

# Red maple

*Acer rubrum*

The volume of red maple has increased significantly since 1983. Red maple, like many other species groups, is aging. The volume in large trees has more than quadrupled in the last two decades. According to predictive models and using current mortality and removal rates, the volume of red maple could increase from 39% to 55% in the next forty years.

Along with volume, the rates of growth and mortality have also increased. But the ratio of mortality to volume for red maple is much lower than the average for all species. Whereas red maple makes up about 10.4% of volume and 12% of growth of trees in Wisconsin, it accounts for only 3.7% of total mortality.

Red maple is an important timber species, making up 9.7% of roundwood production and 11.6% of all biomass.

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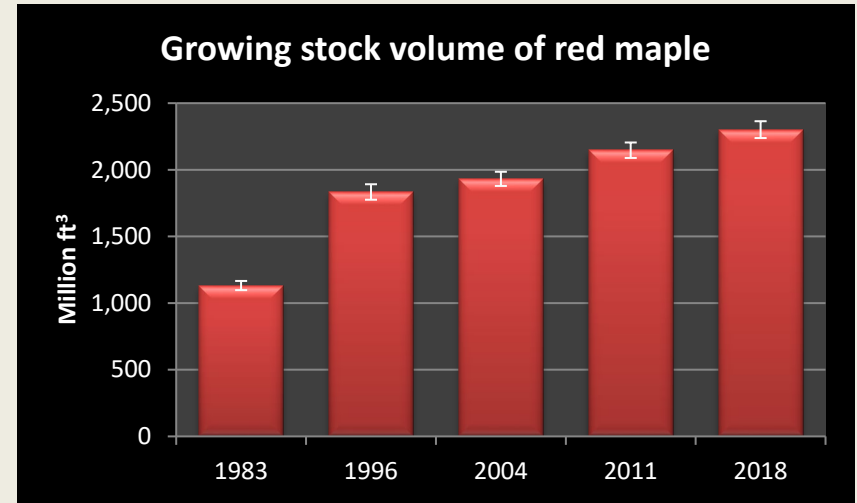
## *"How has the red maple resource changed?"*

### **Growing stock volume and diameter class distribution by year**

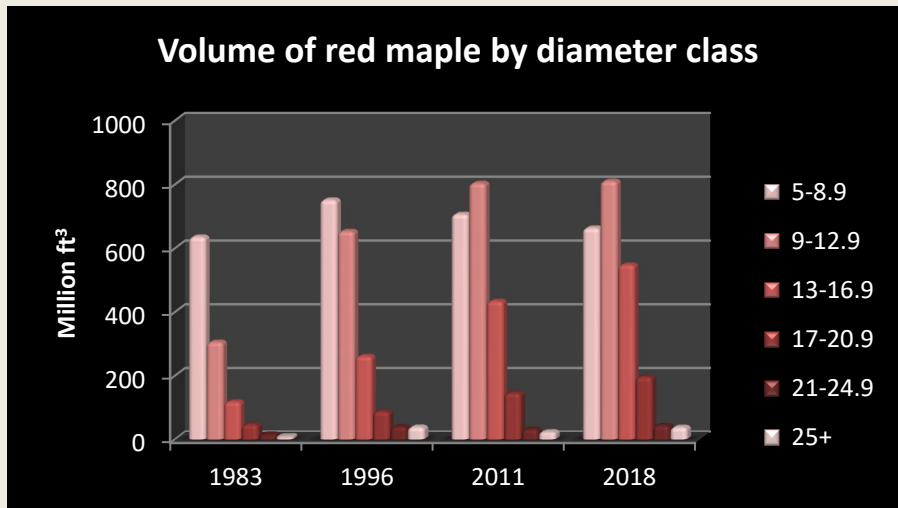
The [growing stock volume](#) of red maple in Wisconsin is approximately 2.3 billion cubic feet or about 10.4% of total statewide volume (chart on right). The volume of red maple is second only to sugar maple. Red maple volume has doubled since 1983 and continues to increase.

