



# Upcycle Urban Wood: Putting Urban Tree Waste to Work

TREE CITY USA®  
BULLETIN

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*Although it is the mission of the Arbor Day Foundation to inspire the planting and nurturing of trees, a fact of life is that some trees come down. It may be on their own due to storms, and sometimes it is through management practices as trees succumb to insects, encroach on wires, or become dangerous. What happens next is also part of good stewardship — and there is good news to report.*

Addressing colleagues in the commercial tree care sector, Rick Howland sums up the tree waste “problem” nicely in the February 2019 issue of *Tree Care Industry*. “Tree waste has become anything but that. Green material that a decade ago represented a business cost has become a valuable raw material. The age of zero waste is upon us. It is reducing the negative impact of tree work on the environment while saving operating costs (dumping fees). It is also the foundation of many profit centers for tree care companies, contributing 10, 20, or even 25% or more to the bottom line. Tree trash is now treasure.”

John Haling of John’s Urban Timber in Whitmore Lake, Michigan, stands next to bookmatched slabs he cut from a weeping willow.

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As communities lose trees to insect invasions and other causes, emphasis continues to be on the need to replant. However, it behooves tree boards and other organizations, as well as interested individuals, to promote the use of wood from removed trees. “Repurposing” seems to be the popular word for this important process. Not only will this reduce pressure on landfills, it contributes to the economic health of green industries and recognizes the beauty and benefits of wood that can continue beyond the life of living trees.

This issue of the bulletin illustrates some of the ideas and successes that are making burdensome tree waste a thing of the past. All have great potential for much wider adoption throughout the nation.

# Beautiful Lumber from Once-Beautiful Trees

*It can be hard to be passionate about boards, but wood made from shade trees is an exception. Companies specializing in these unique woods are providing communities with a valuable service, as well as making wood with beautiful grains and colors available. Edith Makra, director of environmental initiatives for Illinois' Metropolitan Mayors Caucus, sums it up, "Reclaiming valuable wood products from felled landscape trees is just a smart idea."*

## THE URBAN LUMBER COMPANY

Tim O'Neill's sawmill and store is located not far from the heart of Kansas City, Missouri. Like many operators of small, urban wood sawmills, O'Neill has the unbounded enthusiasm of an evangelist. He takes seriously the claim that if wood from dead and diseased trees were put to good use, it would equal nearly one-quarter of annual hardwood consumption in the United States. "And people love wood," O'Neill says. "I can't keep up with the demand for large slabs of lumber with a live edge."

O'Neill's company got its start in partnership with the Missouri Organic Recycling Company and a grant from the Environmental Improvement and Energy Resources Authority. This program promotes and provides assistance for the development of markets for recovered materials and recycled content products. In O'Neill's case, it worked wonderfully — his Urban Lumber Company receives tree trunks from tree care companies, city and park crews, and homeowners. He saws the boards into 1- or 2-inch slabs and dries the wood in a kiln or using slower, energy-free air drying. He and his team then see their wood transformed into beautiful coffee tables, cabinets, and other furniture or decorative highlights by their customers.

When asked about the issue that keeps many sawmills from accepting urban wood, O'Neill says about 10% of the trunks contain hidden metal objects. "But that means that 90% do not," he says, and that no harm is done to his saw blades if it is something small like a nail or a bullet. If it is a larger item and it breaks the blade, he accepts that as a cost of doing business and that the returns more than compensate for the expense.

In short, O'Neill's attitude reflects that of most of the early adopters who are recycling removed trees commercially. "I really care about urban wood," he says. He is proud to be offering Kansas City a resource that has been previously neglected. As O'Neill puts it, "We're talking about America's lost treasure."



The Urban Lumber Company makes lumber from waste trees in Kansas City.

*"I really care about urban wood. We're talking about America's lost treasure."*

—TIM O'NEILL, THE URBAN LUMBER COMPANY



Beautiful wood slabs like this bring a high price for wood that would otherwise end up in a chipper or the fireplace.



## WAYS TO SUPPORT WOOD RECYCLING IN YOUR AREA

- Select products for your home improvement projects from partners working with urban wood organizations.
- Use arborists, tree care companies, and sawmills that recycle wood responsibly.
- Ask about how your municipality handles its tree removals.
- Spread the word about using local tree waste for local products.
- Plant at least one tree for every one removed (and the right tree for the right site).

