Wood Utilization in Virginia's Interface Forestlands and Urban Forests

by P. Eric Wiseman, Ph.D.

What's the Buzz About?

There's been a buzz around Virginia's interface forestlands and urban forests in the last few years, and it's not been just from chainsaws. Lately we're hearing more and more about the utilization of urban wood.

The concept is not new—people have been putting this leftover wood from urban tree removals and lot clearing to good use for years. However, there are new and emerging factors at play that are leading to a growing interest in urban wood utilization.

One is the revival of boutique industries that are capitalizing on the "buy local" movement. Many people want local produce and local beer, so why not local wood products? Another is the sustainability movement. As we seek ways to divert materials from landfills and sequester carbon that has been soaked up by trees in the urban forest, many communities are striving to recycle trees into long-lived wood products. Related to this, the costs of handling, trucking and disposing of wood can be significant for companies that provide lot clearing and tree care services in urban areas where traffic is snarled and disposal sites are few.

These are certainly not new issues, interests or needs, but they are coming at a time when technology is rapidly changing and breaking down many of the barriers that have prohibited value-added recycling of urban wood in the past.

A Study of Urban Wood Utilization in Virginia

Virginia Tech faculty and students have had the privilege to collaborate with Virginia Department of Forestry, Virginia Cooperative Extension, and other professional organizations over several years on a broad-based initiative to improve our collective opportunities and capabilities in utilizing urban wood.

At the outset, the Virginia Urban Wood Group had the foresight to recognize that a huge information gap existed in Virginia. There were plenty of anecdotes and case studies from near and far about urban wood utilization, but there was no scientific information that answered questions about urban wood utilization practices in Virginia, or how these practices were viewed by those working in related private-sector businesses or by government employees working within Virginia municipalities.

By answering these questions through a research study, we hoped to provide the Virginia Urban Wood Group with concrete information to support their educational and technical assistance programs as well as their long-range strategic planning to vitalize a budding industry. Included here are the highlights of a study conducted by Virginia Tech during 2014–2015. The full report about this study can be found at http://treesvirginia.org/images/pdfs/wwu.pdf.

Conducting The Study

Our baseline study of urban wood waste utilization in Virginia was actually carried out as two concurrent stakeholder surveys. One survey looked at interface forestlands (where urban and rural lands converge), and the other looked strictly at urban forests (dense residential and commercial areas, often within a city limit). Collectively, we referred to these as urban/interface forestlands (UIF). Although there are many commonalities and overlap of stakeholders and geographic footprint between these two UIF arenas, we surmised that the two should be separated for purposes of study administration.

Leading the interface forestland study was Dr. Brian Bond, assisted by graduate student Oxana Maria Angulo, both in Virginia Tech's Department of Sustainable Biomaterials. The urban forest study

was led by me, Dr. Eric Wiseman, in Virginia Tech's Department of Forest Resources and assisted by graduate student Jordan Endahl.

The survey for interface forest lands was administered to stakeholders such as primary wood products manufacturers, biomass users, firewood producers, mulch producers, consulting foresters, loggers and those involved in land clearing. For the survey of urban forests, stakeholders comprised two primary groups: municipal government employees and private-sector arborists.

We identified 91 urban municipalities around the state and contacted individuals working for those governments who were most knowledgeable of waste wood generation and utilization within the jurisdiction. Municipal government workers comprised urban foresters, solid waste managers, engineers and planners. Private-sector arborists were identified through cooperation with the Mid-Atlantic Chapter of the International Society of Arboriculture. Contact information was obtained for individuals who were Certified Arborists, a professional credential held by an assortment of tree care service proprietors and consultants. A survey was sent by mail to interface forestland stakeholders while urban forest stakeholders participated in a web-based survey.

What We Learned

When identifying those involved with interface forest wood, it is important to first determine whether respondents had any experience in interface wood utilization or generation at all, and then distinguish between those who generated wood for utilization from those who utilized the wood. Of the interface forestland stakeholders who responded to the survey, 38 percent neither generated nor utilized interface wood, 32 percent utilized, 10 percent generated and 14 percent both utilized and generated.

Among those stakeholders involved with interface wood waste utilization, 95 percent were primary manufacturers, indicating that the largest use of this material is for primary products, broken down almost evenly between lumber or lumber products producers (56 percent) and ground or chipped product producers (44 percent).

When Virginia SHARP loggers whose primary activity was logging were asked if they harvested trees from interface forestlands, the majority (56 percent) did not harvest trees there, while 40 percent did conduct these harvests. For those whose primary activity was not logging, the majority (58 percent) also did not harvest trees there, whereas 36 percent did conduct these harvests.

