

American basswood

Tilia americana



American basswood is a fast-growing species and an important component of the maple beech / birch forest type in Wisconsin. The volume of basswood has increased steadily since 1938. In the last 20 years, growth rates have increased and mortality has decreased. In 2014, basswood accounted for 5.6% of all volume in Wisconsin, but only 3% of total mortality and 4.4% of growth.

Basswood accounts for 4.3% of growing stock removals and 4.2% of roundwood product. Currently, we harvest about half of total growth. The density of basswood is one of the lowest of all commercial species which makes it less desirable for biofuel production.

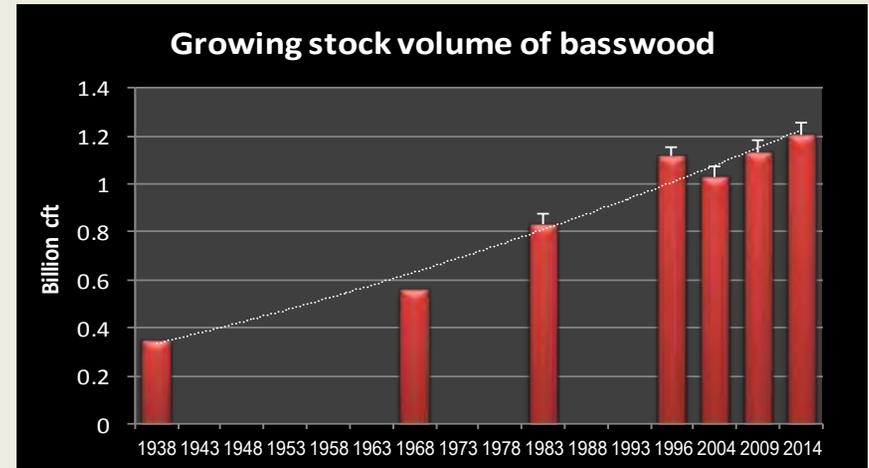
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“How has the basswood resource changed?”
Growing stock volume and diameter class distribution

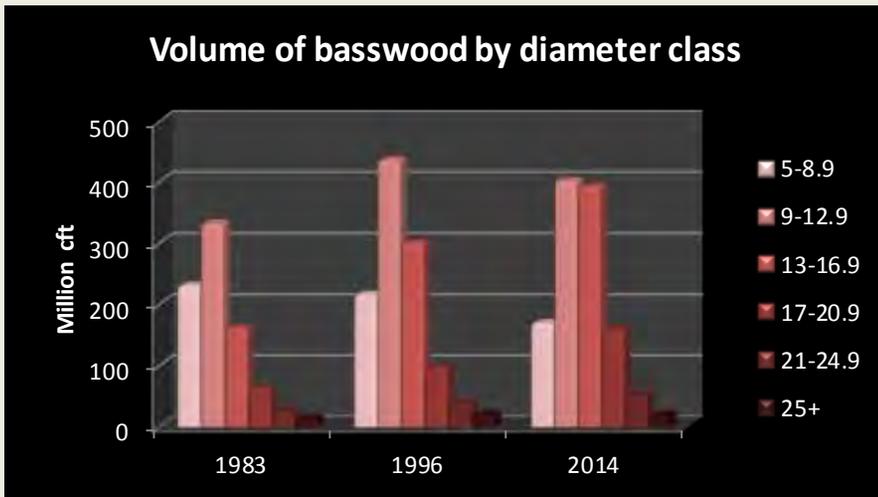
The [growing stock volume](#) of basswood in 2014 was about 1.2 billion cubic feet or over 5.6% of total statewide volume (chart on right). Volume has continued to increase since 1938 as aspen was replaced by late successional species. Basswood volume increased 44% since 1983 and 8% since 2004.

The basswood resource has aged since 1983. For instance, the volume in large trees (over 13 inches in diameter) has more than doubled in this time (chart on left below).