# Regional Organizations Lend a Hand

*Entrepreneurs who face the unique challenge of repurposing tree waste while making a profit and benefiting the urban forest can get a huge boost through partnerships. In the Midwest, when it became apparent that thousands of trees killed by emerald ash borers or removed in quarantined areas were going to waste, leaders with vision in government and industry stood up to the challenge. They created some amazing and productive networks that are putting urban tree material to good uses such as specialty lumber. Here are examples of two such partnerships.*

## THE URBANWOOD PROJECT

The Urbanwood Project and its affiliates address all of the above needs. Urbanwood was created by the Southeast Michigan Resource Conservation and Development Council and Recycle Ann Arbor. This innovative organization provides raw wood, products, and services. It also encourages municipalities and tree care companies to recycle dead street and park trees into high-quality products and provides an outlet for locally sawed lumber at its Urbanwood Marketplaces found at Recycle Ann Arbor's ReUse Center and the Habitat for Humanity Restore in Flint, Michigan.

Urbanwood's guiding philosophy is "Don't chip that tree. Reclaim it!" According to former Coordinator Jessica Simons, more than 73 million board feet of lumber could be produced from urban trees removed from southeastern Michigan's cities each year instead of ending up in a chipper, fireplace, or landfill.

"The Urbanwood Project advocates for finding the highest and best use for wood from local trees, all while supporting local jobs," Simons says.



Racks of beautiful boards can be seen at Urbanwood's two marketplaces. Each board is unique and available for visual inspection and purchase by professional and amateur carpenters, furniture makers, and craftspeople.



## WISCONSIN URBAN WOOD

This nonprofit organization is an affiliate of Urbanwood, and its people clearly have a passion for keeping urban trees out of the waste stream and putting them to their highest use. Executive Director Twink Jan-McMahon says that a guiding policy is "the longest sequestering of carbon possible is the best use." Thus, solid wood products and building structures are emphasized by Wisconsin Urban Wood. The organization is funded by grants and nominal annual fees from its partners. They include:

- Arborists
- Sawmills
- Kiln operators
- Wood product manufacturers, ranging from large companies to craftspeople working out of their garages
- Organizations such as WasteCap, a fellow nonprofit dedicated to the broad range of waste reduction and recycling

"None of the trees we use are harvested for the purpose of lumber," Jan-McMahon says. "Only trees that must be taken down are used." She encourages cities and counties nationwide to get involved and other affiliates to join Urbanwood.

## WHAT IS NEEDED

There are three basic needs in order to capture wood from urban trees for its highest use as lumber and marketable products.

- 1** The public needs to be made aware that they can buy locally made products from local wood.
- 2** A consistent supply of quality wood is necessary, and suppliers need to be matched with consumers.
- 3** Architects and industry leaders such as LEED (Leadership in Energy & Environmental Design) need to recognize the potential value of wood in buildings and promote its use.

# Objets d'Art

*There is nothing like the beauty of wood. The grain and color of softwoods like pine and fir are nice, but those of the hardwoods (broadleaf deciduous trees) that typically grace our streets and parks are excellent. This is the wood sought after by wood turners and other craftspeople. Here are some examples of what is possible when dead trees are matched up with talented artists.*



← This modern reclaimed wood sideboard by Los Angeles-based Blake Avenue furniture company is handmade from reclaimed, old growth Douglasfir wood. Most of the hand-selected reclaimed wood that goes into Blake Avenue furniture is recovered from architecture that dates back 80 to 150 years, from trees as old as 15 centuries.



This black walnut table was created from waste wood by Tree-Purposed, a Detroit-based sawmill and custom workshop focused on turning urban wood into high-quality, unique products.



↑ Amateur wood turner Ed Krume of Moscow, Idaho, created this bowl (top) from a decadent tree that once stood over a pathway in the local arboretum. The wood vessels (above) came from camperdown elms that needed to be removed from a campus street at the University of Idaho.

## What Makes it Special

Wood grains are a bit like snowflakes — no two are exactly alike. But each tree species does have characteristics that set its wood apart.



### ALDER

Brownish with light yellow and reddish streaks



### ASH

ale yellow to brown with straight grain, sometimes similar to oak



### CHERRY

Reddish-brown with darker grain, sometimes with flecks or pockets of black



### HICKORY

Light brown to dark reddish-brown with variable grain ranging from straight to wavy



### MAPLE

Light color, often with wavy, translucent grain with shiny specs or birdseye pattern



### OAK (RED)

Light to tannish with bold, pinkish-brown grain



### WALNUT

Unmistakably rich brown with straight or curvy grain lines

## THINK ART IS FOR THE BIRDS?

If you think this, you are right. Recycled tree trunks or large branches can be made into an attractive piece of work. Useful, too — at least the birds think so. For instructions on how to make a feeder like this, search Ness Customs Wood Work on YouTube.