In the urban forest survey, as with interface forest lands, it is also important to distinguish between those who generate and utilize wood waste. On the municipal side, we found that 87 percent of surveyed municipalities generate wood waste. The majority of this material is generated either

Who are Interface Forestland and Urban Wood Stakeholders?

from maintenance of public greenspaces and rights-of-way (71 percent) or collection of citizen yard debris (21 percent).

Overall, this municipal wood waste is generated in similar proportions through tree pruning (31 percent), tree removal (32 percent), and curbside pickup of residents' yard debris (32 percent). Within private tree care contractors, about two-thirds of survey respondents indicated that they generate wood waste that originated on residential properties (46 percent), commercial properties (17 percent), and public greenspaces (14 percent). Most of this wood waste comes from either tree pruning (45 percent) or tree removal (43 percent).

Urban and Interface Wood Utilization

Companies that work with interface wood are predominantly primary manufacturers (95 percent) who produce a lumber or lumber product (56 percent) or a chipped or ground product (44 percent). Sawmills made up the largest user group (49 percent), followed by compost producers (16 percent), and mulch producers (13 percent). Other users included biomass producers, cabinet manufacturers, wood boiler users, and land clearers. While questions were asked to each stakeholder group regarding the type of material and volume used, the useable response rate for these questions was too low to make reasonable comparisons.

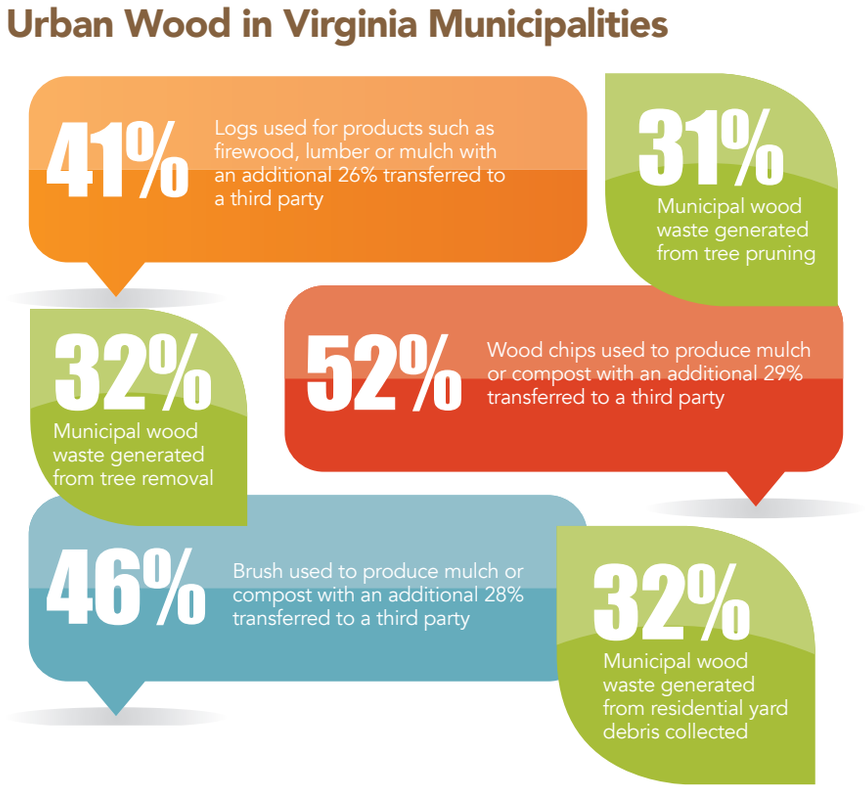
In urban forests, wood waste is generated as a by-product of tree maintenance and land clearing activities. Therefore, it is not a purpose-harvested commodity as is seen in the interface forest. Because Virginia municipalities do not always prohibit landfilling of wood debris, we were surprised to find fairly high rates of utilization amongst municipal operations. They reported that 41 percent of logs, 52 percent of wood chips, and 46 percent of brush is being utilized as some type of wood product. The majority of directly utilized logs are processed into firewood (42 percent of utilization), lumber (18 percent), or mulch (8 percent). Nearly all directly utilized wood chips are processed into mulch (75 percent) or compost (21 percent). Directly utilized brush likewise ends up being processed into mulch (76 percent) or compost (21 percent).

