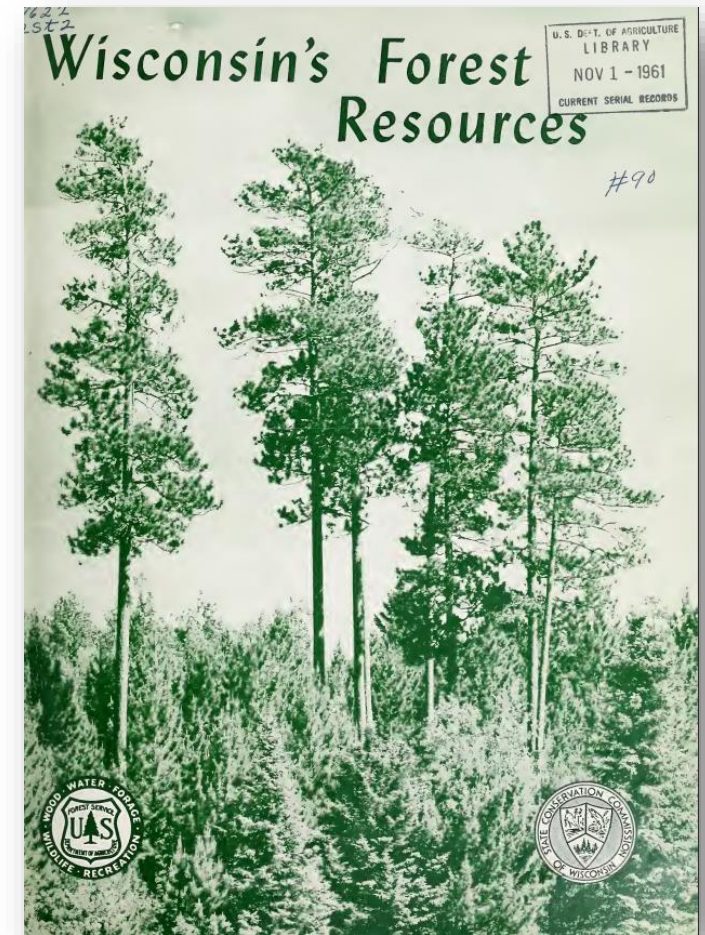
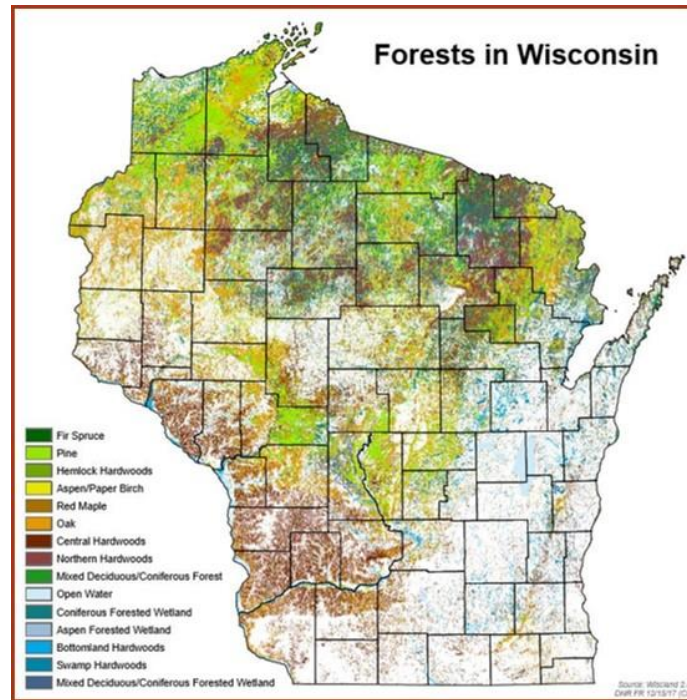