The red maple resource is increasing and maturing in Wisconsin (chart below left). The volume in small trees (5 to 13 inches) has increased 57% since 1983 but the volume in large trees (over 13 inches) has more than quadrupled in the same period.

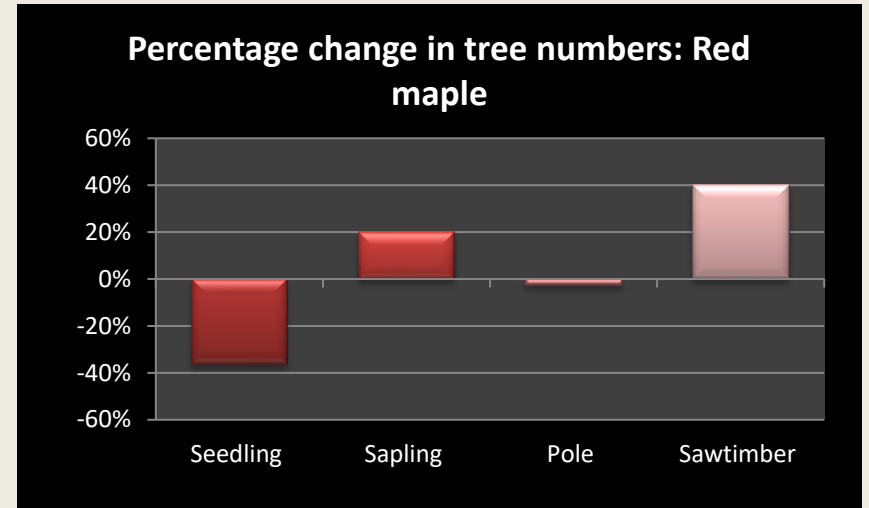
The number of red maple trees has increased substantially since 2004. Both the number of saplings and the number of sawtimber trees have increased but the number of pole-size trees has decreased very slightly (chart below right).



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



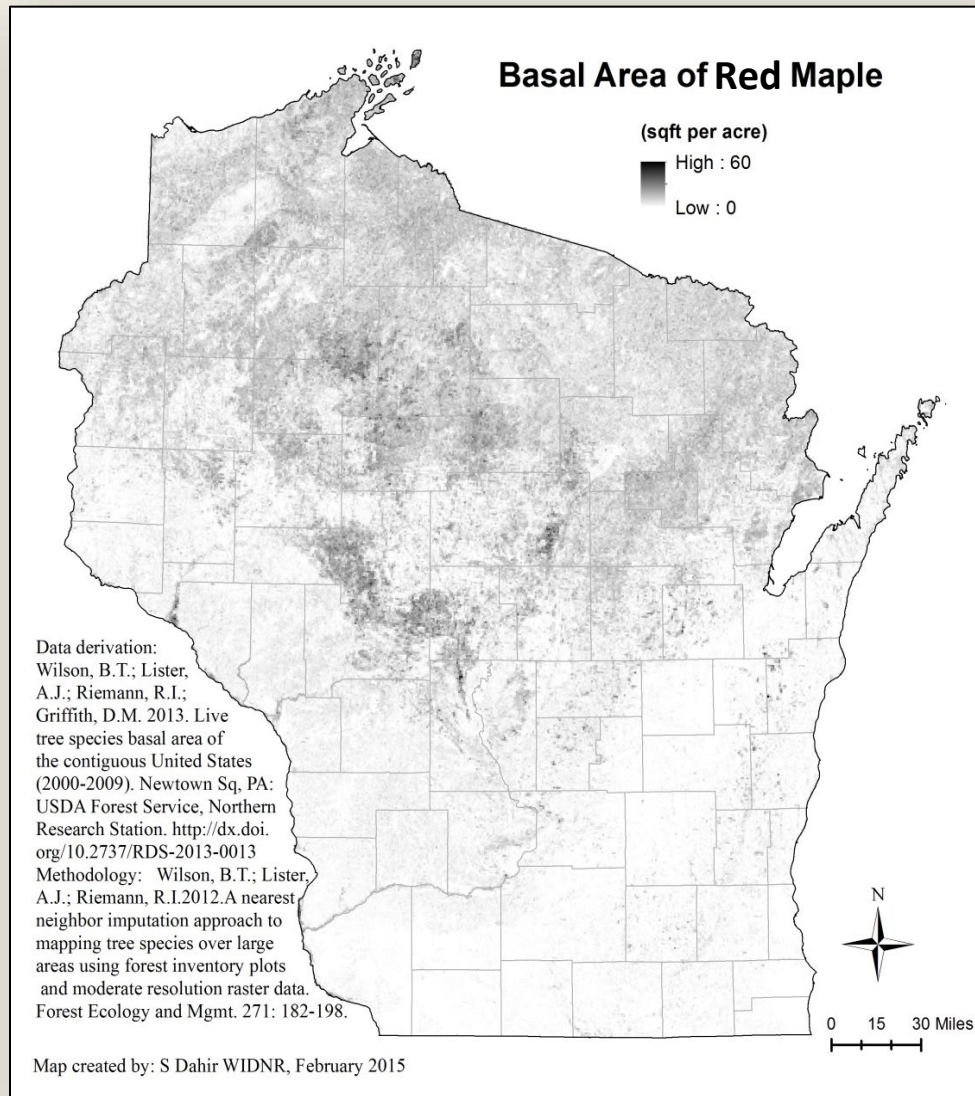
Growing stock volume (trees over 5 inches dbh) by diameter class (inches).  
Source: USDA Forest Inventory and Analysis data



