MARYLAND'S FOREST RESOURCES IN A DYNAMIC ENVIRONMENT:

ASSESSING THE FUTURE CONFIDENCE AND SUSTAINABILITY OF MARYLAND'S FOREST INDUSTRY

Bob Tjaden
University of Maryland, Department of Environmental Science and Technology

Dan Rider
Maryland Department of Natural Resources, Forest Service

Elliott Campbell
University of Maryland, Department of Environmental Science and Technology

Amy Hudson
University of Maryland, Department of Environmental Science and Technology

February 2015

Cover photographs by USDA Forest Service, bugwood.org, and the MD/DEL Master Logger Program.

CONTENTS

ACKNOWLEDGMENTS

Many people were involved in the development and implementation of this project. Thanks go to the forestry staff at the Maryland Department of Natural Resources Forest Service for their overall support and guidance: Steve Koehn, Dan Rider, Ken Jolly, Jack Perdue, and Rob Feldt.

Further support was provided by: Nancy Stewart, Carol Taylor, Nevin Dawson, Jonathan Kays, Al Todd, Sarah Taylor-Rogers, Amelia Wright, Skip Jones, Larry Walton, Ken Roberts, Bill Cheesman, James Remuzzi, Steve Resh, Eric Sprague, and Todd Berman. Special thanks go to Justin Lindenberg from the American Forest Foundation and Len Wrabel, chairman, Maryland Tree Farm Committee, for their support identifying Maryland Tree Farmers, and Craig Highfield, Program Manager from the Alliance for the Chesapeake Bay, for assistance identifying Forestry for the Bay participants.

Rachel Egolf, Brian Knox, and Elliott Campbell Survey conducted design and implementation for both the Forest Industries survey and the Logger survey. In addition, Elliott Campbell performed survey data entry for the Forest Industries and Logger surveys. Larry Harris, Mason-Dixon Polling and Research Survey, provided administration and data entry for the Forest Landowner survey. Amy Hudson provided overall survey data analysis and assisted in the final write-up.

Thanks also go to John Chapman for his assistance filtering and stratifying the property view database, to Tawna Mertz and Ginny Gerhart for editing the survey instruments and introductory letters, and to Nancy Stewart for filtering and compiling the final forest landowner mailing list.

This project was funded by U.S. Department of Agriculture McIntyre Stennis funds provided by Maryland Agricultural Experiment Station and Department of Environmental Science and Technology, University of Maryland.

INTRODUCTION

Maryland contains 2.4 million acres of forestland; 75%, or 1.8 million acres, is family owned. These private forest landowners, numbering 130,800 and growing, own 78% of the forestland, with an average size holding of 17 acres; 75% of these landowners, however, own less than 10 acres. These private forestlands protect and supply more than two-thirds of Maryland's drinking water and provide the majority of the raw material for Maryland's sawmills, pulp/paper mills, and other forest product businesses.

The forest products industry continues to be Maryland's fifth largest manufacturing industry, directly employing more than 10,000 Marylanders with an annual employee compensation of $650 million.[1] Tax revenues from the sale of goods and services related to the manufacture of forest products is $26 million annually.[1] Maryland has more than 1,300 forest product manufacturing facilities, and the forest products industry impacts every Maryland county.[2] Applying an economic multiplier, the total economic benefit of this industry is $4 billion and represents more than 40,000 jobs.[2]

Maryland's forest industry is still suffering major setbacks as a result of the 2008 economic recession. These setbacks have affected the flow of raw wood fiber from the stump to the consumer. Numerous primary and secondary forest industry businesses have consolidated or closed their operations; since 2000 half of the sawmills have closed. These closures are continuing to have a devastating effect on Maryland's private forest landowners, with reduced demand resulting in extremely low stumpage prices. Forest landowners have expressed a willingness to ride the tide of a short-term economic downturn. However, if this economic downturn persists for several more years, the expected long-term effect is landowners choosing not to invest in stewardship, which bodes poorly for both the economics of local communities and the ecological health of our forests. A healthy forest industry is necessary if private forest landowners are to manage their forests for both short- and long-term goals. If the forest industry's long-term prognosis is not positive, many landowners may choose to sell a portion or all of their forestland for other uses. As a result, Maryland will lose forest acreage and Maryland's forests will be relegated to playing a less sustainable role in the state's overall economic and environmental health.

Maryland's forests provide a range of valuable ecosystem services and contribute to the state's economy. According to the State Economic Development Office, the forest industry of Maryland has an employment multiplier effect of 3:1, meaning for every forest industry job, three additional jobs are created. Landowners' perceptions that forest management is a poor economic investment threatens the overall sustainability of forests, which will in turn jeopardize the numerous environmental benefits forests yield.

[1]U.S. Bureau of Economic Analysis. 2010. Gross Domestic Product report, 2009.

[2]U.S. Census Bureau. 2008. Annual Survey of Manufacturers, 2007.

PREVIOUS EFFORTS

The few studies focusing on Maryland's forest landowners and forest industry have illuminated the understanding of landowner motivations and challenges the industry faces, but only in a context of the past: absent are meaningful studies identifying the needs and challenges landowners and industry members now face. This is the information needed for informing policy recommendations designed to change the thinking of policymakers, industry members, and forest landowners. Most importantly, no studies have been conducted since the economic downturn, which has dramatically altered the dynamics of the forest industry across the entire state. This research project recognizes that within the past three to four years behaviors throughout the entire forest production chain have changed significantly and the decisions made today will affect the forests of tomorrow.

The Harry R. Hughes Center for Agro-Ecology report, "Mapping a Sustainable Forestry Strategy for Maryland: Report on the Public Engagement Process, 2009," is the most recent to address policy recommendations. However, since this report, the financial situation has dramatically changed and it does not appear as if the forest industry, loggers, or landowners are making any major efforts to sell timber or make significant capital improvements to their businesses. The Agro-Ecology report included stakeholder involvement through five listening sessions and a forestry summit conducted in early 2009. Stakeholders included Maryland forest landowners, foresters, natural resource professionals, and policy makers. This report provided valuable policy recommendations at the time; however, since then the dynamics of the industry have changed significantly, and a more thorough assessment is needed to reflect the current situation. Additionally, the Maryland Forest Service has performed numerous studies, in cooperation with the U.S. Department of Agriculture (USDA) Forest Service, of timber production and procurement behavior of the sawmill industry, along with regional Forest Inventory Analysis (FIA) data. Although these efforts provide a snapshot of the health of the forest industry and regional forest acres data, they fail to identify county-level commercial forestland acres, strategies, and policy recommendations necessary for maintaining a sustainable forest industry in the future. In most cases, the studies were not forward looking; they only measured past activities.

The most recent study of the forest products industry was performed in 2004 by the Maryland Department of Natural Resources (DNR) Forest Service, Forest Products Utilization and Marketing Program. This study consisted of a mail survey of 98 sawmill businesses both within Maryland and in neighboring states registered as Forest Products Operators (FPOs), a designation legally required for purchasers or processors of raw forest products. The report, "2004 Timber Consumption, Procurement Behavior, and Investment Issues for Maryland Sawmills," now 10 years old, was produced prior to the 2008 recession. This survey indirectly addressed confidence in the future success and profitability of Maryland's forest industry. Highlights are as follows: Most

mill owners of both small and large mills, reported concern about the long-term future availability of timber. Some mill owners are not concerned about wood supplies 25 years from now, apparently, because they don't plan to be in business then (for obvious reasons, this belief should be of great concern to anyone interested in the long-term sustainability of healthy forests). Terminal harvests, harvests that are a permanent loss of forestlands as a result of development or construction activities, represent a more significant overall source of timber to small mills. Many small mills rely on terminal harvests for the majority of their wood sourcing, while large mills currently do not. Strategies for retaining competitiveness focus on investing in new technology and market diversification; however, some mill owners are not optimistic about their mill's ability to remain competitive and are resigned to eventual shut-down; slightly more than one-third of large mills have increased their procurement radius, in response to competition for larger tracts with reduced "per unit" logging costs.

Both Pennsylvania and Virginia have conducted detailed surveys of their loggers, with valuable results. Both states have a vibrant and healthy forest industry. It is our intention to use their studies as a blueprint for a similar effort in Maryland, to establish a baseline for future studies. Numerous other states have also conducted surveys of their logging communities: West Virginia, Mississippi, Georgia, Vermont, and Maine.

RESEARCH OBJECTIVES

The goal of this research effort is to identify and better understand the future opportunities for and threats to retaining a prosperous forest industry and to initiate the development of a confidence index to gauge overall confidence in the forest industry.

The objectives of this research project are as follows:

1. Assess the current status of Maryland's primary and secondary forest industries[3] to determine:
   - Confidence in the future success and profitability of Maryland's forest industry
   - Current status of business
   - Current and future markets
   - Future opportunities and what is needed to achieve them
   - Barriers to industry
   - Educational and research needs
   - Policy and resource needs to stimulate entrepreneurial activities.

2. Assess the logging industry to determine:
   - Confidence in the future success and profitability of Maryland's forest industry
   - Demographics of loggers that include ownership, structure, and workforce
   - Challenges facing loggers
   - Production, profitability, equipment, and capital information
   - Current and future perspectives of loggers and barriers to their success and profitability
   - Educational and training needs
   - Success of the Maryland/Delaware Master Logger program
   - Loggers' long-term business strategies, e.g., sell business, pass on to children, etc.
   - Policy and resource needs to stimulate capital business investment.

3. Assess forest landowners to determine:
   - Confidence in the future success and profitability of Maryland's forest industry
   - Demographics that include age, ownership, and acreage
   - Barriers to and/or challenges of managing their forest
   - Future market potential
   - Future management needs
   - Policies and resources needed to increase sustainable forest management.

[3]For the purpose of this survey, primary and secondary forest industries represent sawmills, pulp and paper mills, pallet manufacturers, large firewood dealers, furniture manufacturers, large sawdust dealers, pole and piling manufacturers, and mulch manufacturers.

SURVEY PROCEDURES

Two foresters, Rachel Egolf and Brain Knox, assisted in survey design. All three surveys were sent through the University of Maryland Institutional Review Board (IRB) review process for approval. Once IRB approval was obtained, pretests were performed to test the survey instruments with appropriate audiences. These pretests occurred from January to September 2013. Pre-tests took participants about 10 to 15 minutes to complete. The primary and secondary forest industries survey had 30 questions, the logger survey 36 questions, and the forest landowner survey 27 questions. Survey questions ranged from Likert rating scales (1–5) to multiple choices to yes/no to open-ended fill-in-the-blanks.

Modifications were made to surveys based on pretest comments and final drafts were sent for final edits and layout. Ginny Gerhart performed edits and layout for the primary forest industry and logger surveys and TKM Marketing performed edits and layout for the forest landowner survey. The final version of the three survey instruments and letters appear in Appendix A (primary and secondary forest industries), Appendix C (loggers), and Appendix E (forest landowners). Amy Hudson, recent M.S. graduate of the University of Maryland (UMD), Department of Environmental Science and Technology (ENST), assisted with the final survey analysis and write-up.

SELECTION OF SURVEY SUBJECTS

Primary and Secondary Forest Industries

We obtained mailing lists from the Maryland DNR Forest Service, Forest Product Operators registration list. This list was filtered to represent 1) all the primary forest products companies, which consist of sawmills, pulp and paper mills, and 2) the larger secondary forest products companies, which represent the larger pallet manufacturers, mulch manufacturers, firewood dealers, and furniture manufacturers. We obtained a total of 66 names and addresses from MD DNR Forest Service to represent the FPOs of Maryland for this survey. Within this mailing list, both Maryland operators and out-of-state operators were identified as MD (39), PA (20), WVA (6), and DEL (1) operators.

Loggers

We obtained mailing lists from the Maryland DNR Forest Service; Forest Product Operators registration list; and University of Maryland Extension (UME), Maryland/ Delaware Master Logger Program. We obtained addresses for 130 Master Loggers and for more than 500 FPOs. Note, although not all Maryland loggers are Master Loggers, all loggers must be licensed by MD DNR Forest Service as an FPO.

FPOs are defined by Maryland law as follows: According to Title 5, Section 608, Annotated Code of Maryland, any person engaged in a forest products business must have a license issued by the Department of Natural Resources. This includes all sawmill operators, pulpwood and logging contractors, and firewood dealers. Other business types may be licensed, such as, for example, mulch suppliers, land-clearing companies, tree removal companies, and lumber brokers.

The Maryland/Delaware Master Logger Program is a voluntary training and education program for loggers who work in Maryland and Delaware. The program helps loggers meet the ever-increasing demands of the logging profession. Program courses provide information about current environmental regulations, forestry principles, and safe work practices.

The Maryland/Delaware Master Logger Program mailing list was filtered for duplicate names, incorrect addresses, closed businesses, and deceased loggers. After filtering, we selected 122 Master Loggers for the survey. From the Maryland DNR FPO list, we filtered for duplicate loggers who are Master Loggers, closed businesses, deceased loggers, and individuals not actively involved in the logging business. After filtering, we selected 285 non-Master Loggers for the survey. A total of 407 loggers were selected for the survey.

Forest Landowners

We obtained mailing lists from two major sectors: forest landowners who currently participate in various state and private educational, outreach, and tax programs, and landowners who own forestland but have not actively participated in any forestry-related programs. We obtained names of landowners who currently participate in one of the following programs: University of Maryland Extension Forestry Correspondence Course (282), University of Maryland Extension Woodland Stewards (427), Maryland Tree Farm Committee (923), Maryland DNR Forest Service Forest Conservation Management Act (711), and Chesapeake Bay Program, Forestry for the Bay (234), for a total list of 2,577 names. These names and addresses were consolidated into one mailing list and filtered for duplicates, with a final mailing list of 1,803.

We obtained the second major-sector mailing list from the Maryland Department of Planning (MDP) property tax database of all private forest landowners owning 10+ acres (34,357). This list did not contain federal, state, municipal, or corporate ownership. This list was filtered for duplicate names, addresses, forest parcels, limited liability corporations (LLCs), associations, churches, real estate investment partnerships, as well as for duplicate names and addresses from the list of 1,819 forest landowners described above. John Chapman was contracted to filter this list and develop a mailing list of 2,000 forest landowners from the MDP database. The list was randomly stratified and sorted by county to reflect the percentage of county forest landownership as documented by the Maryland Forest Service survey data. Both lists were consolidated into one master mailing list of private forest landowners who could serve as possible survey respondents. The total was 3,803 (1,803 + 2,000).

SURVEY IMPLEMENTATION

Foresters Rachel Egolf and Brain Knox assisted in survey implementation. Elliott Campbell, Post-Doc, UMD ENST, assisted in survey implementation and data entry and analysis. Economy Printing, Easton, Md., printed the primary forest product operator and logger surveys. The web-based company, www.click2mail.com, sent the introductory letters and survey. Survey implementation of the primary and secondary forest industries and loggers was performed during the winter months, February to April 2013, when production is slow, weather conditions are not favorable for production, and Master Logger training programs occur. Survey data for both FPOs and loggers were entered into a Qualtrics program by Elliott Campbell. Forest landowner's surveys were designed and implemented during September and October 2013 with the assistance of Mason Dixon Polling and Research Group. All three surveys were reviewed and approved by the University of Maryland IRB process.

Primary and Secondary Forest Industries

We mailed letters on March 7, 2013, to introduce the participants to the survey team (Bob Tjaden, Rachel Egolf, and Brian Knox) and to inform participants of the survey objectives and of our interest in setting up an appointment at their place of business to help them complete the survey. Rachel and Brian were able to set up onsite office visits and complete seven surveys. There was one refusal to participate in the survey. The remaining 58 FPOs, who were not contacted or whose onsite office visits were not able to occur, were sent a survey and instruction letter on July 12, 2013. Respondents were asked to complete and return the surveys by July 26.

A total of 18 surveys were returned by mail, with four surveys returned because of either an incorrect address or a deceased recipient, leaving our survey population at 62. A total of 25 FPO surveys were completed. This represents a response rate of 40% (25/62). We believe that the responses reasonably represent the opinions of Maryland's FPOs.

Loggers

We mailed letters to loggers, February 18, 2013, to introduce them to the survey team (Bob Tjaden, Elliott Campbell, Rachel Egolf, Nevin Dawson, and Brian Knox), and to inform them of the survey and our objectives. Survey team members coordinated with the Master Logger program to attend the winter meetings of the MD/DE Master Logger training programs and to offer the opportunity to have the loggers present complete the survey. Locations and dates of training programs were as follows: Allegany Community College (February 27), Mechanicsville (March 3), Salisbury (March 13), and Edrich Lumber Company, Baltimore (March 20). Survey team members contacted by phone the remaining Master Loggers, who were not present at the training programs, to set up field visits for completion of the survey.

A total of 57 Master Loggers completed surveys during the training programs and onsite field visits. The remaining 65 Master Loggers, who did not complete the survey, and the 285 non-Master Loggers, from the FPO list, were sent an instruction letter and survey in the mail on July 8. Those loggers who were sent the survey via mail were offered an incentive to complete the survey: one Master Logger training program credit; 27 loggers (a combination of Master and non-Master loggers) requested the one credit for Master Logger training. The non-Master Loggers expressed the intent to participate in future Master Logger training programs and obtain the one credit towards their training program. All logger surveys were completed by August 1 and entered into a UMD Qualtrics program for data analysis.

A total of 101 logger surveys were returned, with 90 surveys completed, representing 75 Master Loggers and 15 non-Master Loggers. Of the 11 surveys not completed, some were refused and some were returned blank or with only a few questions answered. Two surveys were returned because of incorrect addresses, leaving our total logger population at 405. This represents a response rate of 25% (101/405). The response rate for the Master Loggers is 61% (75/122) and for non-Master Loggers 5% (15/285). We believe that the responses reasonably represent the opinions of all Maryland's loggers and of the majority of Maryland's Master Loggers.

Forest Landowners

The survey was pretested in September on five forest landowners. It was also shared with forestry program specialists from the following organizations: University of Maryland Woodland Stewardship Program, University of Maryland Forestry Correspondence Course, Maryland Tree Farm Committee, American Forest Foundation, Maryland DNR Forest Service, Chesapeake Bay Program–Forestry for the Bay, and Alliance for the Chesapeake.

Validation letters (Appendix F) were sent out on October 9, 2013, approximately three weeks prior to survey mailing, by cooperating organizations and programs, from the following individuals: Nevin Dawson, UME Woodland Stewards Program; Nancy Stewart, UME Forestry Correspondence Course; Len Wrabel, MD Tree Farm Committee; and Steve Koehn, MD DNR Forest Service, Forest Conservation and Management Agreement (FCMA) Program. Validation letters were mailed by a private vendor, ImPressive Printing Company, Hillsboro, MD.

We contracted with Larry Harris of Mason-Dixon Polling and Research Group in Washington, DC, to print and mail initial notification letters, survey mailings, and follow-up postcards. Dillman's Total Design Method was followed for overall survey implementation. Mason-Dixon Polling and Research also collected and digitized the survey data and produced basic statistics. On October 11, Dr. Bob Tjaden, principal investigator, mailed an introductory letter to all participants, notifying them of the survey and its objectives.

We mailed the surveys October 15, along with an instruction letter from Larry Harris, Mason-Dixon Polling and Research, explaining the survey process and providing the respondents with an opportunity to complete the survey by hand or online. All respondents received a prepaid, self-addressed envelope for returning the paper version of the survey to Mason-Dixon Polling and Research. However, several respondents notified Mason-Dixon that they did not receive a prepaid, self-addressed envelope for returning the survey. It was determined the company Mason-Dixon contracted to handle the mailings did not include the envelope. As a result, on March 31, Mason-Dixon resent the survey and letter of instructions to all possible respondents. Follow-up postcards were mailed November 15. Surveys were to be completed by November 22.

A total of 195 surveys were returned to Mason-Dixon because the addresses were wrong, mislabeled, or nonexistent or the addressee was deceased. Returned surveys had been supplied by UME Forestry Correspondence Course (28), UME Woodland Stewards (54), Maryland Tree Farm (30), Forestry for the Bay (28), Maryland Department of Planning (52), and FCMA (2).

Of the 3,608 (3803-195) surveys mailed successfully, there were 1,093 responses. Responses represented 939 (86%) completed by mail and 154 (14%) completed online. The response rate was 30% (1093/3608). Response rates by organization and programs were difficult to calculate, since respondents were asked to identify as many organizations and programs that they belonged to or participated in. The distribution of returned surveys not only represented the stratified mailing by county but also a reasonable sampling of landowners by organizations and programs. Thus, we believe the responses reasonably represent the opinions of Maryland forest landowners.

RESULTS

Primary and Secondary Forest Industries Survey Summary

The Primary and Secondary Forest Industries Survey was conducted to gain an understanding of the owners' confidence in the future of Maryland's overall forestry industry. The questions and responses have been summarized to highlight perceptions useful in creating a Confidence Index for the Maryland forestry industry. The results directly related to confidence in the industry are followed by a developed confidence index. The summary is rounded out with demographic data and an investigation into perceived potential barriers and opportunities for respondents' business success. For detailed statistics see Appendix B.

Confidence

The reviewers determined that there were four questions that quickly assessed confidence because of their coverage of a) current general perceptions of confidence and b) short-term and long-term company investments. We discuss these four questions and responses and have developed a confidence index for policymakers.

Respondents were asked "How confident are you in the future success and profitability of the forest industry in the State of Maryland?" on a scale of 1 to 5, with 1 corresponding to *not very confident*, 3 to *neutral*, and 5 to *extremely confident*. The mean response was 2.29, conveying the respondents' feelings of being somewhat confident in the future success of the forest industry. Fourteen respondents were *not very* or *somewhat confident*, compared to only 4 who were *very* or *extremely confident*.

Since the terms *confidence* and *future* are subjective and may have different meanings for respondents, we asked three other questions and used the answers to directly measure respondents' confidence in the Maryland forest industry. To understand how confident respondents are in their business short term, we asked whether they planned to make capital improvements in the next five years. Only 42% responded that they planned on making capital improvements, spending an average of $465,000. Another question that measured short-term confidence in the industry was whether they planned on hiring new employees in the next five years. The majority (54%) stated they did not. Respondents that were hiring (13%) were planning on hiring 1 to 5 new foresters, equipment operators, and/or employees for other positions.

Considering these two questions, the majority of respondents did not have definite plans to directly invest in their businesses within the next five years. When they did invest, however, they were more likely to invest in capital improvements than in hiring employees.