# Measuring Wisconsin's Forest Resources



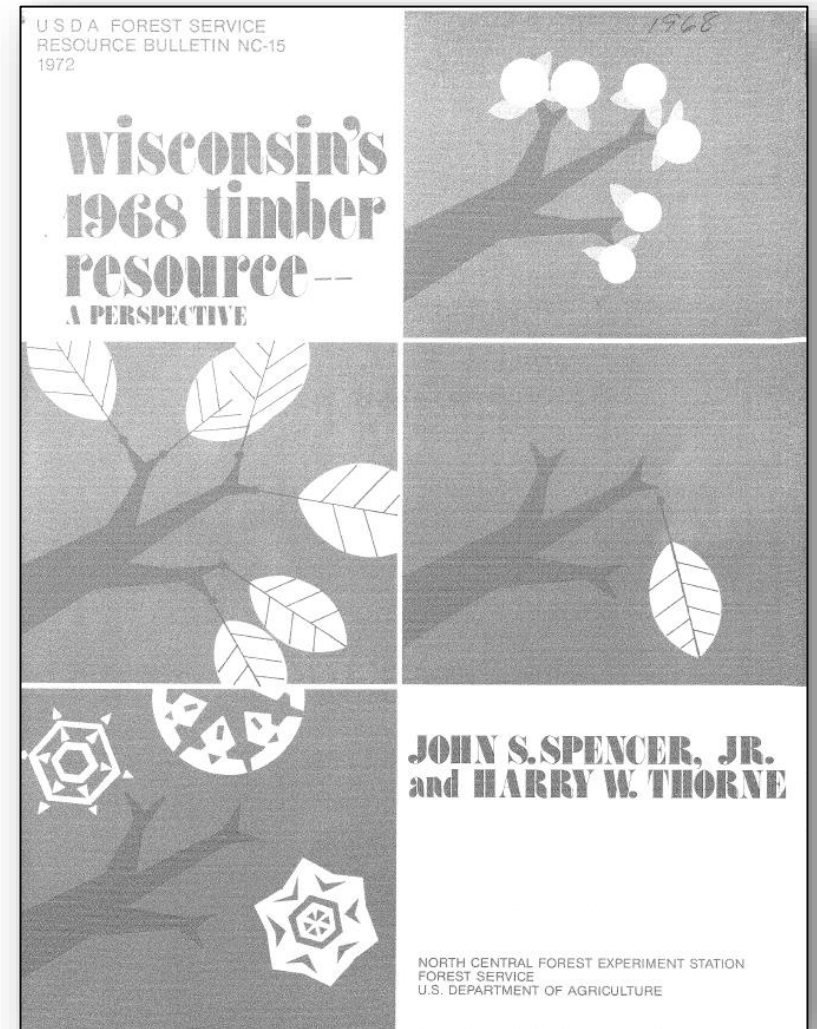
**Sustainable Forestry  
Conference**

**Florence, WI April 2024**

Ryan Heiderman, Forest Inventory  
Analyst

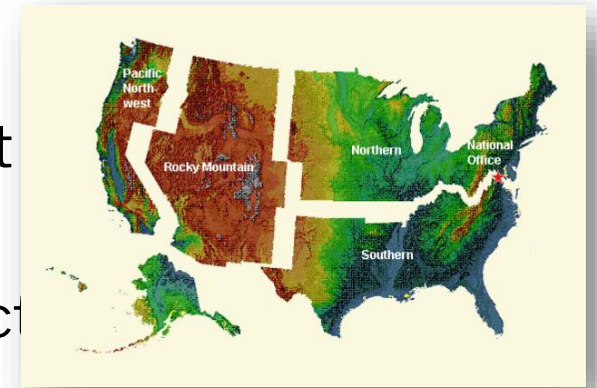
# Forest Inventory & Analysis (FIA) History

- 1897 – The Organic Administration Act
  - Established national forests, included provisions for inventory of these lands
- 1928 – McSweeney-McNary Forest Research Act
  - Created a national “Forest Survey”
  - Ordered periodic inventories of federal, state and private forest lands
  - By 1962, all 48 conterminous States had at least one periodic inventory
  - Wisconsin: 1936, 1956, 1968, 1983, 1996, 2000-2021



