume harvested	33	30.3	35.7	29.4
Maintain annual volume harvested	63	57.8	40.3	43.4
Decrease annual volume harvested	13	11.9	3.9	8.8
Retire or sell business	NA	NA	20.2	18.6

If 1= Increase annual volume harvested, 2 = Maintain annual volume harvested, and 3 = Decrease annual volume harvested, the average value in 2021 is 1.8 which is closer to maintain annual volume harvested than it is to decrease annual volume harvested.

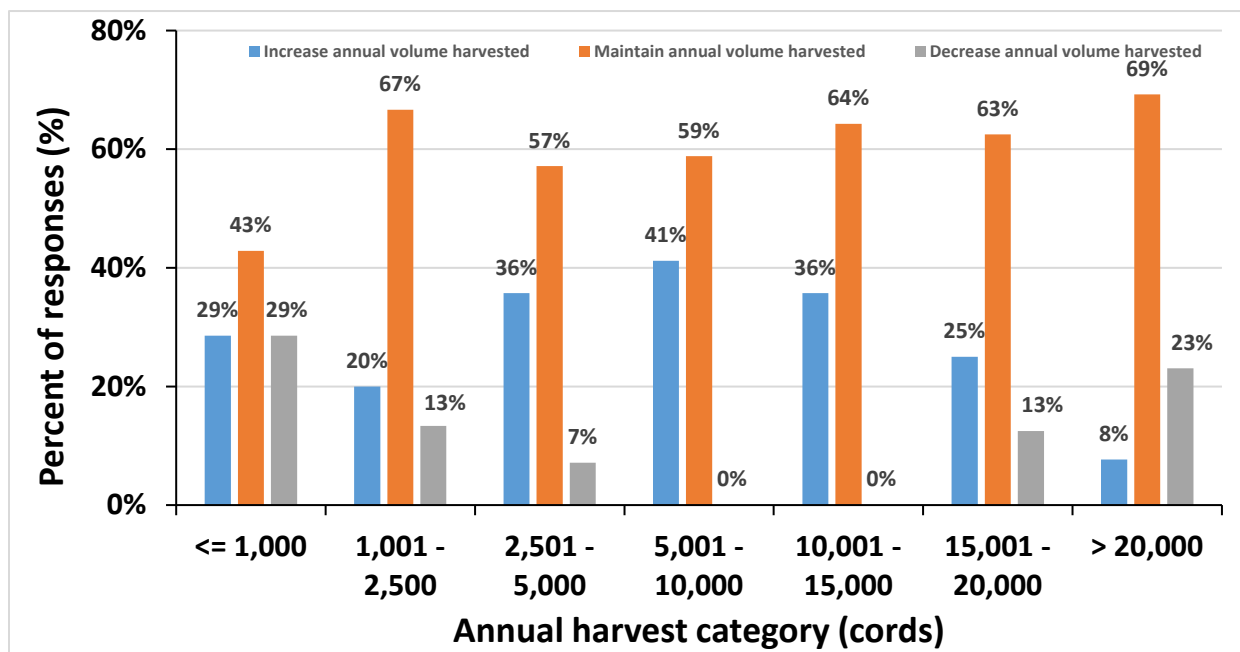


Figure 5. For those businesses which do not plan to leave the business within 5 years (Question 8), percent of responding 2021 businesses who would like to increase, maintain, or decrease their annual volume harvested in the future by annual harvest category.

Question 10 summary: For those owners who still expect to be in business in 5 years, slightly more than half of the respondents (57.8%) indicated that they planned to maintain their annual volume harvested in the future. Of the remainder of the respondents, 30.3% planned to increase their annual volume harvested and 11.9% indicated that they planned to decrease their annual volume harvested. After factoring out those who plan to retire or sell their business from the 2016 and 2011 surveys, a slightly similar percentage of respondents in the 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) surveys (50.4% and 53.2%, respectively) reported that they planned to maintain their annual volume harvested. Across all harvest categories, the highest percentage of respondents plan to maintain their current annual volume that they harvest. The largest volume respondents were least likely to report that they would like to increase their annual volume harvested in the future.

Question 11. For each owner of this business, what is the owner’s age in years? Also, not necessarily only as the owner, how many years in total has each owner worked in the logging industry?

Table 14. Summary of logging business owner ages in 2021 (n=224 owners) and 2016 (Blinn et al. 2019).

Owner age (years)	2021			2016 percent of owners (%) (Blinn et al 2019)
	Number of owners	Percent of owners (%)	Cumulative percent of owners (%)	
< 20	0	0	0.0	0.5
20 – 29	15	6.7	6.7	6.1
30 – 39	27	12.1	18.8	9.4
40 – 49	35	15.6	34.4	20.8
50 - 59	70	31.3	65.6	29.7
60 – 69	51	22.8	88.4	22.2
70 - 79	18	8.0	96.4	10.4
80 - 89	7	3.1	99.6	0.9
90 - 99	1	0.4	100	--

2021 Average owner age = 53.5 years, median = 54.5 years.

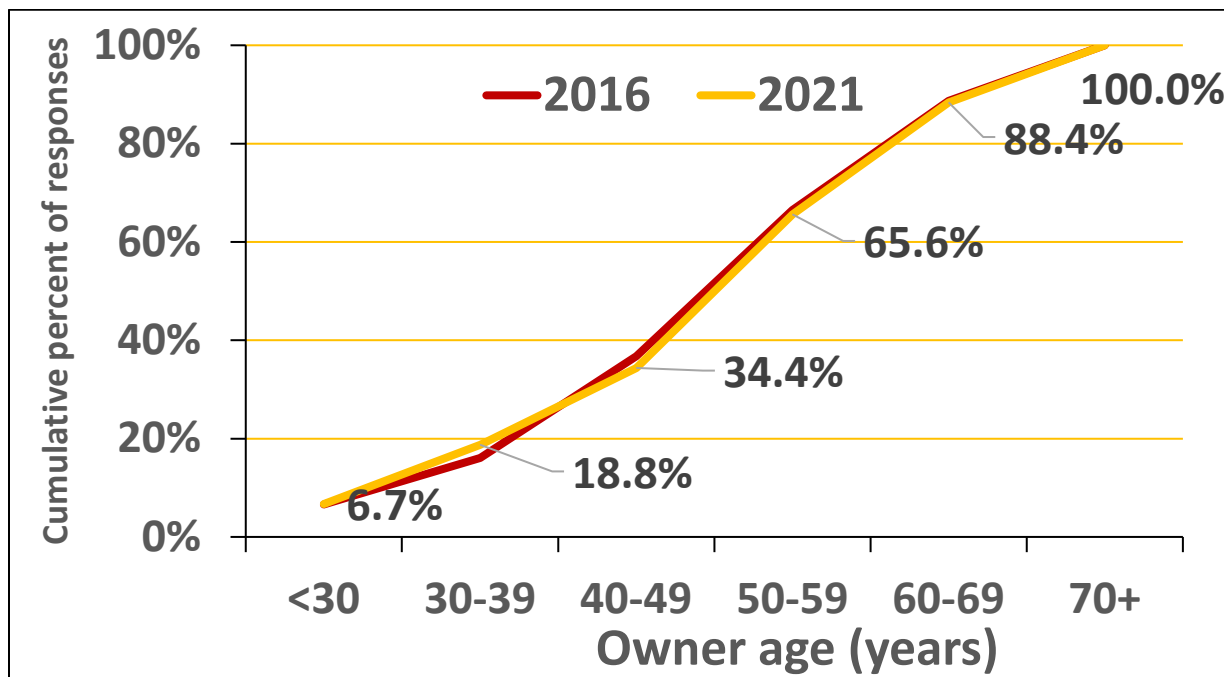


Figure 6. Cumulative percent of Minnesota logging business owner ages in 2021 (gold line) and 2016 (maroon line) (Blinn et al. 2019). Percentages shown are from the 2021 survey.

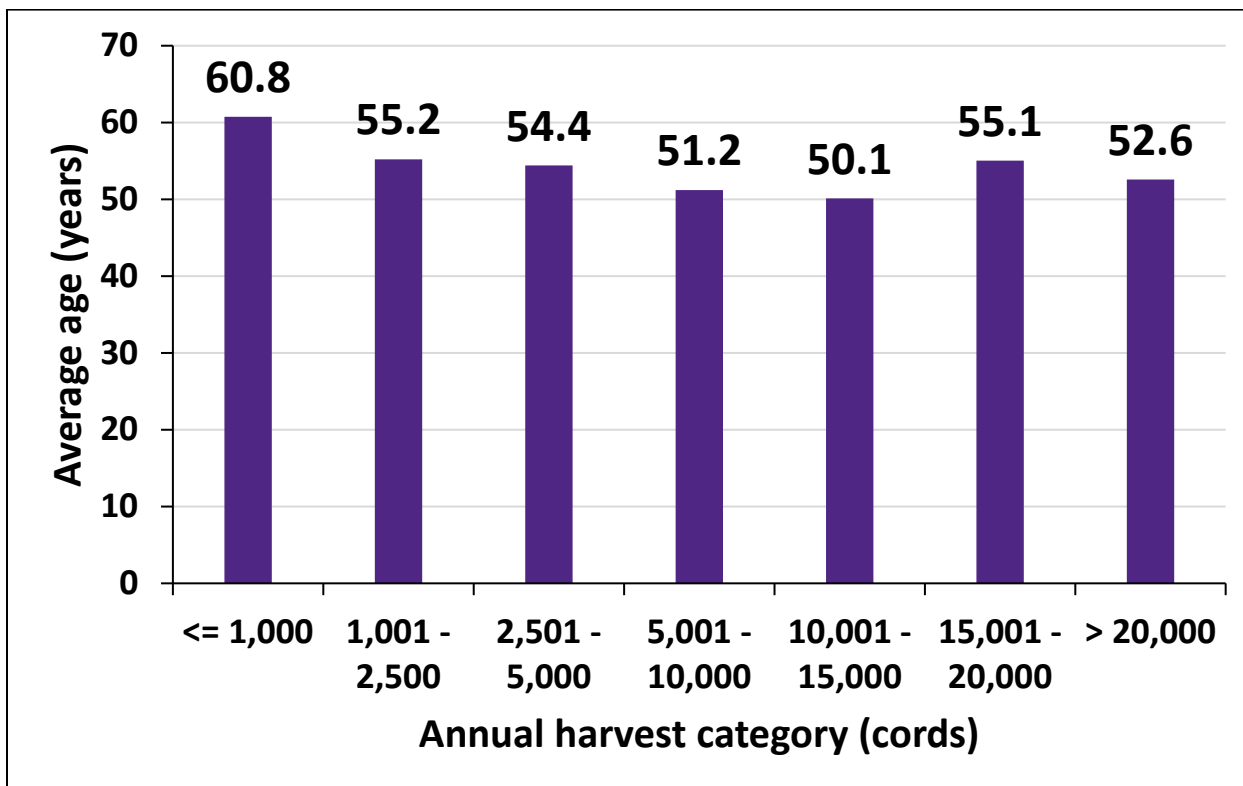


Figure 7. Average owner age in 2021 by annual harvest category.

Table 15. Summary of the number of years of logging business owners in the logging industry in 2021 (n=219) and 2016 (Blinn et al. 2019).

Owner years in logging industry (years)	2021			2016 percent of owners (Blinn et al. 2019)
	Number of owners	Percent of owners (%)	Cumulative percent of owners (%)	
< 5	3	1.4	1.4	21.8
5 - 9	19	8.7	10.0	
10 - 14	10	4.6	14.6	
15 - 19	15	6.8	21.5	
20 - 29	34	15.5	37.0	19.8
30 - 39	60	27.4	64.4	25.7
40 - 49	52	23.7	88.1	26.2
50 - 59	15	6.8	95.0	5.4
60 - 69	8	3.7	98.6	0.5
70 - 79	3	1.4	100.0	0.5

2021 Average years in industry = 32.2 years, median = 34 years. 2016 average 30.1 years in the industry (median = 32 years).

Question 11 summary: The average owner in 2021 was 53.5 years old (median 54.5 years) which is a slight increase from the 52.9 years old (median 54.0 years) reported in the 2016 survey (Blinn et al. 2019). Approximately one-third of the owners in 2021 were under age 50, one-third were between the ages of 50-59

and one-third were at least 60 years old. That age group distribution is similar to the 2016 survey (Blinn et al. 2019). On average, the oldest owners produced 1,000 or fewer cords in 2021. The average owner had been in the logging industry for 32.2 years in 2021 (median 34 years) and 30.1 years (median 32 years) in 2016 (Blinn et al. 2019). In both surveys, approximately sixty percent of the respondents had been in the logging industry for at least 30 years.

Question 12. In 2021, not including older pieces of machinery that were non-operational or used only for spare parts, how many of the following pieces of in-woods equipment did you own and actively use?

Table 16. Summary of the number and age of the newest piece of in-woods equipment in 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

In-woods equipment type	Average number of pieces per respondent (number of respondents) (2021)	Average age (years) of newest piece of equipment (number of respondents)		
		2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Chainsaws/hand delimiting	3.6 (132)	3.1 (123)	3.3 (107)	3.4 (151)
Cut-to-length (CTL) harvesters	1.6 (45)	7.9 (44)	7.1 (32)	7.6 (37)
Feller-bunchers	1.5 (124)	16.1 (118)	14.3 (88)	14.8 (138)
Cable skidders	1.4 (26)	40.3 (28)	35.9 (31)	33.7 (52)
Grapple skidders	2.0 (128)	16.7 (121)	16.8 (96)	13.8 (152)
Forwarders	2.7 (50)	12.4 (47)	11.5 (32)	11.3 (40)
Mechanical delimiters	1.8 (70)	13.8 (66)	12.8 (51)	11.4 (73)
Chippers	1.1 (9)	12.6 (9)	12.5 (15)	11.6 (23)
Grinders	2.0 (3)	7.5 (4)	9.3 (3)	4.3 (8)
Slashers	1.7 (97)	17.2 (92)	16.2 (81)	14.0 (115)
Flail debarkers	5.3 (6)	7.0 (7)	1.0 (1)	---
Loaders	2.3 (109)	18.7 (103)	15.9 (82)	14.4 (116)
Bulldozers	1.5 (109)	22.1 (102)	20.0 (73)	---
Other road building and road maintenance equipment	2.3 (44)	31.4 (42)	---	
Other	1.2 (19) ¹	15.6 (19) ¹	17.4 (11)	20.4 (40)

¹Those who responded “Other” equipment included skid steers (6 pieces), Hahn harvesters (3 pieces), skid loader (2 piece), gravel truck (1 piece), snowplow (1 piece), forestry mulcher (1 piece), welder (1 piece), firewood processor (1 piece), truck (1 piece), diesel generators (1 piece), and cart with loader for firewood (1 piece).

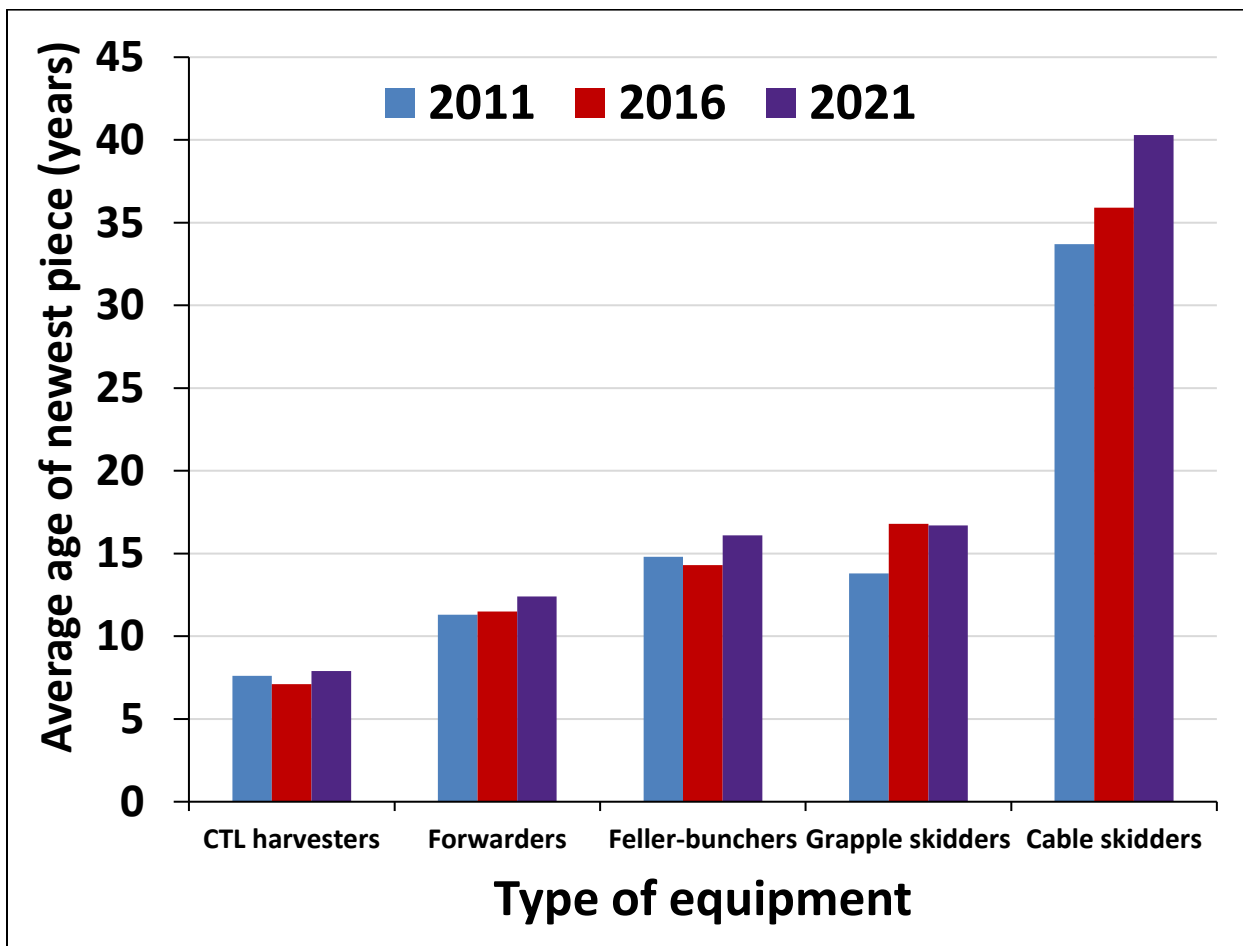


Figure 8. Average age of the newest piece of selected types of in-woods equipment in 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

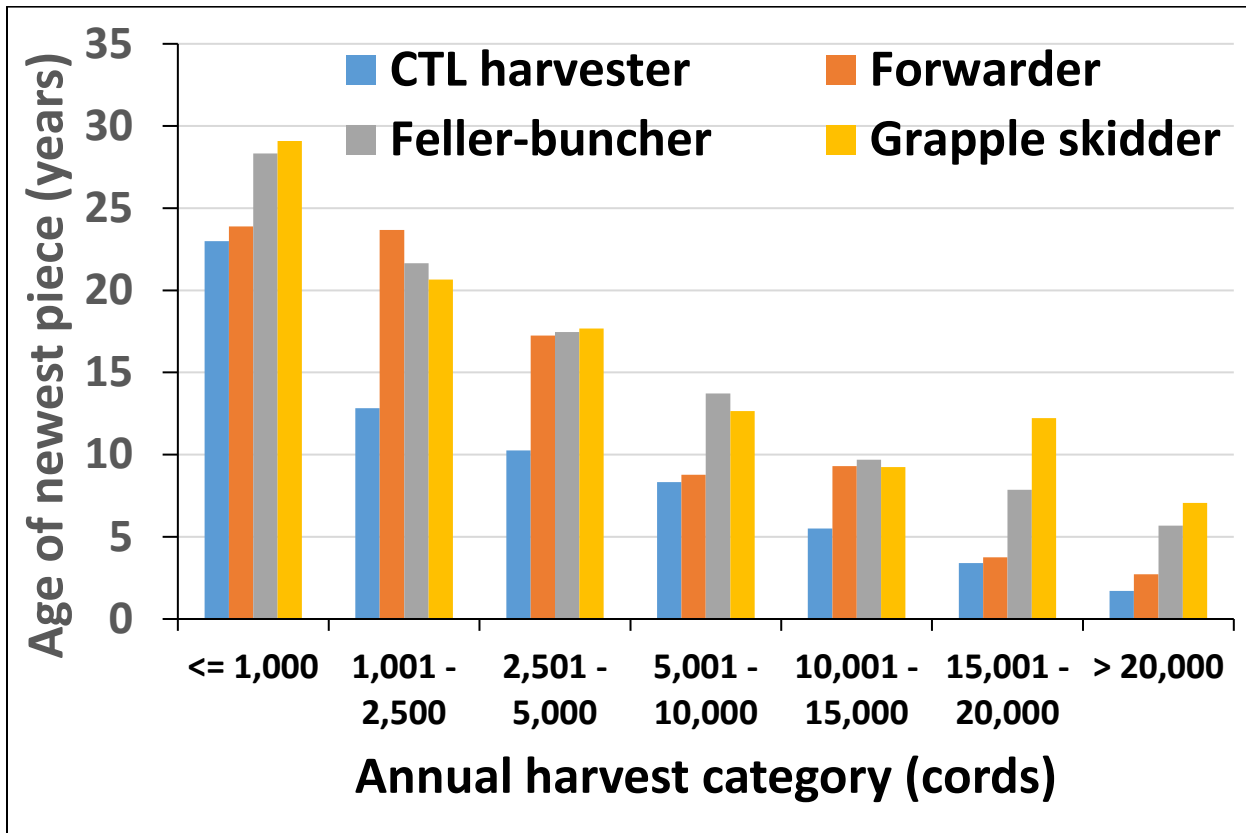


Figure 9. Average age of the newest piece of in-woods equipment by annual harvest category in 2021.