Percentage change in the number of live trees by size class between 2004 and 2018.  
Source: USDA Forest Inventory and Analysis data 2004 and 2018.

## *"Where is red maple found in Wisconsin?"*

### Growing stock volume by region with map



The vast majority of red maple volume, 92%, is found in the northern and central parts of the state (Table 1).

In the south, most red maple volume occurs on the white oak / red oak / hickory, red maple / lowland and red maple / oak [forest types](#). In the north, most volume occurs on the sugar maple / beech / yellow birch, red maple / upland and aspen forest types.

Table 1. Growing stock volume (million ft<sup>3</sup>) by species and region of the state.

| Species          | Central | North east | North west | South east | South west | Total |
|------------------|---------|------------|------------|------------|------------|-------|
| Red Maple        | 639     | 622        | 841        | 99         | 100        | 2,202 |
| Percent of total | 28%     | 27%        | 37%        | 4%         | 4%         | 100%  |

Source: USDA Forest Service, Forest Inventory and Analysis

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

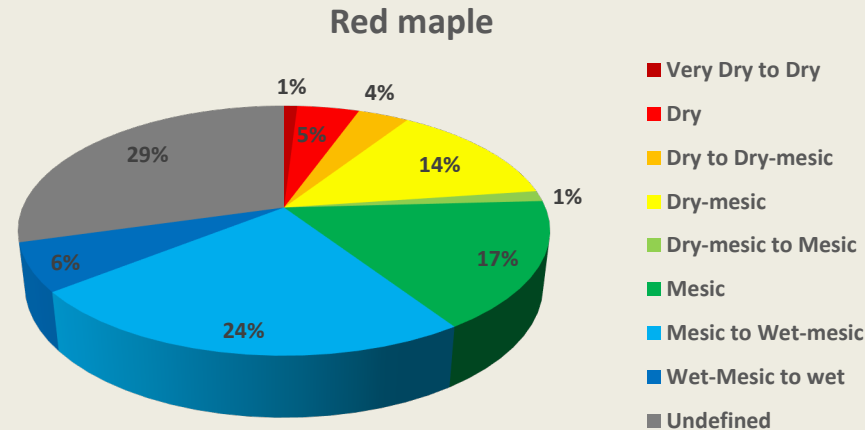
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/VolumeCountySpecies.pdf>



