WOODY BIOMASS FOR EASTERN U.S. FORESTS, 1983-1996

Summary:

Estimates of the woody biomass density and biomass pools were derived at the county scale of resolution of all forests of the eastern United States by using new approaches for converting inventoried wood volume to estimates of aboveground and belowground biomass. Estimates were compiled for 2,009 counties in the 33 eastern states on the basis of state-based inventories conducted between 1983 and 1996. Biomass density and biomass pools were estimated from the U.S. Department of Agriculture Forest Service Forest Inventory and Analysis database on growing stock volume by forest type and stand size-class (see Brown and Schroeder 1999).

Stand volume was converted to aboveground biomass with regression equations for biomass expansion factors (BEF, ratio of aboveground biomass density of all living trees to merchantable volume). Belowground biomass was estimated as a function of aboveground biomass by means of regression equations. Biomass pools were calculated as the product of biomass density and forest area, summed by stand-size class. Forest area was defined by the Forest Service as land producing, or capable of producing, in excess of 20 cubic feet of industrial roundwood products per acre per year. Statistics were presented for hardwood and softwood (pine plus spruce-fir) forest categories. The approach accounted for commercial and noncommercial tree species with diameters greater than 2.5 cm and included noncommercial tree components (branches, twigs, and leaves). Belowground components include both fine and coarse roots.

The estimation methods were based on work by Schroeder et al. 1997 and were also used to estimate aboveground woody production (Brown and Schroeder 1999). These biomass production data are archived at the ORNL DAAC as "NPP Multi-Biome: Production and Mortality for Eastern U.S. Forests, 1962-1996" (Brown and Schroeder 2003).

Based on the analysis of the biomass data (Brown et al. 1999), total biomass density for hardwood forests ranged from 36 to 344 Mg ha-1, with an area-weighted mean of 159 Mg ha-1. About 50% of all counties had hardwood forests with biomass densities between 125 and 175 Mg ha-1. For softwood forests, biomass density ranged from 2 to 346 Mg ha-1, with an area-weighted mean of 110 Mg ha-1. Biomass densities were generally lower for softwoods than for hardwoods; ca. 40% of all counties had softwood forests with biomass densities between 75 and 125 Mg ha-1. Highest amounts of forest biomass were located in the Northern Lake states, mountain areas of the Mid-Atlantic states, and parts of New England, and lowest amounts in the Midwest states. The total biomass for all eastern forests for the late 1980s was estimated at 20.5 Pg, 80% of which was in hardwood forests. Maps (Brown et al. 1999) provided a visual representation of the pattern of forest biomass densities and biomass pools over space that are useful for forest managers and decision makers, and for verification of vegetation models.

Data Citation:

Cite this data set as follows:

Brown S. L., P. Schroeder, and J. S. Kern. 2003. Woody Biomass for Eastern U.S. Forests, 1983-1996. Data set. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A. doi:10.3334/ORNLDAAC/657.

References:

Brown, S. L., and P. E. Schroeder. 1999. Spatial patterns of aboveground production and mortality of woody biomass for eastern U.S. forests. Ecological Applications 9(3):968-980.

Brown, S. L., and P. E. Schroeder. 2003. Production and Mortality of Woody Biomass for Eastern U.S. Forests, 1962-1996. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.

Brown, S. L., P. E. Schroeder, and J. S. Kern. 1999. Spatial distribution of biomass in forests of the eastern USA. Forest Ecology and Management 123:81-90.

Schroeder, P. E., S. Brown, J. Mo, R. Birdsey, and C. Cieszewski. 1997. Biomass estimation for temperate broad-leaf forests of the United States using inventory data. Forest Science 43(3):424-434.

Data Format:

The spreadsheet file is stored as ASCII tab-delimted files. Missing values are represented by -9999.

Data file format for "Woody Biomass East US Brown.txt"

Variables	Units
State	
County	
Hardwood forest area	[ha] [10^3]
Hardwood aboveground biomass	[Mg] [10^6]
Hardwood total biomass	[Mg] [10^6]
Hardwood aboveground biomass density	[Mg] [ha^-1]
Hardwood total biomass density	[Mg] [ha^-1]
Softwood forest area	[ha] [10^3]
Softwood aboveground biomass	[Mg] [10^6]
Softwood total biomass	[Mg] [10^6]
Softwood total biomass density	[Mg] [ha^-1]
Softwood aboveground biomass density	[Mg] [ha^-1]

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