Respondents were asked whether they currently had a transition plan in place or if they were developing one. Fifty percent reported having a transition plan or currently developing one, implying that 50% were confident in the long-term life of their business.

When the responses to these questions were considered, respondents seem less confident in their businesses' short-term profitability than in their long-term life and are only somewhat confident in the industry as a whole. Respondents may not see their long-term presence as existence in a growing business, but rather as existence in a steady-state business or even in a declining business that holds on over the years. Owners of full-time businesses are more confident in the forestry industry than owners of part-time businesses are.

Confidence Index

A method of measuring the confidence of primary and secondary forest business owners in the overall forest industry has been developed, resulting in a number contextualized by an index. The index is valued from 1 as *not very confident* to 5 as *extremely confident* as described in question 6, "How confident are you in the future success and profitability of the forest industry in the State of Maryland?" This question established the foundation for the industry confidence index. For the primary and secondary forest industry data, four components were used to calculate this index. In answer to question 6, respondents averaged 2.29. This value is already on the scale of the index and is labeled as "general confidence."

Responses to the other three questions were not measured in index units, but rather in percentage units. The "yes" and "currently developing" percentage responses to the other three questions were combined to determine the percentage of respondents who were positively invested in making purchases, hiring new employees, or transitioning their business. The "no" and "not sure" responses were not included. The more positively invested a business owner, the higher the confidence in the industry. Fifty percent of respondents currently had or were developing a transition plan, so the corresponding index value was determined to be a neutral 3. Similarly, if there were no positive responses, the index value would be 1, and if 100% of responses were positive, the index value would be 5. Table 1 exemplifies how percentages were converted to index values.

Table 1. Response Translation from Positive Percentage to Corresponding Index Values.
Used to create linear equation.

Percentage of Positive Value	Index Value
0	1
25	2
50	3
75	4
100	5

Converting the positive percentage of the responses to the index required utilizing

a linear function. This allowed all percentages to have a corresponding index. We determined the linear function by plotting the points listed above and graphing a line of best fit that connected the points. The resulting slope of the line of best fit was 0.04 and the y-intercept was 1. To obtain the index value, the percentage was multiplied by 0.04 and then added to 1.

Linear function:	Percentage x 0.04 + 1 =	Index
General confidence:		2.29
Capital improvements:	42% x 0.04 + 1 =	2.68
Hiring:	13% x 0.04 + 1 =	1.52
Transition plan:	50% x 0.04 + 1 =	3.00

Each positive percentage was converted to an index, producing four individual index values when the general confidence index value was included. These four values were then averaged to produce the primary and secondary forest industries' confidence in the overall forestry industry (Fig. 1).

$$\text{Average Confidence Index: } (2.29 + 2.68 + 1.52 + 3) / 4 = 2.3725 \approx 2.37$$

The produced average confidence index of 2.37 is slightly higher than the respondents' 2.29 general confidence value when they were asked directly about confidence.

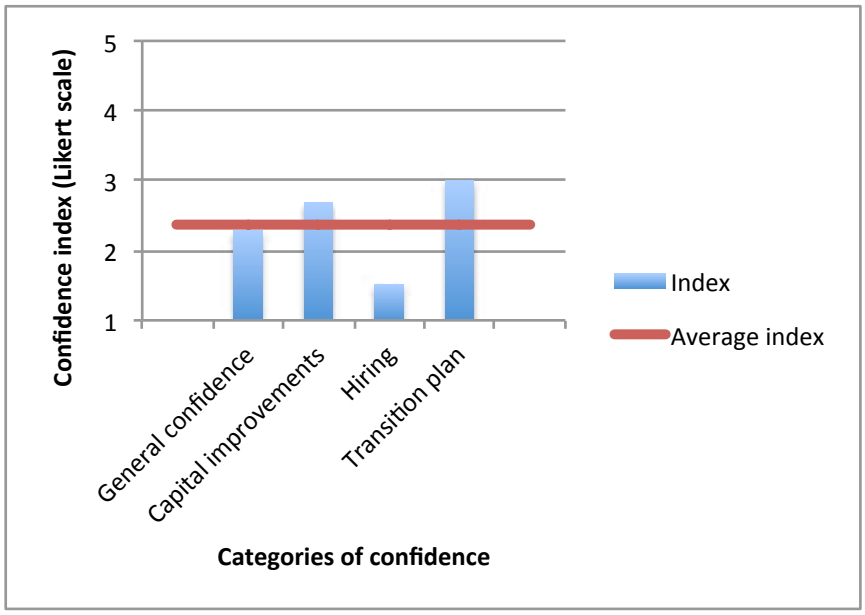


Figure 1. Primary and Secondary Forest Industries' Confidence Index. The average index (shown in red) was calculated with the forest industries' general confidence index and converted indices of forest industries whose business owners planned to make capital improvements and hire new employees and had or were developing a transition plan.

Previous analysis provides a general outlook on the confidence of all the respondents. Now we go deeper and show the differences in confidence between subgroups of respondents. Although we used the chi-square test to support our analysis by highlighting trends, due to the small sample size the test was not statistically significant for any analyses. These subgroups were divided between full-time and part-time businesses, either of which employed less than or more than 15 people and had total assets less than or more than $2.5 million.

The vast majority of respondents (79%) owned and/or ran a business that was full-time (Fig. 2).

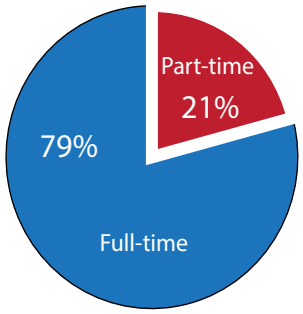


Figure 2. Full-Time and Part-Time Primary and Secondary Forest Industries.

When responses were divided into full-time and part-time categories for the questions that were selected to gauge confidence, owners of full-time businesses showed more confidence in the industry. Full-time business owners (mean of 2.32) were slightly more confident in the future success and profitability of the forest industry than part-time business owners (2.2) were. Respondents were more likely to respond positively to making capital improvements if they owned full-time businesses (45%) versus part-time businesses (25%). No part-time business owners were planning on hiring in the next five years, whereas 15% of full-time business owners planned on hiring. Sixty percent of full-time business owners had or were currently developing a transition plan, but no part-time respondents had a transition plan or were developing one.

The number of people the respondents employed provided another subgroup for analysis. The responses were divided into two groups: businesses that employed one to 15 people and businesses that employed more than 15 people. The owners of businesses employing more than 15 people generally showed more confidence in the overall forest industry, but the number of individuals in this group constituted only about 40% of the total respondent population. They responded with slightly more confidence (mean: 2.29) when asked about the future success and profitability of the forest industry than did owners of smaller businesses (2.18). The majority of business owners (63%) that employ more than 15 people plan to make capital improvements within the next five years, whereas only 36% of smaller-business owners do. Twenty-five percent of business owners that employ more than 15 people plan on hiring new employees in the next five years, compared to only 9% of smaller-business owners. More than 60% of each subgroup currently have or are developing a transition plan.

The number of business owners who listed their total assets as $2.5 million or less was double the number of those who listed their total assets as more than $2.5 million. The business owners with more than $2.5 million in assets reported higher confidence in the industry across the board than owners of lower-valued businesses did. The former responded with more confidence (mean: 2.50) when asked about the future success and profitability of the forest industry than smaller-business owners (2.15) did. The vast majority of business owners (86%) with higher-valued assets planned to make capital improvements within the next five years, whereas only 23% of smaller-business owners did. Although 43% of business owners with larger assets planned on hiring new employees in the next five years, smaller-valued business owners expressed no hiring plans. More than 75% of business owners with larger assets currently had or were developing a transition plan, compared to 31% of smaller-business owners.

Demographics

There were 25 respondents to the Primary and Secondary Forest Industries Survey, and the majority (80%) were owners of full-time businesses. The respondents generally ran smaller productions (65% of these businesses had estimated total assets of $250,000 to $2.5 million). The mean number of business employees was 15, but the maximum value was 51 employees, again reflecting a skew towards smaller organizations. The respondents employed a total of 352 people.

The respondents employed mainly white/Caucasians, followed by a much smaller group of African-American and Latino employees. There were a few Amish employees, presumably employed at the Southern MD sawmills (Fig 3.)

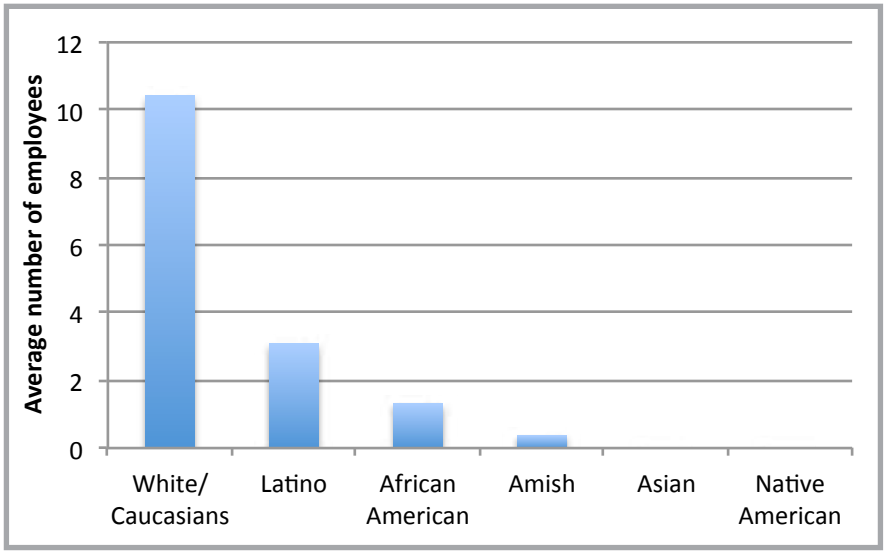


Figure 3. Primary and Secondary Forest Industry Employee Ethnicity.

There was a small presence of military veterans in the workforce. A maximum of 3 employees at one sawmill were veterans, with an average of less than one veteran employee per sawmill. Veterans' responses will directly aid in developing policies aimed at promoting the industry. The age group of employees that made up the largest percentage of the respondents' workforce was 41 to 50 years, with the responses somewhat evenly distributed among the age groups. Owners' average age was slightly above 50, with a maximum value of 68 years.

Eleven veterans are employed by the 25 forest industry respondents.

Most respondents (73%) provided their employees with safety equipment. Other top employee benefits included workers' compensation insurance (59%) and bonuses and paid vacation (55%). Only 36% of respondents provided supplemental health insurance. Thirty-two percent of respondents did not provide benefits to their employees.

The majority of wood material respondents obtained came from Maryland (66%), with locations broken down into the Eastern Shore (27%), Central (20%), Western (13%), and Southern (6%). The rest of the wood came from surrounding states, with Delaware as the largest out-of-state contributor (13%) (Fig. 4). Respondents reported obtaining their wood supply directly from Maryland loggers (34%), out-of-state loggers (11%), and other sources (45%), such as from arborists and/or landowners. No respondents

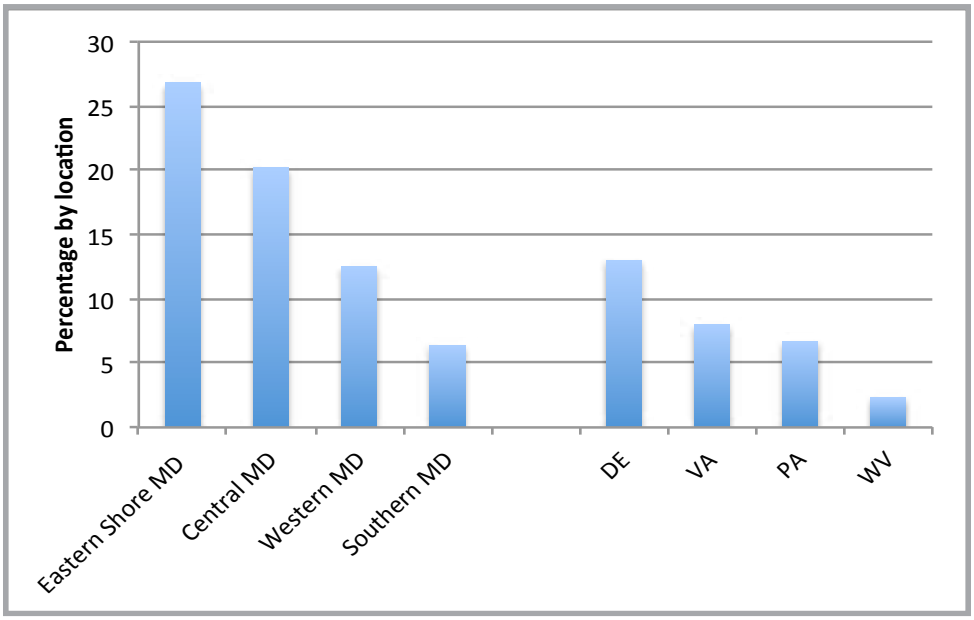


Figure 4. Primary and Secondary Forest Industry Respondents Obtained Wood Material from Various Locations. The percentages of these purchases are indicated by location.

claimed to use wood brokers to supply their wood. Respondents sold most of their products in Pennsylvania (23%), followed by Maryland's Eastern Shore (17%) and the U.S. Northeast region (16%) (Fig. 5). A detailed breakdown of Maryland counties into their regional associations can be found in Appendix H.

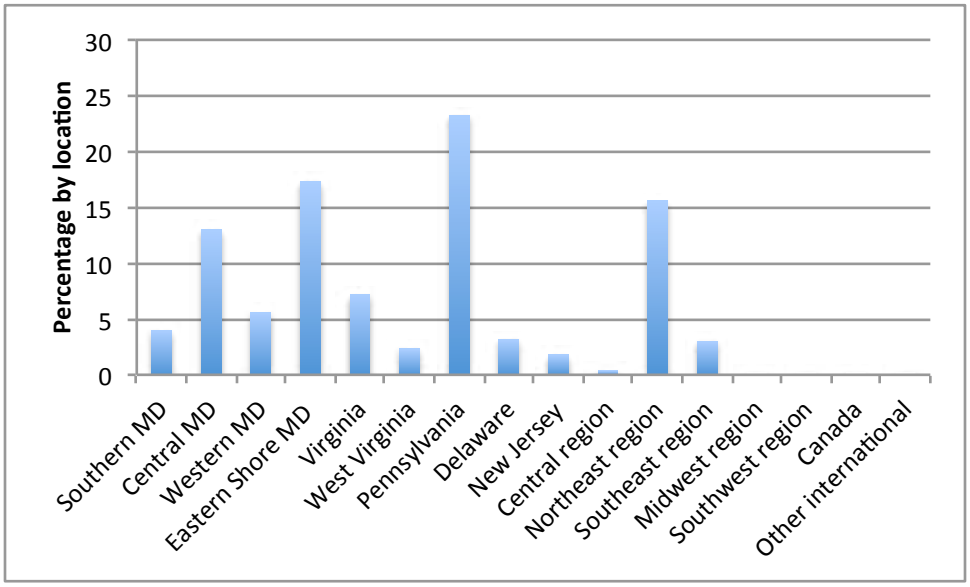


Figure 5. Primary and Secondary Forest Industry Respondents Sold Products to Various Locations. The percentages of these sales are indicated by location.

The areas showing the largest difference between where respondents were buying wood and where they were selling their products, highlighted in Figure 5, are Pennsylvania and the Northeast region. There is a much larger export flow to Pennsylvania and the Northeast region than import flow from either area to Maryland.

Respondents reported buying wood material and selling their products anywhere from Maryland to the Northeast region, so it is no surprise that the largest percentage (27%) of respondents' total income was spent on consumable supplies such as fuel, oil, repair, and maintenance. The remaining income was distributed among labor (20%), overhead expenses (16%), equipment purchases (11%), and insurance (7%).

Respondents mainly produce hardwood sawtimber (the average percentage of annual production is 41) (Fig. 6). This is followed by softwood sawtimber (17%), firewood (8%), and pulp/paper, sawdust, and mulch. Only 13% of respondents said their company was involved in bio-energy products (sawdust and biofuel wood).

It was expected that respondents would be much more involved in firewood and fuel sources in general. The vast majority of respondents (88%) said they did not use woody biomass as a fuel feedstock; but for respondents who did use it, woody

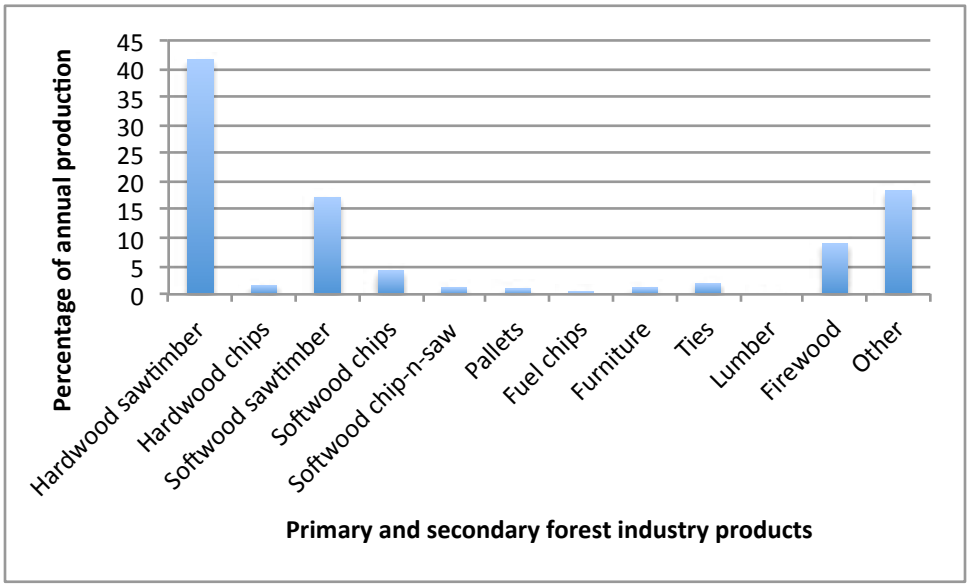


Figure 6. The Percentage of Production of Primary and Secondary Forest Industry Products. The volume was estimated by percentage of annual production.

biomass as a fuel feedstock comprised on average about a quarter (23%) of the total fuel used. Thirty-five percent of respondents said they would like to expand their company into the bio-energy market, leaving 65% with no interest in expanding into the bio-energy market. This information on current use and interest in bio-energy could be useful in developing policies, such as introducing favorable low-interest loans, that will promote and help sustain the logging industry.

Thirty-three percent of respondents reported growth in their company's market and an increase in production during the prior five years. Twenty-five percent reported their company's market to be trending downwards. The survey asked about the production rates of their businesses during the prior five years, but due to the various units used and interpretations of the questions, the responses and analyses are left out of this summary.

Thirteen percent of forest industry owners said their company was involved in bio-energy products.

Evidence of growth should correlate with an increased belief of being better off, but we do not see that here. Respondents (48%) believed they were worse off compared to five years ago. Only 24% of respondents thought they were better off than five years ago.

Challenges

The respondents have shared the characteristics of their businesses and their outlook on what the future holds for them. Now we delve into their interpretation of potential barriers to maintaining or expanding their businesses.

The greatest potential barriers the respondents listed were fuel costs and a long-term concern over their ability to obtain raw materials. Higher fuel costs were also listed as a reason their businesses were worse off now than five years ago. Respondents were also concerned with the long distance between their production center and their markets. Respondents believed their wood suppliers faced the following challenges: costly regulations, costs of production far exceeding market prices, and low availability of raw materials.

The greatest potential barriers to primary and secondary forest industry owners were fuel costs and lack of ability to obtain raw materials, a long-term concern.

Opportunities

Respondents have reported that potential barriers to their success exist; they have also suggested measures that could increase the success of or confidence in the industry. Low-cost loans for equipment, tax breaks, and state-assisted planting, for instance, might boost the profitability of the logging industry. Increasing recycling of pulpwood that would lessen cutting, using local lumber to lower fuel costs, and encouraging the production and sale of alternative forest products could make the industry more sustainable (and more profitable). One respondent mentioned that emerging technologies in biofuels and biomass energy needed more support from the government.

Because governmental policies and educational programs can expand or enhance a business, they were included in this section. Respondents ranked a list of policies and strategies according to their order of importance. Ranked at the top are safety regulations, regulations by U.S. Environment Protection Agency and MD Department of the Environment, product pricing/distribution, and identifying new markets/new product development. The green marketing/product certification, international marketing, and computer training (CAD) were ranked by the majority of responses as not very important.

Maryland Logger Survey Summary

The Maryland Logger Survey is discussed below to emphasize the development of a confidence index for the Maryland forest industry. We also discuss in detail responses to the Master Logger training program to promote policy development. Refer to Appendix D for more statistics.

Confidence

The reviewers determined that four survey questions quickly assessed loggers' confidence in the forest industry. We discuss these four questions and responses below, followed by their development into a confidence index for policymakers.

Respondents were asked "How confident are you in the future success and profitability of the forest industry in the State of Maryland?" on a Likert scale with 1 as *not very confident*, 3 as *neutral*, and 5 as *extremely confident*. The mean response was 2.6, conveying that respondents felt somewhat confident in the future success of the forest industry. When the 1 and 2 responses were grouped together, 41 respondents were *not very* to *somewhat confident*, compared to only 21 who were *very* to *extremely confident*. This index value is slightly higher than the average response of primary and secondary forest industry owners.

Low-cost loans for equipment, tax breaks, and state-assisted planting may boost profitability of the forest industry, according to primary and secondary forest industry owners.

To understand how confident respondents were in their businesses short-term, we asked them whether they planned to purchase new or used equipment in the next five years. The majority (62%) responded that they planned on making these purchases. Another question that measured short-term confidence in the industry was whether respondents expected to be logging in five years. The majority of loggers (71%) responded they were planning to be logging in five years.

Respondents were asked whether they currently had a transition plan in place or if they were developing one. Fifty-three percent responded they had or were currently developing a transition plan, implying that 53% were confident in the long-term life of their business.

When the responses to these questions were considered, loggers seemed more confident in the short-term profitability of their businesses than in its long-term life and were only somewhat confident in the industry as a whole.

Confidence Index

We have developed a method of measuring loggers' confidence in the overall forest industry, resulting in a number contextualized by an index. The index is valued from 1 as not very confident to 5 as extremely confident as described in question 6, which asked, "How confident are you in the future success and profitability of the forest industry in the State of Maryland?" For the logger data, we used four components to

calculate this index. The average response to question 6 was 2.6. This value is already on the scale of the index.