Question 12 summary: The average age of various types of in-woods equipment generally continues to increase as compared to the 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) surveys. Lower volume logging businesses tend to keep their equipment for a longer period than higher volume producers.

Question 13. In 2021, not including older pieces of machinery that were non-operational or used only for spare parts, how many of the following pieces of over the road equipment did your logging business own and actively use?

Table 17. Summary of the number and age of the newest piece of in-woods equipment in 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

In-woods equipment type	Average number of pieces per respondent (number of respondents) in 2021	Average age (years) of newest piece of equipment (number of respondents)		
		2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Tractor (semi)	3.2 (106)	15.9 (104)	12.5 (73)	12.1 (131)
Pulp/sawtimber trailer	3.5 (84)	15.8 (78)	14.8 (65)	13.9 (118)
Lowboy	2.2 (68)	20.8 (63)	19.0 (73)	16.8 (115)
Van/walking floor trailers	1.5 (100)	21.0 (90)	11.1 (16)	11.3 (27)
Self-loading truck/trailer	4.5 (31)	19.3 (26)	17.3 (47)	---
Pole trailer	4.0 (9)	12.7 (7)	18.2 (27)	---
Other	2.1 (11) ¹	14.3 (9) ¹	6.5 (4)	24.5 (15)

¹Those who reported “Other” equipment included belly dump / end dump (4 pieces), trailers (4 pieces), bunk (3 pieces), pickups (3 pieces), end dump (2 pieces), car trailer to haul wood (2 pieces), straight truck with loader (1 piece), pickup trailer (1 piece), firewood processor (1 piece), and service van (1 piece).

Question 13 summary: The average age of various types of over-the-road equipment generally continues to increase as compared to the 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) surveys.

Question 14. In 2021, what was the total volume of timber you harvested?

Table 18. Summary of the volume harvested (cord equivalents¹) in 2021 (n = 152), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Annual production (cord equivalents)	2021			Percent of respondents (%)	
	Number of respondents	Percent of respondents (%)	Percent of total volume reported (%)	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
< 1,000	37	24.3	1.2	24.4	26.3
1,001 – 2,500	24	15.8	2.9	17.6	12.9
2,501 – 5,000	20	13.2	5.2	13.7	19.1
5,001 – 10,000	25	16.4	12.3	16.8	15.3
10,001 – 15,000	19	12.5	16.0	9.9	8.1
15,001 – 20,000	10	6.6	11.7	4.6	3.8
20,001 – 30,000	8	5.3	12.8	6.1	9.6
30,001 – 40,000	4	2.6	9.3	2.3	1.9
40,001 – 50,000	1	0.7	2.9	2.3	0.5
> 50,000	4	2.6	25.8	2.3	2.4

¹Cord equivalents were calculated assuming 1 MBF = 2 cords and 2.3 tons/cord.

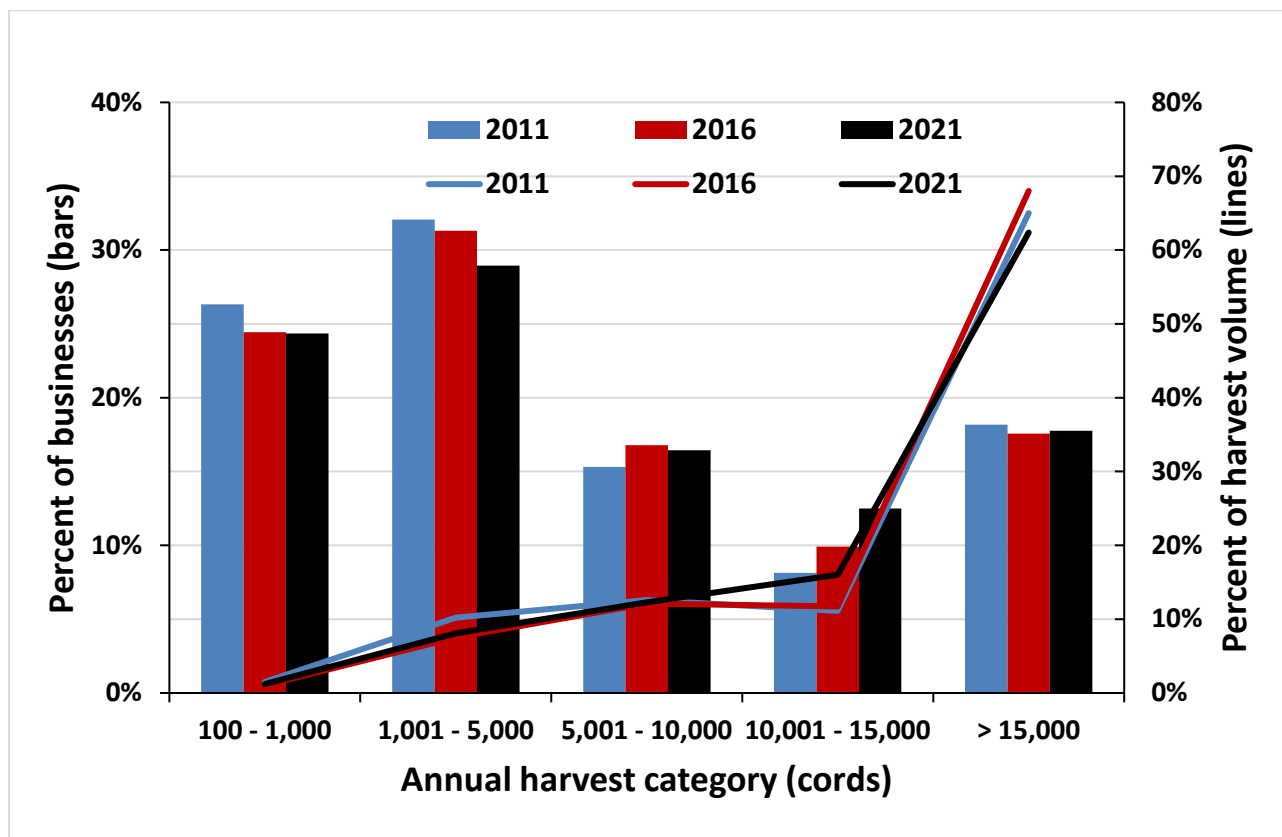


Figure 10. Percent of responding businesses and percent of total annual harvest volume by annual harvest category during 2021 (n=152), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Question 14 summary: A total of 1,560,124 cord equivalents were reported being produced by 152 respondents or 55.5% of the annual harvest volume reported for Minnesota (Minnesota DNR 2021). The

average level of production in 2021 (10,264 cord equivalents) was lower than in 2016 (11,267 cord equivalents) (Blinn et al. 2019) but higher than was reported in 2011 (9,518 cord equivalents) (Blinn et al. 2014). In 2021, the sector continued to be characterized by a large number of businesses that produce relatively small volumes annually and few firms with high levels of production. The percent of respondents who reported producing at least 20,000 cord equivalents (11.2%) is lower than in 2016 (13.0%) (Blinn et al. 2019) and 2011 (14.4%) (Blinn et al. 2014). Respondents who reported producing 100–1,000 cords in 2021 represented 24% of all respondents and 1% of the total volume reported. Eighteen percent of the respondents produced more than 15,000 cords and 62% of the total volume reported.

Question 15. In 2021, of the timber you harvested, what percent was hardwoods and softwoods?

Table 19. Summary of the average percent of volume harvested in 2021 (n=150) and 2016 (Blinn et al. 2019) by species.

Species	Average percent of volume (%)	
	2021	2016 (Blinn et al. 2019)
Aspen	51.4	52.8
Maple	6.6	---
Ash	4.7	---
Birch	5.8	---
Other hardwoods	7.0	21.9
Pine	12.0	12.7
Spruce	4.6	7.0
Balsam fir	2.8	---
Tamarack	2.9	---
Other softwoods	2.2	5.6

Question 15 summary: Aspen continues to represent about 50% of the volume harvested by responding businesses. The average percent of conifer volume reported by respondents has decreased as compared to 2016

Question 16. In 2021, of the timber you harvested, what percentage of your stumpage was purchased by others, such as a mill, and what percentage was purchased by you?

Table 20. Summary of the stumpage sources in 2021 (n=158), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Stumpage source	Number of 2021 respondents with this as their sole source of stumpage	Percent of respondents (%)		
		2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Stumpage purchased by others	6	20.2	28.3	25.4
Stumpage purchased by you	97	79.8	71.7	74.6

Question 16 summary: The percent of stumpage controlled by respondents was nearly 80%, a rate higher than in the previous two surveys.

Question 17. In 2021, how many of your timber sales were in each of the following acreage categories?

Table 21. Summary of the number and percent of timber sales completed and partially completed in 2021 (n=148) and 2016 (Blinn et al. 2019).

Tract size	2021		2016 (Blinn et al. 2019)	
	Number of sales completed	Number of sales partially completed	Number of sales completed	Number of sales partially completed
0 – 5 acres	103 (6.5%)	7 (6.5%)	64 (6.4%)	4 (4.7%)
6 – 10 acres	207 (13.1%)	6 (5.6%)	106 (10.7%)	4 (4.7%)
11 – 20 acres	352 (22.2%)	10 (9.3%)	205 (20.6%)	11 (12.8%)
21 – 40 acres	509 (32.1%)	25 (23.4%)	340 (34.2%)	19 (22.1%)
41 – 80 acres	263 (16.6%)	21 (19.6%)	180 (18.1%)	23 (26.7%)
81 – 160 acres	126 (7.9%)	23(21.5%)	68 (6.8%)	12 (14.0%)
161 acres or more	26 (1.6%)	15 (14.0%)	30 (3.0%)	13 (15.2%)
Total	1586	107	993	86

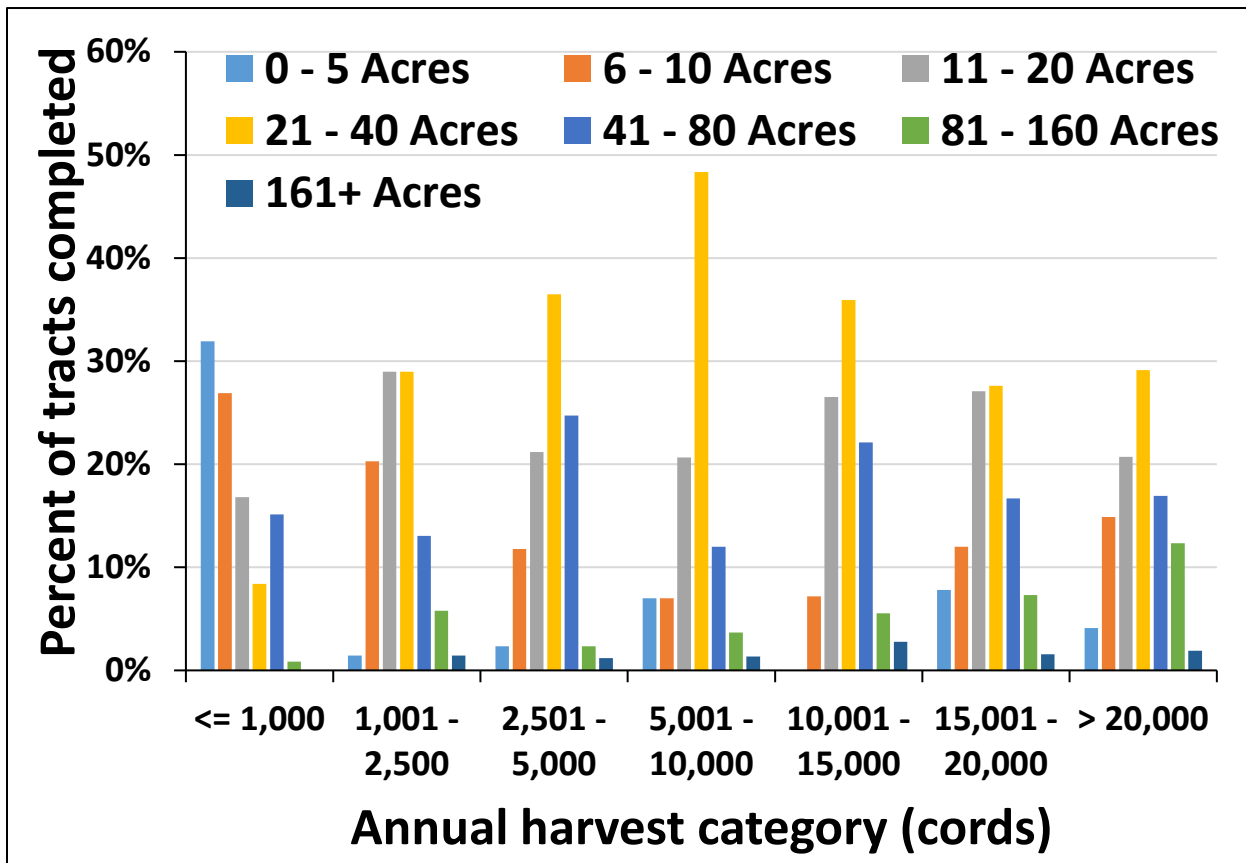


Figure 11. Percent of timber sales completed by annual harvest category in 2021.

Question 17 summary: Nearly 20 percent of the sales that were completed in 2021 were 10 acres or less in size. In both the 2021 and 2016 (Blinn et al. 2019) surveys, approximately one-third of the completed timber sales were 21-40 acres in size and nearly three-quarters of the completed tracts in each survey were 40 acres or smaller. Tracts that were 10 acres or smaller made up 58.8% of the tracts harvested by respondents who produced 1,000 or fewer cord equivalents in 2021. While high volume respondents completed timber sales that were 10 acres or smaller, those small tracts represent 19 percent of their total timber sales completed.

Question 18. In 2021, what percentage of your total harvest volume did you harvest in each season?

Table 22. Summary of the average percent of the total reported volume harvested by season in 2021 (n=155), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014).

Season	Average percent of total reported volume harvested (%)		
	2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Winter (Dec – Feb)	53.1	52.9	50.8
Spring (Mar – May)	5.7	6.1	7.7
Summer (Jun – Aug)	20.3	21.0	20.4
Fall (Sep – Nov)	20.9	20.0	21.1

Question 18 summary: The total percent of volume harvested during the winter is relatively unchanged since the 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) surveys at just over 50%.

Question 19. In 2021, what percentage of your harvest volume was felled by each of the following felling methods?

Table 23. Summary of the felling methods used in 2021 (n=160) not weighted by volume harvested. Respondents could use more than one felling method. Percentages may not total 100 due to rounding error.

Felling method	Number of respondents	Percent of respondents (%)	Number of respondents with this as their sole felling method	Average percent of volume (%)
Chainsaw	61	38.1	16	13.4
Cut-to-length (CTL) harvester	38	23.8	11	16.7
Drive to tree feller-buncher	84	52.5	44	42.9
Reach to tree feller-buncher	59	36.8	23	26.9
Other ¹	1	0.6	0	0.0

¹The respondent who reported “Other” felling method was with a grapple saw.

Table 24. Summary of the percent of total volume felled across all respondents in 2021 (n=152), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) by felling method. Respondents could use more than one felling method. Percentages may not total 100 due to rounding error.

Felling method	Percent of total volume harvested (%)		
	2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Chainsaw	1.4	1.7	2.4
Cut-to-length (CTL) harvester	27.3	24.4	15.7
Drive-to-tree feller-buncher	27.9	27.8	30.8
Reach-to-tree feller-buncher	43.4	46.1	51.1

Question 19 summary: The percentage of the total volume reported by respondents that was felled by cut-to-length harvesters continues to increase as compared to the 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) surveys. The percent of total volume felled by feller-bunchers decreased from 81.9% in 2011 (Blinn et al. 2014) to 71.3% in 2021.

Question 20. In 2021, what percentage of your harvest volume was transported to the landing by each of the following methods?

Table 25. Summary of the in-woods transportation methods to the landing used in 2021 (n=160) not weighted by volume harvested. Respondents could use more than one felling method. Percentages may not total 100 due to rounding error.

In-woods transportation method	Number of respondents	Percent of respondents (%) using the method	Number (and percent) of respondents with this as their sole felling method	Average percent of volume (%)
Cable skidder	22	13.8	10 (6.3%)	8.5
Grapple skidder	126	78.8	96 (60.0%)	69.9
Forwarder	43	26.9	20 (12.5%)	21.2
Other ¹	3	1.9	0	0.5

¹Respondents who reported “Other” in-wood transport methods were Bobcat (1 response), 4-wheeler (1 response), dozer (1 response).

Table 26. Summary of the percent of volume transported in-woods across all respondents from the stump to the landing in 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014)) by transport method. Respondents could use more than one in-woods transport method. Percentages may not total 100 due to rounding error.

In-woods transportation method	Percent of volume transported in-woods (%)		
	2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Cable skidder	0.9	1.1	2.4
Grapple skidder	65.8	72.6	81.3
Forwarder	33.3	26.3	16.3
Other ¹	<0.1	<0.1	<0.1

¹Respondents who reported “Other” in-wood transport methods in the 2021 survey were Bobcat (1 response), 4-wheeler (1 response), dozer (1 response). The “Other” in-woods transportation methods noted for the 2016 survey were a Bobcat (2 respondents), tracked skid steer, dozer, and transported by someone else. For the 2011 survey, they were a Bobcat, a low ground pressure Bombardier and a short wood skidder.

Question 20 summary: While grapple skidders are still the dominant method of transporting felled material to the landing, the percent of total volume transported to the landing by skidders continues to decrease. In contrast, the percentage of the total volume reported by respondents that was transported to the landing by forwarders continues to increase as compared to the 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) surveys.

Question 21. In 2021, what was your average one-way travel distance, in miles, from your primary business location to your timber harvest sites?

Table 27. Summary of the average one-way travel distance in miles between the respondents’ primary business location and their timber harvest site(s) in 2021 (n=158) and 2016 (Blinn et al. 2019). Percentages may not total 100 due to rounding error.

Mileage range	2021		2016
	Number of respondents	Percent of respondents (%)	Percent of respondents (%)
Up to 30 miles	62	39.2	34.6
31 – 60 miles	71	44.9	51.9
61 – 90 miles	21	13.3	10.5
91 – 120 miles	3	1.9	2.3
121 – 150 miles	0	0.0	0.8
More than 150 miles	1	0.6	0.0

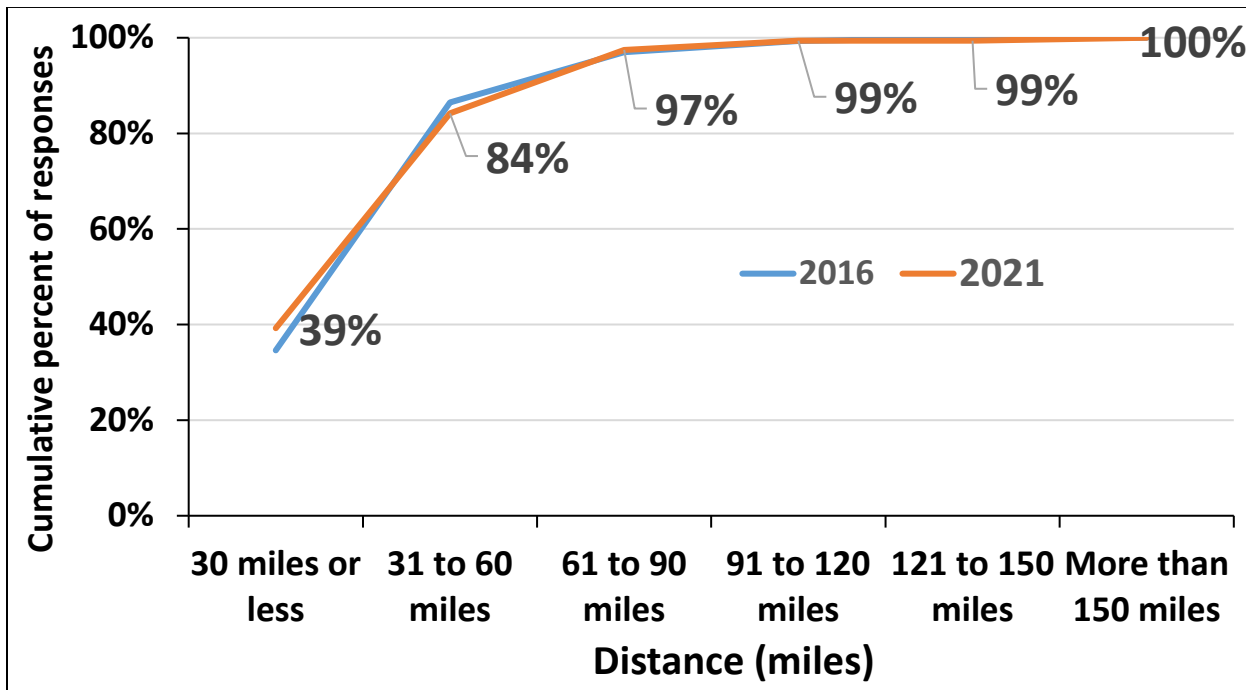


Figure 12. Cumulative percent of responses for one-way travel distance from the respondent’s primary business location to their harvest site(s) in 2021 and 2016 (Blinn et al. 2019). Percentages shown are from the 2021 survey.