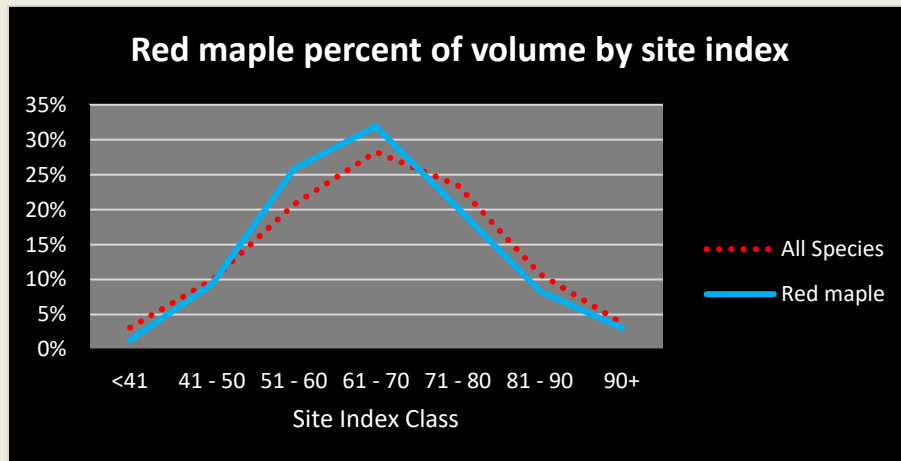
## *“What kind of sites does red maple grow on?”*

### Habitat type<sup>1</sup> and site index distribution

Red maple volume occurs most frequently on mesic, mesic to wet-mesic and wet habitat types, but this species also occurs on very dry to dry as well as dry to dry-mesic sites. Red maple can thrive in a broad range of sites types and soils.



Percent distribution of growing stock volume by habitat type group<sup>1</sup> (USDA Forest Inventory & Analysis data).



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

Red maple tends to occur on a slightly below average range of site indices (chart on left). The average site index by volume for red maple is 65, compared to the average for all species, 66.

<sup>1</sup> For more information on habitat types see Schmidt, Thomas L. 1997. Wisconsin forest statistics, 1996. Resource Bulletin NC-183. St. Paul, MN: U.S. Dept. of Agriculture, Forest Service, North Central



*"How fast is red maple growing?"*

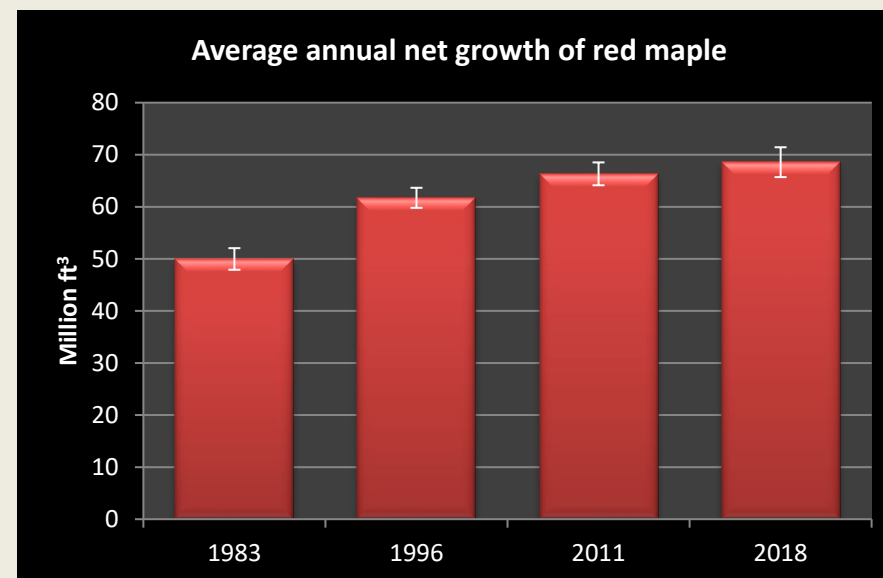
### Average annual net growth and the ratio of growth to volume

Average annual net growth of red maple is about 68.6 million cubic feet/year, representing 12% of statewide volume growth (chart on right). Growth has increased 37% since 1983 and 11% since 1996.

