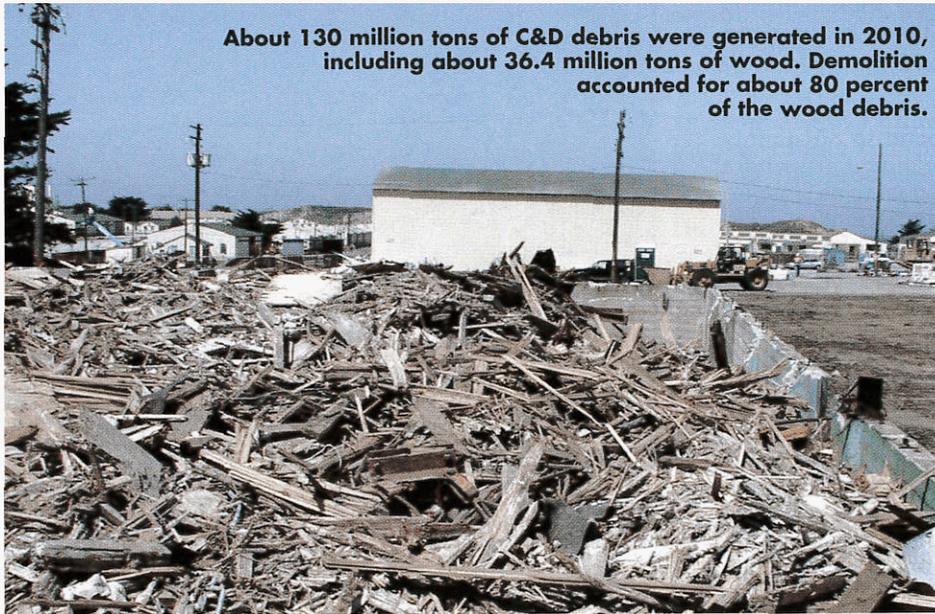


GENERATION AND RECOVERY OF SOLID WOOD WASTE IN THE U.S.



About 130 million tons of C&D debris were generated in 2010, including about 36.4 million tons of wood. Demolition accounted for about 80 percent of the wood debris.

While only a small amount of wood processing residues are available for recovery, the urban wood waste stream has nearly 29 million tons to tap.

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NORTH America has a vast system of hardwood and softwood forests, and the wood harvested from this resource is widely used in many applications. These include lumber and other building materials, furniture, crating, containers, pallets and other consumer goods. This wide array of wood products generates not only a large amount of industrial wood by-product during the manufacturing process, but it also produces a large amount of wood waste when these products are disposed at the end of their useful lives.

Over the past 30 years, an average of 143.3 million tons of wood-based products was produced annually in the United States (Howard 2012). The manufacture of these products generated about 84 million tons of wood residue (about 40% fine residue, including sawdust, and about 60% coarse residues), with more than 98 percent used by the wood products industries for fuel, pulpwood and feedstock for products such as particleboard (Smith and others 2009, Table 1). In addition to this wood residue, a

tremendous amount of wood ends up in the North American municipal and construction and demolition (C&D) waste streams. According to waste characterization data from the U.S. Environmental Protection Agency (EPA) and Natural Resources Canada (NRCan), the Forest Products Laboratory estimates that wood makes up over 10 percent of all waste generated in North America (USEPA2009, NRCan2006).

In 2010, 70.6 million tons of solid wood waste were generated in the manufacture, use and disposal of solid wood products in the United States (Table 1). This waste wood comes from a variety of sources and in a variety of forms. Its principal sources are municipal solid waste (MSW) and C&D waste. Each generates distinctly different types of wood waste, with differing degrees and levels of recovery and recyclability. (For this report, storm-related debris is not accounted for as no reliable estimates on a national level are available; this may be accounted for in future estimates, especially given the frequency and intensity of storms that are generating this wood waste stream.)

While other building materials such as concrete and steel have robust recycling industries, wood has yet to reach the same levels of diversion. According to the Steel Recycling Institute, the recycling rate for structural steel is about 98 percent in North America. Concrete recycling is reported at about 82 percent, according to the Construction Materials Recycling Association (CMRA).

WOOD WASTE BY SECTOR MSW

MSW is waste from residential, commercial, institutional, and “occasional” industrial sources. It includes durable and nondurable goods, containers and packaging, food scraps, yard trimmings, storm debris, and miscellaneous inorganic waste. According to the US EPA definition, MSW does not include waste from other sources, such as C&D activities (with the exception of waste from remodeling activities on existing residential structures), automobile bodies, municipal sludge, combustion ash, and industrial process wastes that may or may not be discarded in municipal waste landfills or incinerators. In 2010,

250.2 million tons of MSW were generated in the United States (USEPA 2010). Nearly 34 percent was recovered for recycling (includes composting).