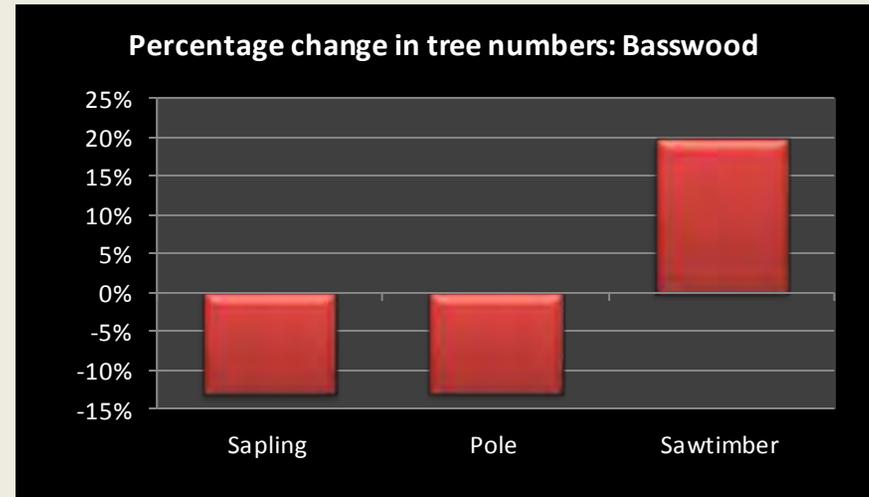
Since 1996 the number of [saplings](#) and [poles](#) has decreased (chart on right below) while the number of sawtimber trees has increased significantly suggesting a possible decrease in future populations of basswood.



Growing stock volume (million cubic feet) by inventory year.
 Source: USDA Forest Inventory and Analysis data.



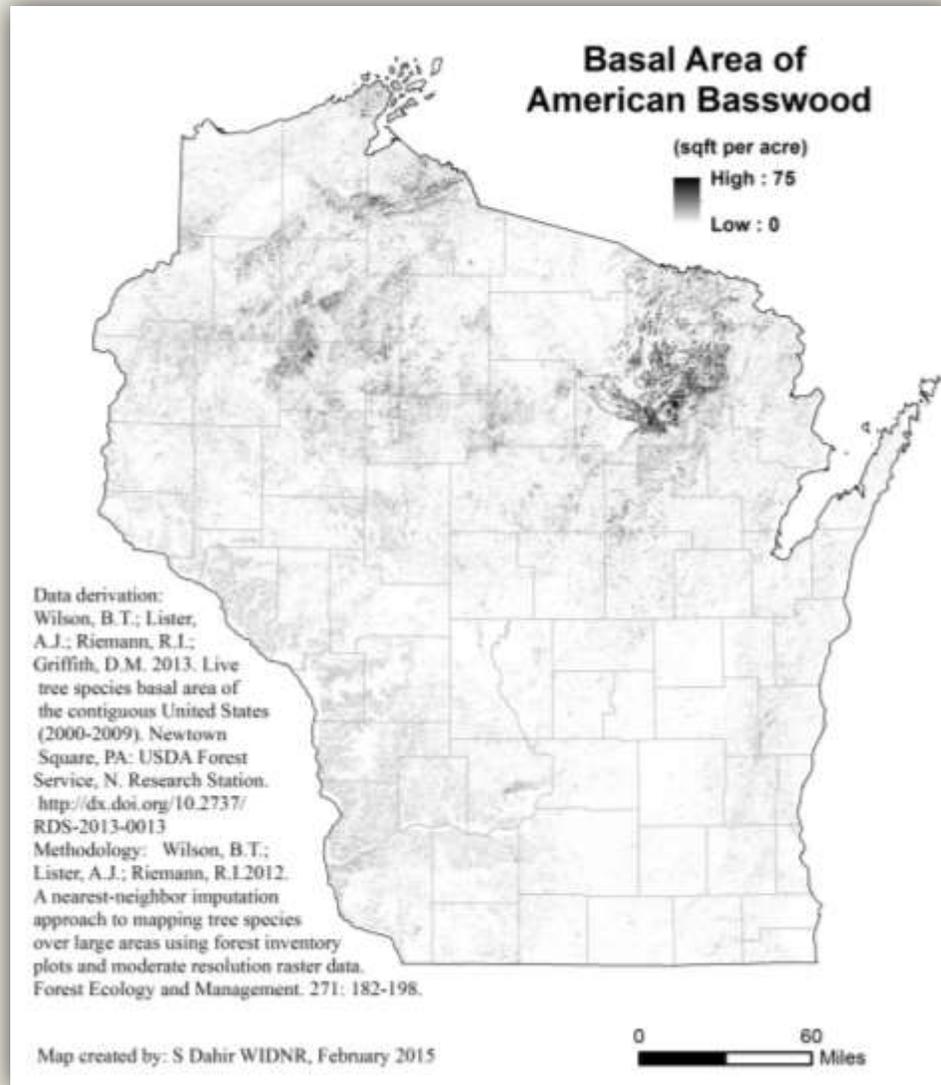
Growing stock volume (trees over 5 inches dbh) by diameter class (inches).
 Source: USDA Forest Inventory and Analysis data



