

Perspectives on Ash Wood Utilization and Marketing in Anticipation of Emerald Ash Borer in Minnesota

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Abstract

The emerald ash borer will likely impact over four million acres of Minnesota's forests in the next 10 years. This study surveyed forest products company representatives and other natural resource professionals to understand their perspectives on the current and future use of ash in wood markets. Survey respondents indicated they were only slightly optimistic that there will be new and emerging ash markets to support the large volume of ash wood potentially available in the next 10 years; however, new technologies such as torrefaction and heat treatments were noted as potential new markets for the species.

Trees in the ash (*Fraxinus* spp.) genus are found with other species on 4.3 million acres of forest land in Minnesota. Ash is a dominant tree species, occupying at least 50 percent of the total live tree volume on nearly 1.1 million acres of forest land in Minnesota (University of Minnesota Extension 2019). The emerald ash borer (*Agrilus planipennis*; EAB) is known to occur in 23 of the state's 87 counties as of 2020, but this invasive insect has not been observed in the state's northern forests, where the vast majority of ash grows and a substantial forest industry is located. A female EAB lays her eggs in the bark cracks of ash trees, and when larvae are hatched, they burrow into the wood and feed on the tree's phloem. This infestation weakens the tree and eventually results in tree mortality (Bauer 2016). As a result, 43 percent of forest managers in Minnesota identified EAB as the biggest threat to managing healthy forests (Windmuller-Campione et al. 2019), yet few insights exist from managers on how to use and market additional ash wood. To date, extensive public awareness campaigns and the state's low winter temperatures have likely limited the spread of the insect (Christianson and Venette 2018). However, general consensus is that EAB is will continue to spread across the state in the next decade and could result in up to 1.8 million cords of mortality annually (VanderSchaaf and Jacobson 2011).

In 2016, some 69,000 cords of ash were harvested from Minnesota's timberlands, the majority of which were used in the pulpwood and residential fuel industries. A minimal volume of ash has been sold in sawlog exports (Minnesota Department of Natural Resources 2019). In 2018, the Minnesota Department of Natural Resources, the largest land management agency in the state with 4.2 million acres of forestland, announced an initiative to harvest an

additional 15,000 cords of ash wood annually. The initiative, which is planned to cover the next 5 years, intends to promote the reforestation of forests threatened by forest insects (Minnesota Department of Natural Resources 2018). Despite the increased interest in harvesting ash before future EAB outbreaks occur, little is known about the current capacity and potential for new markets that use ash wood in Minnesota.

The broad objective of this work is to gain insights from forest and natural resource professionals about the current and future use of ash wood in Minnesota. Specific objectives are to (1) determine knowledge and concern about EAB among forest and natural resource professionals, (2) assess the current volume and use of ash wood in the state, and (3) gather perceptions on emerging markets for ash wood across Minnesota's diverse forest products industries.

Materials and Methods

We used Qualtrics to deliver an online survey comprised of 11 questions about EAB and markets for ash wood (Table 1). The survey instrument contained four categories of questions that included knowledge and concern about EAB, current use and barriers of ash wood utilization, optimism

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Table 1.—Survey questions on ash wood utilization and marketing and emerald ash borer asked to forest products company representatives (FP) and natural resource managers (NRM).

Question	Audience
Do you use ash wood as a material in your company's operations? Ash includes any trees from the <i>Fraxinus</i> genus, including black, white, and green ash.	FP
What is the range in volume of ash wood that you use in your operations on an annual basis?	FP
Approximately what percentage is the volume of ash wood used relative to all wood species in your operation?	FP
If more ash becomes available as a result of the emerald ash borer, what are the barriers to your company using more ash?	FP
In what state and county is your company located?	FP
How many employees are in your company?	FP
How would you describe your knowledge of emerald ash borer and its impact on ash trees in Minnesota?	FP, NRM
How would you describe your concern for the current and future impact of emerald ash borer on ash trees in Minnesota?	FP, NRM
How optimistic are you that there will be new and emerging wood markets for ash wood in Minnesota in the next 10 years?	FP, NRM
What opportunities are there for new and emerging wood markets for ash wood in Minnesota? List up to three products that could be used with ash material.	FP, NRM
Please share any additional comments about current ash wood markets and opportunities to use ash wood in the future.	FP, NRM

for future wood markets for ash species, and demographic information. The survey began by asking whether the participant was a natural resource professional or a forest product company employee, and the rest of the questions were tailored to that response.

Potential survey respondents with an email address ($n = 362$) were obtained from Minnesota's Primary and Secondary Forest Products Producer Directory (Minnesota Department of Natural Resources 2020). The Primary Producer Directory included contact information for individuals representing sawmills, pulp and paper mills, oriented strand board mills, veneer mills, and dry-kiln facilities. The Secondary Producer Directory included contact information for individuals representing wood-product manufacturing companies, e.g., those that make furniture, cabinets, doors, fixtures, and log homes. Contacts from the Primary and Secondary Producer Directories represented 42 and 58 percent of the potential survey respondents, respectively. The survey was also delivered through social media channels to other diverse entities including professionals within natural resource management organizations throughout Minnesota. A prenotice for the survey was emailed on October 28, 2019, and a link to the survey was emailed on November 5. A reminder email to complete the survey was delivered on November 15, and the survey closed on November 21, 2019. The percentages of participants that opened the email were both 31 percent for the initial and reminder emails with links to take the survey. In total, the survey received 32 responses, with 17 and 15 responses from forest products company representatives and natural resources professionals, respectively. Based on the email open rates, this corresponded to a 29 percent response rate.