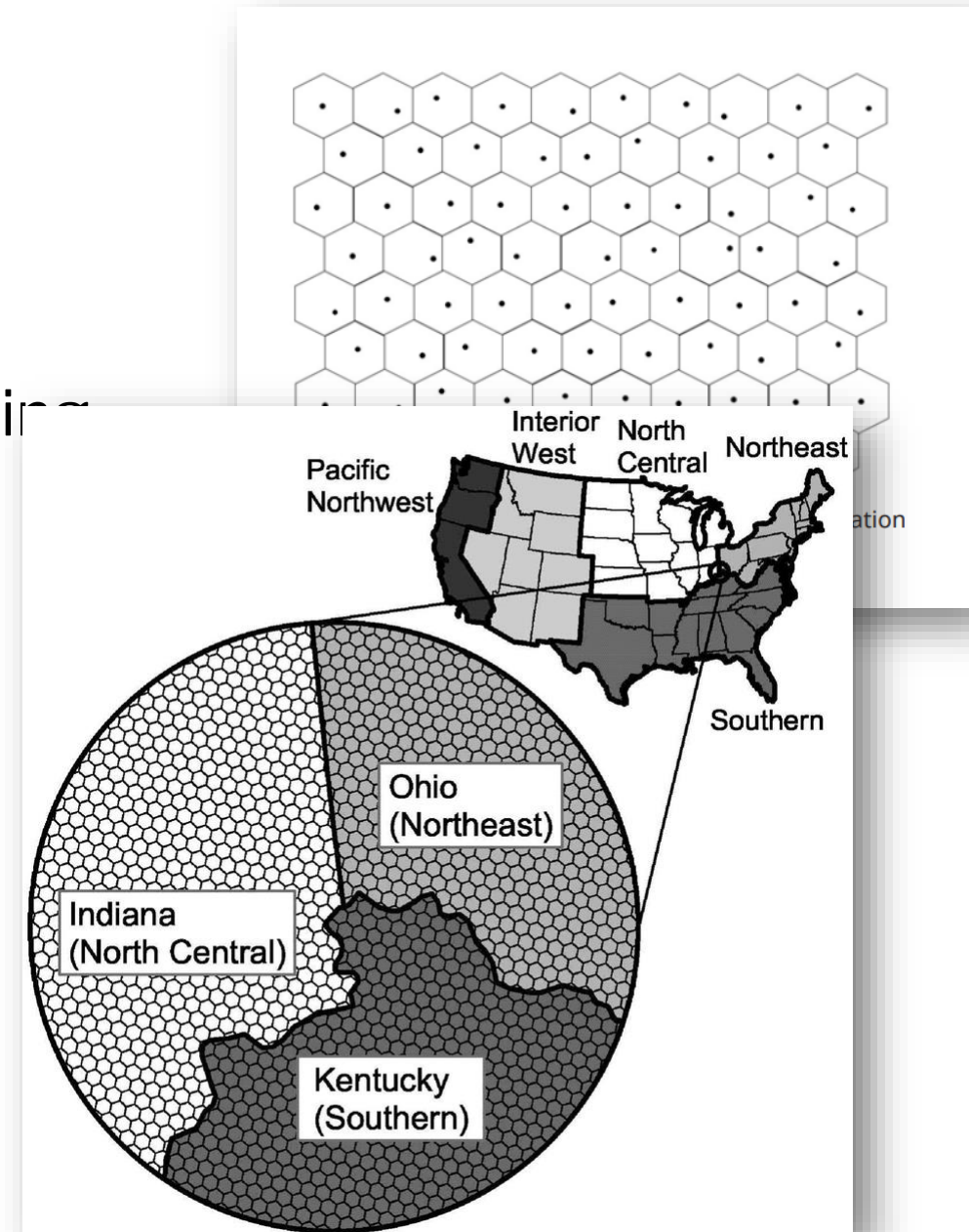
# FIA History cont.