Question 21 summary: The percent of respondents who reported that their average one-way travel distance in miles between their primary business location and their timber harvest site(s) was 60 miles or less is similar between the 2021 (84.1%) and 2016 (86.5%) (Blinn et al. 2019) surveys.

Question 22. In 2021, what was your average one-way travel distance, in miles, from your timber harvest sites to your mill(s)?

Table 28. Summary of the average one-way travel distance in miles between the respondents’ timber harvest site(s) and their consuming mill(s) in 2021 (n=157), 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014). Percentages may not total 100 due to rounding error.

Mileage range	2021		2016	2011
	Number of respondents	Percent of respondents (%)	Percent of respondents (%) (Blinn et al. 2019)	Percent of respondents (%) (Blinn et al. 2015)
Up to 30 miles	13	8.3	9.2	8.8
31 – 60 miles	50	31.8	31.3	35.6
61 – 90 miles	59	37.6	42.7	31.5
91 – 120 miles	28	17.8	14.5	19.4
121 – 150 miles	5	3.2	1.5	3.2
More than 150 miles	2	1.3	0.8	1.4

Assigning a value of 1 = ‘Up to 30 miles’ and 6 = ‘More than 150 miles’, the average distance category was 1.80, which is closer to the mileage range ‘31 – 60 miles’ (2) than to ‘Up to 30 miles’ (1).

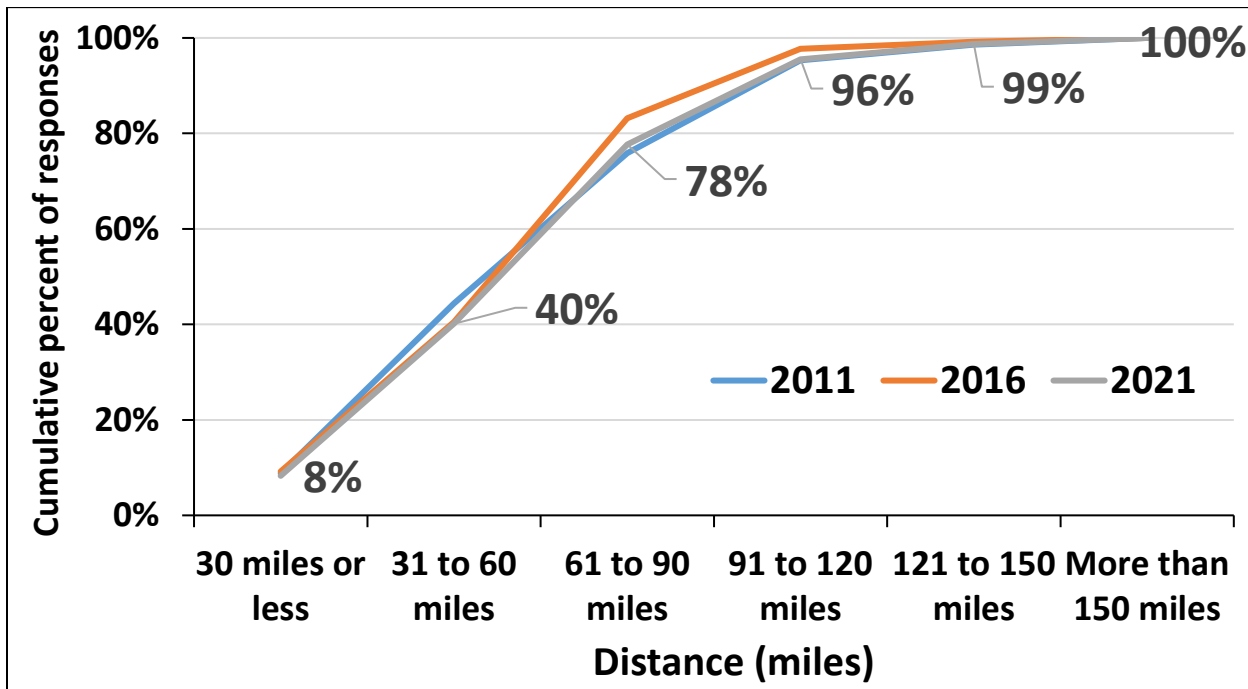


Figure 13. Cumulative percent of responses for one-way travel distance in miles between the respondent’s timber harvest site(s) to their mill(s) in 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014). Percentages shown are from the 2021 survey.

Question 22 summary: The percent of respondents who reported that their average one-way travel distance in miles between their timber harvest site(s) and consuming mill(s) was 90 miles or less is relatively similar between the 2021 (77.7%), 2016 (83.2%) (Blinn et al. 2019) and 2011 (75.9%) (Blinn et al. 2014) surveys.

Question 23. In 2021, what percentage of your harvest volume was transported to mills by trucks you own, and what percentage by trucks you contracted?

Table 29. Summary of the method of hauling harvested material to the mill(s) (trucks owned vs. hauling contracted) during 2021 (n=157).

Hauling method	Average percent of volume (%) hauled	Number (and percent) of respondents who use hauling method
Trucks owned	46.6	101 (64.3%)
Contracted	53.4	114 (72.6%)

Table 30. Summary of the method of hauling harvested material (trucks owned vs. hauling contracted) during 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014) by number of respondents and percent of volume produced.

Hauling method	Percent of total volume reported (%)		
	2021	2016 (Blinn et al. 2019)	2011(Blinn et al. 2014)
Trucks owned	53.9	63.6	63.9
Contracted	46.1	36.4	36.1

Question 23 summary: while the average percent of volume hauled by contract trucking in 2021 across the respondents was more than 50%, trucks owned by the business hauled more than half of the total volume reported. Ninety-nine respondents used only one method of hauling their harvested material (43 respondents only used trucks owned by the business and 56 only used contract trucking). The percent of respondents who used contract trucking in 2021 (72.6%) is slightly less than was reported in the 2016 (74.4%) (Blinn et al. 2019) and 2011 (78.7%) (Blinn et al. 2014) surveys. The percent of total volume hauled by contract trucking in 2021 (46.1%) was higher than in 2016 (36.4%) (Blinn et al. 2019) and 2011 (36.1%) (Blinn et al. 2014).

Question 24. In 2021, did a shortage of truck drivers negatively impact your business? If so, what do you think caused the shortage of truck drivers in 2021?

Table 31. Summary of whether a shortage of truck drivers negatively impacted the respondent’s business in 2021 (n=160).

Response	Number of responses	Percent of responses (%)
Yes	86	53.8
No	74	46.3

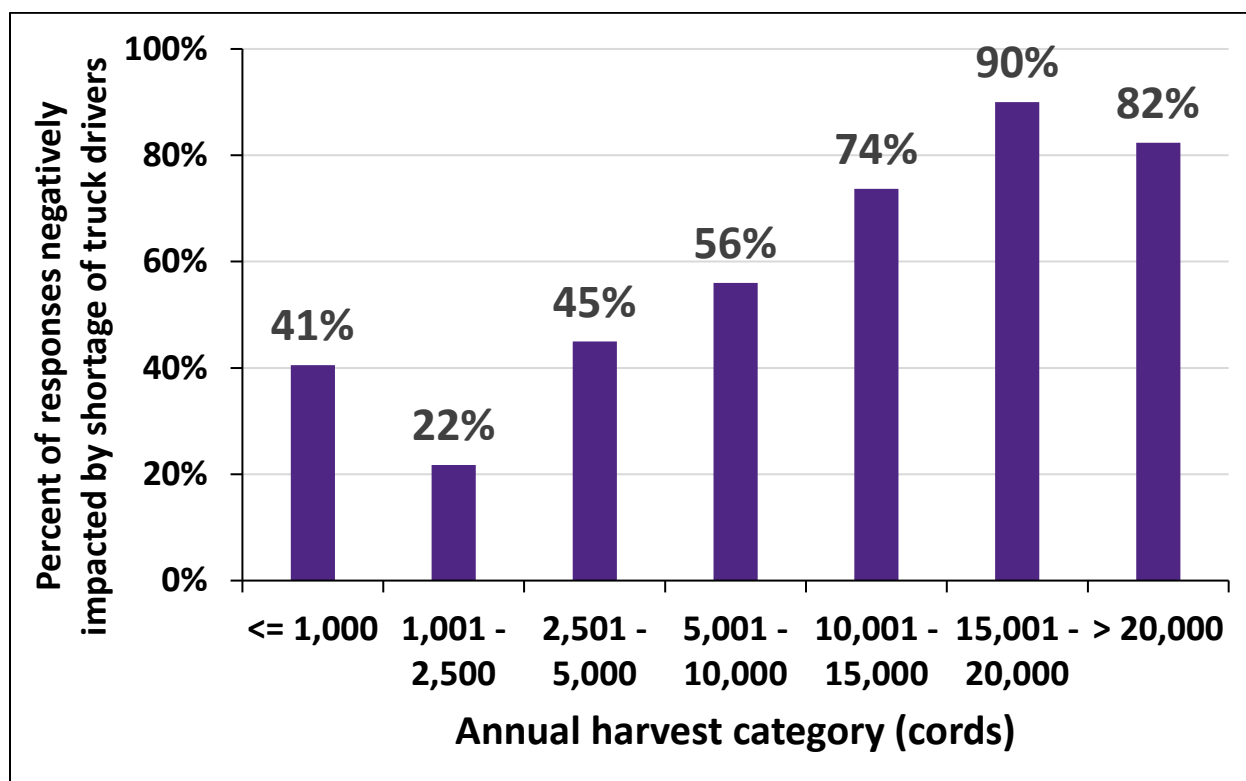


Figure 14. Percent of businesses negatively impacted by a shortage of truck drivers in 2021 by annual harvest category.

Table 32. Summary of the coded reasons respondents thought caused a shortage of truck drivers in 2021 for respondents who reported that a shortage of truck drivers impacted their business (n=73). Some respondents provided more than one reason.

Reason provided	Number (and percent) of responses
Other opportunities/ Low pay compared to other driving opportunities	22 (24.2%)
Lack of drivers/Laziness	21 (23.1%)
Rising costs/Not profitable	13 (14.3%)
Free government money	12 (13.2%)
Regulations	8 (8.8%)
Covid-19 pandemic	5 (5.5%)
Other	10 (11.0%)

Question 24 summary: Slightly more than half of the respondents (53.8%) reported that a shortage of truck drivers negatively impacted their business in 2021. Businesses that were least likely to be impacted by a shortage of truck drivers produced 2,500 cords or less and those who produced more than 15,000 cords were impacted the most. Seventy-three respondents who indicated that they were negatively impacted by a shortage of truck drivers provided 91 different reasons why they thought that there was a shortage of drivers (Appendix 10). The availability of other opportunities, often associated with higher pay, was reported in 24.2% of the responses. The lack of drivers and laziness was reported in 23.1% of the responses.

Question 25. In 2021, about how many gallons of fuel did your logging business use?

Table 33. Summary of the amount of fuel used for off-road and on-road use in 2021, 2016 (Blinn et al. 2019) and 2011 (Blinn et al. 2014). Outliers were deleted from the analysis for 2021 off-road fuel use.

Fuel purchase use	Number of responses in 2021	Average fuel used (gallons)		
		2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Off-road fuel	91	10,824	14,590	22,165
On-road fuel	89	33,248	37,424	34,177

Off-road median values (gallons): 2021 – 5,000, 2016 – 5,000, 2011 – 7,500.

Summary of the amount of fuel used/cord equivalent produced in 2021, 2016 and 2011 for off-road use after eliminating outliers (gallons/cord). Outliers were deleted from the analysis for all three years.

2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
2.93	1.55	1.83

Question 25 summary: An outlier analysis identified seventeen outliers that were deleted from the 2021 summary of off-road fuel used. For the remaining 91 off-road fuel responses, the average respondent used 10,824 gallons of off-road fuel in their business in 2021 with an average of 2.93 gallons/cord equivalent (median 1.20 gallons/cord equivalent) of off-road fuel per respondent. In 2016, an average off-road fuel consumption of 1.55 gallons/cord (median 1.50 gallons/cord equivalent) was reported (Blinn et al. 2019). In 2011, average off-road fuel consumption was 1.83 gallons/cord (median 1.76 gallons/cord equivalent) (Blinn et al. 2014). NOTE: The average off-road fuel consumption/cord equivalent value for 2011 was revised in this report after conducting an outlier analysis on that data.

For the 89 respondents who reported their on-road fuel usage in 2021, an average of 33,248 gallons were consumed (median 5,000) which was lower than the values reported in 2016 (median 7,000 gallons) (Blinn et al. 2019) and 2011 (median 10,000 gallons) (Blinn et al. 2014).

Question 26. In 2021, due to the Covid-19 pandemic, how did the profits of your logging business change?

Table 34. Summary of the change in respondents' business profit in 2021 due to the Covid-19 pandemic (n=158). Percentages may not total 100 due to rounding error.

Profit change rating	Number of respondents	Percent of respondents (%)
Increased a little	3	1.9
Increased somewhat	8	5.1
Increased a little	8	5.1
No change to profits	75	47.5
Decreased a little	34	21.5
Decreased somewhat	14	8.9
Decreased a lot	16	10.1

Assigning a value of 1 = 'Increased a little' and 7 = 'Decreased a lot', the average profit change was 4.49, approximately halfway between the profit change ratings 'No change in profits' (4) and 'Decreased a little' (5).

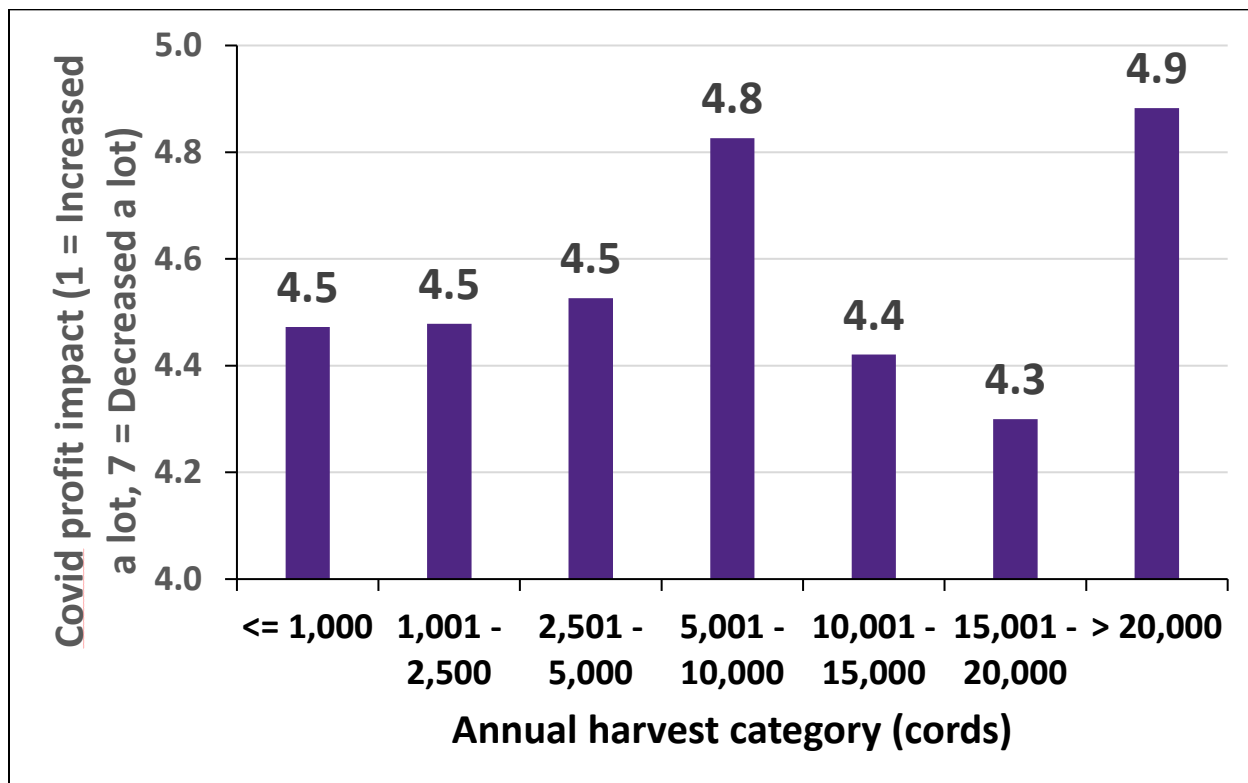


Figure 15. Impact of the Covid-19 pandemic in 2021 on logging business profits by annual harvest category (1=profits increased a lot and 7=profits decreased a lot).

Question 26 summary: Nearly half of the respondents indicated that Covid-19 did not change their profit in 2021. Covid-19 increased profits for 12.0% of respondents and decreased profits for 40.5% of respondents. Covid-19 had the largest impact on businesses that produced more than 20,000 cords in 2021.

Question 27. In 2021 did you apply to and receive funding from the following financial relief programs?

Table 35. Summary of whether the logging businesses applied for and received various financial relief programs in 2021.

Financial relief program	Applied for the program		Received funding	
	Yes	No	Yes	No
Paycheck Protection Program (PPP)	80	69	76	43
Pandemic Assistance for Timber Harvesters and Haulers (PATHH)	27	98	22	68
Economic Injury Disaster Loan	10	109	8	70
SBA Express Loan Bridge	2	117	1	73
SBA Debt Relief	4	114	3	71
Coronavirus Food Assistance Program	1	118	1	73

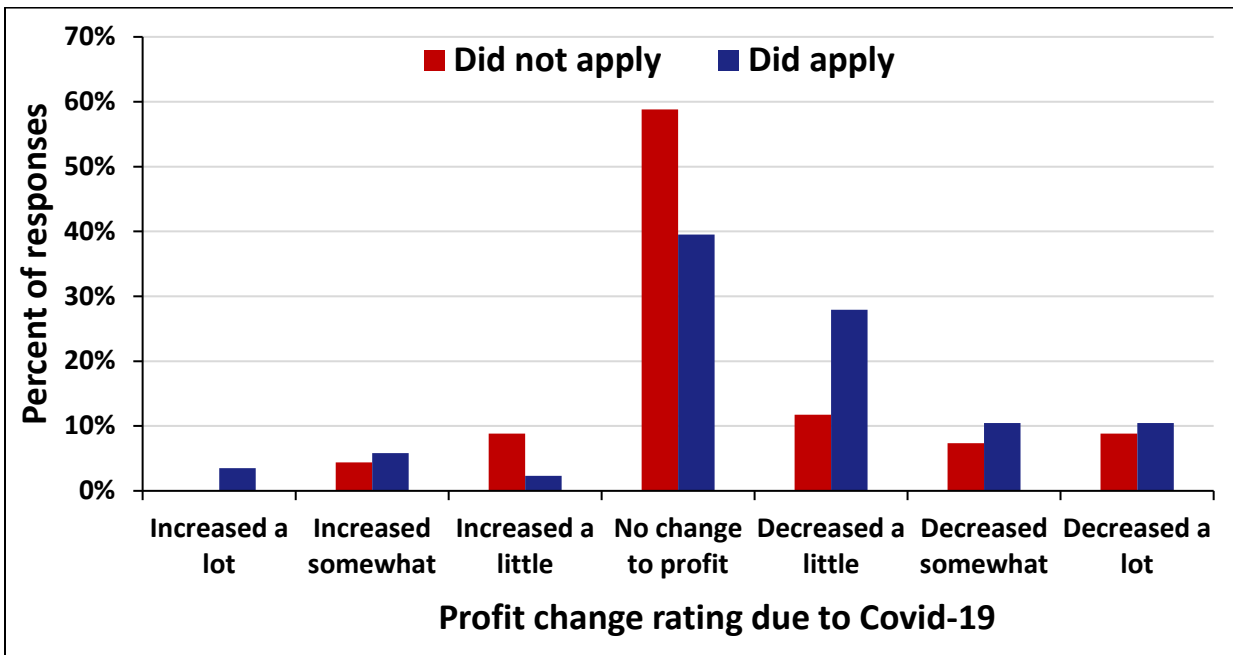


Figure 16. Comparison of the change in 2021 logging business profit due to Covid -19 for businesses who applied for one or more financial relief programs vs. those businesses that did not apply for any financial relief.