Responses to the other three questions were in percentage units, rather than index units. The methodology for converting the percentage units to index units is the same as we used to discuss the primary and secondary forest industries.

Linear function:	Percent * 0.04 + 1 =	Index
General confidence:		2.6
Purchase equipment:	62 * 0.04 + 1 =	3.48
Expect to be logging in 5 years:	71 * 0.04 + 1 =	3.84
Transition plan:	53 * 0.04 + 1 =	3.12
Average confidence:	(3.48 + 3.84 + 3.12 + 2.60) / 4 =	3.26

The average confidence index for loggers is 3.26, which is much higher than the averaged response to the question concerning the general confidence of primary and secondary forest industry respondents (2.6) in the success and profitability of the forestry industry (Fig. 7). Loggers also reported a higher confidence in the industry. Primary and secondary forest industry respondents reported a general confidence of 2.29 and an average confidence index of 2.37 (Fig. 1).

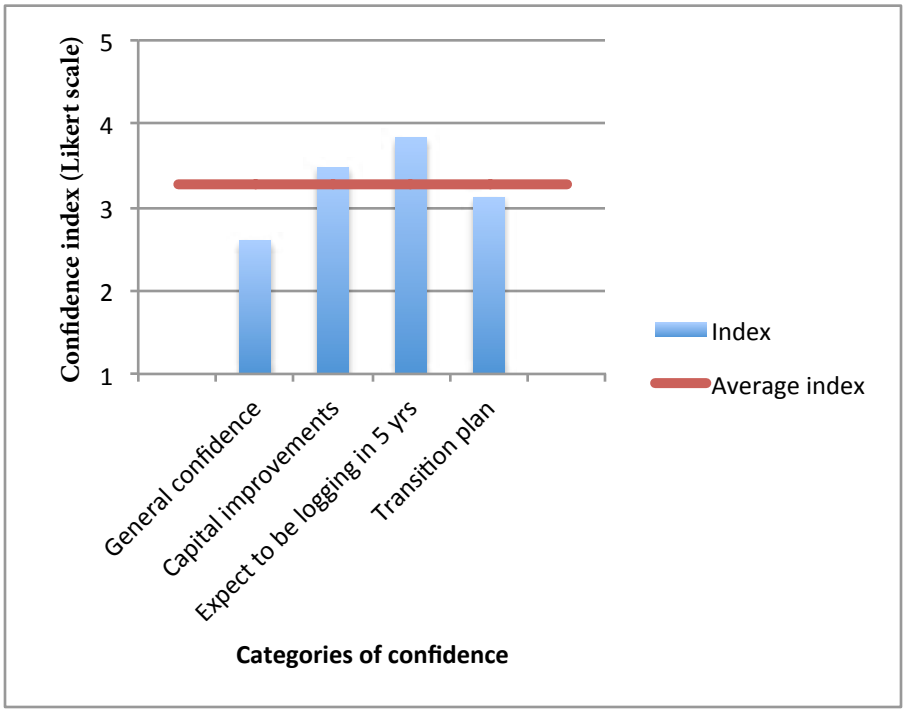


Figure 7. Logger Confidence Index. The average index (shown in red) was calculated with the logger general confidence index and converted indices of loggers who planned to make capital improvements, expected to be logging in five years, and had or were developing a transition plan.

Cross tabulations were created to determine the influence of 1) regional association, 2) full-time vs. part-time, 3) number of employees, and 4) Master Logger status on the confidence of respondents in the Maryland logging industry.

Survey representation from the Maryland regions was evenly distributed, with respondents from the Western (38%), Southern/Central (33%), and Eastern (29%) regions. The Eastern (2.74) and Western (2.76) regions reported a higher confidence than the Southern/Central region (2.32) in the future success and profitability of the forest industry. When asked whether they expected to be logging in five years, loggers from the Western (73%) and Southern/Central (76%) regions reported a much higher positive response than loggers from the Eastern (58%) region did. The majority of respondents from each region reported they planned on purchasing new or used equipment in the next five years. The Eastern region claimed the highest percentage of respondents (25%) who would not be purchasing equipment. The Western region was the only region with the majority of respondents (66%) who had or were currently developing a transition plan. The Eastern (48%) and Southern/Central (39%) regions contained many fewer respondents with a transition plan or aspirations to develop one. Eastern region respondents revealed similar responses to the general confidence question as Western region respondents did. When responding to other questions that indicate confidence, however, the latter reported more negative responses, which could imply a more conservative outlook on confidence in the Western region or a more optimistic outlook on confidence in the Eastern region.

The majority of respondents (81%) had full-time businesses (Fig.8).

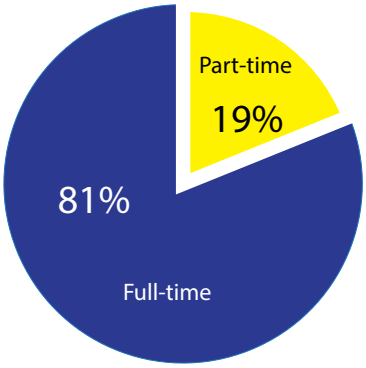


Figure 8. Full-time and Part-time Logger Respondents.

Full-time respondents revealed a higher confidence in the future success and profitability of the forest industry in Maryland (2.66, *somewhat confident*). Seventy-seven percent of full-time respondents expected to be logging in the next five years, whereas only 47% of part-time respondents expected to be logging. Similarly, 66% of full-time respondents planned on purchasing equipment in the next five years, with only 47% of part-time respondents planning on making purchases. Sixty percent of full-time respondents had or were developing a transition plan for their businesses. Only 24% of part-time respondents had or were developing a transition plan. As in the forest production industries survey, the logging survey results have shown full-time business respondents to be more confident in the forest industry than part-time business respondents.

Responses to the number of people employed were broken into two categories, respondents employing 1 to 5 people and those employing more than 5 people. The majority of respondents (64% in response to question 6, which asked "How confident are you in the future success and profitability of the forest industry in the State of Maryland") owned smaller businesses and employed 1 to 5 people. Respondents who employed more than 5 people showed a slightly higher mean confidence (2.69) in the future success and profitability of the forest industry, when compared with employers of 1 to 5 people (2.48). According to their responses, business owners who employed more than 5 people (80%) were more likely to be logging in five years, compared to smaller-business owners (64%). Larger-business owners (72%) were also more likely to purchase equipment in the next five years and had or were currently developing a transition plan (77%), especially when compared to smaller-business owners (58% planned on making purchases in the next five years and 43% had a transition plan in place). The larger-business owners showed more confidence in the industry in all indicator questions, but the smaller-business owners constituted the majority of respondents.

Sixty-one percent of Master Loggers reported having a positive impression of the Master Logger class they had attended.

The logger survey attempts to gauge information about the Master Logger program. Here, we analyze the confidence indicator questions to determine the differences between Master Loggers and other respondents. Master Loggers responded that they were either a) currently an active MD Master Logger, b) in training to become a Master Logger, or c) trained as Master Loggers in other states (WV, PA, VA). The Master Logger group defined 85% of the participants. For three of the four indicator questions, Master Loggers did not differ much from non-Master Loggers in their confidence levels. Master Loggers demonstrated a slightly higher mean of confidence (2.59) compared to non-Master Loggers (2.49) and demonstrated a higher likelihood of purchasing equipment in the next five years (64%), compared to non-Master Loggers (54%). More Master Loggers (55%) were likely to have or to be currently developing a transition plan, compared to non-Master Loggers (42%). But somewhat surprisingly, Master Loggers (68%) were less likely than non-Master Loggers (83%) to expect to be logging in the next five years. This break from the expected may be attributed somewhat to the difference in survey sample size between the two groups. It would be interesting to analyze follow-up surveys and explore this finding further.

Master Logger Training

The Logger survey was developed and executed to determine the Master Logger perception of the forest industry and Master Logger training programs. Survey responses can aid in the development of policies regarding Master Logger training. The following are summaries of responses to questions 10 through 12 in the logger survey that focused on evaluating the Master Logger program.

The majority of Master Logger respondents (61%) believed that the training improved the way they log, kept them current of industry trends (52%), and helped create respect from the landowner (53%). Fewer Master Loggers perceived that the training programs opened up opportunities for bids, such as logging on state land (40%), or helped create respect from the public (44%). The Master Logger training did not seem to impress many respondents as offering them an advantage when buying (15%) or selling (16%) stumpage. Sixty-one percent of Master Loggers reported having a positive impression of the class they had attended. When considering the importance of possible Master Logger training and educational needs and topics, Master Loggers reported first aid and CPR training to have the highest level of importance (4.06, *very important*). All remaining training and educational needs of Master Loggers were rated higher than *important*.

Demographics

Ninety loggers responded to the Maryland Logger Survey. The majority of respondents described their logging assets to be from $0 to $500,000. The respondent logger businesses employed a total of 517 people. This number had mostly remained the same during the five years prior to the survey. Businesses ranged from employing 1 to 80 people, with an average of 6 people, implying that most respondents had 6 or fewer employees. For the majority of logging businesses (70%), the number of employees had remained the same during the five prior years. The majority of logger employees fell into the 21 to 30 age group. Respondents ranged from 21 to 80 years old, with an average age of 46. They reported an average of 25 years of logging, ranging from 1 to 60 years of experience. The logging community respondents reported employing a younger population than the sawmill respondents reported. The racial makeup of respondents' current workforce was mostly Caucasian, including Amish; African-Americans were also represented. Six respondents were military veterans. Equipment operators comprised the largest group of employees, followed by maintenance workers and truck drivers.

Logger respondents had an average age of 46.

The largest percentage (74%) of respondents' logging jobs in the past year occurred on land owned by private landowners.

A smaller percentage of logging jobs (11%) occurred in state forests. A slight majority of respondents (53%) contracted harvesting services to mills. These particular respondents each contracted services to an average of three mills per year for harvesting their timber, with 10 as the largest number of mills any one respondent put under contract. Most respondents (73%) independently bought timber from and sold their harvested timber to mills.

Loggers directly bought 38% of harvested timber, mill foresters bought 28%, consulting or state foresters bought 17%, and wood dealers bought 4%; 2% of timber was cut on mill company land. Because of loggers' 38% direct purchase, it would be beneficial to add forest management techniques to logger educational programs.

Respondents reported harvesting the most timber from Western MD (18%) and Pennsylvania (17%) (Fig. 9). All other harvest source locations were Eastern Shore, MD (14%), Central MD (12%), Southern MD (8%), West VA (8%), VA (8%), and DE (6%).

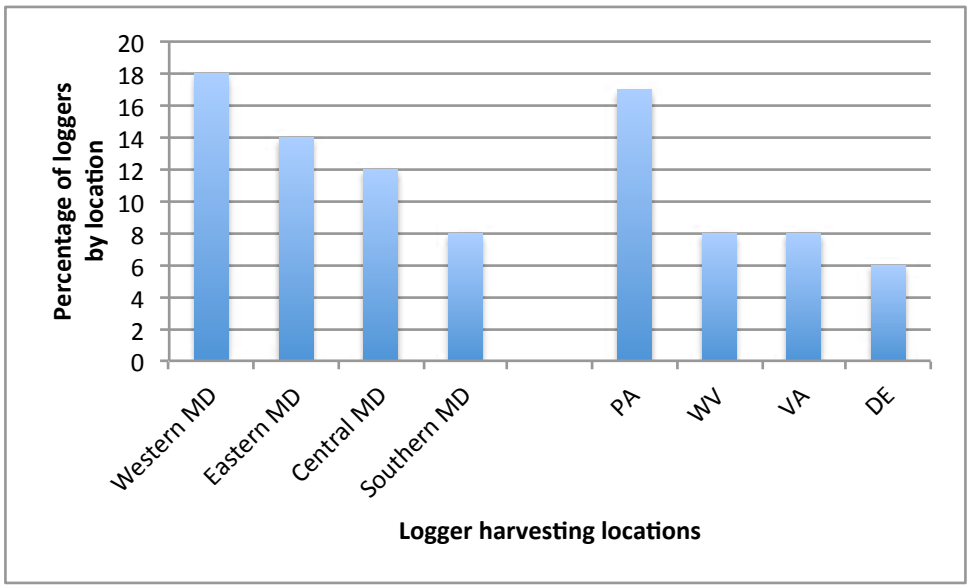


Figure 9. The Percentage Loggers are Harvesting from Each Location. The percentage of harvested timber by location is split between Maryland and surrounding locations.

The average distance to respondents' logging jobs in the 12 months prior to the survey was 40 miles (with a maximum of 100 miles). The average distance to respondents' sawmills in the prior 12 months was 46 miles, slightly longer than to logging jobs. The majority of respondents (58%) believed that this distance had remained the same during the prior five years.

Respondents worked an average of 40 weeks during the 12 months prior to the survey, ranging from 3 to 52 weeks. The majority (62%) believed that the number of weeks they logged had remained the same in the past 12 months. Weather was *very* to *extremely important* to respondents as the main cause of downtime.

Eighty-four percent of respondents reported providing their employees with either benefits or safety equipment. Sixty-two percent of logging business owners provided employees with workers' compensation, 57% with formal logging training, and 54%

with paid vacation. Thus, a majority of these business owners offer some kind of benefit. Only a few respondents (16%) offered an employee pension plan.

Seventy-two percent of loggers indicated they rely on logging for the majority of their income (0% to 25% of income comes from sources outside of logging).

Six logger respondents were military veterans.

Only 8% of respondents had entered the biomass/energy/fuel chip wood market. The respondents were split in thinking they could effectively add a chipper and efficiently harvest fuel chips from logging residues such as limbs, tops, and nonmerchantable trees (38% responded yes, 38% no, 24% not sure). If biomass markets were available 41% would want to add a chipper to their operation to harvest biomass. This option had a slightly more favorable response, with few loggers responding they would not take advantage of the available harvest markets. In terms of economic development, policymakers could, for example, make low-interest loans available as a financial incentive for loggers. The small amount of current involvement in biomass markets offers a real opportunity to the government to make a large impact on the industry by creating policies that would establish low-interest loans.

Challenges

The single greatest barrier to maintaining or expanding the logging business was the high cost of fuel (average value of 4.59, *very* to *extremely important*). The primary and secondary forest industry owners also viewed fuel costs as a major barrier to the logging business. A low percentage of loggers considered the following to be the greatest barriers: low market prices for logs/pulpwood (10%), government regulation (9%), and the cost of replacing equipment (8%).

If biomass markets were available 41% of loggers would want to add a chipper to their operation to harvest biomass.

Health insurance costs (4.20) and workers' compensation costs (4.16) were listed in these responses as *very* to *extremely* major barriers. All of the survey-suggested potential barriers to maintaining or expanding the logging business were rated above *somewhat important*, with vandalism rated as the least important barrier.

Opportunities

When respondents were asked what could be done to help the industry be profitable and sustainable, responses included lowering fuel costs, adding mills, adding biomass programs, promoting better forest management, and providing better financing for

equipment. To attract people to the logging profession, respondents suggested an educational program promoting the logging industry and the benefits of harvesting timber.

Private Forest Landowner Survey Summary

The Maryland Landowner Survey was conducted in conjunction with the Forest Products Industry Survey and the Maryland Logger Survey to establish a confidence index for the overall forest products industry. In this section we present the Maryland Landowner Survey results and place them in the context of the other two surveys. The landowner survey had a much larger sample size—1106—than the other two surveys. Refer to Appendix G for more detailed statistics on results from the landowner survey.

Confidence

Four survey questions assessed landowner confidence in the forest industry. The questions and responses are discussed below, followed by the development of a confidence index for policymakers.
Respondents were asked, "How confident are you in the future success and

> *The costs of fuel, health insurance, and workers' compensation were listed as the greatest barriers to loggers expanding their business.*

profitability of the forest products industry in Maryland?" on a Likert scale, with 1 as *not very confident*, 3 as *neutral*, and 5 as *extremely confident*. The landowners were given the option to respond, *don't know*, whereas neither forest industry owners nor loggers were given that option. The mean was evaluated using the total of the 1 to 5 responses as the total value. The *don't know* responses were not calculated into the mean. The mean response was 2.71, corresponding to *somewhat confident* in the future success of the forest industry. There were 341 landowners who were *not very* or *somewhat confident*, compared to only 193 who were *very* or *extremely confident*. This index value is slightly higher than both the forest industry owner (2.29) and logger (2.6) response index averages.

For us to understand how confident respondents were in their businesses short term, we asked whether they planned to harvest any trees as part of a timber sale within the next five years. The majority (58%) responded that they had no plans to harvest; only 20% responded that they did indeed have plans to harvest. The low willingness to sell could be due to a low confidence in the industry, a willingness or desire to hold onto assets, or landowner objectives that don't include timber production. Another question that measured short-term confidence in the industry was whether respondents had any forest management activities planned for the next five years. The majority of landowners (53%) responded in the affirmative.

Respondents were asked whether they currently had a transition plan in place or if they were developing one. Eighty-three percent had or were currently developing a transition plan.

Lowering fuel costs, adding mills, adding biomass programs, promoting better forest management, and providing better financing for equipment are mechanisms loggers believe will help the industry be profitable and sustainable.

According to the responses to these questions, landowners seemed more confident in their forest's long-term viability than in its short-term profitability. Primary and secondary forest industry respondents also seemed slightly more confident in their business' long-term existence. However, loggers indicated the opposite: emphasizing short-term confidence in their business but long-term uncertainty.

Confidence Index

We discussed the method of measuring landowner confidence in the overall forest industry in detail in the previous survey results.

Converting the percentage of positive responses to the index required utilizing a linear function. The percentage was multiplied by 0.04 and added to 1.

Linear function:	Percentage x 0.04 + 1 =	Index
General confidence:		2.71
Plan to harvest:	20 x 0.04 + 1 =	1.8
Forest management plan:	53 x 0.04 + 1 =	3.12
Transition plan:	83 x 0.04 + 1 =	4.32

Each positive percentage was converted to an index, producing four individual index values when the general confidence index value is included. These four values were then averaged to produce the forest landowner confidence in the forestry industry (Fig. 10).

Average confidence: (2.71 + 1.8 + 3.12 + 4.32) / 4 = 2.9875 ≈ 2.99

The average confidence index of 2.99 is higher than the respondents' more subjective 2.71 general confidence value. The landowner average confidence index is between the primary and secondary forest industry owners' confidence of 2.37 and the logger confidence of 3.26.

We have discussed the general outlook of the confidence of all landowner respondents. Now we delve into the differences in confidence between subgroups of respondents. The subgroups were populated by respondents according to the forestry training

program or organization they were associated with. The subgroups were also divided according to whether respondents had a plan to harvest in the years that followed and whether they had a forest management plan.

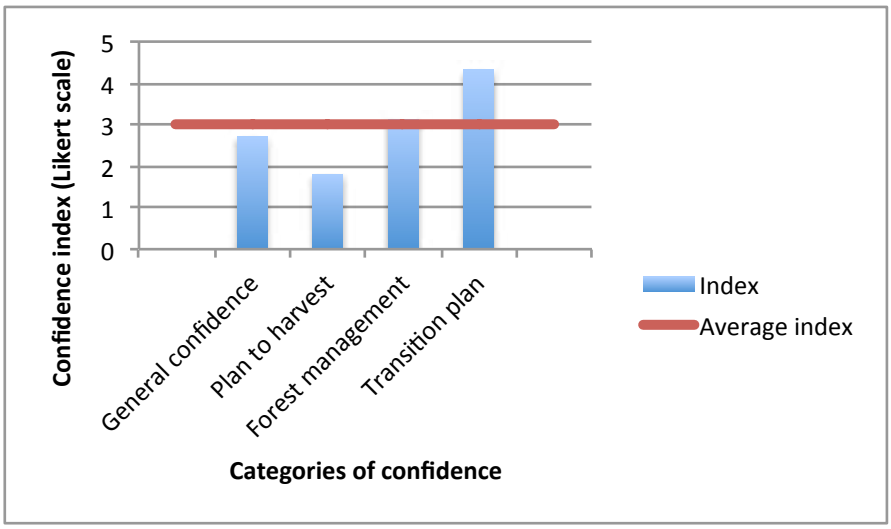


Figure 10. Landowner Confidence Index. The average index (shown in red) was calculated using the landowner general confidence index and converted indices of landowners who planned to harvest in the next five years, had a forest management plan, and had or were developing a transition plan.

We used the association of respondents with forestry programs or organizations as a cross tab filter to determine the impact of the association on respondents' confidence in the Forest Products Industry. The Maryland Tree Farmer Program (34%), Forest Conservation and Management Program (30%), and Maryland Woodland Stewards program/Coverts Cooperators project (19%) were the top three programs or organizations respondents identified with. It is also important to note that 29% of landowners did not associate themselves with any of the organizations or programs listed in the survey.

The majority of FCMA participants had forest management activities planned in the five years that followed (73%) and had a transition plan or were developing one (82%). The other participants were similarly committed to forest management activities and transition plans. Maryland Forests Association (MFA) members (8% of respondents) reported the highest confidence in the forest products industry, directly and indirectly. National Woodland Owners Association members (only 1% of respondents) reported similarly high indirect confidence in the industry, but a slightly lower direct confidence in the industry (23% reported they were *very* to *extremely confident*) when compared to MFA members (30%).

The biggest distinction in this cross tabulation occurs between respondents who identified with an organization and those who did not. If the respondent did not identify with any of the organizations listed on the survey (29% of respondents), he or she reported a lower general confidence in the forest industry (11%, *very* to *extremely confident*) than the other respondents, had fewer plans to harvest in the next five years (12%), and were less likely to have forest management activities planned for the next five years (21%). Even if respondents were not associated with these organizations, the majority still had a transition plan in place (67%).

If respondents planned to harvest in the next five years, 85% also had forest management activities planned for the next five years.

Twenty-nine percent of landowners did not identify with any organizations and reported a lower general confidence in the forest industry than the landowners who did identify with organizations.

Respondents were asked whether they had a written forest management/stewardship (FM/S) plan in place. The answers were analyzed with regard to respondents' reported confidence in the forest products industry. Sixty percent of respondents confirmed that they had a plan. These respondents were slightly more likely to have plans to harvest in the five years that followed. Respondents with a plan were also much more likely to have forest management activities planned for the five years that followed. Seventy-one percent had activities planned, compared to 26% of respondents with no written forest management plan. There was no definite difference between respondents with or without a forest management plan in terms of their general reported confidence in the industry or whether they had a transition plan.