Table 2. Average annual net growth (million ft<sup>3</sup>/year) of growing stock and the ratio of growth to volume by region of the state.

| Region    | Net growth | Percent of Total | Ratio of growth to volume |
|-----------|------------|------------------|---------------------------|
| Northeast | 17.2       | 25%              | 2.8%                      |
| Northwest | 21.8       | 32%              | 2.6%                      |
| Central   | 21.6       | 31%              | 3.4%                      |
| Southwest | 4.5        | 7%               | 4.5%                      |
| Southeast | 3.6        | 5%               | 3.6%                      |
| Statewide | 68.6       | 100%             | 3.0%                      |

Source: USDA Forest Inventory and Analysis



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

The highest volume growth for red maple occurs in central and northern Wisconsin but the highest growth to volume ratio occurs in the southwest part of the state (Table 2).

The average statewide ratio of net growth to volume for red maple is 3.0%, slightly higher than the statewide average of 2.6% 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>



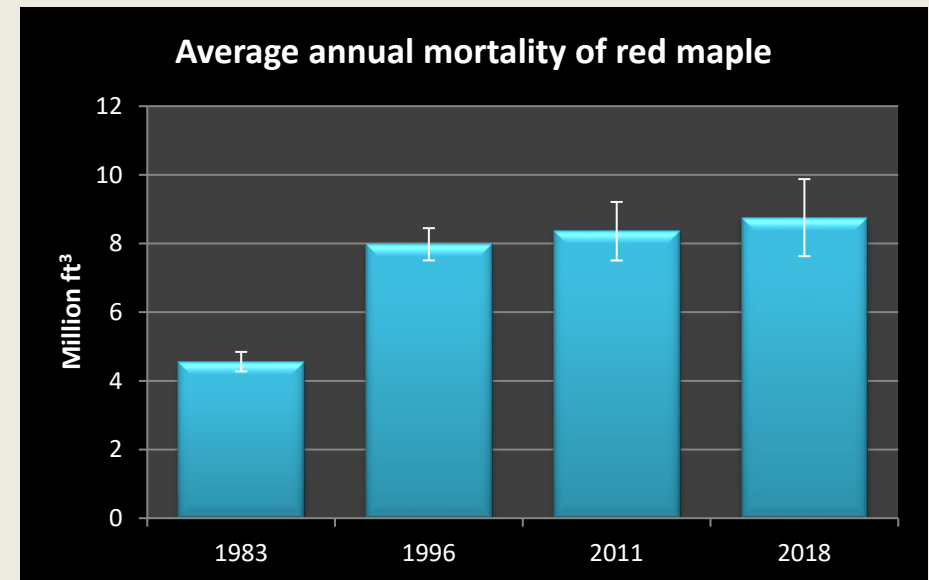


*"How healthy is red maple in Wisconsin?"*

### Average annual mortality: trends and the ratio of mortality to volume

Average annual mortality of red maple, about 8.8 million cubic feet per year from 2012 to 2018, has increased 92% since 1983 but has remained statistically unchanged since 1996 (chart on right). Red maple accounts for about 10.4% of total growing stock volume in the state but only 3.7% of total mortality.

The ratio of mortality to volume is 0.4% for red maple, much lower than the statewide average of 1.1% (Table 3).



Average annual mortality (million cubic feet) by inventory year.