Question 27 summary: The Paycheck Protection Program (PPP) and the Pandemic Assistance for Timber Harvesters and Haulers (PATHH) were the two most common relief programs used in 2021. Of the 80 respondents who reported that they applied for relief through PPP, 76 (95%) received funding, 2 did not receive funding and 2 did not report whether they did or did not receive funding. Of the 27 who reported that they applied for relief through the PATHH program, 22 (81.5%) received funding.

Question 28. Which of the following mill closure-related assistance programs did you take advantage of in 2021 for the timber sales you purchased?

Table 36. Summary of the mill closure relief programs utilized in 2021 (n=159). Respondents could have used more than one relief program.

Relief program	Number of respondents who took advantage of the program
Sale extensions	44
County turnbacks	5
State turnbacks	11
Other	0
None	108

Question 28 summary: Two-thirds (67.9%) of the respondents did not take advantage of any of the mill-closure relief programs. Of the respondents who did take advantage of at least one of the programs, most received one or more sale extensions. One respondent received both one or more sale extensions and turned back one or more sales to one or more counties. Five respondents received both one or more sale extensions and turned back one or more sales to the Minnesota DNR. One respondent turned back one or more sales to a county and the Minnesota DNR. One respondent received at least one sale extension and turned back one or more sales to both a county and to the Minnesota DNR.

Question 29. In 2021, how much did the recent closure of pulp and paper mills in Duluth, Park Falls and/or Wisconsin Rapids have a negative impact on your logging business?

Table 37. Summary of the extent to which the recent closure of pulp and paper mills in Duluth (MN), Park Falls (WI) and/or Wisconsin Rapids (WI) had a negative impact on the respondents’ logging business in 2021 (n=157).

Extent of impact	Number of respondents	Percent of respondents (%)
Not at all	52	33.1
A little	33	21.0
Somewhat	28	17.8
Quite a bit	21	13.4
A great deal	23	14.6

Assigning a value of 1 = ‘Not at all’ and 5 = ‘A great deal’, the average impact was 2.55, about halfway between impact categories ‘A little’ (2) and ‘Somewhat’ (3).

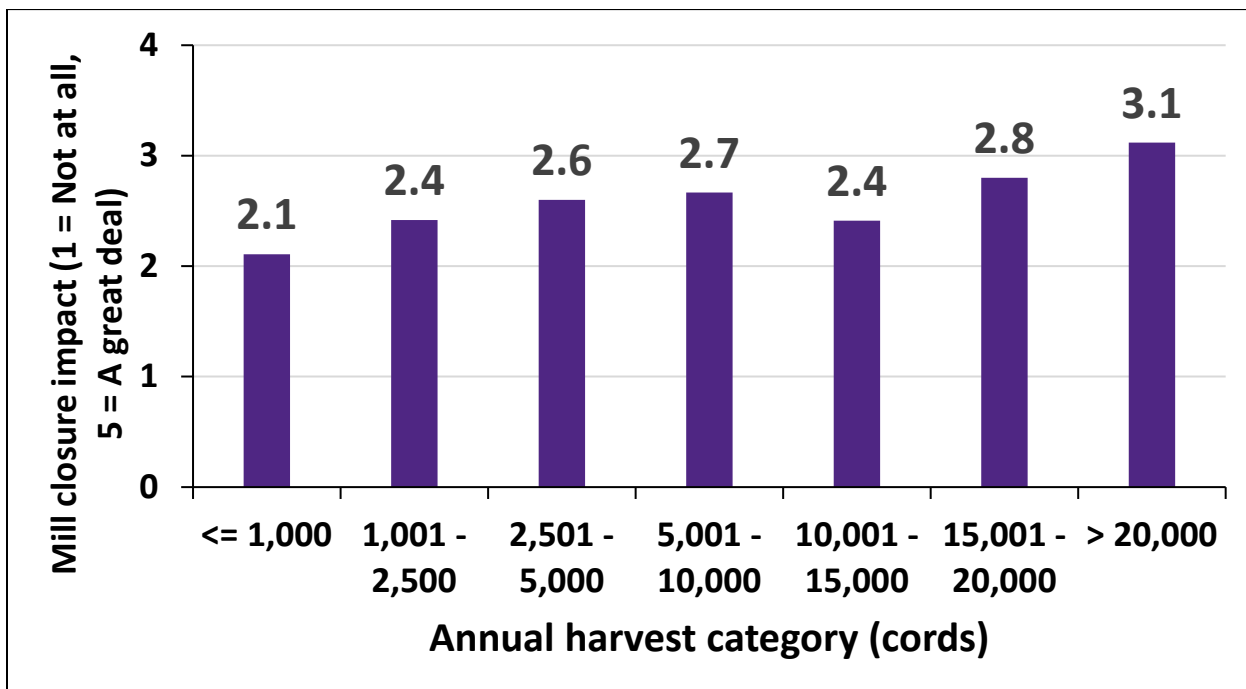


Figure 17. Impact of mill closures on logging businesses in 2021 by annual harvest category (1=Not at all, 5=A great deal).

Question 29 summary: While nearly one-third of the respondents (33.1%) indicated that the closure of pulp and paper mills in Duluth, Park Falls and/or Wisconsin Rapids did not had a negative impact on their logging business in 2021, 28.0% indicated that the impact was at least “Quite a bit”. The impact of the mill closures was lowest on respondents who reported producing up to 1,000 cords and the highest on respondents who reported producing more than 15,000 cords.

Question 30. In 2021, what percentage of your harvest volume occurred on land in the following ownership categories?

Table 38. Summary of the stumpage harvested from each timberland ownership category in 2021 (n = 158). Percentages may not total 100 due to rounding error.

Ownership category	Number of respondents who purchase stumpage from the ownership category	Average percent of volume across all respondents (%)	Number of respondents with this ownership category as their sole source of timber harvested
Private woodlands or non-industrial forests	123	37.0	25
Industrial or corporate owned forests	18	3.0	0
National forests	19	3.8	2
State forests	103	28.5	7
County forests	97	25.1	4
Municipal forests	1	0.1	0
Tribal forests	7	2.4	2
Other	0	0	0

Table 39. Percent of the total volume harvested by ownership category in 2021 (n=156), 2016 (Blinn et al. 2014), and 2011 (Blinn et al. 2014)). Percentages may not total 100 due to rounding error.

Ownership category	Percent of total volume harvested (%)		
	2021	2016 (Blinn et al. 2019)	2011 (Blinn et al. 2014)
Private woodlands or non-industrial forests	25.7	20.1	36
Industrial or corporate owned forests	7.2	15.4	13
National forests	6.7	6.5	10
State forests	33.1	26.6	22
County forests	25.8	24.3	18
Municipal forests ¹	<0.1	1.0	
Tribal forests	1.4	1.2	1
Other ²	---	4.8	---

¹The “Municipal forests” category was combined with the “County forests” category in the 2011 survey (Blinn et al. 2014).

²In 2016, “Other” ownerships cited were mining property and other sources.

Question 30 summary: Private woodlands continue to be an important source of stumpage for logging businesses with 77.8% reporting that they harvested timber from that ownership category in 2021. In the 2016 survey, 80.0% of respondents that they harvested timber from private woodlands (Blinn et al. 2019). Private woodlands, state and county ownerships continue to be the most important stumpage sources.

Question 31. On a scale of 1 (not important) to 5 (very important), how important are each of the following factors in terms of their impact on your decision to purchase a timber sale?

Table 40. Summary of the relative importance of various factors on a decision to purchase a timber sale (1=not important, 5=very important). Percentages may not total 100 due to rounding error.

Factor	Total number of responses	Average response	Number and percent (%) of responses				
			1 (Not important)	2	3	4	5 (Very important)
Bid process	154	3.4	24 (15.6%)	15 (9.7%)	34 (22.1%)	36 (23.4%)	45 (29.2%)
Payment process	153	2.9	36 (23.5%)	20 (13.1%)	46 (30.1%)	23 (15.0%)	28 (18.3%)
Contract language	151	3.1	33 (21.9%)	20 (13.2%)	38 (25.2%)	25 (16.6%)	35 (23.2%)
Level of harvesting supervision / administration	154	3.0	22 (14.3%)	29 (18.8%)	53 (34.4%)	23 (14.9%)	27 (17.5%)
Personality of sale administrator	153	3.4	23 (15.0%)	16 (10.5%)	35 (22.9%)	38 (24.8%)	41 (26.8%)
Dispute resolution	149	3.0	32 (21.5%)	20 (13.4%)	50 (33.6%)	15 (10.1%)	32 (21.5%)
Forester accessibility	152	3.3	23 (15.1%)	12 (7.9%)	51 (33.6%)	28 (18.4%)	38 (25.0%)
Forester flexibility (use of discretion)	153	3.6	17 (11.1%)	8 (5.2%)	43 (28.1%)	32 (20.9%)	53 (34.6%)

Question 31 summary: Except for the payment process, all other factors received an average rating of 3.0 or greater, indicating that they were more than an average level of importance. Forester flexibility (the use of discretion), bid process and personality of the sale administrator were rated as being the most important factors in terms of their impact on a decision to purchase a timber sale.

Question 32. The ease of purchasing and harvesting timber, resolving timber disputes and working with staff may impact who you purchase timber from. Thinking about all of the landowner groups you purchase timber from, which is easiest to work with and why?

Table 41. Summary of the easiest group(s) respondents purchases timber from (n=138). Respondents could report more than one landowner category. Percentages may not total 100 due to rounding error.

Landowner category	Number of responses	Percent of responses (%)
Private woodlands or non-industrial forests	36	25.4
Industrial or corporate owned forests	8	5.6
National forests	4	2.8
State forests	20	14.1
County forests	65	45.8
Municipal forests	0	0.0
Tribal forests	2	1.4
Other ¹	7	4.9

¹ Respondents who provided “Other” responses included no preference/all (3 responses), none (2 responses), no difference (1 response), and foresters with common sense (1 response).

Question 32 summary: County forests were most preferred landowner category followed by private woodlands and state forests. A total of 116 respondents provided written responses why their selected landowner category was the easiest to work with (Appendix 11). Of those written responses, half (58) were in support of county forests. For landowner groups where more than two comments were received, some of the more common themes were as follows: Private woodland owners – They are more reasonable and flexible, the logging business is the boss who makes the rules. Industrial foresters – They have good foresters who are flexible, they don’t have as many restrictions. State foresters – They prepare the entire sale so there is less work for the buyer, they have good foresters with whom the respondent has a good relationship. County foresters – Fewer regulations than State timber sales, they have good foresters with whom the respondent has a good relationship and who are also flexible and can provide answers quickly.

Question 33. Which of the following is your preferred method of purchasing timber?

Table 42. Summary of the preferred method of purchasing timber (n=151). Percentages may not total 100 due to rounding error.

Method	Number of responses	Percent of responses (%)
Oral auctions	90	59.6
Sealed bid auctions	19	12.6
No preference	42	27.8

Question 33 summary: Nearly 60% of the respondents prefer oral auctions. Sealed bid auctions was the least selected option with 12.6% of the respondents preferring that option. A total of 86 respondents added a comment to indicate why they selected their purchasing preference (Appendix 12). Some of the more common themes were as follows: Oral auctions – Participants can see who they are bidding against, they don't overpay (leave money on the table) and it saves them money on sales they purchase. Sealed bid auctions – Buyers bid what they feel the timber is worth to them and do not overbid, the method provides flexibility as one does not need to be present to bid and the process is impersonal and does not cause grudge bidding against another bidder where the goal might be to stick the other bidder with higher priced timber by bidding against them. No preference – Some respondents buy directly from private owners and do not have to participate in auctions and it provides a balance between oral and sealed bid methods for all prospective buyers.

Question 34. Should public agencies continue to offer Intermediate auctions?

Table 43. Summary of the responses whether Intermediate auctions should continue to be offered by public agencies (n=142). Percentages may not total 100 due to rounding error.

Continue to offer Intermediate auctions	Number of responses	Percent of responses (%)
Yes	135	95.1
No	7	4.9

Question 34 summary: Respondents indicated a strong preference (95.1%) to continue offering intermediate sales. A total of 107 respondents added a comment to report why they indicated their preference for continuing intermediate auctions (Appendix 13). There were two common and related themes associated with continuing to offer intermediate timber sales (Yes response) -- they help small loggers and mills cannot participate in these auctions. Some respondents indicated that there is a need to redefine “small” to a lower number. The comments from the 6 respondents who indicated that public agencies should not continue to offer intermediate sales were all broad ranging (e.g., mills still back intermediate buyers to get the timber they want, timber sales should be open to everyone, they only purchase stumpage from private landowners).

Question 35. Do you support the use of online auctions by public agencies?

Table 44. Summary of the responses whether respondents support use of online auctions by public agencies (n=139). Percentages may not total 100 due to rounding error.

Support use of online auctions	Number of responses	Percent of responses (%)
Yes	29	20.9
No	110	79.1

Question 35 summary: Respondents indicated a strong disinterest (79.1%) for public agencies to offer online auctions. A total of 81 respondents added a comment to indicate why they indicated their preference (Appendix 14). Some of the more common themes were as follows: Yes, public agencies should offer online auctions – This method allows a bidder to enter their bid anytime while the auction is open and not at a specific date and time, it requires less time away from their in-woods work and it is an easier process. For those who do not want public agencies to offer online auctions – Many respondents are not comfortable being online, not everyone has a computer and thus would not be able to participate in an online auction, and there is a preference for being face-to-face to connect with others and to see who they are bidding against.

Question 36. If you are required to return to a logging site to close out a sale (e.g., close a road, install water bars), assuming that the distance is 50 miles, what is the round-trip cost to haul a dozer on a lowboy to perform the work?

Table 45. Summary of the number and percent of responses indicating the round-trip cost to haul a dozer on a lowboy back to close out a sale, assuming a distance of 50 miles (n=130).

Estimated cost (\$)	Number of responses	Percent of responses (%)	Cumulative percent (%)
< 100	0	0.0	0.0
100-199	6	4.6	4.6
200-299	13	10.0	14.6
300-399	24	18.5	33.1
400-499	22	16.9	50.0
500-599	23	17.7	67.7
600-699	8	6.2	73.8
700-799	8	6.2	80.0
800-899	9	6.9	86.9
900-999	0	0.0	86.9
1,000-1,099	9	6.9	93.8
1,100—1,199	1	0.8	94.6
1,500	5	3.8	98.5
2,500	1	0.8	99.2
3,000	1	0.8	100

Average=\$567.2, minimum = \$120, maximum = \$3,000, and median= \$490.

Question 36 summary: There was a wide range of estimated round-trip costs to haul a dozer on a lowboy to return to a logging site to close out a sale (e.g., close a road, install water bars). Fifty percent of the respondents indicated that their cost was as much as \$499 and two-thirds (67.7%) indicated that their cost was as much as \$599. The median cost was \$490.

Question 37. On a scale of 1 (strongly discourage) to 5 (strongly encourage), would you encourage members of your family or close friends to become a logger?

Table 46. Summary of the number and percent of respondents who would encourage members of their family or close friends to become a logger (1=strongly discourage, 5=strongly encourage) (n=160). Percentages may not total 100 due to rounding error.

Number and percent (%) of responses					Average response
1 (strongly discourage)	2	3	4	5 (strongly encourage)	
62 (38.8%)	30 (18.8%)	48 (30.0%)	11 (6.9%)	9 (5.6%)	2.22

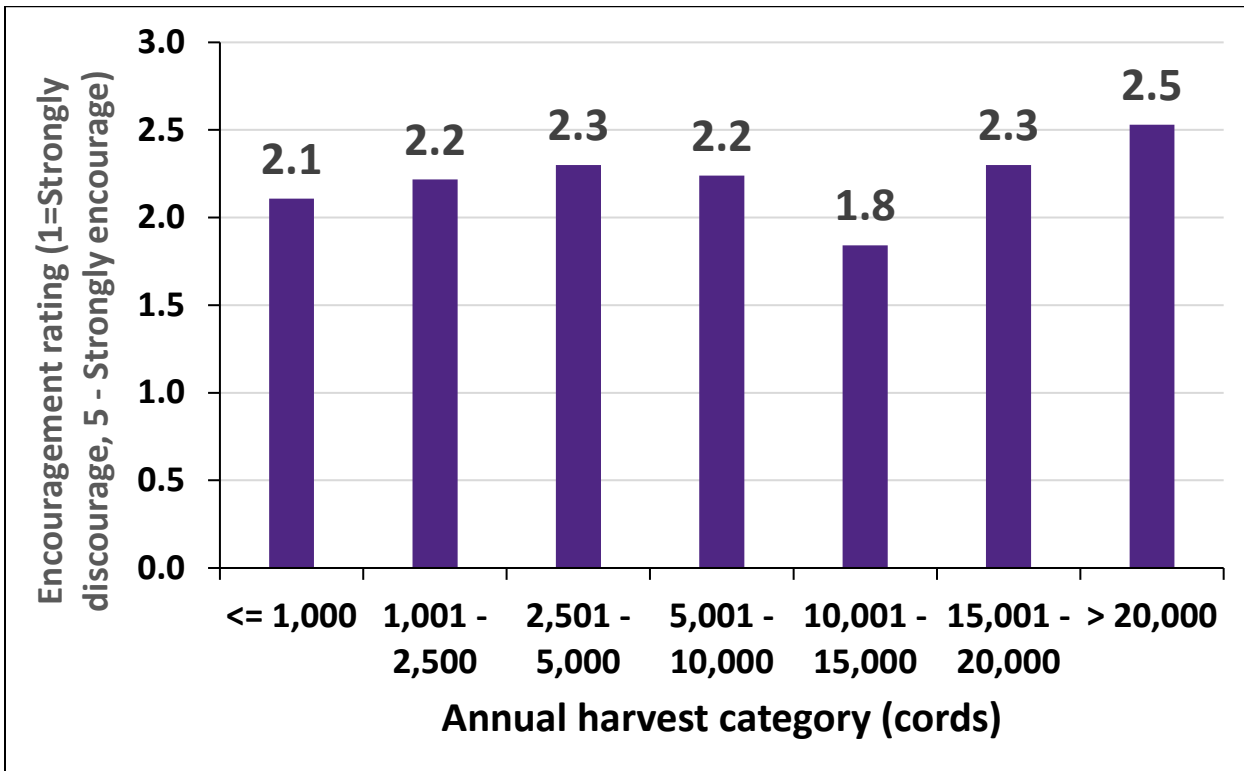


Figure 18. Average rating by annual harvest category in 2021 of whether respondents would encourage members of their family or close friends to become a logger (1=strongly discourage, 5= strongly encourage).

Question 37 summary: Over half (57.6%) of the respondents reported that they discourage (rating of 1 or 2) and only 12.5% indicated that they would encourage (rating of 4 or 5) members of their family or close friends to become a logger. The average rating was 2.2 which is closer to a rating of discouragement than it is to a neutral rating. From the 2016 survey (Blinn et al. 2019), 19.7% of the respondents indicated that they would encourage, 39.4% indicated that they would not encourage and 40.9% indicated that they were not sure that they would encourage members of their close family or friends to become a logger. The highest volume producers were most likely to encourage members of their family or close friends to become a logger. A total of 140 respondents added a comment to indicate why they indicated their preference (Appendix 15). For those who would discourage (rating of 1 or 2) a member of their family or close friends to become a logger, the most common comments were that the profit margin is small (poor return on investment) and that it requires long hours and hard work. For those who would encourage (rating of 4 or 5) a member of their

family or close friends to become a logger, the most common comments were that you have to like the lifestyle, it can be profitable and it is a family tradition.

Question 38. In the next 5 years, do you plan to grow and expand your business?

Table 47. Summary of the number and percent of respondents that plan to grow and expand their business in the next 5 years (n=158). Percentages may not total 100 due to rounding error.