Demographics

Most respondents were joint landowners (48%), with individual (32%), family partnership (10%), and trust or estate (5%) landowners also represented. As we discussed in the cross tabulations, most respondents were Maryland Tree Farmers, FCMA participants, MD Woodland Stewards, or coverts cooperators. Also represented were MD Forest Association members (8%), University of Maryland Extension General Forestry Correspondence Course participants (7%), Local Forestry Board members (4%), Woodland Assessment Program participants (3%), Forestry for the Bay members (3%), and National Woodland Owners Association members (1%).

Maryland counties fell into either Western, Southern, Central, or Eastern Maryland (See Map in Appendix H). Landowners were evenly distributed statewide by county as

per landowner data from Maryland Forest Service. Most landowners were located in Western Maryland (32%), with respondents also living in Eastern (26%), Central (20%), and Southern (19%) Maryland. The remaining 2% owned land in more than one county.

Most respondents (34%) owned 10 to 24 acres, followed by 23% who owned 25 to 49 acres. The majority of each of the respondents' acres (78%) were contiguous.

The associations listed above typically require the landowner to have a written forest management/stewardship plan, and 60% of respondents reported having one.

When asked why respondents owned their forestland, the most important reason was that they enjoyed the beauty or scenery. Eighty percent of respondents rated that reason as *very* to *extremely important* to them, while only 13% rated it as *not very* to *somewhat important*. Other top reasons rated as important for owning forestland were protection or improvement of wildlife habitat (listed according to 75% as *very* to *extremely important*), to preserve for future generations (74%), and to use as part of a home or farm (71%) (Fig. 11).

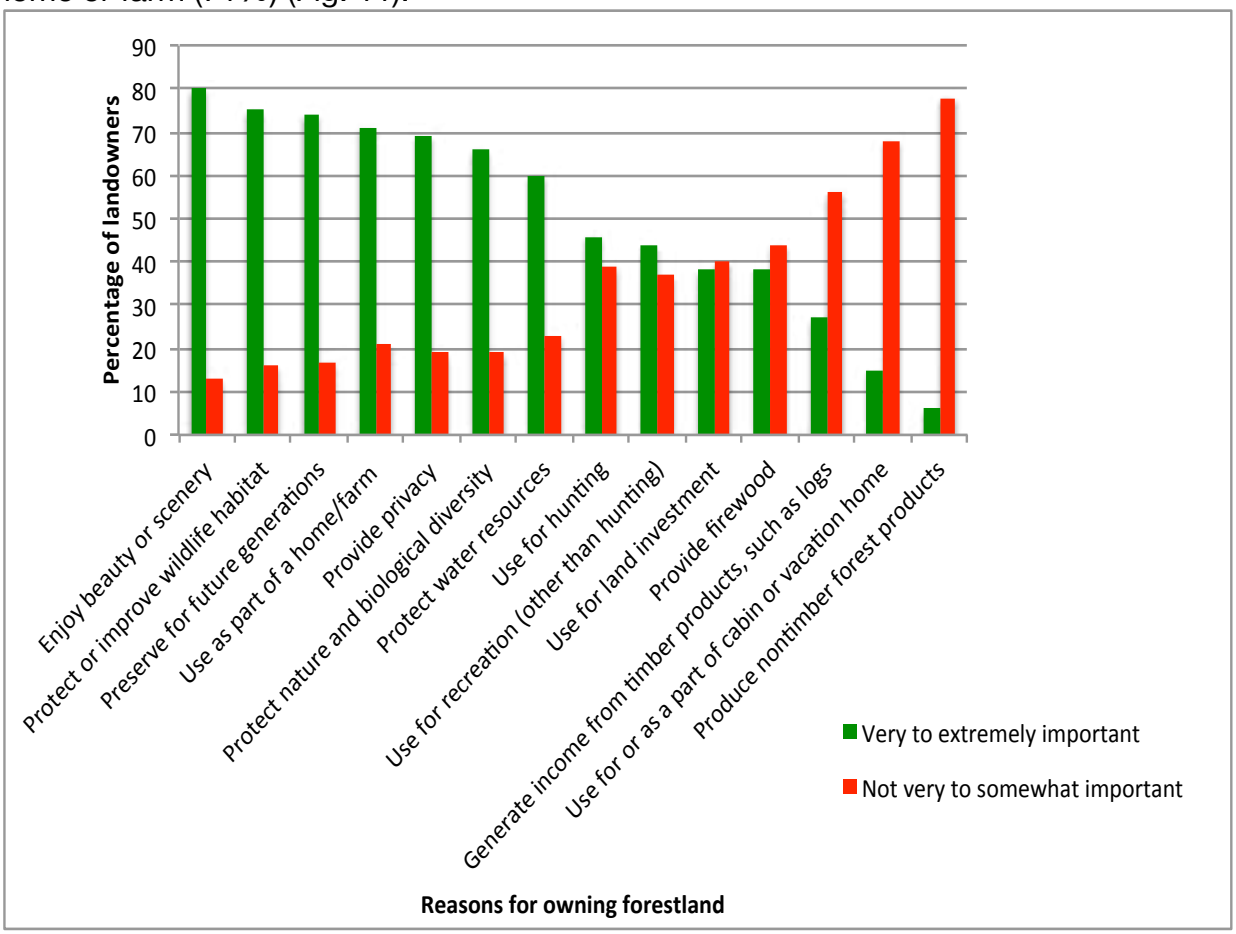


Figure 11. Landowners' Reasons for Owning Forestland. Organized by decreasing levels of importance from left to right.

When asked whether they had harvested in the past 10 years, 30% responded positively. Of those harvests that occurred, respondents indicated foresters were used in 79% of the sales and Master Loggers were used in 48% of the sales, with 29% of respondents indicating they did not know if the logger was a Master Logger. Only 20% responded that they planned to harvest any trees as part of a timber sale within the next five years.

Production of nontimber forest products was the least important reason, with generation of income from timber products also ranked as *not very important*.

Respondents were asked about their general confidence in the forest industry, discussed in the previous confidence section; they were also asked about their confidence in the future success and profitability of specific forest product markets. Respondents expressed they had the most confidence in firewood, followed by lumber (Fig. 12). They expressed low confidence in the viability of ties and nontimber products.

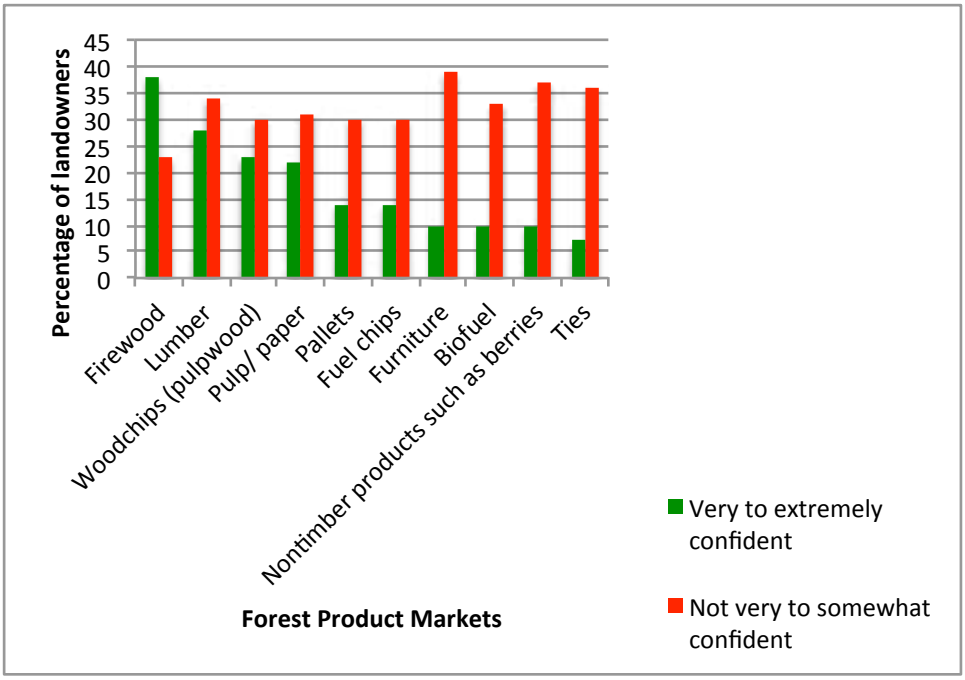


Figure 12. Confidence in the Future Success and Profitability of Forest Product Markets in Maryland. Organized by decreasing levels of confidence, from left to right.

The majority of respondents who had activities planned for the next five years were planning to improve wildlife habitat and manage invasive species. Only a small percentage planned to protect stream banks (Fig. 13).

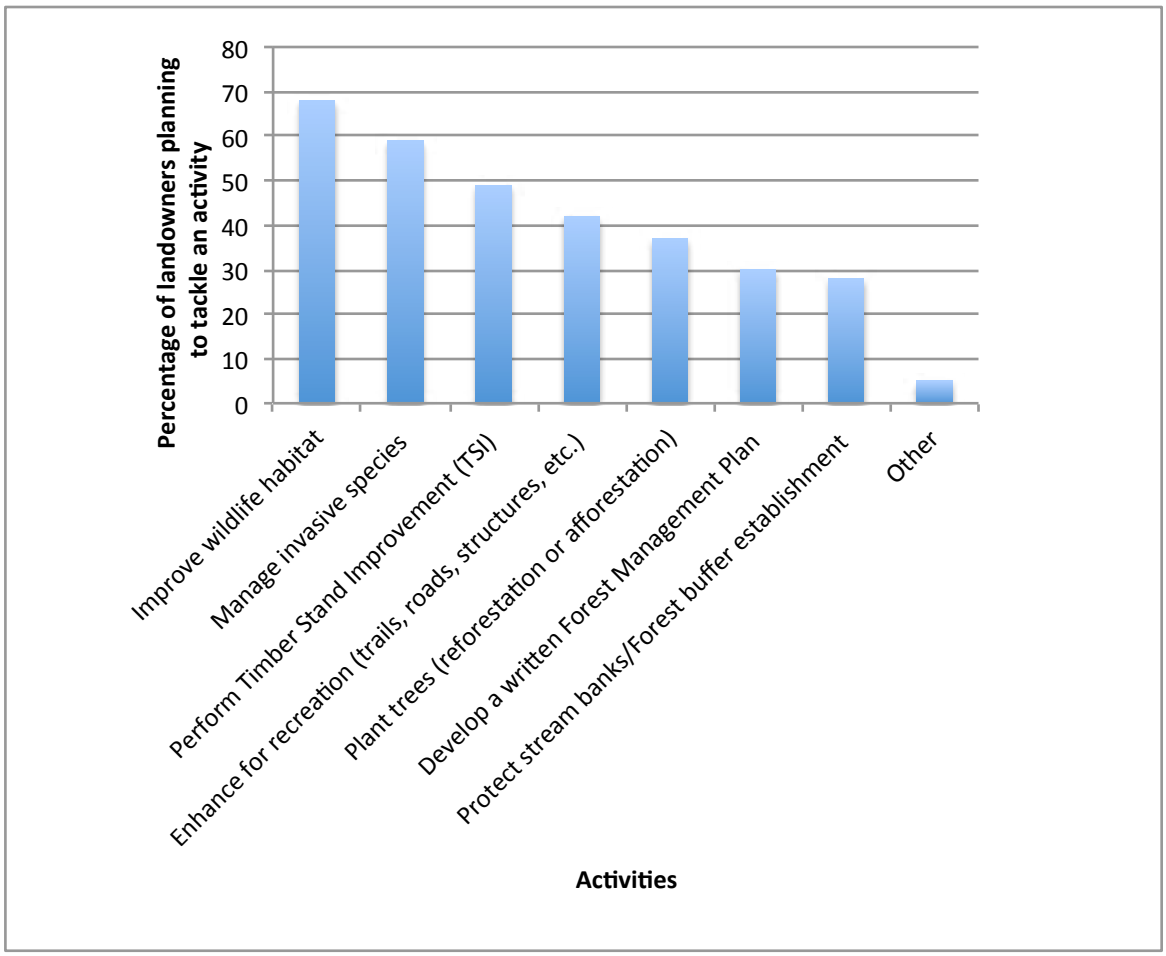


Figure 13. Type of Landowner Forest Management Activity Planned.

When respondents made decisions concerning their forestland, 64% made decisions individually and 25% consulted with a group of friends or with family members. Of the 29% of respondents who had participated in cost share programs, 61% had participated through the USDA Natural Resources Conservation Service, 48% through MD DNR, 36% through MD Department of Agriculture, 16% through National Wild Turkey Federation, 14% through Ducks Unlimited, and 12% through other programs. Nineteen percent of respondents had conservation easements on their land. Of the 19%, 67% had easements that allowed the harvesting of timber. Forty-seven percent planned to develop a transition plan in the next five years.

Respondents reported a lack of familiarity with forestry terminology (Fig. 14). This may exert an impact on future policy and education efforts.

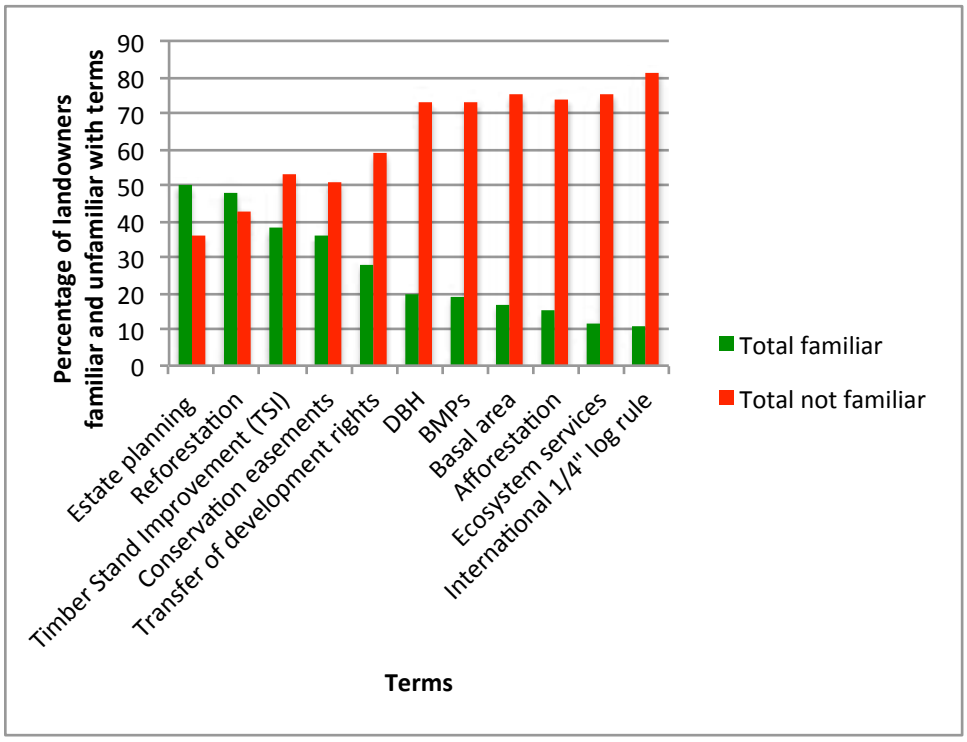


Figure 14. Landowners' Familiarity with Forestry Terms. Organized by decreasing order of familiarity.

Challenges

When respondents were asked to rate the potential barriers to their business, most listed taxes as a *very important* barrier, followed by regulations. Fuel costs that were reported as major barriers to primary and secondary forest industry owners and loggers were not nearly as important to landowners (Fig. 15).

Most landowners listed taxes as a very important barrier to their business, followed by regulations.

The majority of respondents (55%) generated no revenue from their forestland (Fig. 16). The low concern for lack of markets (Fig. 15) is an indicator that the goal of the majority of respondents is not production.

The largest age group of respondents was from ages 60 to 69 (32%). The next largest was 70 to 79 (24%), followed by 50 to 59 (21%). The average age of landowner respondents was much older than the age of the primary and secondary forest industries and logger respondents. Seventy-three percent of landowner respondents were male, and the majority of landowner respondents had a Bachelor's or more

Fifty-six percent of landowner respondents were between the ages of 60 and 79.

advanced degree (55%). The income range with the largest respondent population of landowners was $50,000 to $99,999 (36%). The majority of landowner respondents made an annual income of $50,000 or above (73%).

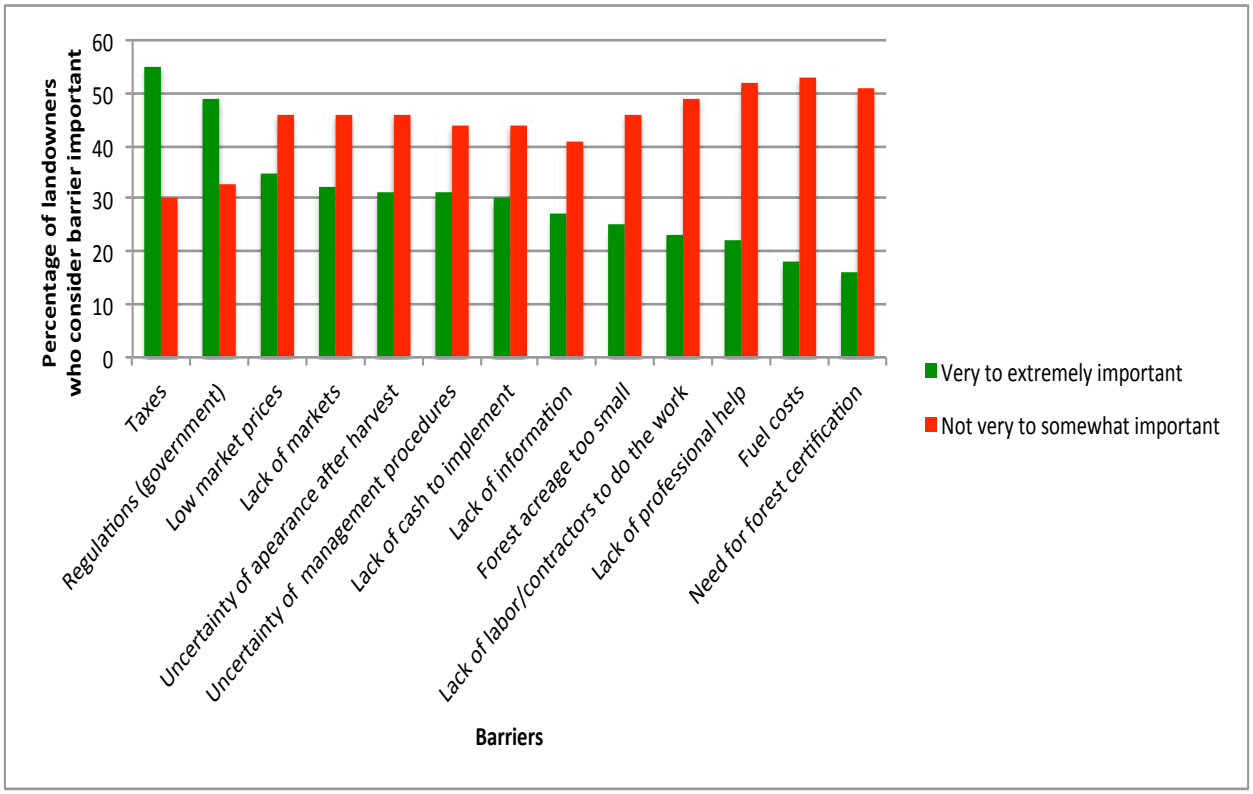


Figure 15. Importance of Potential Barriers to Planned Forest Management/ Stewardship Activities. Organized by decreasing importance.

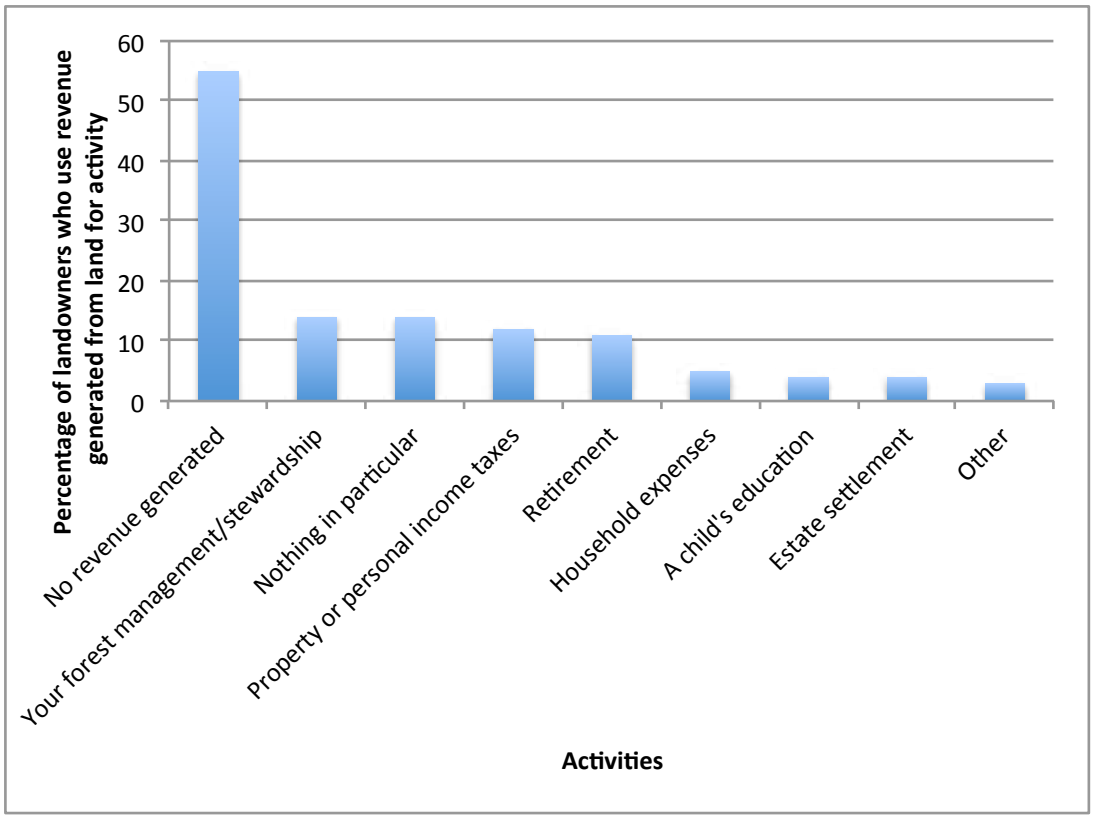


Figure 16. Percentage of Landowners Who Rely on Revenue Generated from Forestland.