- 1974 – Forest and Rangeland Renewable Resources Planning Act
  - Broadened scope of the inventory to include soils, wildlife habitat, grazing lands
  - Mandated inventory updates every 10 years
- 1978 – Forest and Rangeland Renewable Resources Research Act
  - Replaced the McSweeney-McNary Forest Research Act
- 1988 – Forest Ecosystems and Atmospheric Pollution Research Act
  - Founded the Forest Health Monitoring (FHM) Program
  - Beginning of the eventual switch to annual inventories
- 1998 – Research, Extension and Education Reform Act (Farm Bill)
  - Switch the **annual** inventories for each state
  - Mandated 5-year reporting
  - Core variables and national standards established
  - Consolidation of FHM and FIA
- 2014 – Agricultural Act (Farm Bill)
  - Urban FIA established
  - New focus on biomass and carbon
- 2018 – Agriculture Improvement Act (Farm Bill)
  - Continued funding and reporting mandate
  - New emphasis on remote sensing
- 2023 – Farm Bill (in progress...)
  - Explicit incorporation for forest carbon data collection and analysis into FIA mandate



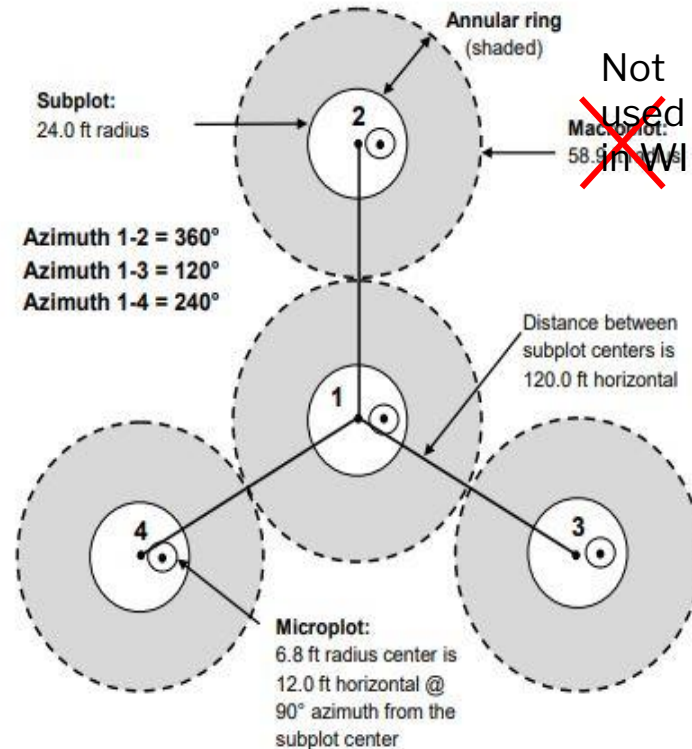
# FIA Sample Design

- Post-Stratified Sample Design
- Phase 1 – Aerial photography and remote sensing
  - Hexagonal layout of plots across the landscape
  - Does plot fall on forested land?
  - Estimation units (based on region, ownership, canopy cover, etc.)
- Phase 2 – Traditional ground plots (P2 plots)
  - Visit the forested plot
  - “Core” variables, collect forest/tree information
- Phase 3 – Focus on forest health
  - 1/16<sup>th</sup> of P2 plots (P2+ plots)
  - Regional differences