Percentage change in the number of live trees by size class between 1996 and 2014.
 Source: USDA Forest Inventory and Analysis data 1996 and 2014.

"Where is basswood found in Wisconsin?"

Growing stock volume by region with map



About 64% of all basswood volume is located in northern Wisconsin with another one quarter in the central and southwest parts of the state.

About $\frac{2}{3}$ of basswood is found on the maple / beech / birch forest type and $\frac{1}{4}$ is found on the oak / hickory type.

Growing stock volume (million cft) by species and region of the state.

Species	Central	North east	North west	South east	South west	Total
Basswood	126	380	403	112	187	1,207
% of total	10%	31%	33%	9%	15%	100%

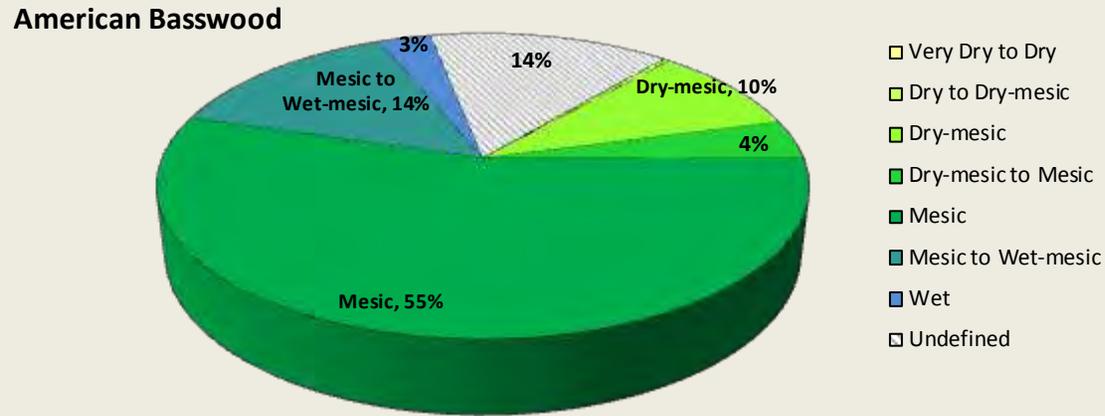
Source: USDA Forest Service, Forest Inventory and Analysis 2014

For a table of **Volume by County** go to:

