

Northern white-cedar

Thuja occidentalis



Northern white-cedar is a slow-growing species found mainly on wetter sites in northern Wisconsin. The volume of northern white-cedar has increased 48% since 1983. This species is maturing with an increase in the number of sawtimber trees and a decrease in the number of saplings and poles. Mortality rates and the rate of removals to growth are very low for this species.

Northern white-cedar is not an important timber species, accounting for only 0.1% of roundwood production. Currently, we harvest only 11% of total growth. The density of northern white-cedar wood is the lowest of all tree species which makes it less desirable for biofuel production.

- [How has the northern white-cedar resource changed?](#)
Growing stock volume and diameter class distribution
- [Where does northern white-cedar grow in Wisconsin?](#)
Growing stock volume by region with map
- [How fast is northern white-cedar growing?](#)
Average annual net growth; trends and ratio of growth to volume
- [How healthy is northern white-cedar in Wisconsin?](#)
Average annual mortality: trends and ratio of mortality to growth
- [How much northern white-cedar do we harvest?](#)
Roundwood production by product and ratio of removals to growth
- [How much is northern white-cedar selling for?](#)
Prices for cordwood and sawtimber: trends
- [How much northern white-cedar biomass do we have?](#)
Tons of aboveground biomass by region of the state

"How has the northern white-cedar resource changed?"

Growing stock volume and diameter class distribution

The [growing stock volume](#) of northern white-cedar in 2013 was about 697 million cubic feet or about 3.3% of total statewide volume (Chart 1). Volume increased 48% since 1983 but and 13% since 1996.

The northern white-cedar resource has aged. For instance, the volume in small trees (5-12.9 inches in diameter) has increased 30% but the volume in large trees (13+ inches) has more than doubled since 1983 (Chart 2).

This aging is also reflected in the number of trees by size class. The number of [sawtimber-sized](#) trees has increased significantly since 1996 (Chart 3) while the number of saplings and poles has decreased. This may suggest a decrease in future populations.

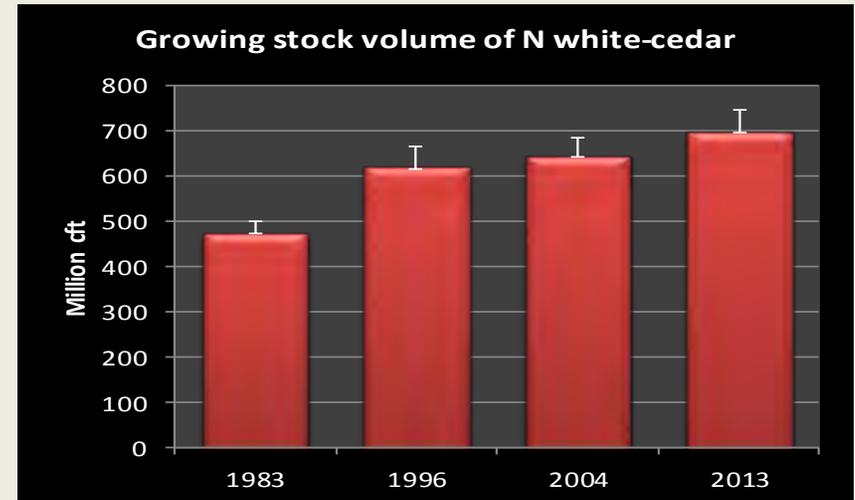


Chart 1. Growing stock volume (million cubic feet) by inventory year.
Source: USDA Forest Inventory and Analysis data