Plan to grow and expand business in next 5 years	Number of responses	Percent of responses (%)
Yes	39	24.7
No	119	75.3

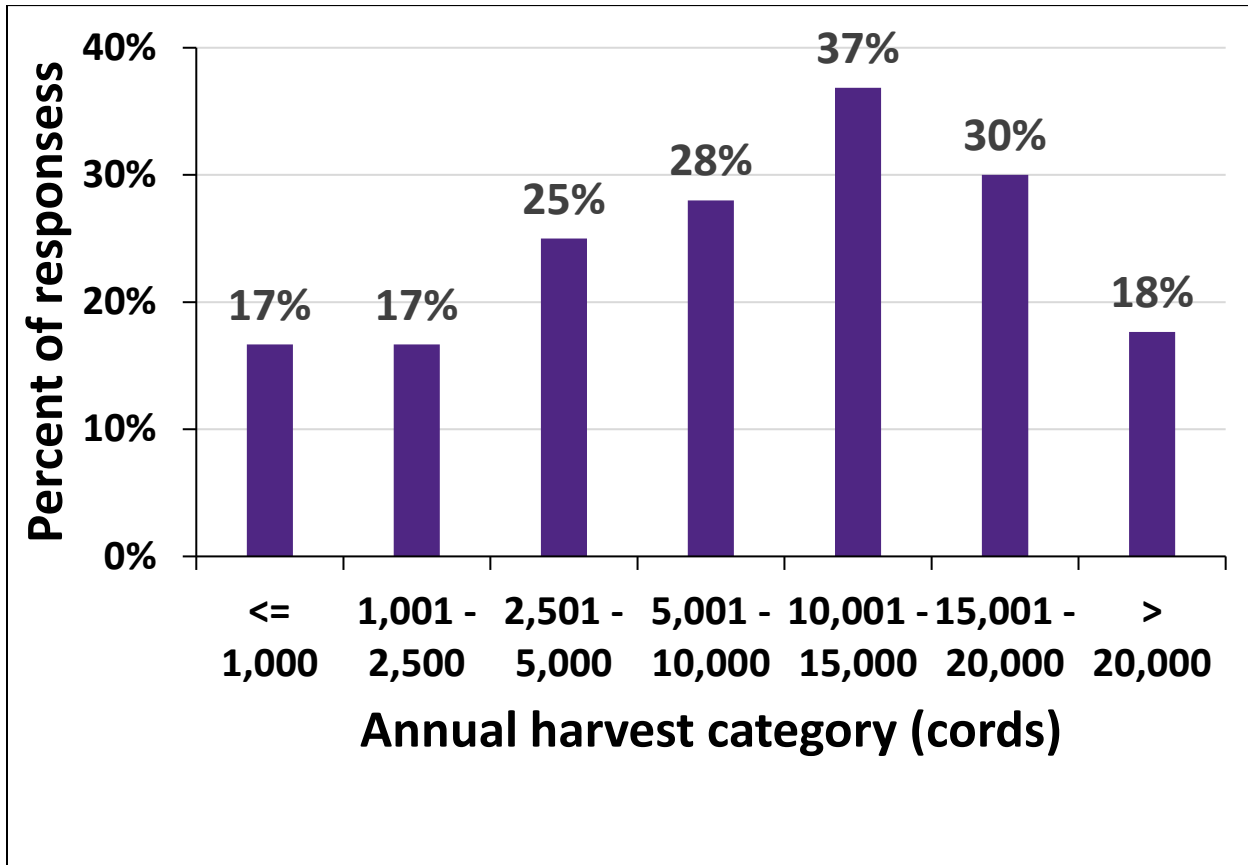


Figure 19. Percent of 2021 responses by annual harvest category that would like to grow and expand their business in the next 5 years.

Question 38 summary: All respondents were considered when summarizing this question, regardless of their response to Question 8 (Do you expect to be in the logging business 5 years from now?). Three-quarters of the respondents (75.3%) do not plan to grow and expand their business in the next 5 years. Respondents who produced up to 2,500 and more than 20,000 cords were least likely to indicate that they planned to grow and expand their business in the next 5 years.

Question 39. For respondents who replied “Yes” to Question 38 (In the next 5 years, do you plan to grow and expand your business?), do you think you will face the following potential obstacles in expanding your business in the next 5 years?

Table 48. For respondents that indicated ‘Yes’ to Question 38 (In the next 5 years, do you plan to grow and expand your business?), summary of percent and number of responses to potential obstacles respondents think they will face in expanding their business in the next 5 years. Percentages may not total 100 due to rounding error.

Obstacle	Number of responses	Yes	No
Difficulty hiring a quality workforce	39	36 (92.3%)	3 (7.7%)
Difficulty retaining a quality workforce	38	33 (86.8%)	5 (13.2%)
Difficulty purchasing specialized equipment	37	24 (64.9%)	13 (35.1%)
Limited access to affordable capital	37	21 (56.8%)	16 (43.2%)
Limited access to sufficient timber markets	37	20 (54.1%)	17 (45.9%)
Limited access to sufficient stumpage	37	30 (81.1%)	7 (18.9%)
Other obstacles (please tell us) ¹	8		

¹Respondents who reported “Other” obstacles included stumpage prices (1 response), getting the word out to landowners to manage their forestland (1 response), stubbornness to give up (1 response), Huber mill must open for them to expand (1 response), limited access to affordable trucking (1 response), government restrictions on timber sales (1 response), high fuel costs compared to payment from mills (1 response), and mills should not be able to outbid against loggers (1 response).

Question 39 summary: At least 50% of the respondents indicated “Yes” to all the obstacle options included within the survey, Difficulty hiring a quality workforce (92.3%), difficulty retaining a quality workforce (86.8%) and limited access to sufficient stumpage (81.1%) were the three most frequently reported obstacles.

Question 40. If a whole-tree chip market developed in the next 5 years, would you ...

Table 49. Summary of the number and percent of respondents who would invest in specialized equipment and add employees if a whole-tree chip market developed in the next 5 years. Percentages may not total 100 due to rounding error.

Would they ...	Number of responses	Yes	No
... invest in specialized equipment to take advantage of it?	150	28 (18.7%)	122 (81.3%)
...add employees to take advantage of it?	131	19 (14.5%)	112 (85.5%)

Question 40 summary: If a whole tree chip market developed in the next 5 years, more than four out of five respondents would not invest in specialized equipment to take advantage of the market and would not add employees to take advantage of this market.

Question 41. As forestry and logging evolve, new opportunities may emerge which could allow a business to diversify its operations. On a scale of 1 (not interested) to 5 (very interested), how interested are you in diversifying your operation for the following options?

Table 50. Summary of the number and percent of respondent interest in diversifying their operation (1=not interested, 5=very interested). Percentages may not total 100 due to rounding error.

Diversification option	Total number of responses	Average response	1 (Not interested)	2	3	4	5 (Very interested)
Reforestation and site preparation	154	2.3	68 (44.2%)	17 (11.0%)	40 (26.0%)	17 (11.0%)	12 (7.8%)
Chemical application	154	1.5	111 (72.1%)	22 (14.3%)	16 (10.4%)	3 (1.9%)	2 (1.3%)
Road/trail construction and maintenance	156	3.0	34 (21.8%)	14 (9.0%)	53 (34.0%)	32 (20.5%)	23 (14.7%)
Fire suppression and rehabilitation	154	2.5	52 (33.8%)	23 (14.9%)	40 (26.0%)	21 (13.6%)	18 (11.7%)
Shearing and timber stand improvement	156	2.6	52 (33.3%)	19 (12.2%)	38 (24.4%)	29 (18.6%)	18 (11.5%)

Question 41 summary: On average, most respondents are not interested in diversifying their operations for any of the five options noted in the survey. Road/trail construction and maintenance was the highest rated option with an average score of 3.0 (neutral level of interest). The lowest rated option was for chemical application which averaged 1.5 (a rating of 1 was the lowest possible and indicated ‘not interested’).

Question 42. Invasives are threatening our ability to maintain healthy forests.

Table 51. Summary of the number and percent of respondent thoughts concerning learning more about and willingness to help prevent the spread of invasive species. Percentages may not total 100 due to rounding error.

Question	Number of responses	Yes	No
Are you interested in learning to identify forest invasives?	154	118 (76.6%)	36 (23.4%)
Are you willing to help prevent their spread?	152	137 (90.1%)	15 (9.9%)

Question 42 summary: At least three-quarters of the respondents are interested in learning more about forest invasives (76.6%) and are willing to help prevent their spread (90.1%).

Question 43. Trees absorb atmospheric carbon and lock it up into wood that can be made into paper and other products.

Table 52. Summary of the number and percent of responses about respondent thoughts concerning forestry’s role in reducing atmospheric carbon and if carbon markets are good for the future of forestry. Percentages may not total 100 due to rounding error.

Question	Number of responses	Yes	No	Don’t know
Do you feel that forestry can play a role in reducing atmospheric carbon?	159	109 (68.6%)	7 (4.4%)	43 (27.0%)
Do you think that carbon markets, such as selling carbon credits for doing something different to absorb or store more carbon, are good for the future of the industry?	155	30 (19.4%)	49 (31.6%)	76 (49.0%)

Question 43 summary: About two-thirds of the respondents feel that forestry can play a role in reducing atmospheric carbon (68.6%). A much smaller percentage think that carbon markets, such as selling carbon credits for doing something different to absorb or store more carbon, are good for the future of the industry (19.4%). For both questions, many respondents did not know how best to answer the question.

Question 44. Weather data suggest that Minnesota winters are getting shorter and milder.

Table 53. Summary of the number and percent of responses about whether recent weather patterns have impacted a respondent’s logging business.

Question	Number of responses	Yes	No	Don’t know
Have recent weather patterns impacted your logging operations?	158	84 (53.2%)	65 (41.1%)	9 (5.7%)

If yes, how are you adjusting your operations?—Of the 71 written responses (Appendix 16), the most common adjustments made to their operations were to add tracks or wide tires to their feller-buncher(s) and/or skidder(s) equipment, they spent more time freezing sites, they worked harder and/or more days during the week and/or longer hours, and they purchased fewer low ground (wetland) timber sales.

If yes, what help do you need to adjust your operations to recent weather patterns? – Of the 51 written responses (Appendix 17) , the most common were that mills should increase their delivered price for wood they purchase, more summer sales need to be set up to compensate for the declining winter conditions, more extensions are needed on timber sales, and they need to get an earlier start on building winter roads and freezing sites and/or agencies need to build better winter roads,

Question 44 summary: About half of the respondents (53.2%) indicated that recent weather patterns have impacted their logging operations while 41.1% indicated that their operations have not been impacted. A variety of responses were provided to the two questions by those who responded that recent weather patterns have impacted their logging business.

Question 45. For each of the following technologies, please indicate whether you already have it available in your home or office for business use or if you plan to adopt it

Table 54. Summary of the number and percent of responses whether respondents already have and/or want various home/office or in-woods technologies.

Technology	Number of responses	Have it		Number of responses	Want it	
		Yes	No		Yes	No
Home or office						
High speed or broadband internet	152	119 (78.3%)	33 (21.7%)	38	19 (50.0%)	19 (50.0%)
Dial-up internet	135	21 (15.6%)	114 (84.4%)	78	1 (1.3%)	77 (98.7%)
Email	155	140 (90.3%)	15 (9.7%)	31	16 (51.6%)	15 (48.4%)
Smartphone	154	134 (87.0%)	20 (13.0%)	31	17 (54.8%)	14 (45.2%)
Flip phone	141	28 (19.9%)	113 (80.1%)	58	6 (10.3%)	52 (89.7%)
Geographic Information System (GIS)	148	73 (49.3%)	75 (50.7%)	51	24 (47.1%)	27 (52.9%)
Computer	155	140 (90.3%)	15 (9.7%)	30	13 (43.3%)	17 (56.7%)
Fax	141	56 (39.7%)	85 (60.3%)	59	7 (11.9%)	52 (88.1%)
Electronic contracting and signing	148	70 (47.3%)	78 (52.7%)	51	10 (19.6%)	41 (80.4%)
Other (please specify)	0	0 (0.0%)	0 (0.0%)	0	0 (0.0%)	0 (0.0%)
In woods						
Global Positioning System (GPS)	144	83 (57.6%)	61 (42.4%)	58	28 (48.3%)	30 (51.7%)
Mobile mapping	143	86 (60.1%)	57 (39.9%)	54	25 (46.3%)	29 (53.7%)
Landview	134	56 (41.8%)	78 (58.2%)	57	25 (43.9%)	32 (56.1%)
Drone	137	19 (13.9%)	118 (86.1%)	78	28 (35.9%)	50 (64.1%)
Other (please specify)						
Avenza	4	3				
OnX Maps or other georeferenced maps	2	1	1			
Airplane	1	1				

Question 45 summary: More than 75% of the respondents have a computer (90.3%), and/or email (90.3%), and/or smartphone (87.0%) and/or high speed or broadband internet (78.3%) in their home or office for business use. None of the other technologies were reported to be available by 50% or more of the respondents in their home or office for business use. Smart phones (54.8%), email (51.6%) and high speed or broadband internet (50.0%) were the only technologies which at least 50% of the respondents plan to add in their home or office use for business use. Mobile mapping (60.1%) and GPS (57.6%) were the only two

technologies identified as being used by at least 50% of the respondents for in-woods use. There was less than 50% interest to add any of the technologies for in-woods use.

Question 46. If you have additional comments on the logging industry, please tell us.

Question 46 summary: Thirty-one (31) individuals provided additional comments (Appendix 18) on a range of topics. The most common themes related to concerns about a) their rising costs to own and operate their business without a commensurate increase in their delivered price received from mills, b) the need for more markets for their harvested wood, c) there is a shortage of labor to help with in-woods operations, d) concerns about regulations that hurt the industry, and e) the mills do not help small businesses.

Summary

Logging businesses are an important component of Minnesota's wood supply chain. If logging businesses are not healthy, it's difficult for any other sector in the wood supply chain to be healthy for very long. Surveys of Minnesota logging businesses have been conducted periodically since the late 1970s and more recently on a five-year interval with the most recent survey in 2022, assessing various items in 2021 and looking into the future.

Many of the findings reported here mirrored those from the 2016 (Blinn et al. 2019) and 2011 (Blinn et al, 2014) surveys. For example:

- the average age of logging business owners and their in-woods and over-the-toad equipment continues to increase,
- while about a quarter of the businesses annually produce up to 1,000 cord equivalents, cumulatively they produce about 1% of the total volume reported,
- the 18% of businesses that annually produce more than 15,000 cord equivalents cumulatively produce 62% of the total volume reported,
- about one-quarter of the businesses indicated that they don't expect to be in business in five years (note the authors have no way of knowing if those businesses will actually go out of business within 5 years),
- more than half of the total cords equivalents were reported to be harvested during the winter,
- county forests, private woodlands and state forests are the most common sources of stumpage,
- feller-bunchers and grapple skidders are the common equipment configuration, and
- most businesses operate within 60 miles of their business location and have an average one-way travel distance from their timber harvest sites to their mills or 90 miles or less.

On average, small (harvest up to 2,500 annual cord equivalents) and large (harvest more than 15,000 annual cord equivalents) logging business owners tend to be different in several of the following ways:

- The owners of smaller businesses tend to be older and to have older equipment. As equipment ages, it is more susceptible to the need for maintenance and repairs, reducing productive machine hours. However, that machinery is likely paid off so downtime due to machine unavailability is less of a problem.
- Smaller businesses tend to have more difficulty accessing capital to facilitate business growth and job creation that can help a business succeed. Limited access to capital can cause a business to want to keep their equipment longer.
- Smaller business owners are less likely to be in the logging business in 5 years. However, for those small business owners who expect to stay in the business, they are more likely to increase their annual harvest volume.
- A shortage of truck drivers affected larger businesses more than small businesses. The shortage of truck drivers was reported to be related to low pay for log truck drivers as compared to other driving opportunities they had available and laziness of drivers.
- The closure of pulp and paper mills in Duluth (MN), Park Falls (WI) and/or Wisconsin Rapids (WI) had a more negative impact on large businesses due to the loss of those markets.

- Larger volume producers are more likely to encourage members of their family or close friends to become a logger.

Businesses which reported producing up to 1,000 cord equivalents in 2021 focus nearly 60% of their procurement on tracts which are 10 acres and smaller. While larger volume businesses will also harvest these tracts, they may be less likely to do so unless the tract contains high-value timber or is near an adjacent timber sale they are already operating on as they may not be able to cover their costs. If there is loss of these small businesses, management on small forested tracts may become more difficult.

Looking at the survey results, there are some potential educational opportunities for interested business owners and/or their employees as noted below.

- One quarter of the respondents do not know if forestry can play a role in reducing atmospheric carbon. Almost half of the respondents do not know if carbon markets are good for the forest products industry. Perhaps some respondents do not know much about atmospheric carbon or carbon markets and thus could not make an informed decision. Addressing this as a part of a weather-related training could help participants learn more about the role of forestry and carbon markets in reducing atmospheric carbon and the associated pros and cons of each.
- Slightly more than half of the respondents indicated that recent weather patterns had affected their logging business. A course could address ways in which a business could plan for/adapt to any weather related changes (e.g., warmer winters, more intense storms during the summer). As some owners have already taken steps to adapt to changing weather patterns, a session could include small group discussions where participants share ideas about what they have tried and how that has/hasn't helped them maintain their operational productivity.
- While there is a relatively high level of access to many home or office technologies (e.g., internet, email, smartphones), there is a lower level of in-woods technologies being used. Hands-on, field-based courses that introduced Global Positioning Systems (GPS), mobile mapping and/or use of drones could increase their use.
- With only 1 in ten respondents willing to encourage members of their family or close friends to become a logger, educational opportunities may exist around the areas of business succession planning, workforce development, and efforts current business owners might implement to address the barriers identified. Comparing the MN logging industry's opinion regarding recommending entry into the field to that of agriculture, construction, and other trades may help identify tools to help improve the opinions of current and future logging operation owners.

Open-ended comments expressed concerns about the lack/loss of markets, difficulty in securing labor, rising costs for everything (e.g., stumpage, equipment, parts, fuel, labor), delivered prices which are relatively flat, regulations which hurt the industry and displeasure that mills are increasing their competition for stumpage at auctions as that takes away potential timber sales from small businesses. Many of those issues were identified in previous surveys (e.g., Blinn et al. 2014, 2019).

Thoughts for Future Surveys

In no particular order of importance, the following are thoughts about this survey and potential improvements for future surveys.

- The voice shot message sent out as a part of the last contact with nonrespondents seemed to boost the response rate and should be continued in the future.

- Question 17 – The data about number of sales partially completed can be deleted as it does not add to the analysis.
- Question 25 – Strongly consider deleting all of this question. The off-road fuel responses from the current survey are very different from the two previous surveys. In each of the three surveys, the minimum and maximum fuel consumption/cord values have a large range before conducting the outlier analysis, suggesting that responses are wild guesstimates and aren't closely tracked. For example, in the 2021 survey, the range of fuel consumption/cord was 0.011 – 250 gallons/cord). Also, it is unknown whether any of the on-road fuel reported was for hauling all of the material produced within their business or if they also hauled for others. Consider adding a question to clarify if all of their over-the-road fuel consumption was for hauling wood that their business harvested (e.g., what percent of your over the road fuel consumption was for hauling wood harvested by your business?).
- Consider adding a question about challenges or concerns their business or logging industry in general is facing. Or, a question about training/information needs, efforts they have made to attract new logging employees, or the number and average age or range of ages of their in-woods employees.
- Avoid surveying the entire MLEP membership too often as that could have a negative impact on response rates for this 5-year survey.
- Georgia has been surveying its loggers since 1987 in 5-year intervals. Their survey fits on one two-sided sheet of paper. Their 2022 survey includes 37 questions, many of which can be answered by checking a box. Interestingly, while the survey appears to be short (only two pages), which could increase response rates, historically their response rate is 20-30% (it was 22% in 2022).

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Appendices

Appendix 1. Minnesota 2022 logging business owner survey for the 2021 calendar year.

Minnesota 2022 Logging Business Owner Survey



Minnesota 2022 Logging Business Owner Survey

We would like to begin with some questions about your logging business for calendar year 2021. All responses will be kept anonymous and used only in summary form.

1. In what county is your business based?

2. As of 2021, how many years has this business been in operation?

Years

3. In 2021, how would you rate the profitability of your business?

- Very unprofitable
- Unprofitable
- Broke even
- Profitable
- Very profitable

4. Compared to 2016, how would you rate your logging businesses' profitability in 2021?

- Much worse in 2021 than in 2016
- Slightly worse in 2021 than in 2016
- Same in 2021 as in 2016
- Slightly better in 2021 than in 2016
- Much better in 2021 than in 2016
- Was not in business in 2016

5. In general, how difficult is it for your business to access capital, such as loans and letters of credit?

- Very easy
- Somewhat easy
- A little easy
- Neither easy nor difficult
- A little difficult
- Somewhat difficult
- Very difficult

6. In 2021, in total, how much capital was invested in your logging business?

\$

7. What percentage of that capital was invested in each of the following categories? If none, please write "0." These should total 100%.

	Percent of capital
a. Harvesting equipment	
b. Off-road transport equipment	
c. Over-the-road hauling equipment	
d. Stumpage	
e. Staff training	
f. Other (please specify)	
Total	100%

8. Do you expect to be in the logging business 5 years from now?

- Yes → Go to question 10
- No

9. Why do you expect you will not be in the logging business 5 years from now?

Please continue to Question 7 above. ➔

10. Looking into the future, what are the general plans for your business? Only check one response.















- Increase annual volume harvested
- Maintain annual volume harvested
- Decrease annual volume harvested







11. For each owner of this business, what is the owner's age in years? Also, not necessarily only as the owner, how many years in total has each owner worked in the logging industry?

	Age of owner in years	Total number of years in logging industry
a. Owner A (You)		
b. Owner B (if applicable)		
c. Owner C (if applicable)		
d. Owner D (if applicable)		
e. Owner E (if applicable)		

(Write in additional owners below if necessary)

12. In 2021, not including older pieces of machinery that were non-operational or used only for spare parts, how many of the following pieces of in-woods equipment did you own and actively use? If none, write "0" in the "Number of pieces" column. Also, please indicate the age in years of the newest piece of equipment for each category.