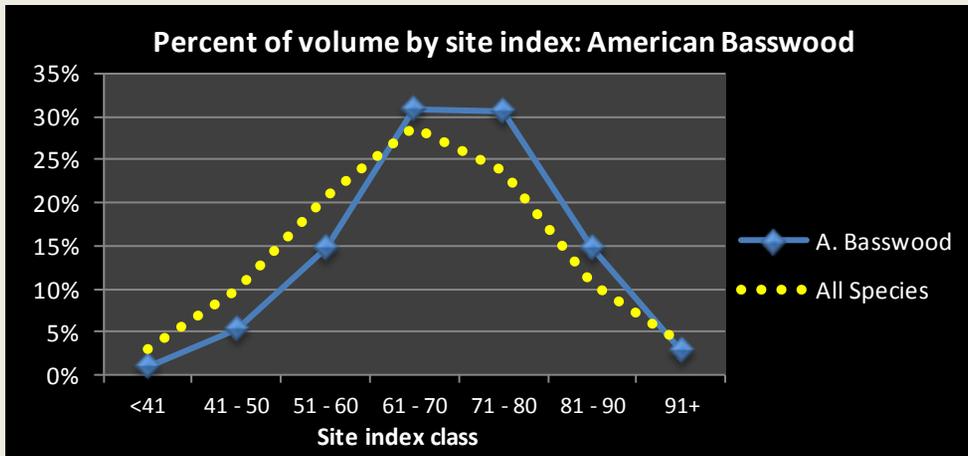
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/VolumeCountySpecies.pdf>

“What kind of sites does basswood grow on?”
Habitat type and site index distribution

The vast majority of basswood volume occurs on mesic and wetter habitat types. Only 10% of volume occurs on dry or dry-mesic sites.



Percent distribution of growing stock volume by habitat type group (USDA Forest Inventory & Analysis data 2014).



Percent distribution of growing stock volume by site index class (USDA Forest Inventory & Analysis data 2014).

The majority of basswood volume occurs on richer sites. Almost 80% is in stands with site indices over 60. As stated, basswood occurs mainly on the maple / beech / birch forest type which is more prevalent on higher site indices.

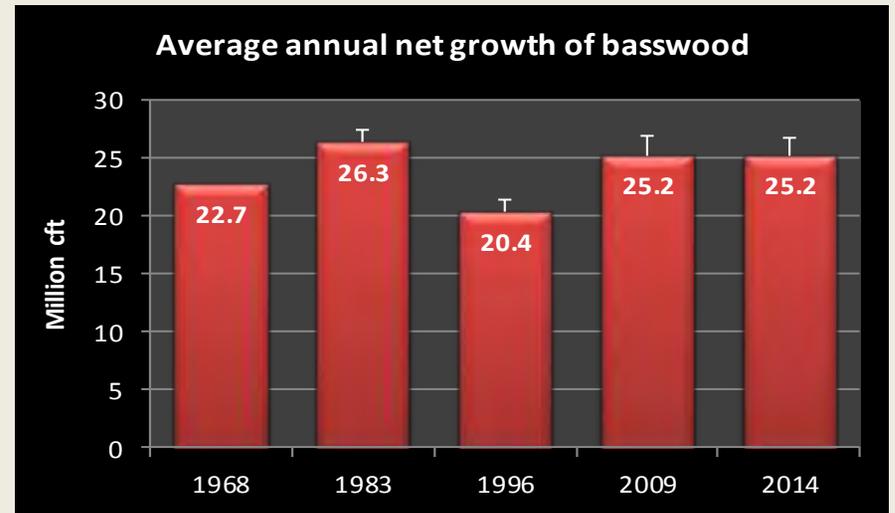
The average site index by volume for basswood is 69 compared to 66 for all species.



“How fast is basswood growing?”

Average annual net growth: trends and ratio of growth to volume

Average annual net growth, about 25.2 million cubic feet per year from 2009 to 2014, accounts for 4.4% of total statewide growth (chart on right). The growth rate has increased by 24% since 1996.



Average annual net growth (million cubic feet).
Source: USDA Forest Inventory & Analysis data

Average annual net growth (million cft/year) and ratio of growth to volume by region of the state.

Region	Net growth	Percent of total	Ratio of growth to volume
Northeast	7.3	29%	1.9%
Northwest	7.5	30%	1.8%
Central	2.6	10%	2.0%
Southwest	4.0	16%	2.2%
Southeast	3.9	15%	3.5%
Statewide	25.2	100%	2.1%

Source: USDA Forest Inventory and Analysis 2014

The highest volume growth for basswood is in the northern part of the state but the highest rates of growth to volume are in southern Wisconsin.