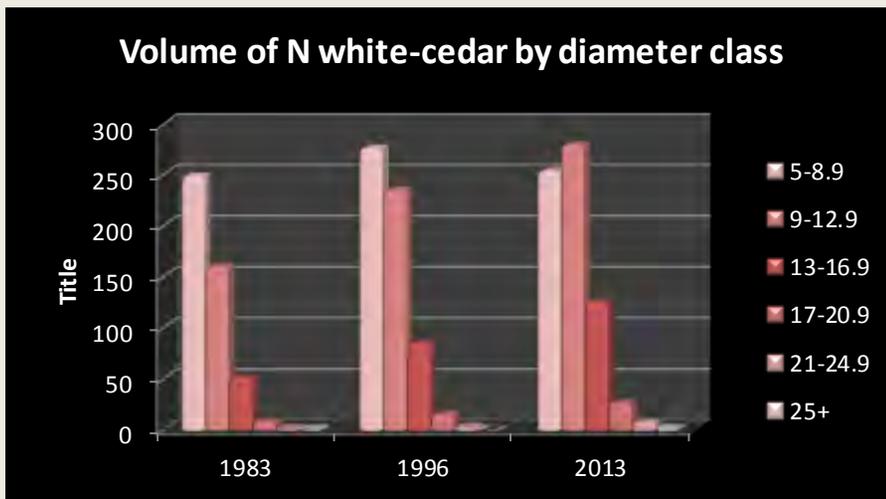


Chart 2. Growing stock volume (trees over 5 inches dbh) by diameter class (inches).
Source: USDA Forest Inventory and Analysis data

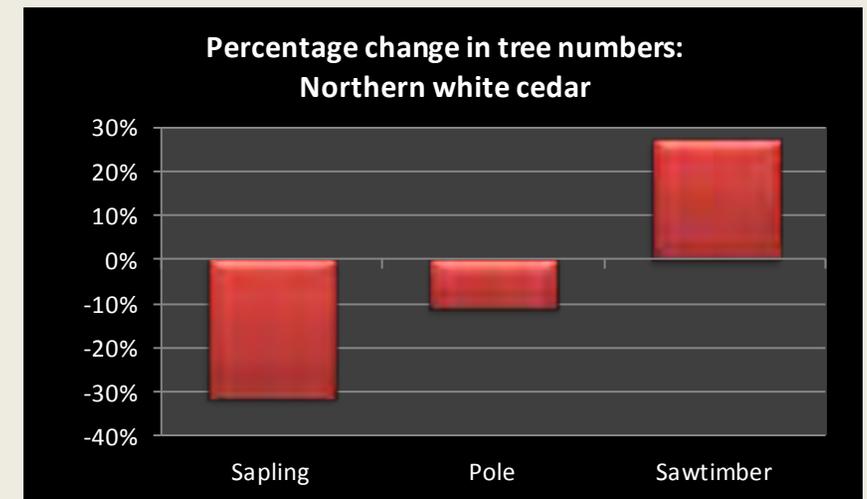
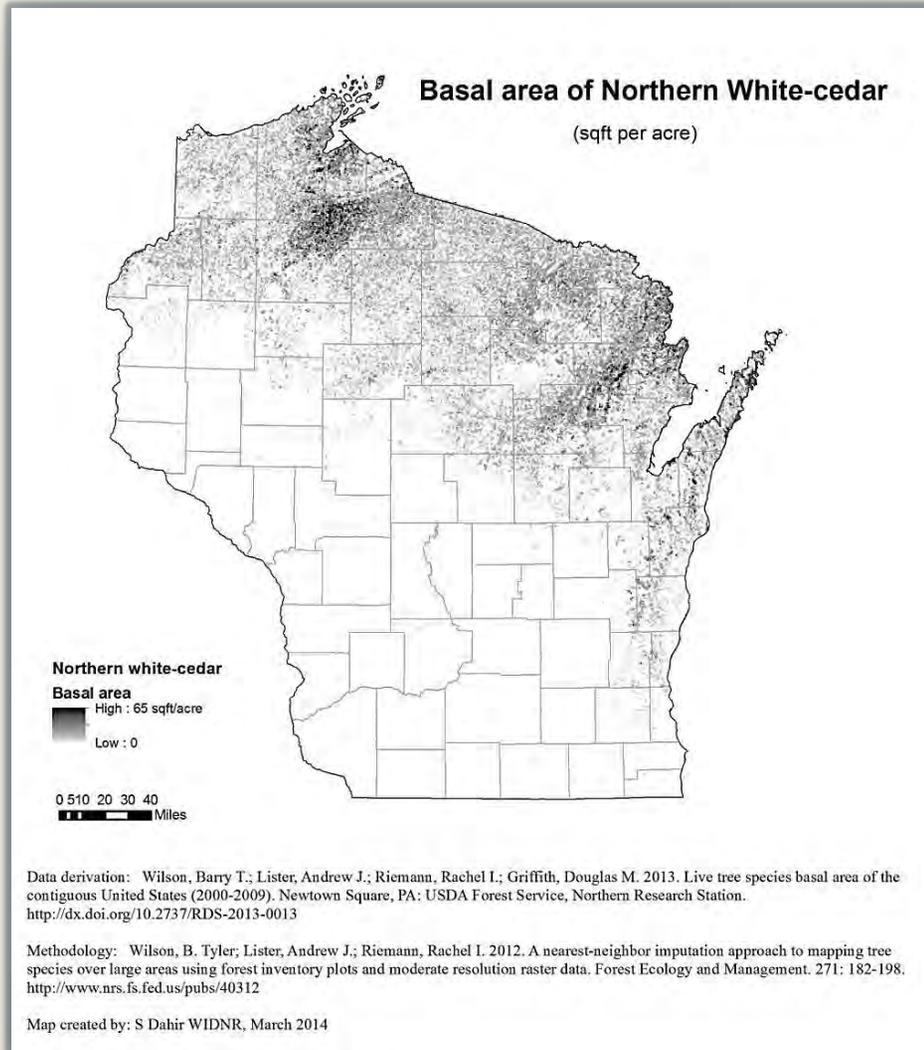