DISCUSSION

The overall intent of this project was to identify and better understand the opportunities and challenges for retaining a prosperous forest industry and to develop a confidence index to determine the overall confidence in the future forest industry. This project represents the first attempt to develop a confidence index of the overall Maryland forest industry. We surveyed the state's three major players in the overall forest industry: forest landowners, who own the resource; loggers, who harvest the resource; and the primary and secondary forest industry owners, who process and manufacture the resource. We believe our survey results reasonably represent the opinions of members of each of the three groups, across the regions of the state.

Results from all three groups demonstrate that, in general, respondents are not highly confident in the future success and profitability of the Maryland forest industry. According to our results, respondents' answers tended to express a neutral confidence (Fig. 17). We demonstrated this through the calculated confidence index, for each group as follows: primary and secondary forest industry owners (2.37), loggers (3.26), and forest landowners (2.99). The indices were based on a scale of from 1 to 5, with 1 representing not very confident, 3 representing neutral, and 5 representing extremely confident. Combined, the average confidence index is 2.87. Owners of large forest industries appeared most confident in the long-term sustainability of the forest industry, as their willingness to develop transition plans indicated**.** One interesting observation about these indices: loggers expressed the overall highest confidence, which could be based on the fact they were younger (46 years old on average) than the respondents in the other two groups (50+ for primary and secondary industry owners and 60+ for forest landowners). They possibly have a more optimistic outlook for the future.

Since our research project is the first one to determine a confidence index for the forest industry in Maryland, we are unable yet to track trends. Our results, however, can provide a baseline to use for future projects for determining reliable industry trends and for documenting challenges and opportunities. It is our hope that similar projects will take place on a five-year cycle, a reasonable timeframe to use to gauge attitudinal changes that occur in the three groups in this study. Also, to our knowledge, this is the first attempt to capture the number of military veterans working for the forest industry that included primary and larger secondary forest industry owners and loggers. Based on our survey results, we determined a total of 17 military veterans were working as primary and secondary forest industry owners (11) and loggers (6). This information can possibly be used to help federal and state governments set up programs that offer low-interest loans, grants, and business incentives to help veterans run successful businesses.

All three survey groups identified numerous challenges and opportunities. Primary and secondary forest industry owners and loggers identified fuel costs and availability

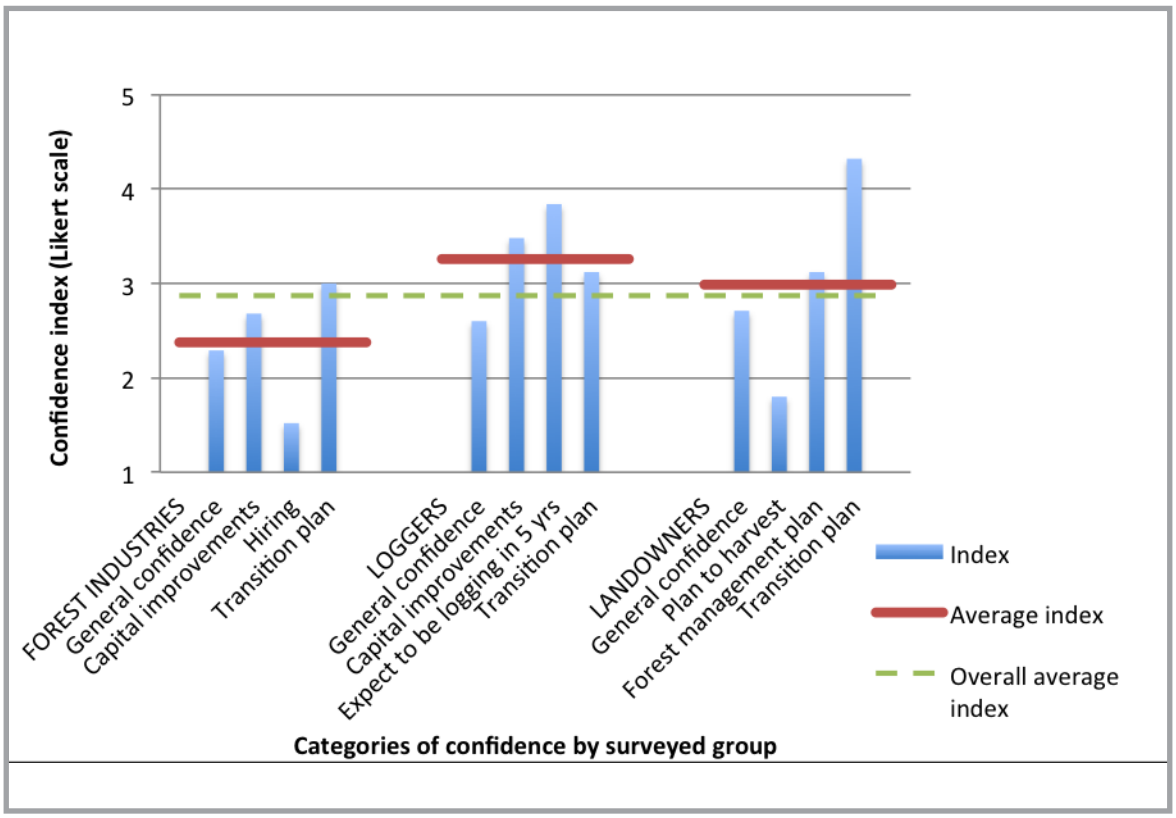


Figure 17. Overall Average Confidence Index for the Primary and Secondary Forest Industry Owners, Loggers, and Landowners. The overall average confidence index (shown in dashed green) is 2.83, indicating a neutral confidence in the forest industry.

of markets and of forestlands to harvest as major barriers, while forest landowners identified taxes and regulations. Primary and secondary forest industry owners and loggers also identified potential opportunities: development of biomass programs and markets, promotion of better forest management, education of forest landowners about the positive attributes of harvesting forestlands, and the provision of tax breaks, business incentives, and low-interest loans for equipment purchases.

Only 13% of the primary and secondary forest industry owners were involved in using or producing any type of bio-energy products. We expected that the forest industry respondents would be much more involved in using firewood or woody biomass fuel sources in general. The vast majority of respondents (88%) indicated they did not use woody biomass as a fuel feedstock. When they did indicate use, it comprised on average only 23% of their total fuel usage, which presents forest industry professionals with a significant opportunity to decrease energy costs by incorporating biomass/ bio-energy into their production operations. Forty-one percent of loggers indicated

they would add a chipper to their operation to harvest biomass as part of a bio-energy effort. Federal and state low-interest loans and tax incentives could be offered to encourage this type of business development.

When Master Loggers were asked to evaluate the overall Master Logger program, 61% reported having had a positive impression of the classes they attended. Although this indicated the program has been successful, there is still room for improvement. For example, the logger respondents identified a need for training in first-aid and CPR. In addition, 73% of loggers indicated they independently bought and sold timber they harvested to mills, which presents an opportunity for the Master Logger program to add a forest management and a silvicultural component to their training.

Evidence in this survey suggests landowner membership in forestry organizations and program participation has a positive impact on landowners' overall confidence in the forest industry. Forestry educational programs and outreach efforts could capitalize on this finding and promote the availability of these opportunities. We found that the reasons forest landowner respondents own their forestland are very similar to what USDA Forest Service researchers found in their landowners surveys over the past 10+ years: to enjoy the beauty or scenery, protect or improve wildlife habitat, and preserve the forest for future generations. To produce income from timber products rated as a minor reason for ownership. Out of a list of forest products, forest landowners reported having the most confidence in the future success and profitability of firewood. Landowners who planned to harvest timber in the next five years rated wildlife habitat improvement and managing invasive species as the top two reasons for harvests. It is interesting to note that only 29% of forest landowner respondents reported participating in any type of federal or state cost share program. Landowner respondents also noted having a lack of familiarity with forestry terms and practices, such as BMP, DBH, International 1/4-inch log rule, and ecosystem services, which presents opportunities for developing educational programs for forest landowners. More than 50% of forest landowners were older than 60. Opportunities therefore exist for programs centered on transition planning to keep forestlands in the family for future generations.

RECOMMENDATIONS

One overall recommendation is that similar surveys be performed on a five-year cycle by the University of Maryland or Maryland Forest Service. Specific recommendations we've deduced from results of the three surveys are described below.

For Primary and Larger Secondary Forest Industry Owners:

- Provide state tax incentives for purchase of biomass energy systems.
- Provide low-interest loans for purchases of equipment. Owners of larger forest industries indicated they were more apt to make capital improvements but not hire new employees during the five years that followed. The availability of low-interest loans could help finance such improvements, which in turn could also stimulate the hiring of more employees.
- Develop educational programs focused on safety regulations, regulations by U.S. EPA and MD Dept. of the Environment, product pricing/distribution, and new markets/new product development.
- Help the forest industry decrease its fuel costs through the installation of biofuel generators. Provide state incentives for biofuel installation and usage.
- Explore U.S. DOE energy-efficiency incentives, similar to those available to the poultry industry, to decrease energy consumption and costs.
- Increase access and availability of raw materials; the lack of access and availability is a big concern for forest industry business owners. To achieve this:
    - maintain a steady and stable amount of state land available for harvests;
    - increase forest landowners' awareness of forest management options and forest management technology, which can help landowners meet their objectives, such as protecting wildlife habitat and transitioning the land for future generations;
    - increase tree planting efforts to provide raw materials for the future; and help forest landowners understand forest management techniques, which include harvesting trees.

For Loggers:

- Provide state tax incentives for purchase of chippers for use in the biofuels/bioenergy market in Maryland.
- Add training programs to the Master Logger Program, concentrating on

forest management planning, silvicultural options, safety, first aid, and CPR. Loggers directly buy 38% of harvested timber, providing an opportunity for this training.

- Continue to develop the Master Logger Program, already well received by existing loggers in the program.
- Solicit more loggers into the Master Logger Program.
- Promote the benefits of the Master Logger Program to forest landowners and promote the value of doing business with a Master Logger. Only 44% of Master Loggers indicated the Master Logger Program helped create respect for Master Loggers statewide with forest landowners.
- Encourage the state to explore potential biomass/biofuel markets and to develop state incentives to establish new markets and low-interest loans for new equipment. An opportunity to develop statewide markets exists because only 8% of loggers have entered into the market.
- Explore federal programs for military veterans and their employers that could enhance the business environment and educational opportunities for veterans.

For Landowners:

- Focus on new forest landowners by developing and increasing educational efforts to help them understand the forest management options and assistance available to them.
- Encourage membership in forestry-related organizations and participation in educational programs and events.
- Increase efforts to educate forest landowners about how to develop forest management plans. That 60% of respondents indicated they currently had a forest management plan demonstrates that current efforts to educate forest landowners about planning have been somewhat successful.
- Increase landowners' awareness of available state and federal cost share programs that can help them in managing their forestlands. Only 29% of respondents indicated they had participated in cost share programs.

REFERENCES

Benway, S. 2008, January 31. Industry Surveys: Paper & Forest Products. *Standard & Poor's*. 37 pp.

Bodenmann J., S. Smith, & G. Grassmueck, 2007. Market and Labor Force Factors in the Growth of the Wood Products Industry in Rural Pennsylvania. Center for Rural Pennsylvania.

Bowe, S., R. Smith, J. Massey, & E. Hansen. 1999. A Methodology for Determining Extension Constituent Needs: A Case Analysis in the Forest Products Industry. *Journal of Extension* 37(4). 10 pp.

De Hopp, C., A. Egan, W. Greene, & J. Mayo. 2002. Surveys of the Logging Contractor Population: 8 Southern States and Maine. Working Paper #55. Louisiana Forest Products Development Center. 13 pp.

Espinoza, O., & R. Smith. 2012, Fall. Education Needs in the Forest Products Industry. Center Focus. University of Minnesota and Virginia Tech. 5 pp.

Hansen, E., & R. Smith. 1997, April. Assessing Educational Needs of the Forest Products Industry in Oregon and Virginia. Oregon State University and Virginia Tech. Management. Pages 36-42.

Harry R. Hughes Center for Agro-Ecology. 2009. Mapping a Sustainable Forestry Strategy for Maryland: Report on the Public Engagement Process. 37 pp.

Hilchey, D., & D. Kay. 1997. The Economic Importance of the Maryland Forest Products Industry. Maryland Department of Natural Resources Forest Service and Maryland Eastern Shore Research Conservation and Development Council. 63 pp.

Jacobson, M., J. Finley, & C. Schmid. 2008. Factors and Trends in Pennsylvania's Logging Industry. Paper submitted to Hardwood Development Council, PA. 34 pp.

Jacobson, M. 2009. Pennsylvania Professional Logger Survey. Penn State Cooperative Extension. 4 pp.

Jarvis, S. 2006. Logging Capacity Survey Summary Report. Forest Resources Association, Inc. Technical Release 07-R-2. 2 pp.

Keefer, M., J. Finley, A. Luloff, & M. McDull. 2002. Characterizing Loggers' Forest Management Decisions. *Journal of Forestry* 100(16): 8-15.

Marciano, J., R. Lilieholm, J. Leahy, & T. Porter. 2009. Maine Forest and Forest Products Survey. University of Maine School of Forest Resources. 53 pp.

Maryland Department of Natural Resources. 2004, September. The Maryland Conservation Act: A Ten Year Review. 47 pp.

Maryland Department of Natural Resources Forest Service. 2011. Maryland Forest Assessment, 2010. 88 pp.

Maryland Forests Association. 2008. Renewable Energy and the Role of Forests and Forestry. MFA Annual Conference Proceedings. 62 pp.

Maryland Forest Service. 2004. Timber Consumption, Procurement Behavior, and Investment Issues for Maryland Sawmills. 12 pp.

Maryland Forest Service. 2005. Maryland Forested Land Base Survey: Logger Survey. 2 pp.

National Alliance of Forest Owners. 2009, September 8. Forest2Market: The Economic Impact of Privately-Owned Forests. 19 pp.

Rider, D. 2011. Maryland's Forest Industry: A Pillar of Our Economy and Quality of Life. Maryland DNR Forest Service Report. 15 pp.

Smith, R., R. Bush, E. Hansen, T. Hammett. 1998. Identifying Educational Needs in the Disciplines of Wood Science and Technology. Department of Wood Science and Forest Products, Virginia Tech, and Department of Forest Products, Oregon State University. 20 pp.

Spatial Analysis Research Center. 2007. Forest Products Industry Survey Project: West Central Landscape Region. Minnesota Forest Resources Council–Landscape Program. 9 pp.

State of Maryland. 2009. Sustainable Forestry Act of 2009. 24 pp.

Stuart, B., & L. Grace. 2003. Logging Cost Indices for 2002. Forest Resources Association, Inc. Technical Release 04-R-25. 2 pp. Full report: Mississippi State University, Forest and Wildlife Research Center. www.cfr.msstate.edu/forestry/WSRI_R4.pdf.

U.S. Bureau of Economic Analysis. 2010. Gross Domestic Product Report, 2009.

U.S. Census Bureau. 2008. Annual Survey of Manufacturers, 2007.

USDA Forest Service. 2009. Maryland's Forests. Resource Bulletin NRS-58. 61 pp.

USDA Forest Service. 2009. Maryland's Forests, 2008: Statistics, Methods, and Quality Assurance. 77 pp.

Van Fleet, T., D. Kittredge, B. Butler, & P. Catanzaro. 2012, June. Reimagining Family Forest Conservation: Estimating Landowner Awareness and Their Preparedness to Act with the Conservation Awareness Index. *Journal of Forestry* 110(4): 207-215.

Virginia Division of Forestry. 2009. Virginia SHARP Logger Questionnaire. 4pp.

Walters, B, D. Rider, & R. Piva. 2008. Maryland Timber Industry: An Assessment of Timber Product Output and Use. USDA Forest Service Report NRS-64. 75 pp.

Wear, D., R. Liu, J. Foreman, & R. Sheffield. 1999. The Effects of Population Growth on Timber Management and Inventories in Virginia. *Forest Ecology and Management* 118: 107-115.

APPENDICES

Primary Forest Products Industry Survey

By participating in this survey, you indicate that you are at least 18 years of age, you have read this consent form or have had it read to you, your questions have been answered to your satisfaction, and you voluntarily agree to participate in this research study. *(circle one)* **Yes No**

1. Is your business **FULL TIME** or **PART TIME**? *(circle one)*

2. How long have you been in the forest products business? ____years

3. Do you have a business **transition plan** in place to transfer your business to a family member or business partner?
   ___yes ___no ___currently developing one

4. Rate **potential barriers** to maintaining or expanding your business.
   (rate importance of each)
   1=not very important 2=somewhat important 3=neutral 4=very important 5=extremely important
   a. ___Low market prices
   b. ___Lack of ability to diversify products
   c. ___Lack of markets
   d. ___Shrinking commercial forest land base
   e. ___Environmental regulations that have reduced access to forestland
   f. ___High fuel costs
   g. ___Lack of access to rail or shipping ports
   h. ___Lack of export opportunities
   i. ___Insurance costs
   j. ___Lack of skilled labor
   k. ___Cost of replacing equipment
   l. ___Loans too difficult and costly to obtain
   m. ___Lack of industry expansion incentives (low interest & guarantee loans, waiver of taxes)
   n. ___Industry saturated
   o. ___Global/regional competition
   p. ___Potential concern of APHIS issues (quarantines)
   q. ___Reduced housing market
   r. ___Changing customer demand
   s. ___Business closures
   t. ___Green business practices
   u. ___Competition with E-commerce
   v. ___Changing landowner objectives
   w. ___Need for forest certification
   x. ___Other/List:

5. From the list above what is the **greatest potential barrier** to maintaining or expanding your business?
   _____

6. How confident are you in the future success & profitability of the forest industry in the State of Maryland?
   (circle one)
   1=Not very confident 2=somewhat confident 3=neutral 4=very confident 5=extremely confident

7. Do you plan on hiring any new employees in the next 5 years? ____yes ____no ____no sure
   a. If yes, about how many _____
   b. What skills will be required _____

8. a. Would you say your business is **BETTER, WORSE,** or **THE SAME** compared to 5 years ago? *(circle one)*
   b. List reasons:

9. a. Do you plan to make any capital improvements within the next 5 years? ____yes ____no ____not sure
   b. If yes, at what approximate cost? $_____

10. a. What describes the market trends for your company: **GROWTH, STABLE,** or **DECLINE**? *(circle one)*
    b. Explain:

11. a. Are there markets or products you would like your company to expand into? ____yes ____no
    b. If yes, list potential markets:

12. What emerging technologies or products do you think need more exploration or support from government and/or universities?

13. a. Is your company involved in bio-energy projects? ____yes ____no
    b. If yes, what types of projects?

14. What are the products and/or services your company produces? Estimate volume by % annually. *(should total to 100%)*
    a. ___Hardwood lumber
    b. ___Hardwood chips
    c. ___Softwood lumber
    d. ___Softwood chips
    e. ___Softwood chip-n-saw
    f. ___Pallets
    g. ___Fuel chips
    h. ___Furniture
    i. ___Ties
    j. ___Pulp/paper
    k. ___Firewood
    l. ___Other/List:

15. a. Do you use woody biomass as a fuel feedstock? ___yes ___no
    b. If yes, what % of the total fuel used does this represent? _____%

16. How many weeks did your business/mill run in the past 12 months? _____
    a. On average, has this **INCREASED, DECREASED,** or **REMAINED THE SAME** over the past 5 years? *(circle one)*
    b. What is the reason for the increase or decrease?

17. Approximately, what was your production in the past 12 month? *(in units you most commonly use)*
    a. _____Tons _____Thousand board feet (MBF) _____Other
    b. Has this **INCREASED, DECREASED,** or **REMAINED THE SAME** over the past 5 years? *(circle one)*

18. Where do you obtain your wood material? Indicate location by %, where applicable. *(should total to 100%)*

a.____Southern MD	d.____Eastern Shore MD	g.____Pennsylvania
b.____Central MD	e.____Virginia	h.____Delaware
c.____Western MD	f.____West Virginia	i. ____Other/List:

19. Who supplies your forest products? Indicate suppliers by %? *(should total to 100%)*

a.___MD loggers	c.___Out-of-state loggers	e.___MD mill	g.___Other/List
b.___MD wood brokers	d.___Out-of-state brokers	f.___Out-of-state mill	

20. Where do you sell your products? Indicate % of sales by location, where applicable. *(should total to 100%)*

____Southern MD	____Virginia	____Central U.S.	____Southwest U.S.
____Central MD	____West Virginia	____Northeast U.S.	____Canada
____Western MD	____Pennsylvania	____Southeast U.S.	____Other international/List:
____Eastern Shore MD	____New Jersey	____Midwest U.S.	

21. a. How many people do you employ? _____
    b. How many employees are military veterans? _____

22. What are the approximate ages of your employees? *(indicate # in each applicable age range)*

___20 & under	___41-50
___21-30	___51-60
___31-40	___61+

23. What is the approximate ethnic makeup of your current workforce?
    (indicate # of employees in each applicable category)

a. __ African-American	c. __ Asian	e. __ White (Caucasian)	g. ___ Other
b. __ American Indian	d. __ Latino	f. __ Amish	

24. What benefits do you provide to your employees? *(check all that apply)*

a. ___Workers compensation insurance	d. ___Pension plan	g.___None
b. ___Supplemental health insurance	e. ___Safety equipment	h.___Other
c. ___Paid vacation	f.___ Bonuses	

25. Approximately what % of total income goes towards the following expenditures? *(should total to 100%)*
    a. ___Consumable supplies (fuel, oil, repair, maintenance)
    b. ___Labor (wages, benefits, workers compensation)
    c. ___Insurance (all except workers compensation)
    d. ___Equipment (depreciation, interest, loans)
    e. ___Overhead expenses
    f. ___Other

26. Rate the following educational programs according to their value to you.
    (rate importance of each)

    1=not very important 2=somewhat important 3=neutral 4=very important 5=extremely important

    a. ___ Identifying new markets/new product development
    b. ___Developing business plans
    c. ___Product pricing/distribution
    d. ___Green marketing/product certification
    e. ___International marketing
    f. ___Product promotion/public relations
    g. ___Strategic market planning
    h. ___ Regulations by U.S. Environment Protection Administration (EPA)/Maryland Department of the Environment (MDE)
    i. ___Plant management & finance
    j. ___Total quality management/lean manufacturing
    k. ___Computer training (CAD, etc.)
    l. ___Motivating personnel
    m. ___Safety regulations
    n. ___Other/List: _____

27. What is the estimated current value of your business, including total assets?

a. ___$250,000-500,000	d. ___$1.5-2 million	g. ___$3-3.5 million	j. ___$4.5-5 million
b. ___$500,000-1 million	e. ___$2-2.5 million	h. ___$3.5-4 million	k. ___$5-6 million
c. ___$1 million-1.5 million	f. ___$2.5-3 million	i. ___$4-4.5 million	l. ___$6 million +

28. What is your age? ____years

29. What challenges do you see facing your wood suppliers?

30. There is a concern about the sustainable future of the forest industry in Maryland. In your opinion, what could be done to help make the industry more profitable and sustainable?