The average ratio of net growth to volume for basswood is 2.1%, **lower than the statewide average** of 2.7% for all species.

For a table of **Average annual growth, mortality and removals by region** go to:
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>

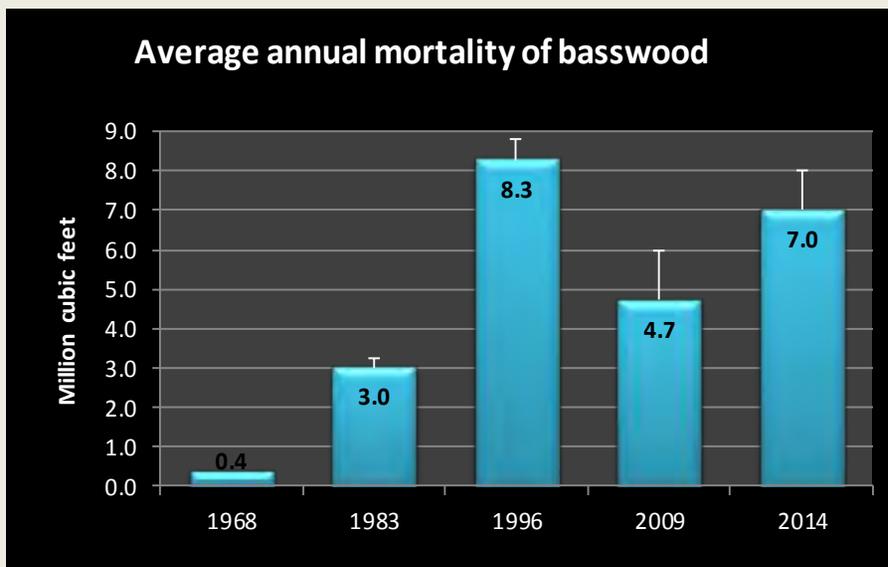


“How healthy is basswood in Wisconsin?”

Average annual mortality: trends and ratio of mortality to growth

Average annual mortality of basswood from 2009 to 2014 was about 7.0 million cubic feet, or 3% of statewide mortality (chart on right). This rate has decreased since 1996 but sampling error is high.

The ratio of mortality to [gross growth](#) is about 21.8% for basswood. This is **significantly lower than the average** for all species in Wisconsin which is 28.8%.



Average annual mortality (million cubic feet) by inventory year.
Source: USDA Forest Inventory & Analysis data

Mortality, gross growth, and the ratio of mortality to gross growth.

Species	Average annual mortality (cft)	Average annual gross growth (cft)	Mortality / growth
American Basswood	7,014,592	32,188,218	21.8%

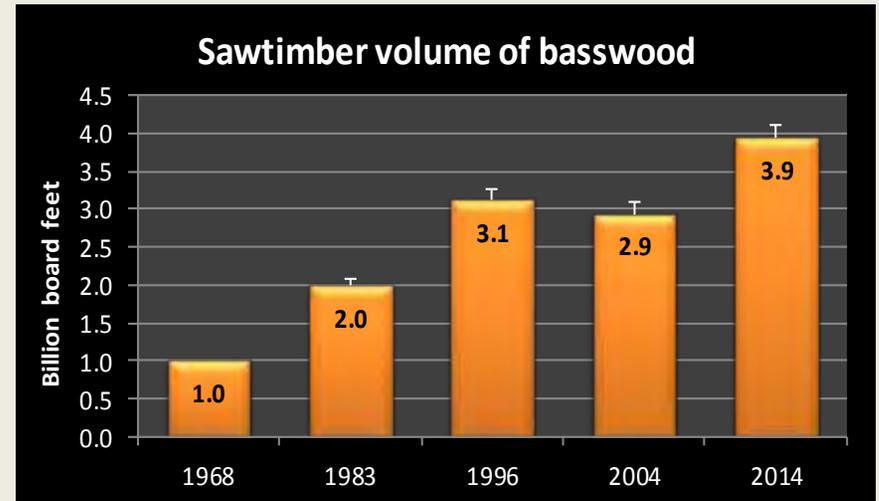
For a table of **Average annual growth, mortality and removals by region** go to:
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“How much basswood sawtimber do we have?”