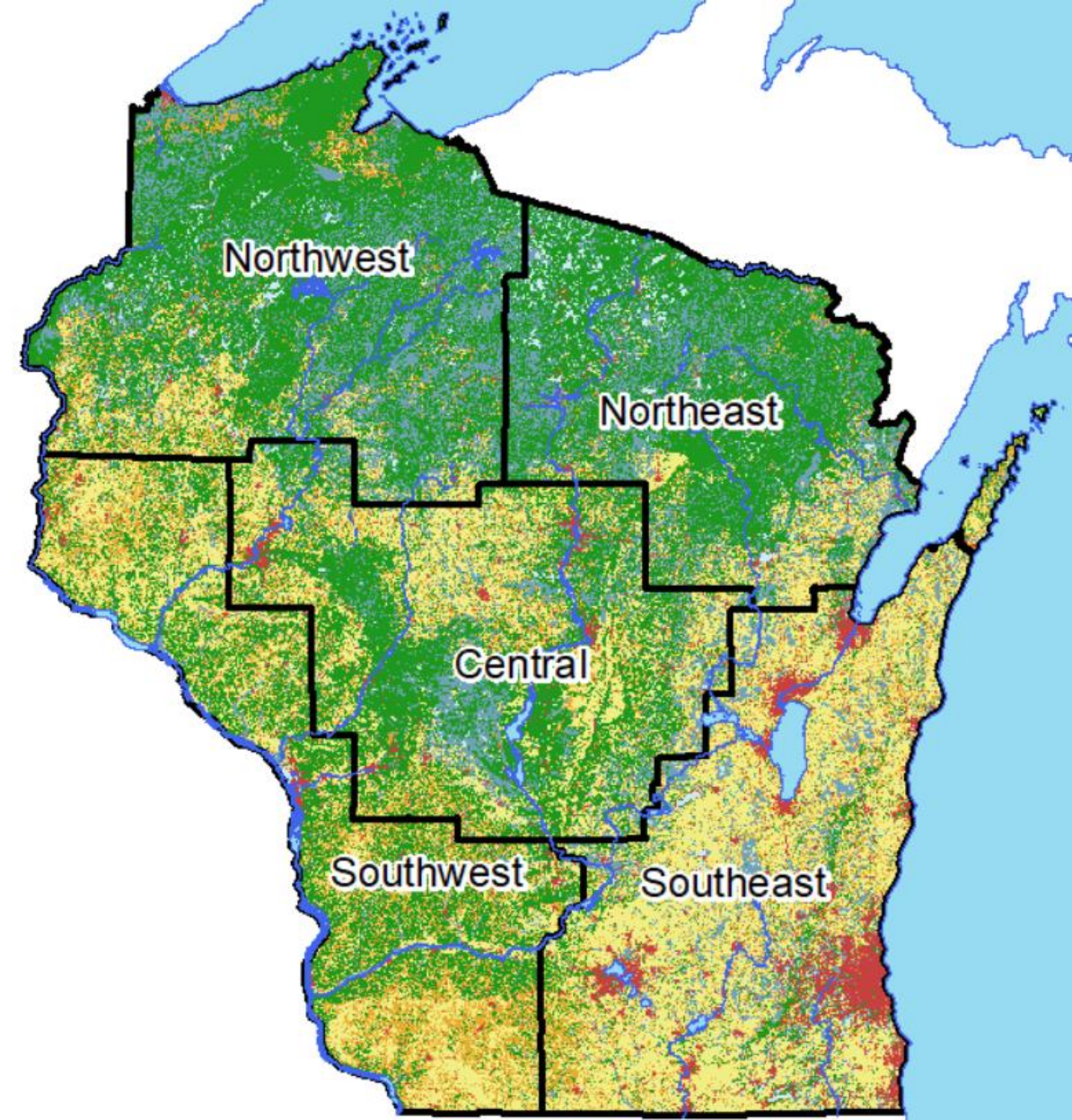
# FIA: Forest Inventory and Analysis

- National-scale forest inventory
- Congressionally mandated program
- USFS administered, input/customization by states/regions
- Network of permanent, field measured plots across all forested land in the U.S.