Municipalities rarely utilize logs in-house for high-value products such as furniture (6 percent), cabinetry (6 percent), or veneer (5 percent), but this is not surprising given the lack of specialized equipment and personnel to do so. Likewise, biomass fuel is rarely produced from wood chips (4 percent) or brush (4 percent).

An appreciable amount of municipal wood waste is being transferred to a third party (26 percent of logs, 29 percent of chips, and 28 percent of brush). While the fate of these materials were not tracked in this study, presumably a large proportion of this material is also being processed into products.

Private tree care contractors in urban forests reported somewhat lower rates of direct (in-house) utilization for products from logs (29 percent), wood chips (31 percent), and brush (35 percent). Given that tree care contractors frequently transfer these material to a third party (42 percent of logs, 53 percent of chips, and 32 percent of brush), overall utilization of their wood waste is probably much higher.

When tree care contractors utilize wood waste in-house, they tend to process logs into firewood (52 percent of utilization), mulch (17 percent), or lumber (17 percent); process wood chips into mulch (63



percent) or compost (20 percent); and process brush into mulch (52 percent) or compost (28 percent). They rarely produce high-value products such as furniture, cabinetry or flooring (6 percent).

Interface & Urban Wood Utilization Barriers

Companies that work with interface forestlands were asked in the mail survey what barriers businesses might encounter with utilizing interface wood. The barriers reported were quite varied and no single barrier had strong consensus. The three most common barriers were: wood contamination (reported by 16 percent of respondents); lack of infrastructure to handle materials (15 percent); and variable supply of wood material (15 percent). Interestingly, lack of market demand was not listed by any respondent as a barrier to interface wood utilization.

For logging businesses that harvest interface woodlands, the three most common barriers were liability (reported by 31 percent of respondents), wood contamination (22 percent), and quality of wood material (18 percent).

Companies not yet working with interface wood were asked why they weren't involved in the business. The major reasons were inadequate volume, and they only purchase gate wood (both 20 percent of respondents), followed by too small volume to make profit and only use contract logging (both 14 percent). Loggers not yet working with interface wood indicated that the volume was too small to make a profit (40 percent of respondents), followed by not enough wood volume available (27 percent), and lack of knowledge on utilizing interface wood (20 percent).

Respondents to the urban forest survey were asked to rank nine potential barriers to urban wood utilization. Lack of local processors (someone to make wood products) was the most frequently cited barrier, identified as a top-three barrier by 42 percent of municipalities and 48 percent of private tree care contractors. Other frequently-cited barriers in urban forests were lack of in-house space for stockpiling (52 percent municipal and 41 percent private), lack of in-house equipment for processing (56 percent municipal and 30 percent private), and logistical difficulties of transporting to local processors (29 percent municipal and 40 percent private).

The biggest point of departure between municipalities and private tree care contractors was their perception of on-site logistical difficulties in handling wood waste. Because private contractors are predominantly working on residential parcels, space for felling and maneuvering saw timber is limited and requires additional time and equipment to extract in salvageable lengths. About 37 percent of private contractors ranked these logistical difficulties as a major barrier compared to 23 percent of municipalities. Concern about a viable market for waste wood products was also expressed: 34 percent of private contractors and 27 percent of municipalities cited lack of local consumers as a major barrier.

Next Steps

Moving toward greater utilization of interface and urban wood is a tough nut to crack. For every success story, there are three stories about frustration or failure. It's a complex matter that is heavily influenced by local geography and fickle market conditions. There is no "one size fits all" formula for success.

So where do operators find motivation and success with urban wood utilization? Interviews with some of the companies involved with interface forestland products emphasized the importance of focusing on unique wood products and not trying to compete with commodity products. They also attributed their business success to sharing with customers the story of how they came up with the business, the importance of not wasting raw material, and how their product is helping the environment.

Likewise, in the urban forest survey, the most commonly agreed upon reason for increasing wood waste utilization was environmental concerns. More than two-thirds of respondents from both municipalities and private tree care contractors cited environmental sustainability as an important incentive to increase utilization.

However, the reasons to pursue urban wood utilization have to make economic sense, whether in the public or private sector. One way to increase economic viability is to divert wood waste into higher-value products. The fact that about half of logs generated in urban forests end up as firewood is a good indication that some value is being left on the table. Training urban foresters and arborists how to grade and buck saw logs in order to recover maximum value is just one of the facets of outreach by the Virginia Urban Wood Group. Another big step is creating technology to connect wood waste generators with sawyers and wood workers so that strong market networks will emerge to support a viable urban wood products industry.

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