For analysis, survey responses were descriptively analyzed for all survey respondents and by employer type (forest products company representative or natural resources professional). Descriptive statistics, including means, standard deviations, and frequencies, were used to summarize knowledge and concern about EAB and optimism for future ash wood markets.

Results and Discussion

Sixty-one percent of forest products company representatives ($n = 11$) indicated they currently use ash species in their production. A third of survey respondents indicated they cannot use ash wood in their operations, and one

respondent indicated they do not currently use ash wood but could. Of those that use ash species in their operation, 70 percent of forest products company representatives indicated they used only small amounts (between 1 and 100 thousand board feet). Ninety percent of respondents reported that ash species were less than 25 percent of the volume used when considering all species in their operation. The low demand and use for ash coincides with historical timber utilization data, yet the ash harvest in Minnesota has increased by over 100 percent since the late 1990s (approximately 30,000 cords per yr) to present day (69,000 cords in 2016; Minnesota Department of Natural Resources 2019). Hardwood species such as aspen, birch, and maple are used in the production of cants, lumber, boxes, crates and pallets, and oriented strand board. These other hardwood species continue to be harvested in greater quantities compared with ash species in Minnesota. Ash is the fifth-ranked species by statewide volume estimates, yet is only the ninth-ranked tree for total wood harvested and used by industry and fuelwood users in Minnesota (Minnesota Department of Natural Resources 2019). With the state's plan to offer an additional 15,000 cords of ash wood annually on its land in each of the next 5 years (Minnesota Department of Natural Resources 2018), additional supply of the species will likely be met with lower prices if industry utilization for ash remains consistent.

Survey respondents cited season of harvest, limited supply, and small wood diameter as the primary barriers to using more ash (Fig. 1). Concerns of seasonality of harvesting ash are likely the result of black ash (*Fraxinus nigra* Marsh.), Minnesota's most abundant ash species, being harvested only in winter months due to seasonal water table yields in this forested wetland cover type (Slesak et al. 2014). While black ash is abundant in the northern region of the state, respondents indicated that limited supply was a barrier to using more of the species. These responses were likely from regions in the southern portion of the state where white (*Fraxinus americana* L.) and green ash (*Fraxinus pennsylvanica* Marsh.) are common but less abundant compared with other hardwood species. Minnesota's ash resource is dominated by small-diameter trees (Minnesota Department of Natural Resources 2019), limiting the use of the species in markets that favor large-diameter trees.



Figure 1.—Identified barriers to using more ash wood in forest products in Minnesota, reported by 19 survey respondents.

Survey respondents were generally knowledgeable about the impacts of EAB in Minnesota’s forests (mean value from a scale of 1 through 4 was [\pm standard deviation] 3.47 \pm 0.51). Forest products industry representatives reported less concern for the current and future impact of EAB (mean value from a scale of 1 through 5 was 3.47 \pm 1.18) compared with natural resource managers (4.67 \pm 0.49). These differences in concerns about EAB could be due to the relatively low use of ash in current forest products industries, whereas the presence of EAB will impact natural resource management more broadly, including the need to make decisions on forest management strategies. A lack of markets for ash wood to support forest management treatments for EAB limits the ability of managers and communities to maintain healthy forests in the future (Woodall et al. 2011). Hence, the different reported concerns about EAB between forest products company representatives and natural resource managers present opportunities for more collaborations between the two groups to address these forest health problems.

Survey respondents were only slightly optimistic that there would be new and emerging wood markets for ash in Minnesota in the next 10 years (mean value from a scale of 1 through 5 was 2.19 \pm 0.87). The limitations of future ash wood use that were cited by respondents included concerns about lower quality for the species in constructing pallets and other industrial packaging, the price of ash wood relative to other hardwoods, and the small diameter of ash, which limits the species for use in select products. Several respondents indicated developing new markets or expanding existing products to increase the use of ash wood in the future (Fig. 2). Ash wood markets that currently exist in the state and were mentioned as possibly expanding included flooring, paneling, and other interior applications; oriented strand board; pallet stock and shipping material; and fuelwood. Torrefaction was suggested in the survey as a potential new use of ash wood and has shown demonstrated success with the species (Tsalidis et al. 2018). Heat-treated wood and biochar were also cited as new potential uses of ash wood that are not currently extensively developed in Minnesota but have been shown to be practical and valuable (Barrow 2012, Schwarzkopf 2020). Additional outreach and education about these novel uses and processes may be required to increase the use of ash wood in more diverse applications.



Figure 2.—A word cloud (with size of text reflecting a larger number of responses) to the open-ended survey question, “What opportunities are there for new and emerging wood markets for ash wood in Minnesota?”

Conclusions

Many of those surveyed believe there are opportunities for increasing the use of ash wood in Minnesota; however, most are only slightly optimistic that there will be new and emerging markets to support it. While the number of responses from this study does not indicate we have surveyed all of the companies that use ash wood, the responses indicate a wide range of company sizes and diverse perspectives on using the species. A greater number of survey responses would be needed to assess statistical differences in perspectives of ash wood utilization and marketing. The majority of forest products companies surveyed indicated that they use ash, but at relatively low volumes. Ash in Minnesota competes with other hardwood species in existing wood markets across the state, and their smaller diameter and lower wood quality potentially limits the expanded use of the species. As the EAB continues to impact forests across the state, forest resource managers may seek additional markets for ash wood but may find little demand for the species.

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