		Number of pieces	Age of newest piece
a. Chainsaws / hand delimiting			
b. Cut-to-length (CTL) harvesters			
c. Feller-bunchers			
d. Cable skidders			
e. Grapple skidders			
f. Forwarders			
g. Mechanical delimiters			
h. Chippers			
i. Grinders			
j. Slashers			
k. Flail debarkers			
l. Loaders			
m. Bulldozers			
n. Other road building and road maintenance equipment			
o. Other (please specify):			

13. In 2021, not including older pieces of machinery that were non-operational or used only for spare parts, how many of the following pieces of over the road equipment did your logging <u>business own and actively use</u>? If none, please write "0."				
			Number of pieces	Age of newest piece
a.	Tractor (semi)			
b.	Pulp/sawtimber trailer			
c.	Self-loading truck/trailer			
d.	Lowboy			
e.	Pole trailer			
f.	Van/walking floor trailer			
g.	Other (please specify)			

We would like to ask some questions about the timber you harvested in calendar year 2021. In answering these questions, please provide your best estimates.

14. In 2021, what was the total volume of timber you harvested? Please use the units that best fit your recollection. For example, "10,000 cords and 20,000 board feet."		
Volume		
a.		Cords
b.		Thousand board feet (MBF)
c.		Green tons (whole-tree chips)
d.		Green tons (clean chips)
e.		Green tons (biomass)
f.		Other unit (please specify):

15. In 2021, of the timber you harvested, what percent was hardwoods and softwoods? These should total 100%.	
Percent of volume	
a.	Aspen
b.	Maple
c.	Ash
d.	Birch
e.	Other hardwoods
f.	Pine
g.	Spruce
h.	Balsam fir
i.	Tamarack
j.	Other softwoods
Total	
100%	

Please continue to Question 15 to the right. ➤

16. In 2021, of the timber you harvested, what percentage of your stumpage was purchased by others, such as a mill, and what percentage was purchased by you? These should total 100%.

	Percent
Stumpage purchased by others	
Stumpage purchased by you	
Total	100%

17. In 2021, how many of your timber sales were in each of the following acreage categories? If none, please write in "0"

	Number of sales completed	Number of sales partially completed
a. 0-5 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		

18. In 2021, what percentage of your total harvest volume did you harvest in each season? If none, please write in "0." These should total 100%.

	Percent of volume
Winter (December – February)	
Spring (March – May)	
Summer (June – August)	
Fall (September – November)	
Total	100%

19. In 2021, what percentage of your harvest volume was felled by each of the following felling methods? If none, please write "0." These should total 100%.

	Percent of volume
a. Chainsaw	
b. Cut-to-length (CTL) harvester	
c. Drive-to-tree feller-buncher	
d. Reach-to-tree feller-buncher	
e. Other (please specify)	
Total	100%
<input type="radio"/> Did not fell timber	

Please continue to Question 18 above. ➔

20. In 2021, what percentage of your harvest volume was transported to the landing by each of the following methods? If none, please write "0." These should total 100%.

	Percent of volume
a. Cable skidder	
b. Grapple skidder	
c. Forwarder	
d. Other (please specify below)	
Total	100%
e. Did not transport timber to the landing	

21. In 2021, what was your average one-way travel distance, in miles, from your primary business location to your timber harvest sites?

30 miles or less
 31 to 60 miles
 61 to 90 miles
 91 to 120 miles
 121 to 150 miles
 More than 150 miles

22. In 2021, what was your average one-way travel distance, in miles, from your timber harvest sites to your mill(s)?

30 miles or less
 31 to 60 miles
 61 to 90 miles
 91 to 120 miles
 121 to 150 miles
 More than 150 miles

Please continue to Question 23 above. ➔

23. In 2021, what percentage of your harvest volume was transported to mills by trucks you own, and what percentage by trucks you contracted? If none, please write "0." These should total 100%.

	Percent of volume
Owned	
Contracted	
Total	100%

24. In 2021, did a shortage of truck drivers negatively impact your business?

Yes – What do you think caused the shortage of truck drivers in 2021?

 No

25. In 2021, about how many gallons of fuel did your logging business use?

	No. of gallons
Off-road fuel purchases	
On-road fuel purchases	

Now we would like to ask some questions about the impact of the COVID-19 pandemic and the loss of markets on your business in calendar year 2021. In answering these questions, please provide your best estimates.

26. In 2021, due to the COVID-19 pandemic, how did the profits of your logging business change?

Increased a lot
 Increased somewhat
 Increased a little
 No change to profits
 Decreased a little
 Decreased somewhat
 Decreased a lot

27. In 2021 did you apply to and receive funding from the following financial relief programs? Please circle the appropriate response.

		Did you apply?		Did you receive funding?	
		Y	N	Y	N
a.	Paycheck Protection Program (PPP)				
b.	Pandemic Assistance for Timber Harvesters and Haulers (PATHH)				
c.	Economic Injury Disaster Loan				
d.	SBA Express Loan Bridge				
e.	SBA Debt Relief				
f.	Coronavirus Food Assistance Program				

28. Which of the following mill closure-related assistance programs did you take advantage of in 2021 for the timber sales you purchased?

Sale extensions
 County turnbacks
 State turnbacks
 Other (please specify)

None

29. In 2021, how much did the recent closure of pulp and paper mills in Duluth, Park Falls and/or Wisconsin Rapids have a negative impact on your logging business?

Not at all
 A little
 Somewhat
 Quite a bit
 A great deal

Please continue to Question 30 above. ➔

Now we would like to ask some questions about your timber sales and timber sale administration.

30. In 2021, what percentage of your harvest volume occurred on land in the following ownership categories? If none, please write in "0." These should total 100%.

	Percent of volume
a. Private woodlands or non-industrial forests	
b. Industrial or corporate owned forests	
c. National forests	
d. State forests	
e. County forests	
f. Municipal forests	
g. Tribal forests	
h. Other (please specify)	
Total	100%

31. On a scale of 1 (not important) to 5 (very important), how important are each of the following factors in terms of their impact on your decision to purchase a timber sale? Please circle the appropriate number.

a. Bid process	1	2	3	4	5
b. Payment process	1	2	3	4	5
c. Contract language	1	2	3	4	5
d. Level of harvesting supervision / administration	1	2	3	4	5
e. Personality of sale administrator	1	2	3	4	5
f. Dispute resolution	1	2	3	4	5
g. Forester accessibility	1	2	3	4	5
h. Forester flexibility (use of discretion)	1	2	3	4	5

32. The ease of purchasing and harvesting timber, resolving timber disputes and working with staff may impact who you purchase timber from. Thinking about all of the landowner groups you purchase timber from, which is easiest to work with and why?

Which group is easiest to work with?	
Why is that group easiest to work with?	

33. Which of the following is your preferred method of purchasing timber? Please indicate why you selected that response option.

Oral auctions
 Sealed bid auctions
 No preference

Why is that your preferred option?

34. Should public agencies continue to offer Intermediate auctions? Please indicate why you selected that response option.

Yes
 No

Why is that your preferred option?

35. Do you support the use of online auctions by public agencies? Please indicate why you selected that response option.

Yes
 No

What is your preferred option?

36. If you are required to return to a logging site to close out a sale (e.g., close a road, install water bars), assuming that the distance is 50 miles, what is the round-trip cost to haul a dozer on a lowboy to perform the work?

Cost (\$)	
-----------	--

Please continue to Question 35 above. ➤

Now we would like to ask some questions about the future plans of your logging business.

37. On a scale of 1 (strongly discourage) to 5 (strongly encourage), would you encourage members of your family or close friends to become a logger? Please indicate why you selected that rating.

Would you encourage members of your family or close friends to become a logger?

1 2 3 4 5

Why did you select that rating?

38. In the next 5 years, do you plan to grow and expand your business?

Yes

No → Go to question 40

39. Do you think you will face the following potential obstacles in expanding your business in the next 5 years?

Difficulty hiring a quality workforce Y / N

Difficulty retaining a quality workforce Y / N

Difficulty purchasing specialized equipment Y / N

Limited access to affordable capital Y / N

Limited access to sufficient timber markets Y / N

Limited access to sufficient stumpage Y / N

Other obstacles (please tell us)

40. If a whole-tree chip market developed in the next 5 years, would you ...

...invest in specialized equipment to take advantage of it?

Yes No

...add employees to take advantage of it?

Yes No

Please continue to Question 41 above ↗

41. As forestry and logging evolve, new opportunities may emerge which could allow a business to diversify its operations. On a scale of 1 (not interested) to 5 (very interested), how interested are you in diversifying your operation for the following options? Please circle the appropriate number.

a. Reforestation and site preparation	1	2	3	4	5
---------------------------------------	---	---	---	---	---

b. Chemical application	1	2	3	4	5
-------------------------	---	---	---	---	---

c. Road/trail construction and maintenance	1	2	3	4	5
--	---	---	---	---	---

d. Fire suppression and rehabilitation	1	2	3	4	5
--	---	---	---	---	---

e. Shearing and timber stand improvement	1	2	3	4	5
--	---	---	---	---	---

Now we would like to ask some questions about issues which may impact Minnesota's forests.

42. Invasives are threatening our ability to maintain healthy forests. Please circle your response to each question below.

Are you interested in learning to identify forest invasives?

Yes No

Are you willing to help prevent their spread?

Yes No

43. Trees absorb atmospheric carbon and lock it up into wood that can be made into paper and other products. Please circle your response to each question below.

Do you feel that forestry can play a role in reducing atmospheric carbon?

Yes No Don't know

Do you think that carbon markets, such as selling carbon credits for doing something different to absorb or store more carbon, are good for the future of the industry?

Yes No Don't know

44. Weather data suggest that Minnesota winters are getting shorter and milder. Please circle your response to the question below.

Have recent weather patterns impacted your logging operations?
Yes No Don't know

If yes, how are you adjusting your operations?

If yes, what help do you need to adjust your operations to recent weather patterns?

Now we would like to ask some questions about your use of technology and ask you to provide any additional comments.

45. For each of the following technologies, please indicate whether you already have it available in your home or office for business use or if you plan to adopt it. Please circle the appropriate response

Home or Office			In-woods		
Technology	Have it	Want it	Technology	Have it	Want it
a. High speed or broad band internet	Y N	Y N	k. Global Positioning System (GPS)	Y N	Y N
b. Dial-up internet	Y N	Y N	l. Mobile mapping	Y N	Y N
c. Email	Y N	Y N	m. Landview	Y N	Y N
d. Smartphone	Y N	Y N	n. Drone	Y N	Y N
e. Flip phone	Y N	Y N	o. Other (please specify)	Y N	Y N
f. Geographic Information System (GIS)	Y N	Y N			
g. Computer	Y N	Y N			
h. Fax	Y N	Y N			
i. Electronic contracting and signing	Y N	Y N			
j. Other (please specify)	Y N	Y N			

46. If you have additional comments on the logging industry, please tell us.

Thank you for your help with this study!

**Please return your completed questionnaire
in the postage-paid envelope provided to:**

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

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

March 28, 2022

Dear Logging Business Owner:

In a couple of weeks, you will receive a survey that is being conducted to better understand the 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 Minnesota Logger Education Program, the Minnesota Timber Producers Association, Minnesota Forest Industries, and the Sustainable Forestry Initiative. A “double-blind” process will be used to ensure respondents are only known by survey code.

Your participation in this survey is highly encouraged. A report summarizing the results of the study will be available at www.mlep.org and [join reports dating back to the 1970s.](#)

If you have any questions about this study, please don't hesitate to contact me.

Sincerely,



David A. Nolle
Executive Director
David.Nolle@mlep.org | 218-391-9278 CELL | 218-879-5633 OFFICE

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

April 4, 2022

«CompanyName»
«Address1»
«Address2»
«City», «State» «Zip»

Dear Logging Business Owner:

A healthy logging industry is critical to Minnesota's forestry sector and sustaining our forests. Many of our Minnesota communities and businesses are dependent on the health of the entire industry. For that reason, we would like your help to understand the status of your logging business so that we can compile an assessment of Minnesota's logging industry.

As a logging business owner identified by 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, Minnesota Forest Industries, the Sustainable Forestry Initiative, 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. The survey should take about 30 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 do not receive reminders once your completed questionnaire has been received by us. Your participation in this survey is voluntary and you do not have to answer all the questions. However, your input is important. When complete, a report summarizing the results of the study will be available at www.mlep.org. Past reports are available at mlep.org for your review.

If you have any questions about this study, please do not hesitate to contact me at (612) 624-3788 or cblinn@umn.edu

Thank you very much for helping with this important study!

Sincerely,



Charlie Blinn
Professor and Extension Specialist

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

Dear Logging Business Owner:

April 11, 2022

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

P.S. Responses received by May 9 will be entered into a chance to receive an annual subscription to OnX Hunt – a great new tool that many loggers have found helps them locate boundaries, develop site plans, and identify private vs public lands.

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

April 25, 2022

Company
Address 1
Address 2
City, State ZIP

Dear Logging Business Owner:

A survey was recently 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 (MLEP) and the Minnesota Timber Producers Association to understand the current status of Minnesota's logging industry. 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 20-30 minutes to complete.

All responses will be kept confidential. The code number on your survey is used only to make sure that you do not 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, your input is important. 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 do not hesitate to contact me at: (612) 624-3788 or cblinn@umn.edu.

Your participation is greatly appreciated!

Sincerely,



Charlie Blinn

Professor and Extension Specialist

Enclosures

P.S. Responses received by May 9, 2022 will be entered into a chance to receive an annual subscription to OnX Maps— a great new tool that many loggers have found helps them locate boundaries, develop site plans, and identify private vs public lands.

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

May 9, 2022

{ADDRESS BLOCK}

Dear {Merged First and Last}:

I am writing to you about the survey on Minnesota's logging industry which you should have received on or around April 6, 2022. 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) 879-5633 or David.Nolle@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, the Associated Loggers and Contract Truckers, the Minnesota Timber Producers Association, Minnesota Forest Industries and the Sustainable Forestry Initiative to understand the current status of Minnesota's logging industry. The survey should take about 30 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, your input is important. When complete, a report summarizing the results of this and previous studies will be available at www.mlep.org

If you have any questions about this study, please contact me.

Your participation is greatly appreciated!

Sincerely,



David A. Nolle
Executive Director

David.Nolle@mlep.org | 218-391-9278 CELL | 218-879-5633 OFFICE

P.S. Completed surveys received by {Date} will be entered into a drawing to receive one of ten one-year free subscriptions to onX Maps – a great smartphone-based tool that many loggers and foresters have found helps them find boundaries, look at topography, delineate private vs public lands, and identify private landowners.

Appendix 7. VoiceShot sent by Dave Nolle on May 9, 2023 via a recorded phone message using www.voiceshot.com to non-respondents, timed to be received around the same time as the final letter was delivered.

Hello, This is Dave Nolle the executive director from Minnesota Logger Education program calling current and past logging business owners about the survey on Minnesota's logging industry which your logging business should have received on or around April 6, 2022. 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, contact me at (218) 879-5633 and leave your name, company name and mailing address. If you would like your phone number removed from future reminder calls, please leave us a message at 218-879-5633 indicating such.

Although we have received many 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 (MLEP), Minnesota Forest Industries, the Sustainable Forestry Initiative, and the Minnesota Timber Producers Association to understand the status of Minnesota's logging industry. The survey should take about 30 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, your input is important. 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 contact me.

Appendix 8. Listing of out-of-pocket expenses for mailing the survey through the Minnesota Logger Education Program.

2022 Survey of 2021 Logger Sentiment in Minnesota												
Project Accounting												
Item	Mailing	Description	Vendor	Budgeted			Actual (in-kind)			Actual (hard costs)		
				QTY	Rate	Amount	QTY	Rate	Amount	QTY	Rate	Amount
Layout/Design	3/28/2022	Notice Postcard (Nolle)	MLEP	0.25	\$80.00	\$ 20.00	0.25	\$80.00	\$ 20.00			
Layout/Design	4/4/2022	Owner Survey	MLEP	3	\$80.00	\$ 240.00	3	\$80.00	\$240.00			
Layout/Design	4/4/2022	Owner Survey	JS Print Group	0						1	\$334.20	\$ 334.20
Layout/Design	4/4/2022	Reply Envelope to Blinn	MLEP	0.25	\$80.00	\$ 20.00	0.25	\$80.00	\$ 20.00			
Layout/Design	4/4/2022	Survey Cover Letter #1 (Blinn)	MLEP	0.25	\$80.00	\$ 20.00	0.25	\$80.00	\$ 20.00			
Layout/Design	4/11/2022	Reminder Postcard (Blinn)	MLEP	0.25	\$80.00	\$ 20.00	0.25	\$80.00	\$ 20.00			
Layout/Design	4/25/2022	Second Survey Mailing (Blinn) Letter	MLEP	0.25	\$80.00	\$ 20.00	3	\$80.00	\$240.00			
Layout/Design	5/9/2022	Survey Final Letter (Nolle)	MLEP	0.25	\$80.00	\$ 20.00	0.25	\$80.00	\$ 20.00			
Layout/Design	4/30/2022	Mailpiece design Consulting	Barcodes Plus							1	\$65.00	\$ 65.00
Postage	3/28/2022	first-Class postcard stamp	USPS	400	\$0.40	\$ 160.00				557	\$0.40	\$ 222.80
		2.3 ounce 9x11 windowed flat \$1.291										
Postage	4/4/2022	postage (Nonprofit = \$.594)		400	\$1.13	\$ 451.64				557	\$1.68	\$ 934.24
Postage	4/4/2022	2 ounce first class reply stamp	USPS	400	\$0.78	\$ 312.00				557	\$0.78	\$ 434.46
Postage	4/11/2022	first-Class postcard stamp	USPS	400	\$0.40	\$ 160.00				557	\$0.40	\$ 222.80
		2.3 ounce 9x11 windowed flat \$1.291										
Postage	4/25/2022	postage (Nonprofit = \$.594)		275	\$1.13	\$ 310.50				396	\$1.56	\$ 617.76
Postage	4/25/2022	2 ounce first class reply stamp	USPS	275	\$0.78	\$ 214.50				396	\$0.78	\$ 308.88
Postage	5/9/2022	Final Letter Postage (Non-Profit rates)	Twin Ports Mailing	150	\$0.58	\$ 87.00				359	\$0.21	\$ 75.54
Printing	3/28/2022	Notice Postcard - Avery Perf 3x5 pcard 1/1,	MLEP/Amazon	400	\$0.03	\$ 12.00				557	\$0.03	\$ 16.71
		Owner Survey 1/1 11x17 to 8.5x11, 24#										
Printing	4/4/2022	digital; variable data on each page	MLEP/OfficeDepot	400	\$0.75	\$ 300.00				0	\$0.75	\$ -
		Owner Survey 1/1 11x17 to 8.5x11, 24#										
Printing	4/4/2022	digital; variable data on each page	JS Print Group	400	\$0.75	\$ 300.00				557	\$1.29	\$ 721.04
Printing	4/4/2022	6x9 reply envelopes	MLEP/OfficeDepot	400	\$0.16	\$ 64.00				557	\$0.16	\$ 89.12
Printing	4/4/2022	Shipping label production 1/0	MLEP/OfficeDepot	400	\$0.04	\$ 16.00				557	\$0.04	\$ 22.28
Printing	4/4/2022	9x11 MLEP Flat Envelope	JS Print Group	400	\$0.42	\$ 168.00				557	\$0.42	\$ 233.94
Printing	4/11/2022	Reminder Postcard (Blinn)	MLEP/Amazon	400	\$0.03	\$ 12.00				557	\$0.03	\$ 16.71
		Owner Survey 1/1 11x17 to 8.5x11, 24#										
Printing	4/25/2022	digital; variable data on last page via label	MLEP/OfficeDepot	275	\$0.95	\$ 261.25				396	\$0.95	\$ 376.20
Printing	4/25/2022	6x9 reply envelopes	MLEP/OfficeDepot	275	\$0.16	\$ 44.00				396	\$0.16	\$ 63.36
Printing	4/25/2022	Shipping label production 1/0	MLEP/OfficeDepot	275	\$0.04	\$ 11.00				396	\$0.04	\$ 15.84
Printing	4/25/2022	9x11 MLEP Flat Envelope	JS Print Group	275	\$0.42	\$ 115.50				396	\$0.42	\$ 166.32