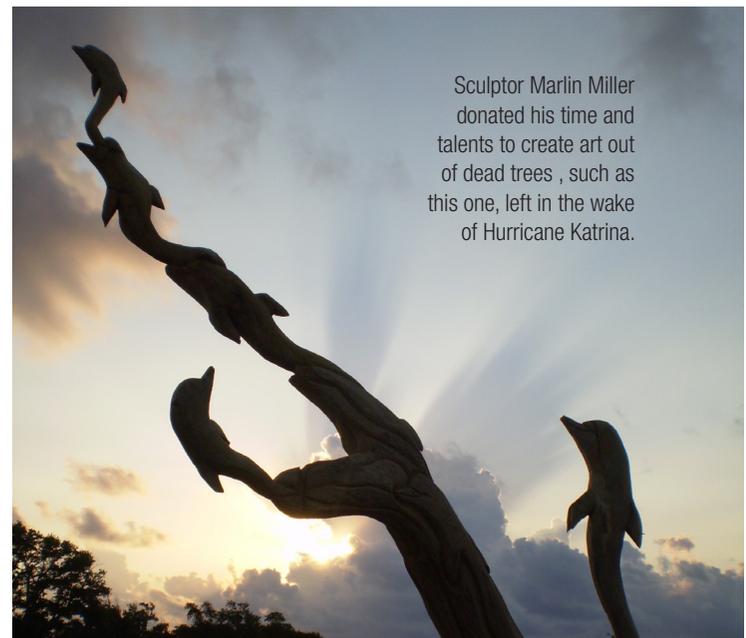


## INSPIRING THE NEXT GENERATION

Dormant talent and interest can be cultivated to prepare tomorrow's artists to work with wood. Recognizing this, the Chicago Park District offers classes designed to teach essential woodworking skills, such as design and measuring, cutting with various saws, and sanding. Classes are offered for three age groups: children 7-8, youth 9-12, and adults. In many cases, students use urban wood salvaged from trees removed from Chicago's parks to make finished products ranging from bird houses to cabinets.

## TREE SCULPTURES

In 2005, Hurricane Katrina left a path of destruction worse than any seen to date in the United States. Thousands of trees fell victim to the wind and floods, but in Biloxi, Mississippi, chain saw artists took the opportunity to make beautiful sculptures from 23 live oaks in the median and vicinity of Beach Boulevard. "We tried to make a good situation out of bad," says City Arborist Eric Nolan. Galveston, Texas, gave Hurricane Ike a similar silver lining in 2008 after its winds and storm surge killed thousands of trees. Artists have made whimsical sculptures that are now scattered throughout the island. There is even a solar-powered shuttle bus that provides tours on Saturdays. All of the city's other destroyed trees went to repurposed uses — not the landfill.



Sculptor Marlin Miller donated his time and talents to create art out of dead trees, such as this one, left in the wake of Hurricane Katrina.

# Strictly Useful

*“Strictly useful” may be a bit of an overstatement because no matter how practical the re-use of waste wood may be, there is a certain aesthetic in putting it to work in a practical way. So it is with some of the old and new methods illustrated here.*

## WOOD CHIPS

Chipping tree branches and trunks is probably the most common method of disposal. Although it is at the lower end of adding value to wood, its uses are myriad and beneficial. Wood chips should always come from an uncontaminated source, such as removed street trees, not from treated wood that may contain arsenic. Chips are frequently used in playgrounds, trail tread, wood-burning boilers, or sold for animal bedding. They have also been called a tree’s best friend when used properly in landscaping to hold down weeds and protect tree trunks from lawn mowers and trimmers.

## BIOFUELS AND BIOCHAR

More and more research and innovative companies are heralding the use of wood as an environmentally friendly way to reduce dependence on fossil fuels and reduce atmospheric inputs that contribute to climate change. Wood chips, for example, can be used to produce ethanol without the fertilization, irrigation, and other downsides of using corn. Biochar, a kind of charcoal made through pyrolysis (elevated temperatures in the absence of oxygen), not only locks up carbon that would otherwise end up in the air, but can be produced with low energy inputs. It results in a product that:

- Increases plant growth.
- Reduces the need for traditional fertilizers.
- Helps retain soil moisture.
- Enriches marginal soils.
- Fosters the growth of mycorrhizal fungi.



## WOOD PELLETS

Pellets are made by compression and extrusion of lignin (structural material in plant cell walls) that acts as a natural glue. Numerous large-scale production plants use sawdust, planer shavings, and removed trees for conversion into pellets sold through chain stores and other outlets. Small-scale equipment is also available on the market to make local production more practical. Either way, pellets are considered a green product that turns waste into clean, renewable, carbon-neutral biofuel.

A modern retort-type charcoal kiln made by Jeffrey Funk: Metalworker in Bigfork, Montana.

## FUELWOOD BOILERS

Biomass combustion is becoming an important means of providing an outlet for wood residues, reducing energy costs, and lowering the amount of carbon that enters our atmosphere from the use of fossil fuels. Modern fuelwood burners are efficient and clean, offering a combination of advantages that often pay significant dividends when used in schools, factories, greenhouses, municipal buildings, and other facilities that once were heated with oil or gas. According to officials at Biomass Combustion Systems Inc., one of the many manufacturers of industrial-scale wood-burning equipment, “We are also convinced that the adoption of wood energy ... contributes to national economic independence.”