By EPA definition, two components of MSW, “wood” and “yard trimmings,” contain solid wood. The wood component includes items such as wooden furniture and cabinets, pallets and containers, scrap lumber and wooden panels, and wood from manufacturing facilities. It does not include roundwood, unprocessed wood, repaired wood, or recycled pallets. Yard trimmings include leaves and grass clippings, brush, and tree trimmings and removals.

In 2010, the EPA estimated that about 15.9 million tons of MSW wood waste were generated, with a recovery rate of only 15 percent (not counting recovery for energy combustion). Over 33 million tons of yard trimmings were generated the same year, but they were recycled at a much higher rate of 58 percent (USEPA 2010). Yard trimmings are about 55 percent wood (18.4 million tons) and 45 percent herbaceous material (15.0 million tons) (Falk and McKeever 2004, McKeever 2004).

As indicated in Table 1, the total wood waste in the MSW (34.3 million tons) is about 14 percent of the total MSW (250.2 million tons); however, the amount of wood in MSW varies by region. Staley and Barlaz (2009) summarized waste characterization data from 11 U.S. states and found that the solid wood component varied from about 4 percent to about 16 percent of MSW.

C & D Waste

Construction and demolition waste is often thought of as a single form of waste because both types are typically

discarded together in landfills. But since construction and demolition wastes originate from distinct types of activities, have different characteristics, and differ in their ease of separation, recovery and recyclability, they are in fact different. Construction waste originates from the construction, repair and remodeling of residential and nonresidential structures. Demolition waste originates when buildings or other structures are de-



molished and is often contaminated with paints, fasteners, adhesives, wall covering materials, insulation and dirt and typically contains a diverse mix of building materials.

In 2010, an estimated 130 million tons of C&D debris were generated in the U.S. This debris contained about 36.4 million tons of wood. Demolition activities accounted for just over 80 percent of the wood debris, and construction activities covered the balance. Estimates reported here for C&D waste are based on generation and recovery rates developed in McKeever (2004) and Falk and McKeever (2004), which were applied to current economic drivers such as housing completions, value of nonresidential construction, and population change. The continued general economic recession in the United States has had a marked ef-

fect on wood waste generation, principally in new residential construction. Of the 36.4 million tons of C&D wood generated, nearly 17.3 million tons were deemed recoverable (Table 1).

As with the MSW waste stream, the wood component of the C&D waste stream varies by region. Staley and Barlaz (2009) found that the wood varied from about 25 percent to about 55 percent. As indicated in Table 1, the total amount of wood in the C&D waste

Yard trimmings are about 55 percent wood and 45 percent herbaceous material. In 2010, over 33 million tons were generated.

stream (36.4 million tons) is about 28 percent of the C&D waste stream (130 million tons).

Other Sources

Other sources of waste wood include chemically treated wood from railroad ties, telephone and utility poles and pier and dock timbers; chipped brush and limbs from utility right-of-way maintenance; and industrial waste wood outside the normal waste streams. Some of this material is being reused, burned or disposed in hazardous waste landfills, but much is being left on site. Chemical treatments and costs of collection make much of this material difficult to recover. The amounts of wood available from these other sources are fairly small and are therefore not included in this discussion.

SUMMARY

In 2010, 70.6 million tons of urban wood waste were generated (Table 1). This figure includes MSW (48%) and C&D waste (52%). Residues from primary timber processing mills are not included because essentially all are currently being recovered. Nearly 29 million tons of waste is deemed to be available for recovery after allowing for current levels of recovery, combustion and unusable material. The MSW could supply about 39 percent of available wood, and the C&D waste stream could supply the balance at 61 percent. ■

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Table 1. Wood residues and waste wood generated, recovered, combusted or not usable, and available for recovery in the United States, 2010¹

Source	Generated	Recovered Not Usable million tons	Combusted	Available For Recovery
Primary timber processing residues				
Wood residues	59.6	58.7		0.9
Bark residues	23.8	23.5		0.4
Total timber residues	83.4	82.1		1.3
Urban wood waste				
Municipal solid waste				
Wood component	15.9	8.6		7.2
Woody yard trimmings	18.4	14.4		3.9
Total, MSW	34.3	23.1		11.2
Construction & demolition waste				
Construction waste wood	6.7	1.8		4.8
Demolition waste wood	29.7	17.2		12.5
Total, C&D	36.4	19.1		17.3
Total, Urban wood waste	70.6	42.1		28.5

Forest Service estimates based on updated demand drivers and estimated recovery rates

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