Volume by grade and region

There were over 3.9 billion board feet of basswood sawtimber in 2014 (chart on right). This represents about 5.9% of total sawtimber volume in the state.

The volume of basswood sawtimber has doubled since 1983 and increased 34% since 2004.

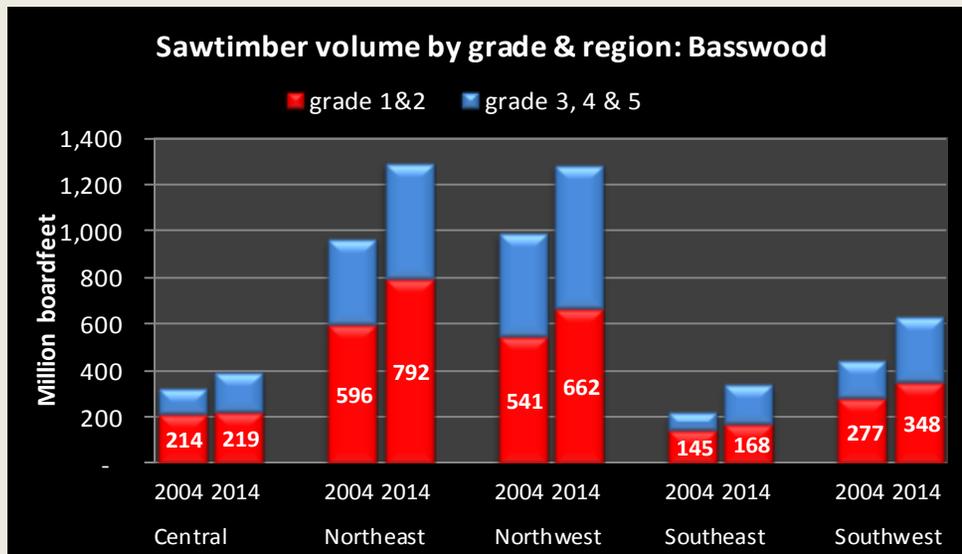


Sawtimber volume on timberland (million boardfeet) by inventory year.

Source: USDA Forest Inventory & Analysis data

The volume of basswood sawtimber has increased in every region of the state (chart on left).

The majority (56%) of basswood volume is classified as high grade sawtimber (grades 1 and 2). The volume of low grade timber (grades 3, 4 and 5) has increased about 44% between 2004 and 2014 while high grade basswood sawtimber has increased by 22%.



Sawtimber volume on timberland (million boardfeet) by grade and region of the state .