Good examples of fuelwood boilers can be found throughout the United States. When a campus uses wood fuel, there is the additional advantage of making students — the country’s future leaders — aware of the possibilities of using waste wood. In the cold climate, wood-rich area of northwestern Montana, Troy Elementary School was one of the first in the state to switch to wood to heat its boilers. Officials say they save \$12,000 annually using wood pellets. Troy’s 55,000-square-foot high school then made the switch from oil and gas to wood. The source of the wood for these schools is only 20 miles away.

At the University of Idaho, one of the pioneering institutions in this movement, 90% of the steam generated



Nestled within the campus of the University of Idaho, steam for hot water in the dorms and heat to warm all buildings in the campus core area come from this wood-burning boiler plant.

is from wood chip fuel. The switchover from fossil fuels made in 1986 has saved the university more than \$11 million by not relying on oil or gas. In the 1990s, eight water chillers for summer air conditioning were installed, five of which are powered by wood fuel. This use of wood has the additional advantage of benefiting the community by providing a steady market for mill wastes within a 60-mile radius of campus.

## LIED LODGE & CONFERENCE CENTER

As part of the Arbor Day Foundation’s mission to promote responsible stewardship of natural resources, a fuelwood boiler was installed as part of the conference center and lodge at Arbor Day Farm in 1993, with steady upgrades since then as technological advances have been made. For more than two decades, the fuelwood boiler has provided reliable room heat and hot water in the winter. Now, its state-of-the-art steam-fired chiller can also provide air conditioning in the summer for the 144,000-square-foot facility. The clean-burning system surpasses EPA requirements for wood-burning particulate emissions and provides a carbon neutral supply of energy.

Fuel for the Lied Lodge facilities comes mostly from scraps generated at a nearby pallet mill, providing local employment from a local resource and a boost for the state’s economy. In addition, guests and other visitors can view the boiler operation in action from a Fuelwood Gallery complete with explanatory murals and exhibits.



# Local Use is Good Use

Using wood locally goes beyond contributing to the economy, reducing pressures on landfills, or preventing additional carbon compounds from entering the atmosphere. Moving dead wood long distances is a contributor to the spread of invasive insects, such as the emerald ash borer. On its own, this beetle can only fly about one-half to 2 miles in its lifetime. But firewood or similarly cut wood containing the eggs or larvae (or a clinging adult, for that matter) is easily transported to new areas where the infestation can start anew. There are at least 35 insect pests and 20 tree diseases that can be spread in this manner.

The good news is that the kinds of uses described in this bulletin can be made from wood without danger of spreading pests, especially if it is used locally or processed appropriately.



**DONTMOVE  
FIREWOOD.org**

Join the national campaign to inform residents about a major step they can take to help stop the spread of invasive pests.

## MUCH MORE AT ARBORDAY.ORG

There is a wealth of additional information available on all the topics discussed briefly in this bulletin. For quick links, please visit [arborday.org/bulletins](http://arborday.org/bulletins) and click on Available Bulletins & Resources.

## Helping to Put Tree Waste to Good Use

### U.S. FOREST SERVICE

From new kinds of building materials to renewable wood energy, the U.S. Forest Service Energy and Forest Products program is designed to help find uses for waste wood. At the same time, work is in progress to develop products from forest thinnings. Underlying this mission is the need to manage for healthier trees and the reduction of wildfires. Secondly, there is the need to create jobs in rural and urban areas and all along the supply chain. Much of the innovative work and testing occurs at the agency's Forest Products Laboratory in Madison, Wisconsin, but, when possible, partnerships are formed throughout the country.

### U.S. DEPARTMENT OF ENERGY

The Office of Energy Efficiency and Renewable Energy in the U.S. Department of Energy includes within its mission finding ways to use wood byproducts and other renewable materials to reduce the nation's reliance on petroleum and natural gas. Wood residues include mill wastes and the use of unmerchantable trees that can be converted to biofuels for vehicles and for use in the manufacturing of plastics and industrial chemicals.

### NATIONAL BIOENERGY DAY

Last year was the sixth annual Bioenergy Day. Led by the Biomass Power Association in partnership with the U.S. Forest Service, participating organizations invite the public to tours and demonstrations that promote the many benefits of energy from wood and other renewable resources.

### CERTIFICATION

As more people are concerned about where and how the products they buy are produced, a nationwide wood certification program is currently being developed to provide the answers. The goals are to provide guidelines to companies and municipalities that create wood residues and to assure buyers that the products are sustainable. The effort is being led by Dovetail Partners in cooperation with the Arbor Day Foundation, Society of Municipal Arborists, Tree Care Industry Association, Utility Arborists, and others.

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