Printing	4/11/2022	Reminder Postcard (Blinn)	MLEP/Amazon	400	\$0.03	\$ 12.00				557	\$0.03	\$ 16.71
Printing	4/25/2022	Owner Survey 1/1 11x17 to 8.5x11, 24# digital; variable data on last page via label	MLEP/OfficeDepot	275	\$0.95	\$ 261.25				396	\$0.95	\$ 376.20
Printing	4/25/2022	6x9 reply envelopes	MLEP/OfficeDepot	275	\$0.16	\$ 44.00				396	\$0.16	\$ 63.36
Printing	4/25/2022	Shipping label production 1/0	MLEP/OfficeDepot	275	\$0.04	\$ 11.00				396	\$0.04	\$ 15.84
Printing	4/25/2022	9x11 MLEP Flat Envelope	JS Print Group	275	\$0.42	\$ 115.50				396	\$0.42	\$ 166.32
Printing	5/9/2022	Survey Final Letter (Nolle)	MLEP	150	\$0.06	\$ 9.00				361	\$0.06	\$ 21.66
Printing	5/9/2022	#10 MLEP Envelope	MLEP	150	\$0.17	\$ 25.50				361	\$0.17	\$ 61.37
Production	3/28/2022	Apply first-class postcard stamp	MLEP	400	\$0.01	\$ 4.00	400	\$0.010	\$ 4.00			
Production	4/4/2022	collate, insert and seal	MLEP	400	\$0.75	\$ 300.00	0	\$0.750	\$ -	0	\$0.75	\$ -
Production	4/4/2022	Apply First-Class 2-ounce stamp & reply envelope to reply envelope	MLEP	400	\$0.01	\$ 4.00				0	\$0.01	\$ -
Production	4/4/2022	Apply postage, collate, insert, & Seal	S&A Services	0	\$0.00	\$ -				557	\$0.36	\$ 200.00
Production	4/4/2022	Pre-Sort & intro to USPS @ First Class	Twin Ports Mailing	400	\$0.06	\$ 24.00				557	\$0.12	\$ 66.84
Production	4/11/2022	Apply first-class postcard stamp	MLEP	400	\$0.01	\$ 4.00	0	\$0.010	\$ -			
Production	4/25/2022	collate, insert and Seal	MLEP	275	\$0.75	\$ 206.25	0	\$0.750	\$ -			
Production	4/25/2022	Pre-Sort & intro to USPS @ First Class	Twin Ports Mailing	275	\$0.06	\$ 16.50	0	\$0.060	\$ -			
Production	4/25/2022	Apply First-Class 2-ounce stamp & reply envelope to reply envelope	MLEP	275	\$0.01	\$ 2.75	0	\$0.010	\$ -			
Production	4/25/2022	Apply postage, collate, apply variable data label to survey, insert, & seal	S&A Services							396	\$0.51	\$ 200.00
Production		116 live answer, 172 Machine, + 65 unuccessful VoiceShot "Robo" reminder calls. (minutes used at \$.12/min)	VoiceShot							622	\$0.12	\$ 66.84
Production	5/9/2022	Survey Final Letter (Nolle) Fold & Insert	MLEP				361	0.02	\$ 7.22			
Production	5/9/2022	Survey Final Letter (Nolle)	Twin Ports Mailing	150	\$0.03	\$ 4.50				359	\$0.14	\$ 49.08
		Summary of other in-Kind hours/rates (Development, Data-Entry & Compilation, Analysis, Focus groups, Publication) (see in- kind tab)				\$ -			\$ -			
		TOTAL				\$ 3,959.89			\$ 591.22			\$ 5,602.99
Reference	2017	\$2783.56. (383 initial postcards, 383 survey mailing #1, 383 reminder postcards & 338 second survey mailing pieces)										
Prepared:	1/20/2021	DNOLLE										
Updated:	1/21/2021	DNOLLE - Added 2oz stamp rate to budget for 4/4 and 4/25										
	8/25/2022	DNOLLE - Entered actual costs and In-Kind Estimates										

Appendix 9. Listing of open-ended comments provided by respondents to Question 9 (Why do you expect you will not be in the logging business 5 years from now?), arranged by theme. Where a respondent provided multiple thoughts in their response, each portion of their insight is reported in the appropriate theme. Some respondents provided more than one reason.

Too old/Declining health/Plan to retire (23 comments)

- 71 yrs old retiring
- 80 yrs. old who knows
- Age
- Age and health problems
- Don't know for sure, age factor is becoming something to consider.
- Getting older
- May also retire
- Older & smarter
- Personal health
- Plan to retire
- Retire
- Retire
- Retire
- Retire
- Retire
- Retire from logging
- Retire from logging business
- Retired
- Retired out of logging business age, health factors
- Retiring
- Too old
- Will be 72 years young
- Will be too old

Can't make enough money/Costs too high (20 comments)

- Can't make any money. Wood too expensive to buy
- Cost of stumpage. cost of fuel
- Depends fuel is crazy parts are crazy if you can even get them
- Depends on stumpage prices and fuel costs
- Every thing has went up.
- Fuel expenses, price of maintenance, stumped, trucking
- Hopefully stump prices lower, fuel prices go down
- Little margin or none
- Money invested is too great with very little return. I work very hard to make everyone else rich. Buying wood is to[o] expensive to get, raising cost of EVERYTHING and equipment is very expensive to simply replace
- No money anymore
- No money in it
- No money to be made anymore
- No profit. Need to move on to a better job that has good insurance and some kind of retirement package
- No return on investment

- Not profitable
- Operating costs
- Price of fuel
- Unprofitable with fuel prices and labor cost
- Unsure if able to continue cost of replacing equipment is getting out of reach
- Will be broke

Difficulty in hiring labor (4 comments)

- Can't find any help
- Finding labor
- No labor force
- Unable to find quality help

Delivered prices are too low (4 comments)

- Hopefully mills pay more
- Not getting paid enough for it. (Wood)
- The mill prices have only gone down. With no raises from the mill we have no choice but to quit
- Unfair prices at mills for small logger

Lack of markets (3 comments)

- Hopefully markets will change, more markets
- Need another mill for softwood market
- Not enough outlets for wood fiber

Trucking shortage (2 comments)

- No contract trucking
- Trucking is hard to get

Someone else is taking over the business (1 comment)

- My son is taking over

Too many regulations (1 comment)

- I am getting sick of all the hoops you have to jump thru just to cut a tree like this thing I am filling out

Other (3 comments)

- Also in the cattle business
- Country will not last 2 more years
- St. Louis County running out of wood to harvest. Timber sales are not mature enough to harvest

Appendix 10. Listing of open-ended comments provided by respondents to Question 24 (In 2021, did a shortage of truck drivers negatively impact your business? If so, what do you think caused the shortage of truck drivers in 2021?), arranged by theme. Where a respondent provided multiple thoughts in their comments, each portion of their insight is reported in the appropriate theme. Some respondents provided more than one reason.

Other opportunities/ Low pay compared to other opportunities (22 comments)

- All went to the F-----g contract loggers that can pay more, because the mills pay the extra money for hauling that I don't get.
- Can't compete with wages
- Contractor trucking- many of them decided to pull belly dumps for hwy upgrades. Better pay than what a logger can pay
- Higher wages doing dirt work hauling
- Hours/ pay
- Jobs offered by gravel co. hauling on state jobs. The one contractor I talked to said if he got the bid, he would have to pay drivers \$44.00 @ hour. Also pipelines in the area
- Line 3 pipeline
- Long hours for little money
- Low wages we can't compete with other trucking firms
- Money!!!
- Not enough money
- Not very profitable
- Other job opportunities
- Others paying more (union) cost of ownership industry trucking price too little
- Pay is better hauling dirt
- Pay was too low
- Pipeline in the area
- They don't get paid enough
- Truckers complain not making enough
- Trucking rates

Lack of drivers/Laziness (21 comments)

- Can't find competent drivers that can pass drug test
- Hard to find help these days- the country is getting lazier!
- Have trucks sitting due to shortage
- Lack of drivers available
- Lack of skilled drivers
- Lack of workers
- Lack of workers
- Laziness
- Lazy asses, parents not raised kids to work anymore
- Lazy people
- Less of them
- Less truckers, older people retiring and aren't many younger people to take that place.
- Mills buying area shrinking due to shortage of drivers

- No capable drivers to hire in price range I can afford
- No younger people are replacing the retiring drivers
- Nobody seems to want to work anymore
- Nobody wanted to work
- Not too sure. Does not seem like there's a ton of qualified drivers out there. The good ones already have good jobs so you almost have to steal them from other companies
- Older guys not driving anymore
- Work ethic (none)

Rising costs/Not profitable (13 comments)

- Cost of expenses
- Cost of ownership fuel cost repair cost
- Cost to truck
- Fuel
- Fuel
- Fuel is too high
- Fuel price
- Fuel prices
- Fuel prices
- Logging wages
- Operating costs. Owner operators selling out
- Primarily money-mills haven't kept up with the rising transportation costs
- Unable to pay a competitive wage

Free government money (12 comments)

- Covid payments to people
- Covid- stimulus
- Fee government money aka COVID money
- Fee, money from govt. to be on unemployment
- Free money
- Free money from fed. Gov.
- Free money too much unemployment
- Government handing out too much money. Some people just live off others when they are ABLE to work
- Government stimulus
- Government stimulus money!
- Too much free money
- Unemployment people not wanting yet

Regulations (8 comments)

- Coming w/new cdl rules concerning required schooling
- Federal regulations
- How hard it is to get class A CDL
- Its not just a 2021 shortage, DOT requirements for drivers. Hours and conditions
- Ownership rules and regs
- Policy
- Regulations

- Regulations and difficult to get CDL

Covid-19 pandemic (5 comments)

- China flu
- Covid
- Covid 19
- Covid made them lazy
- Covid strikes

Other (10 comments)

- Distance to mill
- During the busy winter months. It was hard to find extra trucks
- Fuel was too high
- IDK
- Joe Biden
- Low timber prices
- President Biden
- Seasonal drivers
- Sometimes had to contact truck drivers 2 weeks in advance
- Very much so

Appendix 11. Listing of open-ended comments provided by respondents to Question 32 (Which ownership category is the easiest to work with and why?), arranged by ownership category. Some respondents indicated two ownership categories.

Private woodlands or non-industrial forests (27 comments)

- Cheaper
- Flexibility and less administrative nightmare
- Flexibility in putting in landings easier for logger
- Flexible
- Haven't read forestry books
- Honesty hard work = work
- I make the rules
- It's just how I get my jobs - word of mouth
- Less bullshit
- Less rules
- Meeting new people
- More reasonable
- More reasonable and don't live by an unreasonable book
- Most cutting on private is on smaller parcels and usually easy access
- Motivated for good complete operation
- Neighbors
- No forester
- The ones I have cut for were easy to work for
- Their forester's seem to have better knowledge
- They are passionate about keeping their woodlot healthy
- They have more common sense
- They usually contact me to do the work so they want me there
- They will listen & work with you
- We can see ourselves by the job we do way more profitable
- We have a great staff
- You are your own boss
- You make a plan and stick with it

Industrial or corporate owned forests (8 comments)

- Flexible
- Good foresters
- Good forester's and less reserves to work around
- Good understand of what need to be done to be efficient
- Less politics
- Not as many restrictions
- Understand loggers better
- We have the same goal get the wood cut

National forests (1 comment)

- They understand how logging works/ can't do everything by the book perfectly

State forests (16 comments)

- Clear rules and good local foresters
- DNR does not expect favors
- Everything is stated before you cut
- Forester personality
- Foresters always available if needed
- Get along
- Good foresters
- Good guys
- Less prep work for the logger
- Lines complete
- Local office rules are consistent
- More flexibility with sale contracts
- Pick the sale I want with the foresters I want
- State of Minn open sales faster
- They act as an intermediary between us and landowner
- They understand the process

County forests (58 comments)

- A better, more ideal way of proper forest management
- A little less strict
- Because it's not state
- Been working with them for years
- Better system all around
- Cause the state seems like there always out to get u
- Common sense
- Common sense
- Common sense
- Down to earth
- Easier to work with more flexible on the job
- Easy to talk to & resolve problems
- Easy to work with. They work with logger well
- Everything SOAV
- Experienced well educated level headed staff
- Familiarity. Have some common sense
- Flexibility
- Flexibility and SOAV
- Flexibility in all aspects of sales
- Flexible
- Flexible pay
- Flexible, seems to understand willing to work with changes
- Foresters will work with you on all levels

- Good foresters
- Good foresters
- Good relationship with them
- Good relationships same objectives
- Has less restrictions
- Know the staff personally less red tape
- Less government
- Less red tape than state and they know what to expect unlike private
- Less red tape!!
- Listen
- Location, relationship. Sale set up easy to follow
- More flexibility in various ways
- Most practical
- No hassles from landowners to deal with
- No need to go to St. Paul DNR steps or Federal steps.
- Not all the state regulations
- Personal
- Respect
- Sensible administration and no consumer scale agreements
- Simple and flexible
- Simplicity to ease of their operation is superior
- Smaller government can get answers quickly
- State
- State DNR
- Straight forward they are understanding
- They act like they want me there
- They are more local and understand issues & use common sense better than state
- They aren't a big bureaucracy
- They keep it simple
- They listen to you and resolve the problems onsite same day
- They seem to understand the problems of the logger
- They take job serious but don't go over board
- They work well with you
- Very polite and honest
- Work with logger not against logger!

Municipal forests (no comments)

Tribal forests (2 comments)

- Common sense
- I am enrolled member

County and Private woodlands forests (2 comments)

- More flexible and understanding
- Not as many regulations

County and Federal forests (2 comments)

- Common sense & great foresters
- Flexible, understanding

Appendix 12. Listing of open-ended comments provided by respondents to Question 33 (Which of the following is your preferred method of purchasing timber? Why is that your preferred option?), arranged method of purchase.

Oral auctions (60 comments)

- Answers right away
- Because I can have better control over what I buy
- Better chance of getting timber
- Can see who you are bidding against and possibly could be a no bid sale which increases your bottom line
- Control of results. No wasted money
- Cut and dry if questions quick and easy to resolve human interaction
- Don't like sealed bid
- Don't over pay, or leave money on the table
- Don't want to be screwed by leaving money on the table and know who bidding against
- Easier to bid
- Good excuse to get out of office and go chat with other loggers
- Hands on
- Hopefully get for cheaper than our max price as opposed to sealed bid
- I can bid to a certain point and stop and not lose money on the table
- I know what the other bid is and who other bidder is
- I stay close to home, if I want a sale I have a better chance of buying it
- In this market too much \$ left on the table
- It allows you to bid more accurately and it isn't a mystery unlike the sealed bids
- It's simple- a person can bid to get it. Sealed bids is like gambling with your livelihood
- Know what others are bidding at time
- Know where I stand immediately
- Less panic buying
- Less time consuming
- Live results I can decide if I want to keep bidding
- More control for bidder
- Most honest way
- No guessing prices
- No money left on table
- No money left on table
- No risk of leaving thousands of dollars " on the table" (example ; could of got the sale for appraised instead got it for my highest bid-up price)
- Not bidding higher than the last bid by a big amount like can happen on sealed bid auctions
- Not leaving money on the table
- On sealed bid you usually leave money on table sometimes a lot
- On sealed bids, the bid may be higher than necessary
- Open bidding works better
- Oral because you don't over bid and have a higher chance of obtaining
- Over the counter cheaper
- People over bid on sealed bid
- Saves most loggers money
- Sealed bid auctions suck! Too much bidding against yourself! Try bidding your job on sealed bid you will get the picture!
- Sealed bid, you have to bid max amount

- Sealed bids you can leave a lot of money on the table if you bid high & nobody else bids close to you
- See who your bidding against
- Seems to not leave as much money on the table
- Sealed bid forces you to pay top dollar and leave money on the table!
- Shove that sealed bid shit up their ass
- So loggers won't buy timber with no access
- So you don't bid higher than you need to
- So you don't over bid yourself. Might be able to get timber sale cheaper or bid on other sales that you wouldn't normally bid on
- Sometimes you may over bid and find out nobody else bid on that sale
- That's what I like
- There is no second guessing on the price you pay for stumpage
- Too much money can be left with sealed bids
- You can bid on sealed forever and never get one
- You can over pay on sealed bid
- You don't over bid
- You don't over bid on sales
- You get opportunity to buy if you need the wood
- You know what the bid is
- You know who is bidding against you

Sealed bid auctions (13 comments)

- Don't have to attend the timber auction
- Don't like auctions prices; go too high
- Flexibility in bidding
- If people aren't stupid wood can be bought a bit cheaper
- No animosity with other bidders
- No one is caught up in personal grudges causing them to "run someone up" just to make them pay more
- Not competitive
- Not having to be present to bid. 2. fair process
- Pay what you can afford. Down feel as if you need work to pay bills
- People bid the amount they think they can make money, instead of just bidding to get it
- Sealed bid is impersonal which I like because oral bids become personal grudge matches at times
- We don't get many this way but it is not a waste of time going to auction. When we do we aren't over paying
- You pay what you feel it is worth to you

No preference (13 comments)

- A good balance of each has seemed to achieve a balance of being a successful bidder
- Buy direct
- Clear rules and good local foresters
- Doesn't matter a whole lot
- Doesn't matter. You are only going to be able to buy the sales the big guys don't want anyway unless you bid crazy and cut it for nothing. Unless they are small sales
- Doesn't really matter I bid according to trees
- Don't stand a chance at either
- Haven't needed to purchase timber at auction

- I have won and lost on each
- Neither. I buy private and it works great. I go on percentage with landowners.
- No comment never bid
- Some of each sealed bid evens the odds but oral can be cheaper
- Wish auctions were online after work hours

Appendix 13. Listing of open-ended comments provided by respondents to Question 34 (Should public agencies continue to offer Intermediate auctions? Why is that your preferred option?), arranged by their Yes or No response.

Yes, public agencies should continue to offer intermediate auctions (101 comments)

- Because everyone needs a chance at a sale
- Because I'm an intermediate logger! It's getting less of an issue with fewer and fewer loggers so mills kinds getting it, but absolutely should be no allowance for wood brokers who claim fewer employees to allowed to bid on intermediate auctions!!! This getting less of an issue to but need some sort of ability to pick up a few sales that mills (bigger operations) can't gobble up should conditions prove favorable
- Because it helps out smaller business
- Because mills try to control all the wood otherwise
- Better small operators
- But to actual smaller loggers, not mills or large loggers
- Can not compete and make money against mill bidding
- Competing with large companies
- Eliminates big mill competition although we know big loggers are already being backed financially
- Fair
- Fair for small logger. Should be less workers
- Flexibility
- For small logger
- For smaller loggers
- Give small loggers a chance
- Give smaller logger a chance
- Gives small operations a chance
- Gives smaller operations a chance
- Gives smaller operators a chance to procure stumpage
- Gives some people a chance to bid
- Gives the little logger a chance
- Gives the logger a chance to buy sales
- Gives the smaller guy a chance
- Gives us a chance
- Giving small loggers opportunity makes the industry more sustainable, reliable, predictable.
- Helps smaller loggers
- Helps us compete against mills
- Hope to give the logger a chance to purchase sales
- Hope to keep small logger in business
- I can't compete with bigger loggers so it gives me a chance to get a sale with decent timber closer to home
- I don't like competing with mills
- I have 4 people in my business. How can I afford a regular sale
- I have seen the mills get most all large sales for appraised, then the rest of us bid on smaller sales
- I just feel comfortable at them
- In my area of forestry I wish they would make smaller sales for individuals like me
- Intermediate auctions allows mill involvement in purchasing timber
- It benefits the smaller logger. I believe there should be more intermediates for small loggers
- It gives small guys a chance
- It gives the loggers a chance to purchase timber without the mills controlling it
- It helps small loggers

- It helps smaller operators if its done fairly
- It makes it fair for the smaller companies to get sales to cut
- It makes it possible for small operators to have a chance at buying affordable stumpage
- It offers some flexibility to my business
- It's hard to compete with the big dogs
- Keep big companies out
- Keeps industries hands off some of it
- Keeps mills out from costing loggers more money especially when the mill might get the wood anyways. Largest logger in Minnesota (name redacted) should NOT be allowed to buy these sales. His trucking company, the many, many, many subcontracted loggers working under his name all get paid from him. If you get paid from him means you are their employee and I can name over +30 people along
- Keeps the mills from bidding
- Keeps the mills from competing with loggers
- Less interaction in bigger buyers making more sales available to small loggers
- Less mill control
- Logger buy the wood
- Make it more fair for the small guy
- Mills get the timber from the logger's anyway and most don't have equip. to harvest
- Mills have enough control
- Mills should stay out of it
- Mills shouldn't be allowed to compete in some aspects
- Mills will control it all if they don't
- Mills don't get it all!
- More fair for all sizes of operations
- More opportunity
- More timber
- More variety
- Most sale are too big to compete
- Needs to be 7 or less employees tho
- No comment never bid
- No competing against big company
- Not bidding against mills
- Not competing with large corporations should have more section
- Only ones little guys can afford
- Only way to get wood
- Refer to reason they were started
- Slightly levels the playing field
- Small co.
- Small loggers don't have the large cash reserves. They also need to redefine what they call intermediate
- Small operation doesn't have the funding and mill pricing to compete with larger operations
- Small operator can buy
- Smaller loggers need timber sales too. Larger companies can take control of lost sales if you didn't have intermediate auctions
- Smaller sales
- So larger mills don't buy it all
- So mills don't have all the control
- So small loggers have a chance
- So that we don't have to bid with large mills

- So the mills can't buy everything
- So the smaller loggers don't get bid up by the mills
- So wood is accessible to everyone
- Something for smaller loggers
- Stops mills from competing
- The smaller sales are better for me
- The wood tends to be cheaper!
- Then the little loggers have a chance
- There are many small companies that can't compete. The number needs to change to 5 not 32 employees
- There needs to be more wood set up for the small guys we can't compete on 500 ft. cord cuts
- They allow small operations to participate
- To help out smaller operators
- Want to be able to bid on job
- Without it the overage companies would own MN
- Works best for some loggers - smaller ones
- Yes but only 5 employees

No, public agencies should continue to offer intermediate auctions (6 comments)

- Guidelines are not followed
- Makes no difference mills just back Intermediate buyers
- Personally I have a better chance getting a company bought timber sale
- Private. There are not many bid sales in my area.
- Sales should be open to all parties
- Sealed bid only

Appendix 14. Listing of open-ended comments provided by respondents to Question 35 (Do you support the use of online auctions by public agencies? Why is that your preferred option?), arranged by their Yes or No response.