Source: USDA Forest Inventory & Analysis data

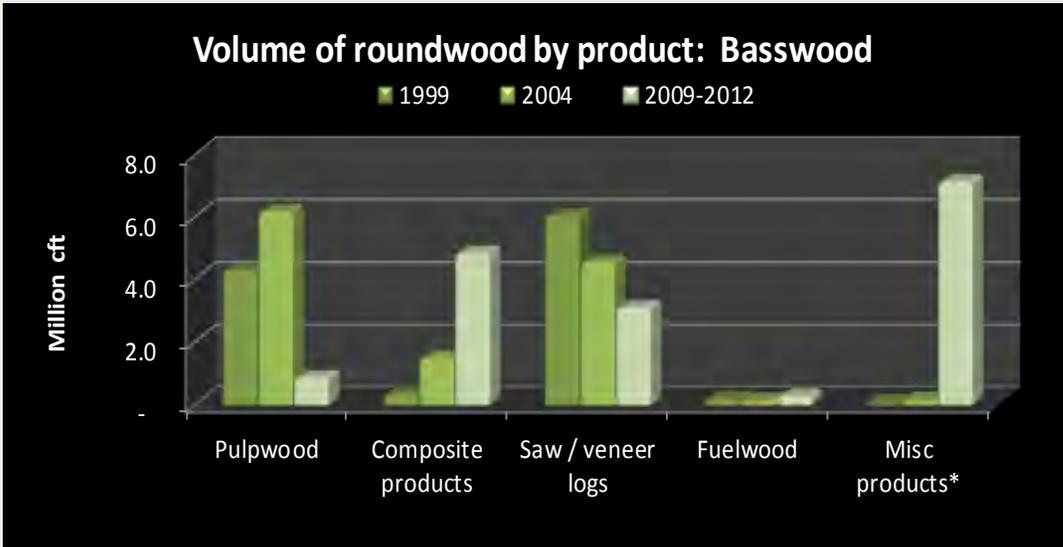


“How much basswood do we harvest?”

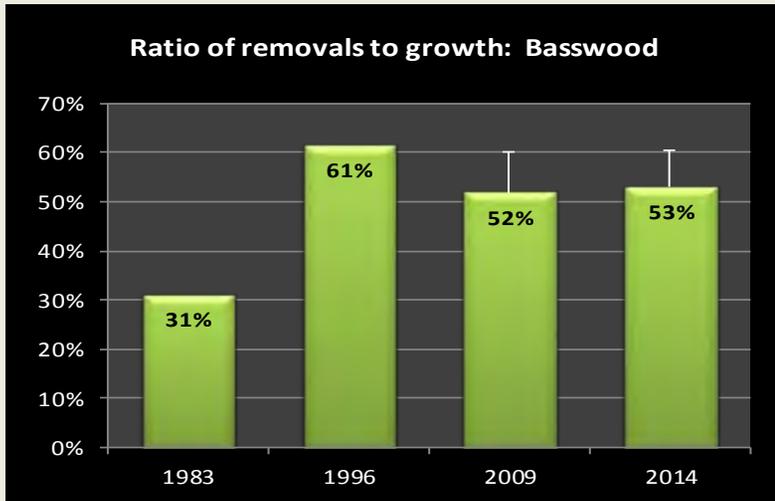
Roundwood production by product and ratio of removals to growth

In 2009-2012, Wisconsin produced about 16.3 million cubic feet of basswood roundwood, or about 4.2% of the total statewide (chart on right). Poles, posts and pilings accounted for almost 44%.

Basswood pulpwood made up only 0.5% of statewide production and sawlogs and veneer accounted for 3.9% in 2009.



Volume of roundwood products. * Miscellaneous products include poles, posts, pilings and veneer. Recent numbers for pulpwood and composite products are from 2012. Other recent product data is from 2009. Source: Ronald Piva, USDA Forest Service, Northern Research Station, St. Paul MN



Ratio of volume harvested annually to net growth. Source: USDA Forest Inventory & Analysis data.

Removals of basswood totaled 13.4 million cubic feet per year from 2009 to 2014. Basswood accounts for 5.6% of growing stock volume and 4.3% of removals.

The ratio of removals to growth is 53% for basswood, equal to the statewide average ratio of 53.6% (chart on left).

For a table of **Average annual growth, mortality and removals by region** go to:
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>



“How much is basswood selling for?”
Prices for cordwood and sawtimber: trends

Due to the variability of timber prices from year to year and region to region, two methods of reporting prices are presented here: [Timber Mart North](#) (chart on right) and [weighted average stumpage prices](#) from Wisconsin Administrative Code Chapter NR 46 (table below).

Stumpage prices, both pulpwood and sawtimber (as reported in the Timber Mart North) have increased recently.

Average weighted stumpage values, as reported in Wisconsin administrative code, are lower than the statewide average for all products.



Average prices for cordwood and sawtimber (2014 dollars).
 Source: Timber Mart North, <http://timbermartnorth.com/>

Average weighted stumpage prices (adjusted for inflation to 2014 dollars) by year for Wisconsin.