APPENDIX B

Primary and Secondary Forest Industries Summary Statistics

1. Is your business FULL TIME or PART TIME?

	Response	%
Full time	20	80%
Part time	5	20%

2. How long have you been in the forest products business?

	Min Value	Max Value	Mean	Std Dev	Responses
Years	3	60	32.23	16.01	22

3. Do you have a business transition plan in place to transfer your business to a family member or business partner?

	Response	%
Yes	9	38%
No	12	50%
Currently Developing	3	13%

4. Rate potential barriers to maintaining or expanding your business (rate importance of each with 1. Not very important, 2. Somewhat important, 3. Neutral, 4. Very important, 5. Extremely important)

	1	2	3	4	5	Total Responses	Mean	Std Dev
a) Low market prices	0	4	2	6	10	22	4	1.15
b) Lack of ability to diversify products	10	2	5	4	0	21	2.14	1.24
c) Lack of markets	8	2	4	1	6	21	2.76	1.7
d) Shrinking commercial forest land base	2	5	5	6	5	23	3.3	1.29
e) Environmental regulations reduced access to forestland	0	4	1	7	12	24	4.13	1.12
f) High fuel costs	0	2	1	4	15	22	4.45	0.96
g) Lack of access to rail or shipping ports	13	2	4	2	0	21	1.76	1.09
h) Lack of export opportunities	12	4	4	1	0	21	1.71	0.96
i) Insurance costs	3	3	1	10	6	23	3.57	1.38
j) Lack of skilled labor	7	4	3	3	5	22	2.77	1.6
k) Cost of replacing equipment	1	2	3	6	11	23	4.04	1.19
l) Loans too difficult and costly to obtain	8	5	5	1	2	21	2.24	1.3
m) Lack of industry expansion incentives	6	3	5	4	4	22	2.86	1.49
n) Industry saturated	7	4	6	2	2	21	2.43	1.33
o) Global/regional competition	8	3	6	3	1	21	2.33	1.28
p) Potential concern of APHIS issues (quarantines)	5	2	7	6	2	22	2.91	1.31
q) Reduced housing market	5	1	3	8	4	21	3.24	1.48
r) Changing customer demand	3	2	9	6	2	22	3.09	1.15

	1	2	3	4	5	Total Responses	Mean	Std Dev
s) Business closures	2	1	8	6	4	21	3.43	1.16
t) Green business	6	1	8	5	1	21	2.71	1.27
u) Competition with E-commerce	10	2	7	1	1	21	2.1	1.22
v. Changing landowner objectives	4	6	4	5	3	22	2.86	1.36
w) Need for forest certification	8	2	6	3	3	22	2.59	1.47
x) Other/List	0	0	0	1	2	3	4.67	0.58

5. From the list above what is the greatest potential barrier to maintaining or expanding your business?

	Most Important
a) Low market prices	2
b) Lack of ability to diversify products	0
c) Lack of markets	1
d) Shrinking commercial forest land base	1
e) Environmental regulations that have reduced forestland access	5
f) High fuel costs	5
g) Lack of access to rail or shipping ports	0
h) Lack of export opportunities	0
i) Insurance costs	1
j) Lack of skilled labor	0
k) Cost of replacing equipment	0
l) Loans too difficult and costly to obtain	0
m) Lack of industry expansion incentives	0
n) Industry saturated	1
o) Global/regional competition	2
p) Potential concern of APHIS issues (quarantines)	0
q) Reduced housing market	0
r) Changing customer demand	0
s) Business closures	0
t) Green business practices	0
u) Competition with E-commerce	0
v) Changing landowner objectives	0
w) Need for forest certification	0
x) Other/List	10

6. How confident are you in the future success and profitability of the forest industry in the State of Maryland? (1. Not very confident, 2. Somewhat confident, 3. Neutral, 4. Very confident, 5. Extremely confident)

	1	2	3	4	5	Total Responses	Mean	Std Dev
Confidence	6	9	5	4	0	24	2.29	1.04

7. Do you plan on hiring any new employees in the next 5 years?

	Response	%
Yes	3	13%
No	13	54%
Not Sure	8	33%

7a. If yes, about how many

	Min Value	Max Value	Mean	Std Dev	Responses
Employees	1	5	3	2.83	2

8a. Would you say your business is BETTER, WORSE, or THE SAME compared to 5 years ago?

	Response	%
Better	6	24%
Worse	12	48%
The same	7	28%

9a. Do you plan to make any capital improvements within the next 5 years?

	Response	%
Yes	10	42%
No	9	38%
Not Sure	5	21%

9b. If yes, at what approximate cost?

	Min Value	Max Value	Mean	Std Dev	Responses
$ Cost	20,000.00	1,250,000.0	465,000.00	444,104.23	8

10a. What describes the market trends for your company: GROWTH, STABLE, or DECLINE?

	Response	%
Growth	8	33%
Stable	10	42%
Decline	6	25%

11a. Are there markets or products you would like your company to expand into?

	Response	%
Yes	8	35%
No	15	65%

12. What emerging technologies or products do you think need more exploration or support from the government?

- Same support farmers enjoy
- Education for forest landowners encouraging sustainable harvest and alternative, low-impact logging techniques.
- Don't know.
- Sawdust/chicken waste energy plant
- Biofuels
- Biomass energy
- Less regulation
- None

13a. Is your company involved in bio-energy projects?

	Response	%
Yes	3	13%
No	21	88%

14. What are the products and/or services your company produces? Estimate volume by % annually.

	Min Value	Max Value	Mean	Std Dev
a) Hardwood sawtimber	0	95	41.56	33.27
b) Hardwood chips	0	15	1.64	3.81
c) Softwood sawtimber	0	100	17.12	26.23
d) Softwood chips	0	95	4.2	18.97
e) Softwood chip-n-saw	0	20	1.24	4.39
f) pallets	0	15	1	3.54
g) Fuel chips	0	5	0.2	1
h) Furniture	0	20	1.2	4.4
i) Ties	0	25	2	5.95
j) Lumber	0	0	0	0
k) Firewood	0	50	8.96	12.65
l) Other/List	0	100	18.35	29.8

15a. Do you use woody biomass as a fuel feedstock?

	Response	%
Yes	3	13%
No	21	88%

15b) If yes, what % of the total fuel used does this represent?

	Min Value	Max Value	Mean	Std Dev	Responses
Percentage	20	25	22.5	3.54	2

16. How many weeks did your business/mill run in the past 12 months?

	Min Value	Max Value	Mean	Std Dev	Responses
Weeks	20	52	46.95	9.09	22

16a. On average, has this INCREASED, DECREASED, or REMAINED THE SAME over the past 5 years?

	Response	%
Increased	4	18%
Decreased	3	14%
Remained the same	15	68%

17a. Approximately, what was your production in the past 12 months?

	Min Value	Max Value	Mean	Std Dev	Responses
Milion Tons	0	4	0.68	1.63	6
Million Board feet	0.02	35	5.96	8.07	20
Other (hundred cords)	0	1.75	0.58	1.01	3

17b. Has this INCREASED, DECREASED, or REMAINED THE SAME over the past 5 years?

	Response	%
Increased	6	40%
Decreased	4	27%
Remained the same	5	33%

18. Where do you obtain your wood material? Indicate location by %.

	Min Value	Max Value	Mean	Std Dev
a) Southern MD	0	100	6.4	21.91
b) Central MD	0	100	20.2	39.06
c) Western MD	0	100	12.52	29.1
d) Eastern Shore MD	0	100	26.8	34.52
e) Virginia	0	95	8	21.55
f) West Virginia	0	33	2.32	8.11
g) Pennsylvania	0	50	6.72	15.39
h) Delaware	0	75	13	22.64
i) Other/List	0	0	0	0

19. Who supplies your forest products? Indicate suppliers by %.

	Min Value	Max Value	Mean	Std Dev
a) MD loggers	0	100	34	43.9
b) MD wood brokers	0	0	0	0
c) Out-of-state loggers	0	100	11.4	28.49
d) Out-of-state brokers	0	50	2	10
e) MD Mill	0	100	4	20
f) Out-of-state mill	0	0	0	0
g) Other/List	0	100	32.6	45.35

20. Where do you sell your products? Indicate % of sales by location, where applicable.

	Min Value	Max Value	Mean	Std Dev
Southern MD	0	100	4	20
Central MD	0	100	13	28.76
Western MD	0	100	5.6	20.33
Eastern Shore MD	0	100	17.33	33.73
Virginia	0	90	7.2	19.74
West Virginia	0	55	2.32	10.99
Pennsylvania	0	100	23.24	35.94
New Jersey	0	25	1.8	5.57
Central region	0	10	0.4	2
Northeast region	0	90	15.6	27.66
Southeast region	0	30	3	8.66
Midwest region	0	0	0	0
Southwest region	0	0	0	0
Canada	0	0	0	0
Other International	0	0	0	0
Other/List	0	70	3.2	13.99

21a) How many people do you employ?

	Min Value	Max Value	Mean	Std Dev	Responses
Number of Employees	0	51	14.67	19.05	24

21b) How many employees are military veterans?

	Min Value	Max Value	Mean	Std Dev	Responses
Employee Veterans	0	3	0.52	0.87	21

22. What are the approximate ages of your employees? (indicate # in each applicable age range)

	Min Value	Max Value	Mean	Std Dev	Responses
20 & under	1	2	1.33	0.58	3
21-30	1	15	5.4	4.77	10
31-40	0	15	5.89	6.11	9
41-50	0	14	4.43	4.97	14
51-60	1	12	4.27	3.47	11
61+	1	3	1.67	0.82	6

23. What is the approximate ethnic makeup of your current workforce?

	Min Value	Max Value	Mean	Std Dev	Responses
a) African American	1	15	4	5.03	7
b) American Indian	0	0	0	0	
c) Asian	0	0	0	0	
d) Latino	3	15	9.29	5.12	7
e) White (Caucasian)	0	47	10.95	13.93	20
f) Amish	1	6	2.67	2.89	3
g) Other	0	0	0	0	

24. What benefits do you provide to your employees? (Check all that apply)

	Response	%
a) Workers comp	13	59%
b) Supplemental health insurance	8	36%
c) Paid vacation	12	55%
d) Pension Plan	5	23%
e) Safety equipment	16	73%
f) Bonuses	12	55%
g) None	7	32%
h) Other	3	14%

25. Approximately what % of total income goes towards the following expenditures?

	Min Value	Max Value	Mean	Std Dev
a) Consumable supplies (fuel, oil, repair, maintenance)	0	90	26.6	18.78
b) Labor (wages, benefits, workers compensation)	0	50	20	16.89
c) Insurance (all except workers compensation)	0	33	9.36	7.58
d) Equipment (depreciation, interest, loans)	0	40	13.72	11.29
e) Overhead expenses	0	50	16.52	16.01
f) Other	0	10	1	2.89

26. Rate the following educational programs according to their value to you (rate importance of each with 1. Not very important, 2. Somewhat important, 3. Neutral, 4. Very important, 5. Extremely important).

	1	2	3	4	5	Total Responses	Mean	Std Dev
a) Identifying new markets/new product development	2	5	3	6	5	21	3.33	1.35
b) Developing business plans	5	3	5	8	0	21	2.76	1.22
c) Product pricing/distribution	2	1	5	7	5	20	3.6	1.23
d) Green marketing/product certification	10	4	3	3	2	22	2.23	1.41
e) International marketing	10	3	4	3	0	20	2	1.17
f) Product promotion/public relations	5	4	5	5	2	21	2.76	1.34
g) Strategic market planning	4	3	11	1	1	20	2.6	1.05
h)Regulations by U.S. EPA/ MDE	2	4	3	5	7	21	3.52	1.4
i) Plant management & finance	4	1	6	4	5	20	3.25	1.45
j) Total quality management/lean manufacturing	4	2	5	5	4	20	3.15	1.42
k) Computer training (CAD, etc.)	9	5	2	3	1	20	2.1	1.29
l) Motivating personnel	7	1	3	6	3	20	2.85	1.57
m) Safety regulations	2	3	3	6	7	21	3.62	1.36
n) Other/List	0	0	0	0	1	1	5	0

27. What is the estimated current value of your business, including total assets?

	Response	%
a. $250,000-$500,000	10	50%
b. $500,000-$1 million	3	15%
c. $1 -$1.5 million	0	0%
d. $1.5 -$2 million	0	0%
e. $2 -$2.5 million	0	0%
f. $2.5-$3 million	1	5%
g. $3-$3.5 million	1	5%
h. $3.5-$4 million	1	5%
i. $4-$4.5 million	0	0%
j. $4.5-$5 million	1	5%
k. $5-$6 million	0	0%
l. $5.5-$6 million+	3	15%

28. What is your age?

	Min Value	Max Value	Mean	Std Dev	Responses
Age in years	25	68	50.52	11.46	23

Maryland Logger Survey

By participating in this survey, you indicate that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction, and you voluntarily agree to participate in this research study. **Yes** **No**

1. Are you the **OWNER** or **EMPLOYEE** of a logging business? *(circle one)*

2. Do you log **FULL-TIME** or **PART-TIME**? *(circle one)*

3. Which statements most closely reflect plans for your logging operation over the next 5 years?
   (check all that apply)
   a. ___No significant changes
   b. ___Expand size of logging operation
   c. ___Reduce size of logging operation
   d. ___Sell operation
   e. ___Diversify into nonlogging ventures
   f. ___Diversify into other logging operations (e.g., chipping)
   g. ___Not sure
   h.___Other

4. Do you plan to purchase any new or used equipment in the next 5 years? ___Yes ___No ___Not sure

5. Do you expect to be logging in 5 years? ___Yes ___No ___Not sure

6. Upon your retirement or death, do you have a transition plan in place to transfer your logging operation to a family member or business partner? ___Yes ___No ___Currently developing one

7. Rate the following **potential barriers** to maintaining or expanding your operation.
   (rate importance of each)
   1=not very important 2=somewhat important 3=neutral 4=very important 5=extremely important
   a. ___Competition for stumpage
   b. ___Low market prices for logs/pulpwood
   c. ___Mills/buyers disappearing
   d. ___Shrinking forest land base/decrease in stumpage available
   e. ___Fuel costs
   f. ___Health insurance costs
   g. ___Workers compensation costs
   h. ___Cost of replacing equipment
   i. ___Loans too difficult or costly to obtain
   j. ___Inability to attract quality employees
   k. ___Regulations (state or local)
   l. ___Landowners unwilling to harvest trees/ landowner lack of understanding of forest management
   m. ___ Negative public opinion of harvesting trees
   n. ___State land not available
   o. ___Taxes
   p. ___Vandalism
   q. ___Other/List_____

8. From the list above what is the **single greatest barrier** to maintaining or expanding your operation?
   _____

10. Indicate which best describes your **logger training status**. *(check one)*
    a. __Currently an active MD Master Logger (ML)
    b. __ Master Logger in training
    c. __Once a Master Logger; no longer participate
    d. __ Attend training; not pursuing ML status
    e. __ Log & never participate in ML training
    f. __ Trained in other states (WVA, PA, VA)

11. Are you a MD Master Logger? ___Yes ___No. **If yes**, did the training: *(check all that apply)*
    a. ___Improve the way you log
    b. ___Save you money by being more efficient
    c. ___Keep you current on industry trends
    d. ___Open up opportunities for bids, such as logging on state land
    e. ___Provide you with an advantage when buying stumpage
    f. ___Provide you with an advantage when hired on a contract
    g. ___Provide you with an advantage when selling
    h. ___Help you win respect from the public
    i. ___Help you win respect from the landowner

12. My overall impression of the MD Master Logger classes I have attended: *(circle one)*
    1=very negative 2=negative 3=neutral 4=positive 5=very positive

13. What are your training & educational needs: *(rate importance of each)*
    1=not very important 2=somewhat important 3=neutral 4= very important 5= extremely important
    a. ___Logging safety/OSHA regulations
    b. ___Equipment operation/maintenance
    c. ___First aid/CPR
    d. ___Low-impact logging
    e. ___Recordkeeping, including computers applications for loggers
    f. ___Insurance for loggers
    g. ___Logging & trucking safety & efficiency
    h. ___Forest management practices
    i. ___Technology (computers, GPS)
    j. ___Business management
    k. ___Best management practices (BMPs)/stream crossing options
    l. ___Financial analysis of business operations (e.g., machine rates, tract analyzers)
    m. ___Other/List:_____

14. Where do you typically harvest timber? Indicate by **percent**. *(total to equal 100%)*
    ____Southern MD ____Eastern Shore MD ____Virginia
    ____Central MD ____Delaware ____Pennsylvania
    ____Western MD ____West Virginia ___ Other (list:) _____

15. a. How many weeks did you log in the past 12 months? _____
    b. Has this **INCREASED, DECREASED,** or **REMAINED CONSTANT** over past 5 years? *(circle one)*

16. Approximately what was your **production** in the past 12 months? *(in units you most commonly use)*
    _____Loads _____Tons _____Thousand board feet (MBF)

17. a. What is your **average one-way distance** traveled to a logging job in the past 12 months? _____ Miles
    b. What is your **average one-way distance** traveled to a mill in the past 12 months? _____ Miles
    c. Have these mileages **INCREASED, DECREASED,** or **REMAINED SAME** over past 5 years?
    (circle one)

18. What **percent** of the timber you harvest comes from the following sources? *(total to equal 100%)*

a. ___I buy (no one else involved) c. ___Wood dealer buys e. ___ Cut on mill company land
b. ___Mill forester buys d. ___Forester (consulting or state)

19. Estimate the **percent** of your logging jobs in the past year that occurred on land owned by the following: (*total to equal 100%)*

a. ___Private individuals c. ___Mill company land e. ___ Other
b. ___State forests d. ___Conservation organizations

20. For an average year, what are the main causes of your **downtime**? *(rate importance of each)*
1=not very important 2=somewhat important 3=neutral 4=very important 5=extremely important

a. __Weather
b. __Road conditions
c. __Mill quota
d. __Equipment breakdown
e. __Moving equipment to other location
f. __Inefficient unloading or handling (excessive truck turnaround delays)
g. __Poor planning or management on your part
h. __Poor planning or management on someone else's part
i. __Regulations
j. __Lack of labor (unplanned shortages due to illness, injury, or no available labor)
k. __Unproductive labor
l. __Mill closure
m. __Inability to find stumpage
n. __Inability to compete for stumpage
o. __Other

21. a. Have you entered the **biomass, energy or fuel chip wood market**? ____Yes ____No
b. **If no**, with your current logging system, do you think you could effectively add a chipper and efficiently harvest biomass fuel chips from logging residues such as limbs, tops, and nonmerchantable trees?
____Yes ___No ___Not sure

22. If biomass markets were available, would you want to add a chipper to your operation to harvest biomass?
____Yes ____No ___Not sure

23. a. How many employees, including yourself, do you have? _____
b. Has this **INCREASED, DECREASED,** or **REMAINED THE SAME** over past 5 years? *(circle one)*
c. What are the approximate ages of your employees, including yourself?
(enter # of employees in each applicable age range)

___20 & under ___41-50
___21-30 ___51-60
___31-40 ___61+

24. What is the makeup of your current workforce, including yourself? *(approximate # of employees)*

a. __ African-American c. __ Asian e. __ White (Caucasian) g. ___ Other
b. __ American Indian d. __ Latino f. __ Amish

25. Indicate the approximate # of people you employ by primary job responsibility, including yourself.

a. ___Equipment operator d. ___Foreman/supervisor g. ___Timber cruiser
b. ___Chainsaw operator e. ___Truck driver h. ___Single man operation-do it all
c. ___Maintenance f. ___Clerical/administrative i. ___Other/List_____

26. a. Do you provide contract harvesting services to mills? ___Yes ___No
    b. **If yes**, how many mills do you contract within an average year for harvesting their timber? ____

27. Do you buy and sell the timber you harvest independently to mills? ___ Yes ___No

28. What **benefits** do you provide to employees, or if you are an employee, what benefits do you receive?
    a. ___Workers compensation insurance
    b. ___Supplemental health insurance
    c. ___Paid vacation
    d. ___Formal logging training
    e. ___Safety equipment
    f. ___ Bonuses
    g. ___Pension plan

29. Indicate the estimated **current market value of your logging assets**; include equipment, buildings, etc.
    a. ___Less than $100,000
    b. ___$100,000-$250,000
    c. ___$250,000-$500,000
    d. ___$500,000-$750,000
    e. ___$750,000-$1 million
    f. ___$1 million-$2 million
    g. ___$2 million+

30. What **percentage** of your annual household gross **income**, if any, comes from **sources other than logging**?
    a. ___0%
    b. ___1%-25%
    c. ___26%-50%
    d. ___51%-75%
    e. ___76%+

31. How many years have you been logging? ___Years

32. What is your age? ___Years

33. Are you a military veteran? __Yes __No

34. Describe your formal level of education *(check one)*
    a. __ Some high school
    b. __High school graduate
    c. __Trade school graduate
    d. __2-year college graduate
    e. __4-year college graduate & higher

35. Indicate the category that best describes you.
    a. __ African-American
    b. __ American Indian
    c. __ Asian
    d. __ Latino
    e. __ White (Caucasian)
    f. __ Amish
    g. ___ Other

36. There is a concern about the future of the forest industry being sustained in the State of Maryland. In your opinion, what could be done to help the industry be profitable and sustainable and what could be done to attract people to the logging profession?

APPENDIX D

Logger Summary Statistics

What is your regional association?