Chart 3. Percentage change in the number of live trees by size class between 1996 and 2013.
Source: USDA Forest Inventory and Analysis data 1996 and 2013.

“Where does northern white-cedar grow in Wisconsin?”

Growing stock volume by region with map



Three quarters of northern white-cedar volume is located in northern Wisconsin with 20% in the southeast.

Most northern white-cedar volume is located on mesic to wet-mesic and wet-mesic to wet habitat types.

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

Species	Central	North east	North west	South east	South west	Total
N white-cedar	37	350	170	140	-	697
% of total	5%	50%	24%	20%	0%	100%

Source: USDA Forest Service, Forest Inventory and Analysis 2013 data

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

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



“How fast is northern white-cedar growing?”
Average annual net growth and ratio of growth to volume

Average annual net growth of northern white cedar was about 14.8 million cubic feet per year from 2009 to 2013 and accounts for 2.6% of total statewide growth (Chart 4). The growth rate has increased by 45% since 1996.

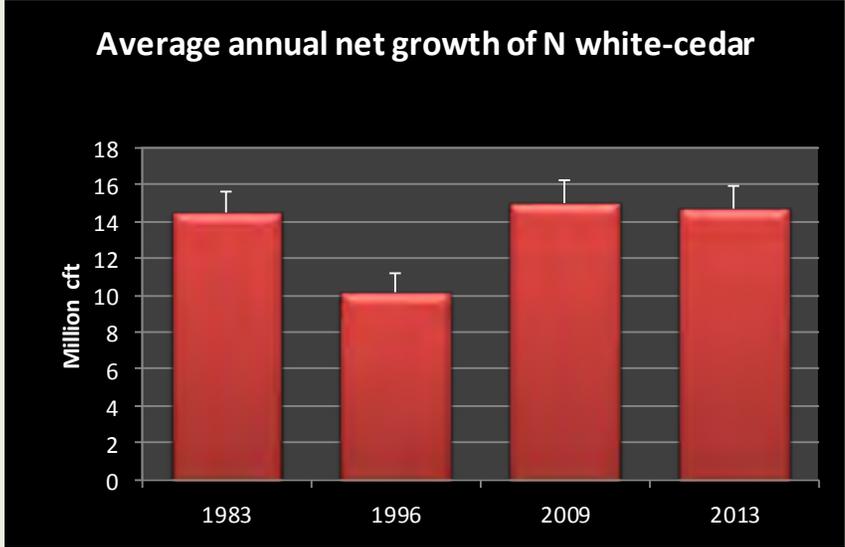


Chart 4. Average annual net growth (million cubic feet).
 Source: USDA Forest Inventory & Analysis data

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

Region	Net growth	Percent of Total	Ratio of growth to volume
Northeast	6.9	47%	2.0%
Northwest	3.4	23%	2.0%
Central	1.0	7%	2.6%
Southwest	0.0	0%	
Southeast	3.5	24%	2.5%
Statewide	14.8	100%	2.1%

Source: USDA Forest Inventory and Analysis 2013.

The highest volume growth for northern white-cedar is in the northeast region of the state but the highest rates of growth to volume are in central and southeast Wisconsin.

The average ratio of net growth to volume for northern white-cedar is 2.1%, **lower 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 northern white-cedar in Wisconsin?”
Average annual mortality and the ratio of mortality to growth

Average annual mortality of northern white-cedar from 2009 to 2013 was about 1.6 million cubic feet, or 0.7% of statewide mortality (Chart 5). Mortality has decreased significantly since 1996.