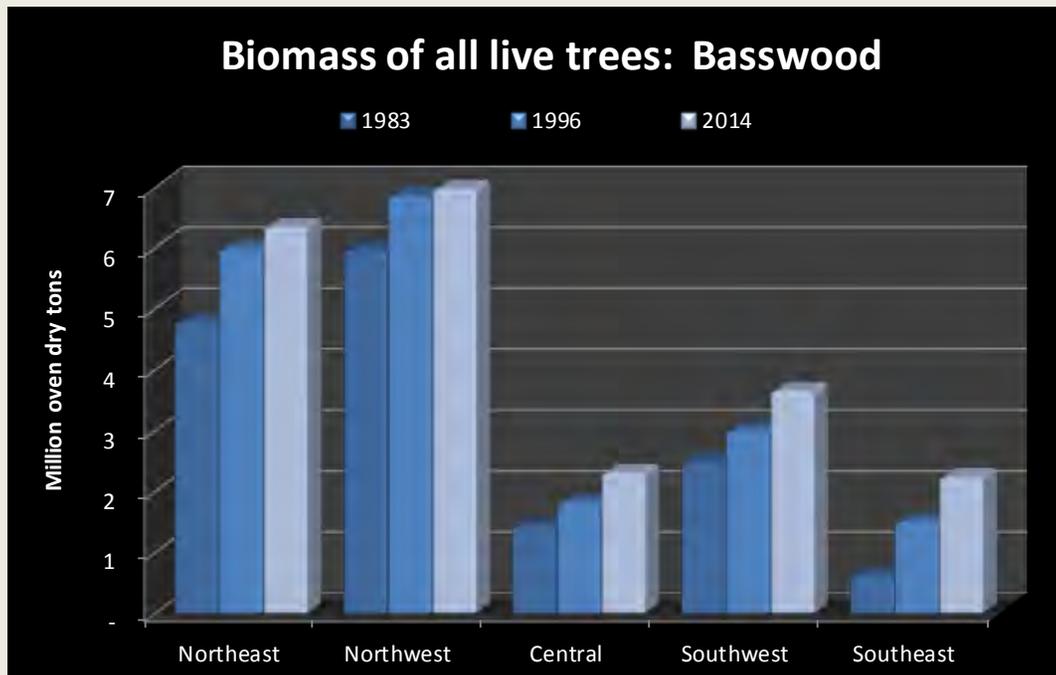
Product	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Average for all hardwoods
Cordwood (per cord)	\$6	\$7	\$8	\$8	\$9	\$7	\$10	\$8	\$8	\$8	\$20
Logs (per MBF)	\$175	\$190	\$179	\$138	\$134	\$138	\$141	\$125	\$137	\$139	\$268

Source: Wisconsin Administrative Code Chapter NR46,. The stumpage values calculated each year are for the sole purpose of assessing MFL yield and FCL severance taxes, not for determining the price that should be received for timber.



“How much basswood biomass do we have?”
Tons of aboveground biomass by region of the state

There were 21.4 million short tons of aboveground [biomass](#) in live basswood trees in 2014, up from about 15.2 million tons in 1983, an increase of 41%. This is equivalent to approximately 10.7 million tons of carbon and represents 3.4% of all aboveground biomass statewide. As with volume, most basswood is located in northern Wisconsin (chart below).



Biomass (above ground dry weight of live trees >1 in dbh, short tons) by year and region of the state.
 Source: USDA Forest Inventory & Analysis data

Basswood has one of the lowest density of any of the commercial species in Wisconsin, with a specific gravity of 0.37 and an average oven-dry weight of 23 pounds per cubic foot. The average specific gravity for all hardwoods is about 0.56 with an average weight of 34 lbs/cft. Approximately, 67% of all biomass is located in the bole, 18% in tops and limbs and 15% in bark.

For a table of **Biomass by County** go to:
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/BiomassByCounty.pdf>