	Response	%
Eastern Region	25	29%
Western Region	33	38%
Southern/Central Region	29	33%

1. Are you the OWNER or EMPLOYEE of a logging business?

	Response	%
OWNER	71	79%
EMPLOYEE	19	21%

2. Do you log FULL-TIME or PART-TIME?

	Response	%
FULL-TIME	69	80%
PART-TIME	17	20%

3. Which statements most closely reflect plans for your logging operation over the next 5 years? (check all that apply)

	Response	%
a) No significant changes	47	53%
b) Expand size of logging operation	15	17%
c) Reduce size of logging operation	9	10%
d) Sell business	9	10%
e) Diversify into non-logging ventures	8	9%
f) Diversify into other logging operations(chipping/biofuels)	11	12%
g) Not sure	12	13%
h) Other	3	3%

4. Do you plan to purchase any new or used equipment in the next 5 years?

	Response	%
Yes	56	62%
No	12	13%
Not Sure	22	24%

5. Do you expect to be logging in 5 years?

	Response	%
Yes	64	71%
No	5	6%
Not Sure	21	23%

6. Upon retirement or death, do you have a transition plan in place to transfer logging operations to a family member or business partner?

	Response	%
Yes	40	47%
No	40	47%
Currently Developing	5	6%

7. Please rate the following potential barriers to maintaining or expanding your business. (rate importance of each)

	1. Not very important	2. Somewhat important	3. Neutral	4. Very important	5. Extremely important	Total Responses	Mean	Std Dev
a) Competition for stumpage	6	18	20	22	16	82	3.29	1.22
b) Low market prices for logs/pulpwood	4	11	9	25	33	82	3.88	1.22
c) Mills/buyers disappearing	6	10	15	27	25	83	3.66	1.23
d) Shrinking forest land base/Decrease in stumpage available	13	11	12	27	20	83	3.36	1.39
e) Fuel costs	0	2	5	20	61	88	4.59	0.71
f) Health insurance costs	4	3	10	22	45	84	4.2	1.1
g) Workers comp costs	6	4	7	20	46	83	4.16	1.21
h) Cost of replacing equipment	3	6	7	33	35	84	4.08	1.06
i) Loans too difficult or costly to obtain	14	9	19	17	24	83	3.34	1.43
j) Inability to attract quality employees	11	15	18	21	18	83	3.24	1.34
k) Regulations (state or local)	4	5	13	20	41	83	4.07	1.16
l) Landowners unwilling to harvest trees/lack of understanding of forest management	7	11	22	25	19	84	3.45	1.22
m) Public negative opinion of harvesting trees	12	7	20	22	22	83	3.42	1.35
n) Availability of state land	14	9	23	11	25	82	3.29	1.44
o) Taxes	6	3	13	23	38	83	4.01	1.19
p) Vandalism	22	15	16	13	16	82	2.83	1.48
q) Other (list)	0	0	1	2	11	14	4.71	1.93

8. From the list above what is the single greatest barrier?

	Response	%
a) Competition for stumpage	2	3%
b) Low market prices for logs/pulpwood	8	10%
c) Mills/buyers disappearing	5	6%
d) Shrinking forest land base/Decrease in stumpage available	2	3%
e) Fuel costs	10	13%
f) Health insurance costs	0	0%
g) Workers comp costs	3	4%
h) Cost of replacing equipment	6	8%
i) Loans too difficult or costly to obtain	2	3%
j) Inability to attract quality employees	2	3%
k) Regulations (state or local)	7	9%
l) Landowners unwilling to harvest trees/lack of understanding of forest management	1	1%
m) Public negative opinion of harvesting trees	0	0%
n) Availability of state land	0	0%
o) Taxes	0	0%
p) Vandalism	0	0%
q) Other (list)	29	38%

9. How confident are you in the future success & profitability of the forest industry in the State of Maryland?

(1. Not very confident 2. Somewhat confident 3. Neutral, 4. Very confident, 5. Extremely confident)

	1. Not very confident	2. Somewhat confident	3. Neutral	4. Very confident	5. Extremely confident	Total Responses	Mean	Std Dev
Confidence	22	19	26	14	7	88	2.6	1.25

10. Indicate which best describes your logger training status. (check one)

	Response	%
a) Currently an active MD Master Logger	61	69%
b) Pursuing being a Master Logger (in training)	8	9%
c) Once a Master Logger, no longer participate	6	7%
d) Attend training, not pursuing being a Master Logger	6	7%
e) Log & never participate in Master Logger training	1	1%
f) Trained in other states (WV, PA, VA)	6	7%

11. If you are a MD Master Logger, did the training: (check all that apply)

	Response	%
a) Improve the way you log	38	61%
b) Save you money by being more efficient	15	24%
c) Keep you current on industry trends	32	52%
d) Open up opportunities for bids, such as logging on state land	25	40%
e) Provide you with an advantage when buying stumpage	9	15%
f) Provide you with an advantage when hired on a contract	15	24%
g) Provide you with an advantage when when selling	10	16%
h) Help create respect from the public	27	44%
i) Help create respect from the landowner	33	53%
j) Not a Master Logger	3	5%

12. My overall impression of the MD Master Logger classes I have attended: (circle one)

	1. Very negative	2. Negative	3. Neutral	4. Positive	5. Very positive	Total Responses	Mean	Std Dev
Opinion	1	1	16	49	14	81	3.91	0.73

13. What are your training & educational needs. (rate importance of each with 1. Not very important, 2. Somewhat important, 3. Neutral, 4. Very important, 5. Extremely important)

	1. Not very important	2. Somewhat important	3. Neutral	4. Very important	5. Extremely important	Total Responses	Mean	Std Dev
a) Logging safety/OSHA regulations	6	9	15	35	19	84	3.62	1.16
b) Equipment operation/ maintenance	9	16	17	25	14	81	3.23	1.27
c) First aid/CPR	4	0	14	36	31	85	4.06	0.98
d) Low impact logging	9	8	27	24	11	79	3.25	1.17
e) Record keeping/ computer applications for loggers	9	6	27	26	11	79	3.3	1.16
f) Insurance for loggers	8	5	15	26	26	80	3.71	1.26
g) Logging/ Trucking safety & efficiency	7	7	19	28	21	82	3.6	1.21
h) Forest management practices	4	6	19	32	21	82	3.73	1.08
i) Technology (computers, GPS)	11	8	30	19	11	79	3.14	1.21
j) Business management	5	6	25	24	18	78	3.56	1.12
k) Best management practices/ Stream crossing options (BMPs)	4	6	18	30	23	81	3.77	1.1
l) Financial analysis of business ops (e.g., machine rates, tract analyzers)	5	7	31	20	14	77	3.4	1.09
m) Other (list)	0	0	0	0	3	3	5	0

14. The state needs to implement some biomass energy programs and take the lead in installing some wood/chip fired heating/cooling units in state buildings, schools and promote it better with homeowners.

	Min Value	Max Value	Mean	Std Dev
Southern MD	0	100	8.46	25.49
Western MD	0	100	17.84	31.3
Virginia	0	100	7.68	20.49
Central MD	0	100	11.99	29.25
Pennsylvania	0	100	17.04	28.39
Eastern Shore MD	0	100	13.69	28.83
West VA	0	81	8.14	17.94
Delaware	0	100	6.07	15.67
Other	0	0	0	0

15a. How many weeks did you log in the last 12 months?

	Min Value	Max Value	Mean	Std Dev
# of Weeks Logging	3	52	40.47	15.45

15.b. Has the number of weeks you log in 12 weeks INCREASED, DECREASED OR REMAINED CONSTANT over the last 5 years?

	Response	%
Increased	8	11%
Decreased	21	28%
Remained Constant	47	62%

16. Approximately what was your production in the last 12 months? (units you most commonly use)

	Min Value	Max Value	Mean	Std Dev	Responses
Loads	0	5,000	894	1,008	33
Tons	25	55,000	17,796	15,843	23
Thousand Board Feet	0	25,000	3,819	4,998	70

17a. What is your average one-way distance traveled to a logging job in the last 12 months? (in miles)

	Min Value	Max Value	Mean	Std Dev	Responses
Avg. Distance	0	100	39.6	20.44	85

17b. What is your average one-way distance traveled to a mill in the last 12 months? (miles)

	Min Value	Max Value	Mean	Std Dev	Responses
Avg. Distance	0	100	45.95	25.51	81

17c. Have these INCREASED, DECREASED OR REMAINED SAME over the past 5 years?

	Response	%
Increased	23	27%
Decreased	12	14%
Remained the same	49	58%

18. What percent of the timber you harvest comes from the following sources? (should total 100%)

	Min Value	Max Value	Mean	Std Dev
a) I buy (no one else involved)	0	100	37.51	40.59
b) Mill forester buys	0	100	27.73	37.86
c) Wood dealer buys	0	100	3.63	14.47
d) Forester (consulting or state)	0	100	17.19	26.87
e) Cut on mill company land	0	50	1.62	8.16

19. Estimate the % of your logging jobs in the past year that occur on the following landowner types? (total 100%)

	Min Value	Max Value	Mean	Std Dev
a) Private individuals	0	100	73.91	34.99
b) State Forests	0	99	11.31	23.27
c) Mill company land	0	50	3.43	10.43
d) Conservation organizations	0	65	1.54	8.65
e) Other	0	75	2.2	9.07

20. For an average year, what do you consider to be the main causes of your down-time.
(rate importance of each with 1. Not very important, 2. Somewhat important,
3. Neutral, 4. Very important, 5. Extremely important)

	1. Not very important	2. Somewhat important	3. Neutral	4. Very important	5. Extremely important	Total Responses	Mean	Std Dev
a) Weather	7	3	1	29	45	85	4.2	1.18
b) Road conditions	18	8	26	17	12	81	2.96	1.35
c) Mill quota	17	9	21	17	14	78	3.03	1.4
d) Equipment breakdown	10	17	19	27	11	84	3.14	1.23
e) Moving equipment to other location	16	16	30	17	3	82	2.7	1.12
f) Inefficient unloading or handling(excessive truck turnaround delays)	24	15	22	15	3	79	2.47	1.22
g) Poor planning or management on your part	42	10	20	7	1	80	1.94	1.12
h) Poor planning or management on someone else's part	29	10	23	11	7	80	2.46	1.34
i) Regulations	10	19	17	19	15	80	3.13	1.32
j) Lack of labor(unplanned shortages due to illness, injury, or no labor)	35	10	22	6	6	79	2.22	1.3
k) Unproductive labor	32	9	21	7	9	78	2.38	1.4
l) Mill Closure	33	8	21	6	10	78	2.38	1.43
m) Inability to find stumpage	26	13	19	12	6	76	2.46	1.32
n) Inability to compete for stumpage	24	7	24	11	10	76	2.68	1.4
o) Other	0	0	2	0	0	2	3	0

21a. Have you entered the biomass/energy/fuel chip wood market?

	Response	%
Yes	8	9%
No	80	91%
Maybe	0	0%

21b. If no or not sure, with your current logging system, do you think you could effectively add a chipper and efficiently harvest biomass fuel chips from logging residues such as limbs, tops and non-merchantable trees?

	Response	%
Yes	30	38%
No	30	38%
Not Sure	19	24%

22. If biomass markets were available, would you want to add a chipper to your operation to harvest biomass?

	Response	%
Yes	34	41%
No	23	28%
Not Sure	26	31%

23a. How many employees, including yourself, do you have?

	Min Value	Max Value	Mean	Std Dev	Responses
Number of Employees	1	80	6.23	10.5	83

23b. Has this number INCREASED, DECREASED, OR REMAINED SAME over the past 5 years?

	Response	%
Increased	6	10%
Decreased	13	21%
Remained the Same	44	70%

23c. What are the approximate ages of your employees, including yourself?
(total # in each age range)

	Min Value	Max Value	Mean	Std Dev	Responses
20 & under	0	2	1	0.58	7
21-30	1	8	2.81	2.24	31
31-40	0	10	2.35	2.64	37
41-50	0	6	1.98	1.58	40
51-60	1	7	2.15	1.44	34
61+	1	3	1.38	0.67	21

24. What is the makeup of your current workforce, including yourself?
(approximate # of employees in each category)

	Min Value	Max Value	Mean	Std Dev	Responses
a) African American	0	6	1.85	1.57	13
b) American Indian	0	0	0	0	
c) Asian	0	0	0	0	
d) Latino	0	0	0	0	
e) White (Caucasian)	0	26	4.36	5.53	77
f) Amish	1	5	2.2	1.64	5
g) Other	0	2	1	1.41	2

25. Indicate the approximate # of people you employ on staff by the primary job responsibility, including yourself.

	Min Value	Max Value	Mean	Std Dev	Responses
a) Equipment operator	1	50	4.39	6.79	57
b) Chainsaw operator	1	6	1.74	1.18	43
c) Maintenance	1	7	2.37	1.61	19
d) Foreman/supervisor	1	4	1.4	0.87	25
e) Truck driver	1	10	2.35	2.24	37
f) Office clerical	1	3	1.31	0.6	16
g) Timber cruisers	1	2	1.38	0.5	16
h) Single man operation	1	6	1.33	1.05	24
i) Other/List	1	15	6	7.81	3

26a. Do you provide contract harvesting services to mills?

	Response	%
Yes	46	53%
No	40	47%

26b. If yes, how many mills do you contract with in an average year for harvesting their timber?

	Min Value	Max Value	Mean	Std Dev	Responses
Number of Mills	0	10	2.52	1.96	44

27. Do you buy and sell the timber you harvest independently to mills?

	Response	%
Yes	62	73%
No	23	27%

28. What benefits do you provide to employees, or if you are a logging employee, what benefits do you receive?

	Response	%
a) Workers compensation insurance	43	62%
b) Supplemental health insurance	22	32%
c) Paid vacation	37	54%
d) Formal logging training	39	57%
e) Safety equipment	58	84%
f) Bonuses	29	42%
g) Pension plan	11	16%

29. Indicate the estimated current market value of your logging assets to include: equipment, buildings, & other assets. (check one)

	Response	%
a) Less than $100,000	15	18%
b) 100,000-250,000	16	19%
c) 250,000-500,000	16	19%
d) 500,000-750,000	11	13%
e) 750,000-1,000,000	8	10%
f) 1,000,000-2million	9	11%
g) 2million+	8	10%

30. What percentage of your annual household gross income, if any, comes from sources other than logging?

	Response	%
0%	31	36%
1-25%	31	36%
26-50%	11	13%
51-75%	7	8%
76+	6	7%

31. How many years have you been logging?

	Min Value	Max Value	Mean	Std Dev	Responses
Years Logging	1	60	24.66	14.49	86

32. What is your age?

	Min Value	Max Value	Mean	Std Dev	Responses
Age	21	80	45.48	13.81	88

33. Are you a military veteran?

	Response	%
Yes	6	7%
No	84	93%

34. Describe your formal level of education

	Response	%
Some High School	14	16%
High School Grad	44	49%
Trade School Grad	8	9%
2 yr College Grad	12	13%
4 yr College Grad	11	12%

35. Indicate the category that best describes you

	Response	%
African American	2	2%
American Indian	0	0%
Asian	0	0%
Latio	0	0%
White (Caucasian)	82	92%
Amish	3	3%
Other	2	2%

Maryland Private Forest Landowner Survey

By participating in this survey, you indicate that you are at least 18 years of age; you have read this consent form or have had it read to you; your questions have been answered to your satisfaction; and you voluntarily agree to participate in this research study. (***Circle one***) Yes No

1. Check the category that best describes your forest land ownership in Maryland?

a. ___ Individual
b. ___ Joint, such as husband and wife
c. ___ Family partnership
d. ___ Trust or estate
e. ___ Corporate or business partnership *(such as LLC, LLP, or other form of corp.)*
f. ___ Other (*specify*): _____

2. Please check ALL that apply to you.

a. ___ Maryland Tree Farmer
b. ___ Maryland Woodland Stewards or Coverts Cooperator
c. ___ Extension General Forestry Correspondence Course participant
d. ___ Forest Conservation and Management Agreement (FCMA) participant
e. ___ Maryland Forests Association member
f. ___ National Woodland Owners Association member
g. ___ Local Forestry Board member
h. ___ Woodland Assessment Program participant
i. ___ Forestry for the Bay member
j. ___ None of the above
k. ___ Other (*specify*) _____

3. In what Maryland county or counties is your forest land located? _____

4. How many acres of forest land do you own in Maryland? _____

5. Are the acres contiguous/not fragmented? ___Yes ___No

6. Do you have a written Forest Management/Stewardship Plan? ___Yes ___ No ___Don't know

7. Why do you own your forest land? (***Please rate the importance of each to you***)

1 = Not Very Important 2 = Somewhat Important 3 = Neutral 4 = Very Important 5 = Extremely Important

a. ___ Protect water resources
b. ___ Protect or improve wildlife habitat
c. ___ Protect nature and biological diversity
d. ___ Use for recreation (other than hunting)
e. ___ Use for hunting
f. ___ Use for land investment
g. ___ Produce income from timber products, such as logs or pulpwood
h. ___ Produce non-timber forest products, such as berries, nuts, or maple syrup
i. ___ Enjoy beauty or scenery
j. ___ Use as part of a home or farm
k. ___ Use for or as part of a cabin or vacation home
l. ___ Preserve for future generations
m. ___ Provide privacy
n. ___ Provide firewood

8. How confident are you in the future success and profitability of the Forest Products Industry in Maryland?

(*Circle one*)

1 = Not Very Confident 2 = Somewhat Confident 3 = Neutral 4 = Very Confident 5 = Extremely Confident 6 = Don't Know

9. How confident are you in the future success and profitability of the following Forest Product Markets in Maryland? (***Please rate each***)

1 = Not Very Confident 2 = Somewhat Confident 3 = Neutral 4 = Very Confident 5 = Extremely Confident 6 = Don't Know

a. ___ Lumber
b. ___ Woodchips (pulpwood)
c. ___ Pallets
d. ___ Fuel chips
e. ___ Furniture
f. ___ Ties
g. ___ Pulp/paper
h. ___ Firewood
i. ___ Biofuel
j. ___ Non-timber products such as berries and nuts

10. Have you harvested any trees as part of a timber sale within the past 10 years? ___Yes ___No

a. *If yes*, was a professional forester used to help with the sale? ___Yes ___No ___Don't know

b. *If yes*, was a Maryland Master Logger used to harvest the timber? ___Yes ___No ___Don't know

11. Do you plan to harvest any trees as part of a timber sale within the next 5 years?

(Note: This does not include cutting firewood for personal use.) ___Yes ___No ___Don't know

12. Do you have any forest management activities planned for the next 5 years? ___Yes ___No ___Don't know
If yes, check all those that apply:

a. ___ Develop a written Forest Management Plan
b. ___ Perform Timber Stand Improvement (TSI)
c. ___ Plant trees (Reforestation or Afforestation)
d. ___ Protect stream banks/Forest buffer establishment
e. ___ Enhance for recreation (trails, roads, structures, etc.)
f. ___ Improve wildlife habitat
g. ___ Manage invasive species
h. ___ Other (*please specify*): _____

13. Who makes the management decisions concerning your forest land? (*Check One*)

a. ___ Me
b. ___ My spouse
c. ___ My children
d. ___ My parents
e. ___ Another family member
f. ___ My business partner
g. ___ My land manager or forester
h. ___ Group or family
i. ___ Other (*please specify*): _____

14. Have you ever participated in cost share programs? ___Yes ___ No ___ Don't know

If yes, check all programs that apply:

a. ___ USDA Natural Resources Conservation Service (NRCS) cost share programs
b. ___ Maryland Department of Natural Resources (DNR) cost share programs
c. ___ Maryland Department of Agriculture (MDA) cost share programs
d. ___ Ducks Unlimited
e. ___ National Wild Turkey Federation
f. ___ Other programs (*please specify*): _____

15. Do you have any Conservation Easements on your forest lands? ___Yes ___ No ___ Don't know

    a. *If yes*, with what organization/agency is your easement agreement? _____

    b. *If yes*, are you permitted to sell timber or other forest products? ___Yes ___ No ___ Don't know

16. Do you have a Transition Plan, Estate Plan, Will, or other legal written plans to transfer property to family or others? ___Yes ___ No ___Don't know

17. *If no*, do you plan to develop some type of written plan within the next 5 years? __Yes __ No __Don't know

18. How familiar are you with each of the following terms?

1 = Not Very Familiar, 2 = Somewhat Familiar, 3 = Neutral, 4 =Very Familiar, 5 = Extremely Familiar

a. ___ Timber Stand Improvement (TSI)
b. ___ Reforestation
c. ___ Afforestation
d. ___ BMPs
e. ___ Basal Area
f. ___ International ¼″ log rule
g. ___ DBH
h. ___ Estate planning
i. ___ Conservation easements
j. ___ Transfer of Development Rights
k. ___ Ecosystem Services

19. Rate the potential barriers to any of your planned forest management/stewardship activities.
1 = not very important, 2 = somewhat important, 3 = neutral, 4 = very important, 5 = extremely important

a. ___ Low market prices
b. ___ Lack of markets
c. ___ Need for forest certification
d. ___ Fuel costs
e. ___ Regulations (government)
f. ___ Taxes
g. ___ Lack of information
h. ___ Lack of labor/contractors to do the work needed
i. ___ Lack of professional help
j. ___ Lack of cash to implement
k. ___ Uncertainty of appearance after harvest
l. ___ Uncertainty of harvesting and other management procedures, such as contracts and prices
m. ___ Forest acreage too small

20. What is your level of concern about the impact of each of the following topics for your forest land in Maryland?

1 = Not Very Concerned, 2 = Somewhat Concerned, 3 = Neutral, 4 = Very Concerned, 5 = Extremely Concerned

a. ___ Air pollution
b. ___ Water pollution
c. ___ Damage or noise from off-road vehicles
d. ___ Damage from deer and/or bear
e. ___ Development of nearby lands
f. ___ Drought
g. ___ Climate change
h. ___ High property taxes
i. ___ Invasive plant species
j. ___ Keeping land intact for future generations
k. ___ Misuse, such as vandalism, dumping, trespassing, poaching
l. ___ Insects and/or diseases
m. ___ Fire
n. ___ Severe weather other than drought
o. ___ Lack of a market
p. ___ Other (*please specify*): _____

21. Do you rely on revenue generated from your forest land to fund the following? (*Check all that apply*)

a. ___ Your forest management/stewardship activities
b. ___ A child's education
c. ___ Household expenses
d. ___ Retirement
e. ___ Estate settlement
f. ___ Property or personal income taxes
g. ___ Nothing in particular
h. ___ Other (*specify*):_____
i. ___No revenue generated

22. How often do you approach the following organizations or contacts for information?

1 = Never 2 = Sometimes 3 = Neutral 4 = Frequently 5 = Very Frequently

a. ___ University of Maryland Extension
b. ___ USDA Forest Service
c. ___ Maryland Forest Service
d. ___ Conservation Districts
e. ___ Forestry for the Bay
f. ___ Forestry consultants, including industry foresters
g. ___ Other forest land owners
h. ___ Lawyer
i. ___ Real Estate professional
j. ___ Conservation groups
k. ___ Family, friend, or associate
l. ___ Other (*specify*): _____

23. How often do you seek information concerning your forest land from the following sources?

1 = Never 2 = Sometimes 3 = Neutral 4 = Frequently 5 = Very Frequently

a. ___ Printed materials, such as brochures or books
b. ___ Internet searches
c. ___ Social media (such as Facebook, Twitter, etc.)
d. ___ Conferences or workshops
e. ___ One-on-one contact with professionals
f. ___ Other (*please specify*): _____

24. What is your age? _____ years

25. What is your gender? ___ Male ___ Female

26. What is the highest level of formal education you have completed?

a. ___ Some high school
b. ___ High school diploma/GED
c. ___ Some college
d. ___ Associate degree
e. ___ Bachelor's degree
f. ___ Advanced degree

27. What is your household's annual income?

a. ___ Less than $24,999
b. ___ $25,000 to $49,999
c. ___ $50,000 to $99,999
d. ___ $100,000 to $199,999
e. ___ Greater than $200,000

Thank you for your participation in this survey.