Source: USDA Forest Inventory & Analysis data

Table 3. Mortality, volume and the ratio of mortality to volume.

| Species   | Average annual mortality (ft <sup>3</sup> ) | Growing stock volume (ft <sup>3</sup> ) | Mortality / volume |
|-----------|---|---|--------------------|
| Red Maple | 8,753,296                                   | 2,301,591,468                           | 0.4%               |

Source: USDA Forest Inventory & Analysis data

For a table of **Average annual growth, mortality and removals by region** go to:

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

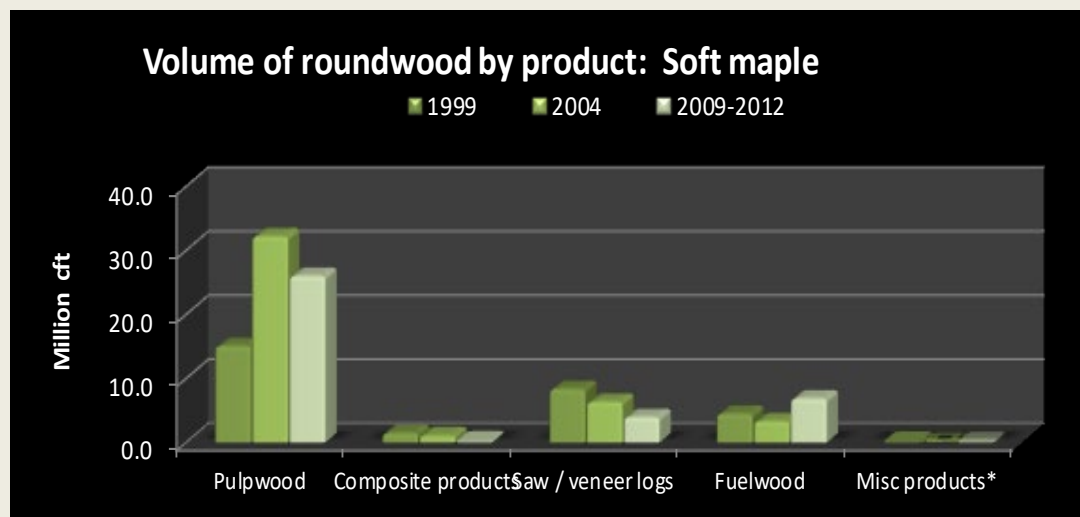


*"How much red maple do we harvest?"*

## Roundwood production and the ratio of growth to removals

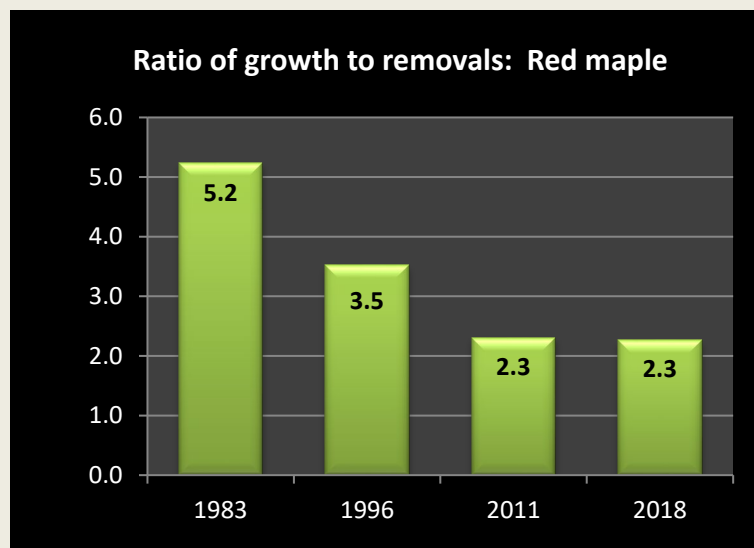
In 2009-2012, red maple accounted for 37.1 million cubic feet or about 9.7% of Wisconsin's total [roundwood](#), down 14% from 2004 (chart on right). Pulpwood accounts for 70% of red maple roundwood and 15.3% of total statewide pulpwood production. Sawlogs and veneer make up 11% and fuelwood 19%.

From 2004 to 2012, pulpwood production decreased by 19%. Only fuelwood has increased.



Volume of roundwood. Most recent figures for pulpwood and composite products are from 2012 while other product volumes are from 2009. \* Miscellaneous products include poles, posts and pilings.