The ratio of mortality to [gross growth](#) is about 10.0% for northern white-cedar. This is **significantly lower than the average** for all species in Wisconsin which is 29.2%.

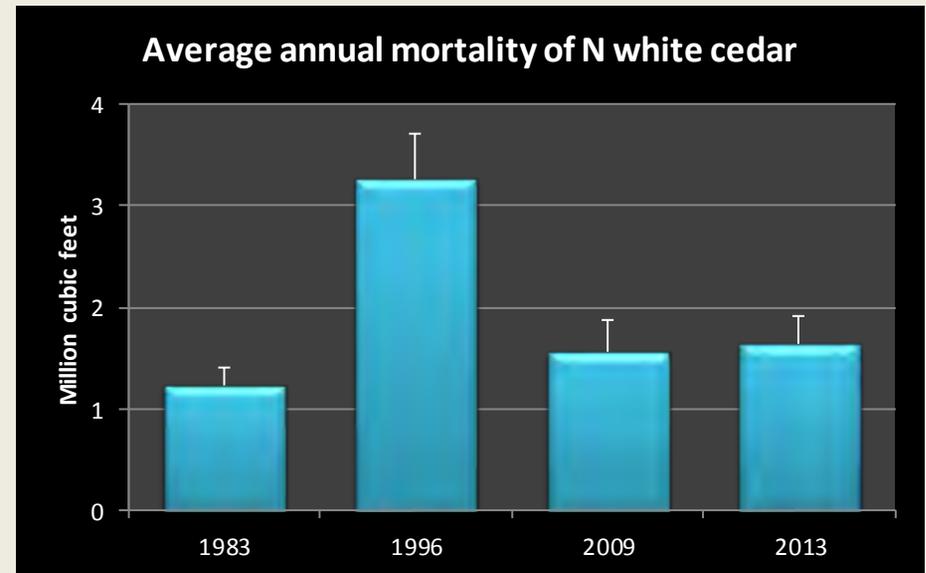


Chart 5. Average annual mortality (million cubic feet) by inventory year.
 Source: USDA Forest Inventory & Analysis data

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

Species	Average annual mortality (cft)	Average annual gross growth (cft)	Mortality / growth
Northern white-cedar	1,637,723	16,389,742	10.0%

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 northern white-cedar do we harvest?”
Roundwood production and the ratio of removals to growth

In 2009, Wisconsin produced about 275,000 cubic feet of cedar roundwood, or about 0.1% of the total harvest (Chart 6). Cedar roundwood production has decreased 86% since 2004.

Cedar is used mostly for miscellaneous products such as poles, posts and pilings.



Chart 6. Volume of roundwood products. * Miscellaneous products include poles, posts and pilings.
 Source: Ronald Piva, USDA Forest Service, Northern Research Station, St. Paul MN

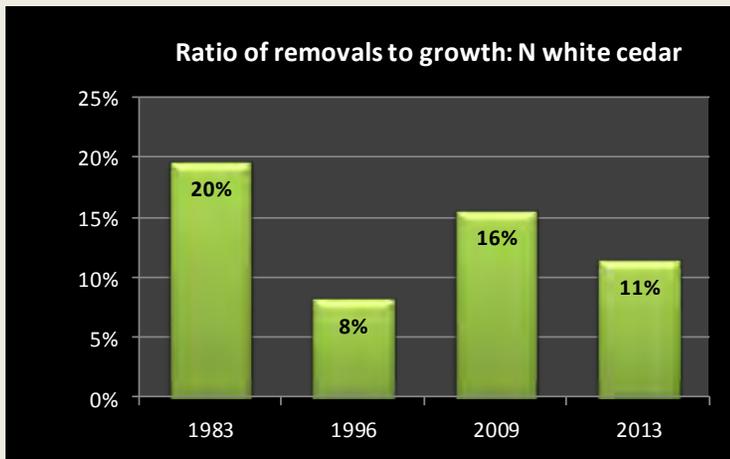


Chart 7. Ratio of volume harvested annually to net growth.
 Source: USDA Forest Inventory & Analysis data

The ratio of removals to growth is 11% for northern white-cedar, much lower than the statewide average ratio of 56.3% (Chart 7). Whereas northern white-cedar accounts for 3.3% of growing stock volume in the state, it makes up only 0.7% of removals.