Yes, the respondent supports the use of online auctions (22 comments)

- Accessibility
- As long as they are live auctions
- As long as you don't see who is bidding against you.
- Bid
- Can do from job site
- Depending on how the technology is used it could be great for saving time and energy
- Ease of use
- Easier
- I am certainly open to it
- I can do a the bidding at time when I choose
- I can do it from my office or phone and not take off work
- Less travel
- Less travel time
- Make it easier to participate
- More convenient
- No hard feelings with fellow loggers
- No peer pressure
- Not having to be present
- Only if they are live deed so it is just like an oral auction
- Takes less time off work
- Time
- Travel time

No, the respondent does not support the use of online auctions (59 comments)

- All loggers aren't online
- Can't see I'm bidding against
- Do not do online auctions
- Do not use a computer
- Don't have to sit in front of a computer
- Don't have a computer
- Don't have computer
- Don't know enough about it/ I'm tech challenged
- Don't think everyone has equal internet service
- Everyone is not comfortable with online use
- Everyone isn't a computer geek
- Have never tried one
- I am not a big fan of online auctions
- I buy timber on shares with seller
- I haven't been to one
- I like oral auctions
- I prefer being able to attend in person
- I prefer face to face
- I struggle with computers
- I think confusion could occur

- I'm not a computer savvy
- I'm not a computer yuppy?
- I'm not good with online stuff
- I'm not real good at computer stuff
- In person is always better
- In person is more effective and controlled
- In person with online option
- Kinda torn here- but it sure seems like the human contact is important we don't want EBAY like auctions frenzy! Think it's important to be present and accountable
- Makes the process seem a bit impersonal
- Might be too much misinterpretation
- Need to be present to win. What would stop an entity from another state online?
- No computer
- No computer or internet
- No online access
- No time or desire to sit at a computer
- No time to sit in front of computer
- Not 100% of users have access open public auction always more transparent
- Not all of us are computer savvy
- Not an option
- Not computer savvy
- Not everybody have internet and it's nice to know who you bidding against.
- Not found of online anything
- Not interested
- Not that good on a computer
- Old school
- Online gives more room for problems- confusion
- Oral auctions are a good place to make connections
- See who is bidding
- Seems advantageous to mills who have people sitting at computers all day vs. loggers out in the woods working
- Some of us still like to know who we are bidding against. Helps price to stay down!
- The gov. sites are too difficult to navigate
- The system in place are adequate
- There is no comparison of sealed bid to face-to-face bidding. Internet is the way to go
- Timing seems never good
- Too much is going that way, better timing to sell sales would be better
- Want to see other bidders
- We all don't have good internet
- We are old school go to auctions see who is buying

Appendix 15. Listing of open-ended comments provided by respondents to Question 37 (On a scale of 1 (strongly discourage) to 5 (strongly encourage), would you encourage members of your family or close friends to become a logger? Why is that your preferred option?), arranged by their numerical response.

1 – Strongly discourage (57 comments)

- Absolutely no future at today's cut & haul rates
- Bad prices at mills for small logger/can't afford to upgrade
- Because of all the hoops you go to get to be MLEP Logger
- Big investment small return
- Cost
- Don't really see a future in it. Very poor pay for the investment
- Get a job that pays more and has benefits
- Get a real job with some benefits unless they have the same passions
- Hard work, long hours for little money
- High cost low return
- I have 2 sons that help me at times. Dangerous, pay is poor for the risk and investment in hand felling logging operation
- it takes way too much money to do for the return so if you're not sold out to do it you'll likely struggle
- I'm too old to start over but it is a terrible career choice... bottom line... low pay
- it's a dying bread
- it's a hard way to make a living
- It's tough
- Long hours and low pay
- Lots of work
- Lot of work for small return
- Many factors have hindered loggers to operate successfully
- More money in other jobs that require a lot less of an investment
- More reg. cost of fuel, expenses, cost of finance logging,
- No money
- No money
- No money in it
- No money in it
- No money in it
- No money and security in the business
- No/ very little. Control of your profit margin
- Nobody wants to work hard
- Not enough pay for the amount of equipment needed
- Not much money in it for what you do
- Not profitable
- Poor pay
- Poor return on investment
- Profit margin going down
- Profit margins getting slimmer
- Profit are too low
- Profits are dwindling
- Rules & regulations along with cost of operation
- Stumpage too high, sales are junk

- The money coming in is not consistent. Sometime we go month's without a check
- The price of running the business is not enough
- The ups & down of the mill, weather rising costs parts, tire, fuel
- There is better options
- There is better paying jobs out there
- There is no future in logging. Mills are getting bigger and don't care about loggers & just their bottom line
- There is no such thing as a price increase in logging
- Too costly
- Too hard for small business to compete
- Too much investment for the little return a lot of hard work
- Too much stress
- Very little return on investment
- Way easier ways to making a living
- With high stumpage, high fuel, high equipment prices would be a folly to start a logging business
- Wrong people making rules

2 – (26 comments)

- Difficulty to purchase required machinery
- I have a son now working. Losing sleep thinking about the future with this it seems to be hard to compete these days it always been up/ down
- It depends on the person. It's a lot of hard work for not much pay. Takes lots of experience and capital to make it on your own
- It is not an easy business to get into anymore. Huge overhead low profit margins
- It isn't exactly consistent work our lucrative work in this market/ economy
- It's a life style not a job
- It's a rewarding job for me but I love the wood. If you don't, there is better money doing other jobs
- It's too big of a risk for what you get out of it getting started
- Little to no profit
- Long hours, hard work you have to love what your doing
- Mills are not keeping pace with pricing compared to cost to do business
- More money in different fields with less work
- No mills for softwood & equipment prices high
- No money in it. Profit is low have to work off volume
- No ROI guarantee investment too high to start too many hours required
- Not a lot of profit and long hours
- Not consistent work. Mills not dependable take a lot of \$ to run business
- Not easy to get into
- Not much money to be made
- Only a few individuals would possess the crazy mix of determination & lack of something better to do with their time & money
- Profitability
- Profitability. Regulations
- Terrible industry to get the with low pay and no return for capital put into and shut regulations
- The cost of entry is very high chance of failure is very high. Mills don't support a long term contract
- Too much overhead to start out
- Too much cost in operation a logging business

3 – (40 comments)

- A lot of cost to get started
- Because of the stress level and high # of hours you have to work to make it work
- Because to start not it costs so much to get machines
- Can't get enough pay for products sold
- Cause its a lot of stress, we are just a # to the mills, they get there company loggers & they get all the good wood & make more money
- Danger market fluctuation
- Do what you like & work hard to make it
- Enjoy the work but doesn't work well without good team. Too much equipment to maintain for one person
- Getting costly
- Hard business, volatile market
- Hard way to make a good living
- I am just starting out. I have logged my whole life in a family business. I want my son to join me but know higher paying jobs w/benefits would be better
- I don't have any sons, so I know my daughter won't be a logger
- If they enjoyed that type of work then yes but it's a tough trade
- Independence- good long hours , low personal income - poor
- It is rewarding if you are willing to work
- It would depend on the person and if they would be a good fit
- It's a good way of life but it's not easy
- It's a struggle but rewarding also
- It's a life style not just a job, very few people would probably not stick with it long enough to be profitable
- It's a stressful & sometimes not very profitable
- It's fun
- It's not a very profitable business at the moment
- It's not for everybody you cannot treat logging as a job. It's a passion
- It's ok but you have to work huge amounts
- Kind of a feast and famine business
- Lack of return on investment
- Markets are tough
- Money is very low for amount of work. I.E. equipment/ parts cost, fuel
- No money in it!
- No money who is going to work 7 days a week like a dog!
- Not an easy life. Margins are thin
- Not enough return on the investment
- Not sure about the industry
- Not the profit there anymore. More regulations, cost of doing business is higher all the time, lack of employees
- Pride & self-ownership
- There's a living if that's what you want wood & Market is here
- They have to really want to do it and commit
- Very rewarding but it's a lot of work. Also not a cheap business to get into
- Very unstable industry at the time

4 – (9 comments)

- Because the price of fuel, stumpage, parts, trucking is getting out of hand
- Cost is getting out of hand. Parts are tougher to get, there's not much in it

- Good work
- Hang on to the family tradition & it is an enjoyable job being outdoors in nature
- Honest, hard work
- It's a good living
- Logging is a fun industry and is great for people who enjoy outdoors
- Make money
- Would like my son to take over someday

5 – Strongly encourage (8 comments)

- Hopeful for a better future
- I have 2 sons that log
- I have logged all my life and love it
- I like logging and make money, so if you like equipment ,the woods, trucks and not to have to be around a lot of people it's better than working at a mine
- It is same as being a farmer you live a certain way of life
- It's a good life. If you like to work and like challenges. If not you shouldn't log
- My son is a tribal member lots of natural resources and he could make a good business
- No profit

Appendix 16. Listing of open-ended comments provided by respondents to Question 44 (Have recent weather patterns impacted your logging operations?) who indicated that recent weather patterns had impacted their logging operations, noting how they are adjusting their operations.

- A lot of cold mornings -20 we start later, after the sun comes up
- Adding lights to work at night
- Bigger tires for flotation, more time spent freezing roads/ jobs down
- Bigger tires for flotation, more time spent freezing roads/ jobs down
- Bought used track buncher and flotation tires for rubber tire buncher
- Buying less low ground sale
- Change equipment
- Cut low ground on the colder years
- Cut more in the summer months
- Cut to length harvesting is more able to work in difficult conditions
- Cutting less low ground
- Cutting less wood
- Day by day
- Deep snow
- Different equipment
- Don't know where you are getting your info but we have one of the coldest longest winters in my 40 year memory. We logged until May
- Don't work
- Dual wheels and tires for skidder/ buncher
- Equipment, longer work days when can work
- Had to buy duals for equipment
- Had to buy duals for skidder& buncher
- Have multiple sales of different site conditions available to access when needed
- Having a variety of timber sales, some with higher ground access in case of a late freeze up
- Having to try to find more summer cut wood finding more guys for winter working more hours in the winter
- Higher ground
- I switched to cut to length for low ground pressure
- If they do, usually requires better timber sales set up and management
- If weather is taking a turn we evaluate the site and move out until acceptable weather. Working on smaller project affords us some flexibility
- Invested in equipment that is lighter on the ground
- It's about impossible to adjust to warmer winters because of the availability of summer wood. Becomes too expensive to purchase. We had to purchase wider tires for softer ground, track buncher. All have large expense
- Just wait till it freezes up
- Last year too warm. This year too cold
- Less working days
- Long stretches of low temps, replaced a lot of fuel filters
- Longer break up times
- Losing money
- More construction/ less logging/ with faster efficient equipment when harvesting
- More equipment for frost preparation
- More production frozen season, dualing up tires, more landing prep
- More snow, colder than hell. Think about it. Avoid working. Da

- Night operations
- No adjustments
- Not as many days in the woods
- Not working when too wet. Wider tires & duals
- Planning on road restrictions going on by the end of February
- Putting better heaters for the equipment to start in these tropical winters
- Quit
- Shorter winter on winter only sales road restrictions working 7 days a week
- Skidders with wide tires
- Some are better some are worse. Look at this year, this is a normal winter we just have to live with whatever that comes along
- Some areas are not accessible in wet conditions
- Spending many days doing whatever it takes to freeze the ground
- Taking more time to freeze in roads early. If it snows, plow it off at once. Just 1 day can make a difference
- The polar & westerly wind have been brutal we have generators and heater to warm up equipment
- There are cycles right?! This was a good old fashion MN in northern MN this year- snowy cold!!! Worked until 1st week of April which is rare but happened in 2015? 200
- Very lite on the ground equipment
- Waiting till later in winter to work in swamps
- We have had 3 of the last 4 yrs. with waste deep snow, and last winter was the worst. 30 below or 40 mph winds or 15 snow storms, kinda hard to log with a chain saw that way. Winters seem to be getting worse not better
- We just have to make due with the few cold months we have and cut a lot of wood
- We stay diversified- Dry summer and now long wet spring
- Weather has affected logging for years! Part of the business
- Wider tires
- Winter operations
- Winter was colder and longer, buy generator's to keep equipment engines warm
- Winters are nice. The same you take what you get and adjust and change plans to meet the weather and ground conditions. We have light skidders with wide tires to soft ground along with track buncher and wide pad dozer then we work long hours.
- Work 7 days a week
- Work faster
- Work harder on the winter to get more done in the less time
- Work more hours
- Work only when capable
- Working harder in a shorter period of time
- Working longer hours in the winter when possible

Appendix 17. Listing of open-ended comments provided by respondents to Question 44 (Have recent weather patterns impacted your logging operations?) who indicated that recent weather patterns had impacted their logging operations, noting what help they need to adjust their operations to those weather patterns.

- ? A crystal ball
- A little profit
- A raise in price for our wood- going broke
- A reliable weather forecast
- Better forest roads and better understanding from foresters on how to get the ground to freeze
- Bigger equipment and newer
- Cheaper stumpage, loser rules on rutting, more summer sales, administrators that are not scared to do summer sales
- Crystal ball would be nice
- Early roading and site prep with equipment
- Explain to my wife why I work 7 days a week
- Extensions
- Extra permits without penalty
- For mother nature to be a little more kind. Make our tamarack sales in this part of MN. 5 yrs instead of 3 yrs.
- Free timber sale extensions / adverse conditions extensions
- Funding
- Get roads into swamps early as possible
- I believe logging companies just need to learn how to adapt
- It would be great to see public owned forest managers investing in woods roads for greater access in a wider range of weather conditions
- Just need more frost
- Keep different sales
- Keep putting wood up for sale and it will get cut. The real problem is where is the real common sense in people going?
- Last winter was very cold and windy with lots of snow. The winter before was warm and dry. The winter before that was soft ground with a blanket of snow. As a logger you have to figure it out
- Less down. Payment amounts and extended time periods on sale expirations
- Less regulations on fuel
- Less restrictions
- Less restrictions on rutting
- Longer sale terms in bad years
- Longer terms on state sales, less regulations and better foresters to work with
- More \$
- More experienced operators & truck drivers
- More flexibility by agencies
- More high ground timber and less lowland
- More money
- More money for our products
- More money for our work
- More money from the mill. Cheaper fuel and stumpage
- More pay
- More summer accessible sales
- More summer wood
- More summer wood put up

- Newer equipment that is more updated to climate change
- None
- None
- Nothing
- Offer more summer wood with less restrictions
- Put more wood up for summer operators
- Start the state timber sales operations on Dec. 1st not Jan. 1st
- Stay home
- Time to get out! If the mills do not increase cut & haul rates by a minimum of \$15 a cord, it's a completely lost cause
- Way's to keep hyd oil warm for easy startup
- We're ctl operation already-which is more suited to variable weather. If anything more patients and prayer to get through each years challenges but nothing specific to weather related issues

Appendix 18. Listing of open-ended comments provided by respondents to Question 46 (If you have additional comments on the logging industry, please tell us).

- Agencies must invest in forestry roads 2) MN DNR needs to become easier to work with and have better congruency within the agency. 3) Federal gov't needs to setup more timber 4) Without mill support, it will be very difficult to get new owners into the industry.
- Been in the industry for 38 years and the last few years are the worst I've ever seen.
- Bottom line of the industry is the mills need to pay more for this to work for all of us
- Cost of ownership prices are going up faster than mill prices. Evaluate the need for more/ better chip market. Survey of average cost to own/ operate logging company for industry understanding
- Don't have time. U have M.L.E.P. (Do It Or Schedule it In a Program) at M.L.E.P. Class of April 19 2022 In Brainerd was a waste of my time. It to be 4 hr class? Ended up 2hr. class and not too happy with class setup. It should be like Bemidji 2 day back to back classes then you are done. Spring Break Up (Brainerd Area) (Need to Be Done)
- Get rid of the mills at the auction sales that's all bullshit so the logger's have a chance and can make a living again
- Government restrictions are the most harmful on industry changes in climate change policy (watershed policy changes)
- Hello Charlie! Long time no see
- I am a 3rd generation logger. My grandfather did it for 45 years till his death. My father has, and is still doing it for 47 years and counting. I will do this for 45+ years as well. Logging is hard work that requires millions of dollars into capital to get such small amounts of return, its gotten to the point to where it's no longer worth it. With shrinking markets, poor labor shortage, the cost of producing a product, and poor wood quality all makes for bad industry that only works for the BIG loggers. In today's industry if a mill is not buying your wood, or giving you a special kick-back you will not survive! All this sounds depressing but it's true, the BIG loggers are all mill fed but they are also the oldest loggers around. And for the cost to open up and get into logging is far too expensive for the 10+ NEW, smaller loggers to take the place of the 1 BIG logger, that is and will always be the problem in the logging industry, too many BIG loggers and not having the suitable replacements for them when they are done. I guess I'm just a 3rd generation Idiot, that likes to poop in the woods.
- I am a one-person operator. I can utilize small sales well. I have no desire to expand my business
- I am new to this industry compared to most people. I'm very familiar with trees, cutting trees, pruning them, etc. but the full scale logging is a whole new thing for me. To me and from what I have seen, the future is bright for our industry. My only fears are future government mandates that will drive up our costs even more. With diesel at \$5/gallon currently, I'm leery of where our economy is headed. I think the other thing is breaking down the misconceptions about forest management. Growing up all I ever heard was logging = bad so we have a lot of work to do to change people's perceptions about proper forest management.
- (I)We are getting the same for wood that I got 15 Years ago but stumpage has doubled and fuel has tripled to be honest. I don't think I can do it much longer. These other loggers must be getting more for their profit because it just don't pencil out.
- I've had major surgery last fall so didn't get out to woods. Am healing good now but at 71 will likely phase out logging next year.
- Make sales up here in northern mn. 5 yrs instead of 3 yrs. Tamarack is hard to do when the snow gets so deep up here. And we usually have 6 month of winter every year. I had to get my logger I.D because the state made it to where I could only get 12 cords a year without a logger I.D. I burn 60 to 75 cords a year in my wood boiler. We use 35+ cords for most of the winter. And at green house time we heat our house and greenhouses with wood boiler up here in Northern MN. We get 6 month of winter every yr. So nobody can convince me there's global warming. It's a bunch of crap. This year was exceptionally bad winter.
- Mills need to pay more.

- Mills shrinking their buying area, lack of trucking availability, state timber sales have too many restrictions. Operation times restrictions, invasive species rules, people concerns (seems like restrictions are all against the logging)
- Minnesota needs to cut their pine or get a bigger budget to put the fire out. Look on google dot.earth our fire protection lines
- Need training for young folks and off road truck driver training.
- Not all but some of the new foresters for DNR are becoming terrible to work with. When companies have worked with state and foresters for years without problems and then new foresters start complaining to new bosses its not the loggers creating problems. The DNR needs to take these sales operations book and shove it up there ass. The book doesn't work for any sales and fewer foresters are afraid of getting in trouble so won't work with the loggers. The wildlife lands also need to pull head out of ass and give loggers more time. January 1 to March 1 is not enough time to work on jobs just because someone wants to hunt.
- The biggest impact I have seen in my small logging operation is all the mill closures. In my approx. 20 years in the business, the price paid by the mill has not increased, but my expenses and inflation have increased dramatically. Thanks for your work to help keep logging going in Minnesota
- The logging industry in Minnesota would be better with these new things. 1. More and cheaper stumpage. 2. More markets for our products. 3. Training for truck drivers, and equipment operators. 4. Some sort of subsidies more like farming
- To many restrictions for poor pay
- We are a very small logger . We only log in winter when we cannot do our excavating. This may not paint a very accurate picture of other logging businesses
- We need more markets for unmerchantable wood!
- We need more mills
- Without major price increases no one will survive. The mill stock holders have made their money. COVID & Fuel have made it impossible to continue with any profit margin at all. Parts are expensive and hard to get. New equipment prices are ridiculous with wait times up to 2 years. Pretty silly to continue with a money losing situation!!!