UNIVERSITY OF MARYLAND EXTENSION
Solutions in your community

Wye Research & Education Center
PO Box 169
124 Wye Narrows Drive
Queenstown, Maryland 21658
TEL 410-827-8056
FAX 410-827-9039

October 9, 2013

Dear Maryland Woodland Stewards Program Participant:

I am writing to notify you that next week Mason-Dixon Polling & Research of Washington, DC, will be mailing a survey to you and other Maryland forest landowners. The survey concerns the future of the forest industry in Maryland, and I ask that you please take time to participate.

Retaining a prosperous forest industry in Maryland is important. The goal of this research survey is threefold: to identify and gain a better understanding of the threats to our forest industry, to determine the industry's future opportunities, and to learn about the challenges you face managing your forest.

Mason-Dixon is conducting this survey on behalf of Dr. Bob Tjaden of the University of Maryland, College of Agriculture and Natural Resources. Your answers to this survey will be kept completely confidential. Mason-Dixon will not provide the University, or anyone else, with your individual responses. Results will be reported exclusively in the aggregate.

If you have any questions regarding the survey please contact Dr. Bob Tjaden at 410-827-8056 or Larry Harris of Mason-Dixon Polling & Research at 202-548-2680.

What forest landowners believe about the future of Maryland's forest industry is important information. Survey results will enable us to inform the public and policymakers about your views. Thank you for taking the time to consider participating in this effort.

Thank You,

Nevin Dawson
Coordinator, Maryland Woodland Stewards Program

MARYLAND WOODLAND STEWARDS

University of Maryland Extension programs are open to all citizens without regard to race, color, gender, disability, religion, age, sexual orientation, marital or parental status, or national origin.

Maryland Tree Farm Committee

P.O. Box 2822 ▪ Westminster, MD 21158 ▪ marylandtreefarm@gmail.com

October 9, 2013

Dear Maryland Tree Farmer:

I am writing to notify you that next week Mason-Dixon Polling & Research of Washington, DC, will be mailing a survey to you and other Maryland forest landowners. The survey concerns the future of the forest industry in Maryland, and I ask that you please take time to participate.

Retaining a prosperous forest industry in Maryland is important. The goal of this research survey is threefold: to identify and gain a better understanding of the threats to our forest industry, to determine the industry's future opportunities, and to learn about the challenges you face managing your forest.

Mason-Dixon is conducting this survey on behalf of Dr. Bob Tjaden of the University of Maryland, College of Agriculture and Natural Resources. Your answers to this survey will be kept completely confidential. Mason-Dixon will not provide the University, or anyone else, with your individual responses. Results will be reported exclusively in the aggregate.

If you have any questions regarding the survey please contact Dr. Bob Tjaden at 410-827-8056 or Larry Harris of Mason-Dixon Polling & Research at 202-548-2680.

What forest landowners believe about the future of Maryland's forest industry is important information. Survey results will enable us to inform the public and policymakers about your views. Thank you for taking the time to consider participating in this effort.

Thank You,

Leonard M Wrabel

Len Wrabel
Chair, Maryland Tree Farm Committee

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Martin O'Malley, *Governor*
Anthony G. Brown, *Lt. Governor*
Joseph P. Gill, *Secretary*
Frank W. Dawson III, *Deputy Secretary*

October 9, 2013

Dear Maryland Forest Landowner:

I am writing to notify you that next week Mason-Dixon Polling & Research of Washington, DC, will be mailing a survey to you and other Maryland forest landowners. The survey concerns the future of the forest industry in Maryland, and I ask that you please take time to participate.

Retaining a prosperous forest industry in Maryland is important. The goal of this research survey is threefold: to identify and gain a better understanding of the threats to our forest industry, to determine the industry's future opportunities, and to learn about the challenges you face managing your forest.

Mason-Dixon is conducting this survey on behalf of Dr. Bob Tjaden of the University of Maryland, College of Agriculture and Natural Resources. Your answers to this survey will be kept completely confidential. Mason-Dixon will not provide the University, or anyone else, with your individual responses. Results will be reported exclusively in the aggregate.

If you have any questions regarding the survey please contact Dr. Bob Tjaden at 410-827-8056 or Larry Harris of Mason-Dixon Polling & Research at 202-548-2680.

What forest landowners believe about the future of Maryland's forest industry is important information. Survey results will enable us to inform the public and policymakers about your views. Thank you for taking the time to consider participating in this effort.

Sincerely,

Steven W. Koehn
Director / State Forester

SWK/
CC: Dr. Bob Tjaden, UMD

Tawes State Office Building – 580 Taylor Avenue – Annapolis, Maryland 21401
410-260-8DNR or toll free in Maryland 877-620-8DNR – *dnr.maryland.gov* – TTY Users Call via the Maryland Relay

APPENDIX G

Maryland Private Forest Landowner Summary Statistics

Collection type

	Response	%
Paper	952	86%
Web	154	14%

1. Check the category that best describes your forest land ownership in Maryand.

	Response	%
Family Part	114	10%
Individual	348	32%
Joint	529	48%
Other	46	4%
Trust/Estate	57	5%

2. Please check ALL that apply to you.

	Response	%
MD Tree Farmer	373	34%
Forest Conserv and Management (FCMA) participant	327	30%
None of the above	318	29%
MD Woodland Stewards or Coverts Cooperator	212	19%
MD Forests Association member	91	8%
Extension General Forestry Correspondence Course participant	80	7%
Other (please specify)	60	5%
Local Forestry Board member	44	4%
Woodland Assessment Program participant	33	3%
Forestry for the Bay member	31	3%
National Woodland Owners Association member	15	1%

3. In what Maryland county or counties is your forest land?

	Response	%
AA	52	5%
AL	71	6%
BA	55	5%
CA	30	3%
CE	29	3%
CH	61	6%
CR	53	5%
CV	44	4%
DO	42	4%
FR	129	12%
GA	100	9%
HA	40	4%
HO	14	1%
KE	21	2%
MO	39	4%
PG	23	2%
QA	42	4%
SM	32	3%
SO	59	5%
TA	22	2%
WA	60	5%
WI	38	3%
WO	39	4%
More than 1 county	27	2%

4. How many acres of forest land do you own in Maryland?

	Response	%
1 to 9	75	7%
10 to 24	366	34%
25 to 49	244	23%
50 to 99	193	18%
100 to 199	107	10%
200 to 299	38	4%
300 to 499	25	2%
500 to 999	15	1%
>1000	12	1%

5. Are the acres contiguous/ not fragmented?

	Response	%
Contiguous	828	78%
Fragmented	237	22%

6. Do you have a written Forest Management/ Stewardship Plan?

	Response	%
Don't Know	100	9%
Have FM/S Plan	630	60%
No Plan	326	31%

7. Why do you own your forest land? (Please rate the importance of each to you)

	1. Not very important	2. Somewhat important	3. Neutral	4. Very important	5. Extremely important	Total Responses	Mean
Protect water resources	82	126	152	311	224	895	3.52
Protect or improve wildlife habitat	71	77	92	363	348	951	3.88
Protect nature and biological diversity	66	103	140	302	296	907	3.73
Use for recreation (other than hunting)	208	120	177	268	123	896	2.98
Use for hunting	255	110	138	232	203	938	3.02
Use for land investment	248	108	201	212	129	898	2.85
Income from timber products, such as logs or pulpwood	350	162	152	147	97	908	2.43
Produce non-timber forest products	577	92	135	33	20	857	1.63

7. (Continued) Why do you own your forest land? (Please rate the importance of each to you)

	1. Not very important	2. Somewhat important	3. Neutral	4. Very important	5. Extremely important	Total Responses	Mean
Enjoy beauty or scenery	59	66	69	341	421	956	4.04
Use as part of a home or farm	152	42	82	234	435	945	3.80
Use for or as part of a cabin or vacation home	527	48	136	60	70	841	1.93
Preserve for future generations	90	67	92	277	418	944	3.92
Provide privacy	121	60	106	260	386	933	3.78
Provide firewood	240	170	164	210	139	923	2.82

8. How confident are you in the future success and profitability of the Forest Products Industry in Maryland?

	1	2	3	4	5	DK	1-5 Responses	Mean
Profitability of the Forest Products Industry in MD?	128	213	290	160	33	224	824	2.71

9. How confident are you in the future success and profitability of the Forest Product Markets in Maryland?

	1. Not very confident	2. Somewhat confident	3. Neutral	4. Very confident	5. Extremely confident	DK	Total Responses	Mean
Lumber	116	213	207	208	64	165	808	2.87
Woodchips (pulpwood)	106	179	243	169	46	196	743	2.83
Pallets	136	141	276	109	21	242	683	2.62
Fuel chips	132	142	276	102	30	241	682	2.64
Furniture	214	147	244	73	21	227	699	2.34
Ties	192	138	265	49	15	259	659	2.33
Pulp/ paper	132	154	243	157	43	201	729	2.76
Firewood	92	127	196	241	119	177	775	3.22
Biofuel	191	115	272	70	20	257	668	2.42
Non-timber products such as berries and nuts	226	111	246	65	30	243	678	2.35

10. Have you harvested any trees as part of a timber sale within the past 10 years?

	Response	%
Yes	321	30%
No	758	70%

10a. If yes, was a professional forester used to help with the sale?

	Response	%
Yes	235	78%
No	61	20%
DK	4	1%

10b. If yes, was a MD Master Logger used to harvest the timber?

	Response	%
Yes	138	48%
No	65	23%
DK	85	30%

11. Do you plan to harvest any trees as part of a timber sale within the next 5 years?

	Response	%
Yes	211	20%
No	616	58%
DK	244	23%

12. Do you have any forest management activities planned for the next 5 years?

	Response	%
Yes	576	53%
No	402	37%
DK	102	9%

If yes check all those that apply:

	Response	%
Improve wildlife habitat	390	68%
Manage invasive species	339	59%
Perform Timber Stand Improvement (TSI)	283	49%
Enhance for recreation (trails, roads, structures, etc.)	242	42%
Plant trees (Reforestation or Afforestation)	211	37%
Develop a written Forest Management Plan	174	30%
Protect stream banks/ Forest buffer establishment	161	28%
Other (please specify)	27	5%

13. Who makes the management decisions concerning your forest land? (Check one)

	Response	%
Me	688	64%
Group or Family	270	25%
Mngr or Forester	46	4%
Spouse	25	2%
Other	19	2%
Children	14	1%
Business Partner	4	0%
Other Family	4	0%
Parents	3	0%

14. Have you ever participated in cost share programs?

	Response	%
Yes	292	29%
No	653	65%
DK	65	6%

If yes, check all programs that apply:

	Response	%
USDA Natural Resources Conservation Service (NRCS) cost share program	178	61%
MD Department of Natural Resources (DNR) cost share programs	139	48%
MD Department of Agriculture (MDA) cost share programs	106	36%
National Wild Turkey Federation	47	16%
Ducks Unlimited	40	14%
Other programs (please specify)	36	12%

15. Do you have any conservation easements on your forest lands?

	Response	%
Yes	200	19%
No	706	66%
DK	159	15%

15b. If yes, are you permitted to sell timber or other forest products?

	Response	%
Yes	138	67%
No	36	17%
DK	32	16%

16. Do you have a Transition Plan, Estate Plan, Will, or other legal written plans to transfer property to family or others?

	Response	%
Yes	706	65%
No	341	32%
DK	32	3%

17. If No: do you plan to develop some type of written plan within the next 5 years?

	Response	%
Yes	190	47%
No	129	32%
DK	89	22%

18. How familiar are you with each of the following terms?

	1. Not very familiar	2. Somewhat familiar	3. Neutral	4. Very familiar	5. Extremely familiar	Total Responses	Mean
Timber Stand Improvement (TSI)	372	164	89	251	132	1008	2.61
Reforestation	232	205	91	307	177	1012	2.99
Afforestation	646	83	107	82	65	983	1.82
BMPs	657	62	77	94	95	985	1.89
Basal Area	671	67	85	98	67	988	1.81
International 1/4" log rule	725	76	74	63	47	985	1.61
DBH	663	51	64	92	103	973	1.89
Estate planning	180	188	139	309	193	1009	3.15
Conservation easements	322	189	126	223	141	1001	2.67
Transfer of Development Rights	439	149	126	164	116	994	2.37
Ecosystem services	603	136	126	63	51	979	1.80

19. Rate the potential barriers to any of your planned forest management/ stewardship activities.

	1. Not very important	2. Somewhat important	3. Neutral	4. Very important	5. Extremely important	Total Responses	Mean
Low market prices	303	101	174	172	134	884	2.70
Lack of markets	313	92	190	172	107	874	2.62
Need for forest certification	330	104	285	96	43	858	2.32
Fuel costs	345	113	252	98	61	869	2.33
Regulations (government)	212	80	161	182	258	893	3.22
Taxes	182	85	143	234	259	903	3.34
Lack of information	252	111	281	134	102	880	2.69
Lack of labor/ contractors to do the work needed	323	102	251	127	70	873	2.45
Lack of professional help	328	124	231	133	56	872	2.39
Lack of cash to implement	282	110	234	153	109	888	2.66
Uncertainty of appearance after harvest	294	111	200	152	118	875	2.64
Uncertainty of harvesting and other management procedures, such as contracts and prices	285	100	216	159	106	866	2.65
Forest acreage too small	309	101	248	125	99	882	2.55

20. What is your level of concern about the impact of each of the following topics for your forest land in Maryland?

	1. Not very concerned	2. Somewhat concerned	3. Neutral	4. Very concerned	5. Extremely concerned	Total Responses	Mean
Air pollution	237	211	174	227	151	1000	2.84
Water pollution	217	190	137	241	212	997	3.04
Damage or noise from off-road vehicles	343	150	148	188	160	989	2.67
Damage from deer and/or bear	336	168	195	168	135	1002	2.60
Development of nearby lands	197	145	138	264	266	1010	3.25
Drought	228	189	213	229	133	992	2.85
Climate change	292	172	220	181	127	992	2.68
High property taxes	120	104	111	282	404	1021	3.73
Invasive plant species	115	142	168	308	269	1002	3.47
Keeping land intact for future generations	70	95	113	333	418	1029	3.91
Misuse, such as vandalism, dumping, trespassing, poaching	122	138	114	323	322	1019	3.57
Insects and/or diseases	67	121	136	370	317	1011	3.74
Fire	130	172	192	269	240	1003	3.32

20. (Continued) What is your level of concern about the impact of each of the following topics for your forest land in Maryland?

	1. Not very concerned	2. Somewhat concerned	3. Neutral	4. Very concerned	5. Extremely concerned	Total Responses	Mean
Severe weather other than drought	162	193	219	259	167	1000	3.08
Lack of a market	321	155	223	153	121	973	2.59

21. Do you rely on revenue generated from your forest land to fund the following?

	Response	%
No revenue	603	55%
Nothing in particular	157	14%
Your forest management/ stewardship activities	156	14%
Property or personal income taxes	135	12%
Retirement	120	11%
Household expenses	57	5%
Estate settlement	49	4%
A child's education	41	4%
Other	35	3%

22. How often do you approach the following organizations or contacts for information?

	1. Never	2. Sometimes	3. Neutral	4. Frequently	5. Very frequently	Total Responses	Mean
University of Maryland Extension	504	310	53	88	18	973	1.77
USDA Forest Service	628	223	50	44	10	955	1.52
MD Forest Service	356	385	95	119	42	997	2.10
Conservation Districts	642	179	47	56	26	950	1.57
Forestry for the Bay	855	56	16	11	2	940	1.14
Forestry consultants, including industry foresters	532	262	67	82	19	962	1.75
Other forest land owners	555	255	74	54	18	956	1.67
Lawyer	652	217	44	33	5	951	1.45
Real estate professional	738	149	32	18	4	941	1.30
Conservation groups	668	180	42	38	13	941	1.46
Family, friend, or association	402	268	100	134	41	945	2.09

23. How often do you seek information concerning your forest land from the following sources?

	1. Never	2. Sometimes	3. Neutral	4. Frequently	5. Very frequently	Total Responses	Mean
Printed materials, such as brochures or books	297	397	97	163	46	1000	2.26
Internet searches	417	310	87	142	33	989	2.05
Social media (such as Facebook, Twitter, etc.)	902	41	22	10	1	976	1.12
Conferences or workshops	591	275	59	48	9	982	1.58
One-on-one contact with professionals	351	405	84	127	32	999	2.08

24. What is your age?

	Response	%
24 to 29	6	1%
30 to 39	19	2%
40 to 49	69	6%
50 to 59	222	21%
60 to 69	340	32%
70 to 79	261	24%
80 +	149	14%

25. What is your gender?

	Response	%
Female	288	27%
Male	794	73%

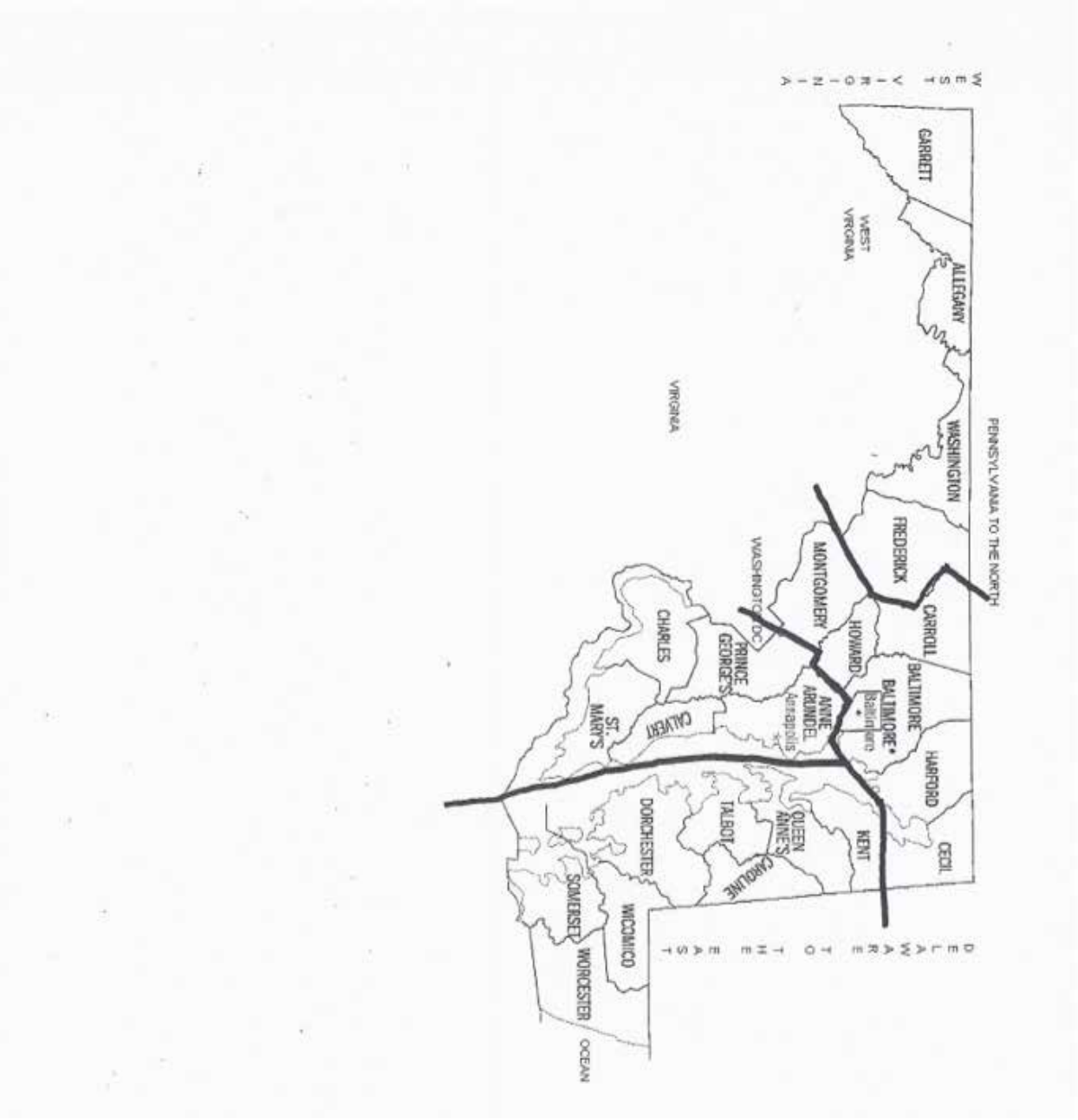
26. What is the highest level of formal education you have completed?

	Response	%
Some high school	22	2%
High school diploma/ GED	217	20%
Some college	198	18%
Associate degree	52	5%
Bachelor's degree	244	23%
Advanced degree	339	32%

27. What is your household's annual Income

	Response	%
<$24.9K	65	7%
$25,000 to $49,999	189	20%
$50,000 to $99,999	335	36%
$100,000 to $199,999	240	25%
>$200,000	113	12%

Regional Map



Blank Page

Inside back cover
Blank Page

Back cover
Blank Page