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 northern white-cedar 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](#) and [weighted average stumpage prices](#) from Wisconsin Administrative Code Chapter NR 46.

Prices for northern white-cedar pulpwood, as reported in the Timber Mart North (Chart 8), have been increasing especially in 2014.

Average weighted stumpage values for cordwood and sawlogs, as reported in Wisconsin administrative code, have fallen since 2006-2007.



Chart 8. Average prices for cordwood and sawtimber (2014 dollars).
 Source: Timber Mart North, <http://timbermartnorth.com/> accessed December 2014

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

Product	2002	2003	2004	2005	2006	2007	2008	2010	2011	2013	Average for all conifers
Cordwood (per cord)	\$31	\$38	\$24	\$35	\$37	\$34	NA	\$10	\$14	\$10	\$24
Logs (per MBF)	\$99	\$102	\$101	\$93	\$206	\$415	\$97	\$93	\$106	\$94	\$89

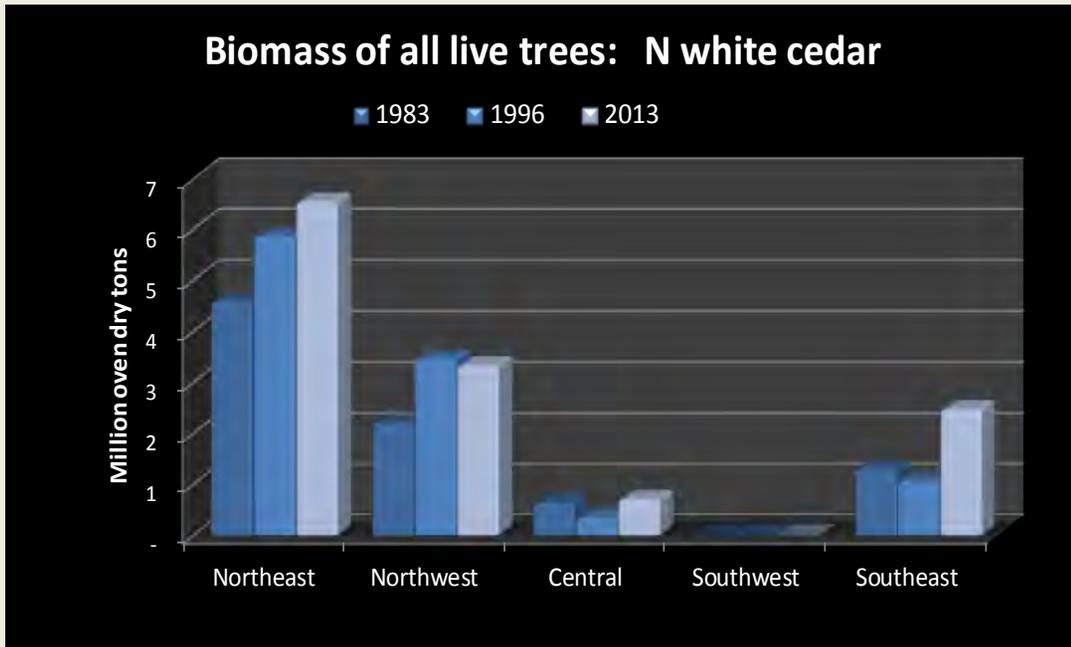
Source: Wisconsin Administrative Code Chapter NR46, 2002 to 2013. The stumpage values calculated each year are for the sole purpose of assessing MFL yield and FCL severance taxes, not for determining the price that should be received for timber.



“How much northern white-cedar biomass do we have?”

Tons of aboveground biomass by region of the state

There were 13.0 million short tons of aboveground [biomass](#) in live northern white-cedar trees in 2013, an increase of 50% since 1983. This is equivalent to approximately 6.5 million tons of carbon and represents 2.1% of all aboveground biomass statewide. As with volume, most northern white-cedar is located in northern Wisconsin (Chart 9).



Northern white-cedar has the lowest density of any of the commercial tree species in Wisconsin, with a ratio of biomass to volume of 22 oven-dry lbs. per cubic foot. The average for all softwoods is about 26 ODP/cubic feet and for all species is 33 ODP/cubic feet. Approximately, 74% of biomass is located in the bole and 13% in the top branches.

Chart 9. 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

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

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