Source: Ronald Piva, USDA Forest Service, Northern Research Station, St. Paul MN



Source: USDA Forest Inventory & Analysis data.

Removals of red maple were 30.2 million cubic feet per year from 2012 to 2018 or 10.3% of total removals.

The ratio of growth to removals for red maple is 2.3, higher than the average of 1.7 for all species in the state (chart on left). Growth has increased since 1996 but not as much as removals which have almost doubled.

For a table of **Average annual growth, mortality and removals by region** go to:

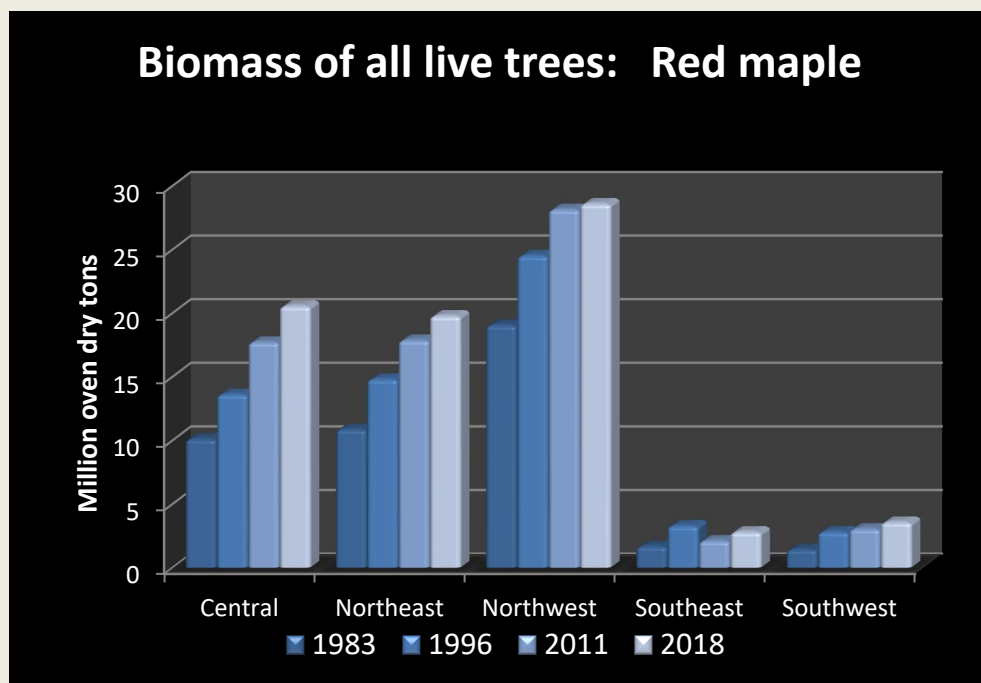
<http://dnr.wi.gov/topic/ForestBusinesses/documents/tables/GrowthMortalityRemovals.pdf>



## *"How much red maple biomass do we have?"*

### Aboveground biomass by region of the state

There were 75.4 million short tons of aboveground [biomass](#) in live red maple trees in 2018, an increase of 74% since 1983. This is equivalent to approximately 37.7 million tons of carbon and represents 11.6% of all aboveground biomass statewide. As with volume, most red maple is located in central and 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

The density of red maple wood is slightly lower than average for hardwoods with a ratio of biomass to volume of 34 oven-dry lbs. per cubic foot (ODP/ft<sup>3</sup>). The average for all hardwoods is about 36 ODP/cubic feet and for all species is 33 ODP/cubic feet.

Approximately, 65% of all red maple biomass is located in the main stem, 12% in saplings, 4% in stumps, and 22% in the branches.

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

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

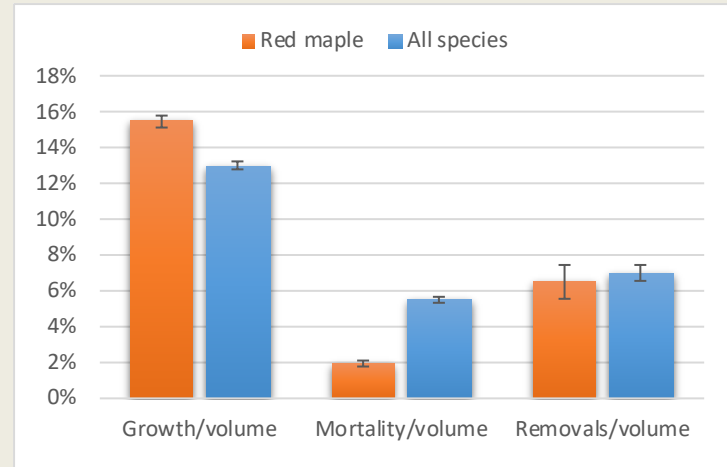


## *"Can we predict the future of red maple?"*

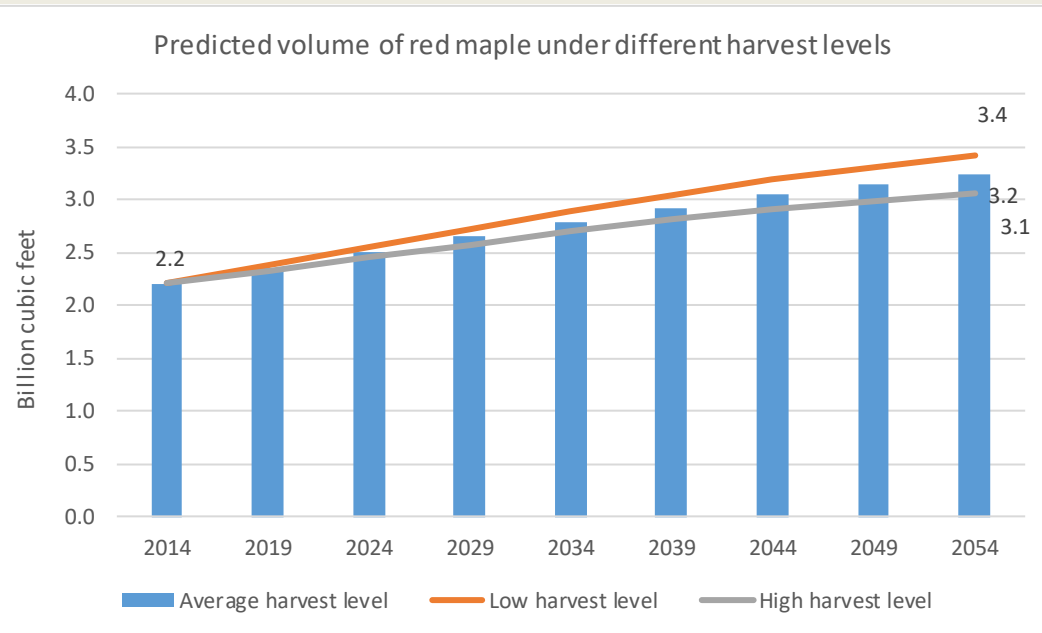
### Predicted volumes based on current rates of mortality and harvest

The 5-year ratio of growth to volume is significantly higher and the ratio of mortality to volume significantly lower for red maple compared to all species in the state (chart on right). These two trends could indicate an increase in the volume of red maple in the future.

The Forest Vegetation Simulator (FVS<sup>1</sup>) was used to predict future volumes of red maple through 2054. Three scenarios are forecast. One with current rates of mortality and removals (i.e. average annual mortality and removals for 2009 to 2014). Another with current mortality rates and the lower 67% confidence interval for current removals and another with the upper 67% confidence interval for removals.



Five-year ratios of mortality, removals and growth to volume.  
Source: USDA Forest Inventory & Analysis data



As expected, by 2054 volume increases in all three scenarios, 47% for current removal levels, 55% for low removals and 39% for high removals. If volume or removals were to increase substantially over current levels, these predictions would certainly change.