# FIA in Wisconsin

- Forest land only:
  - at least 10 percent canopy cover of trees (or capable of)
  - at least 1 acre in size and 120 feet wide
- Currently on 7-year cycle
- Double intensity
- 6,336 plots in 'accessible forest conditions'
- Field work: Half USFS/Half Contractor

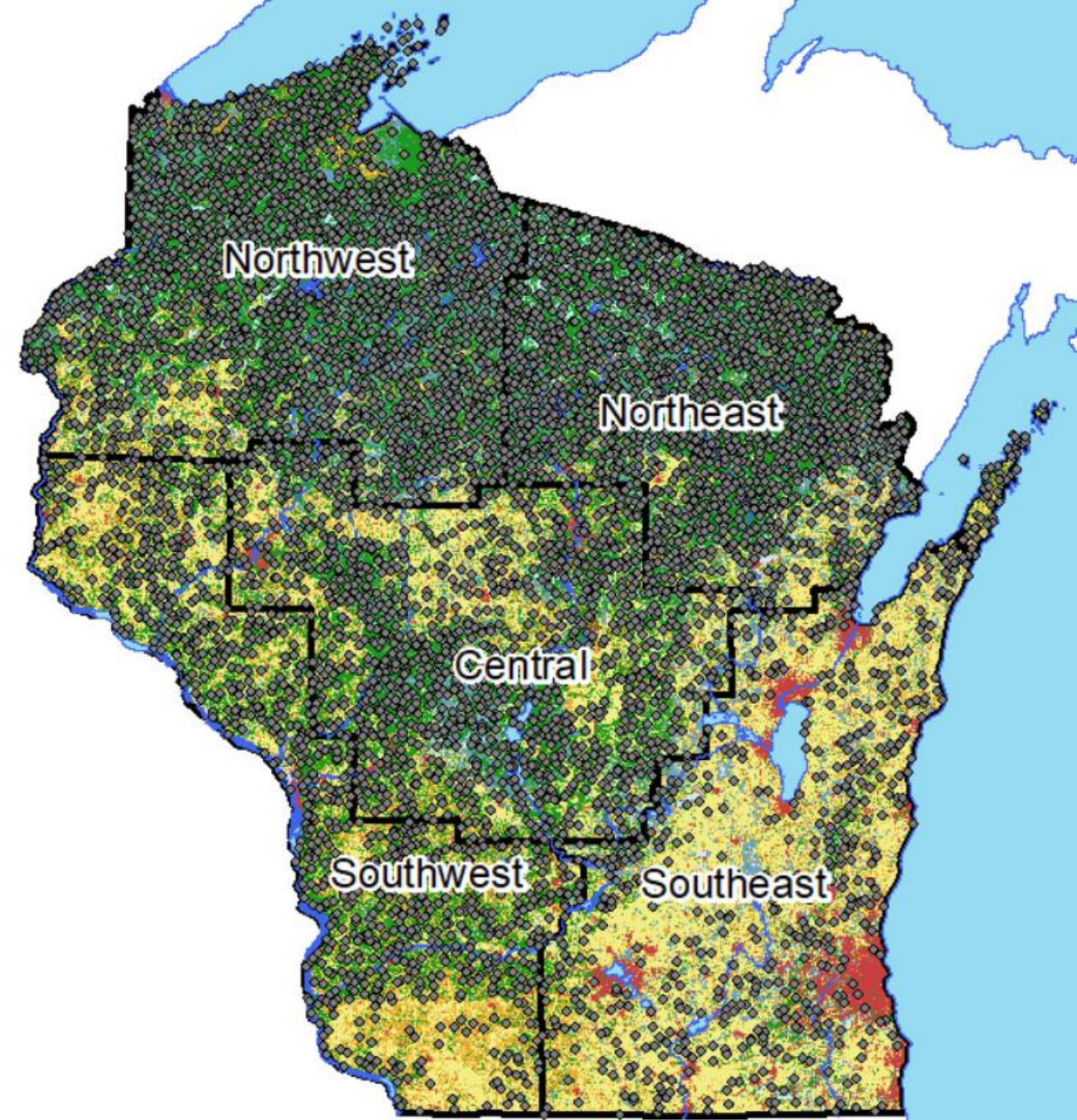


WISCLAND

2.0

# FIA in Wisconsin

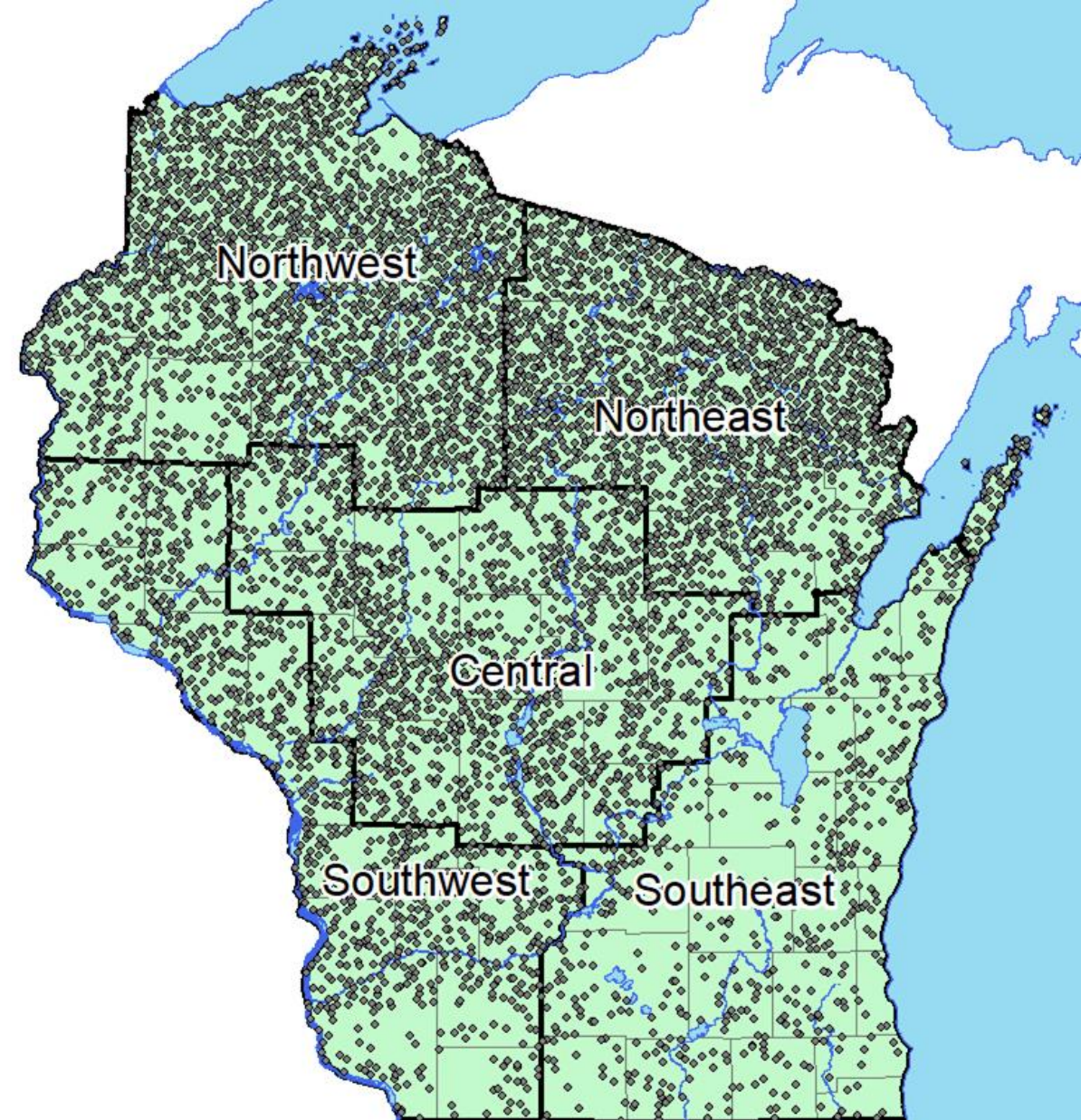
- Forest land only:
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Forested Plots: Fuzzed  
locations

# FIA in Wisconsin

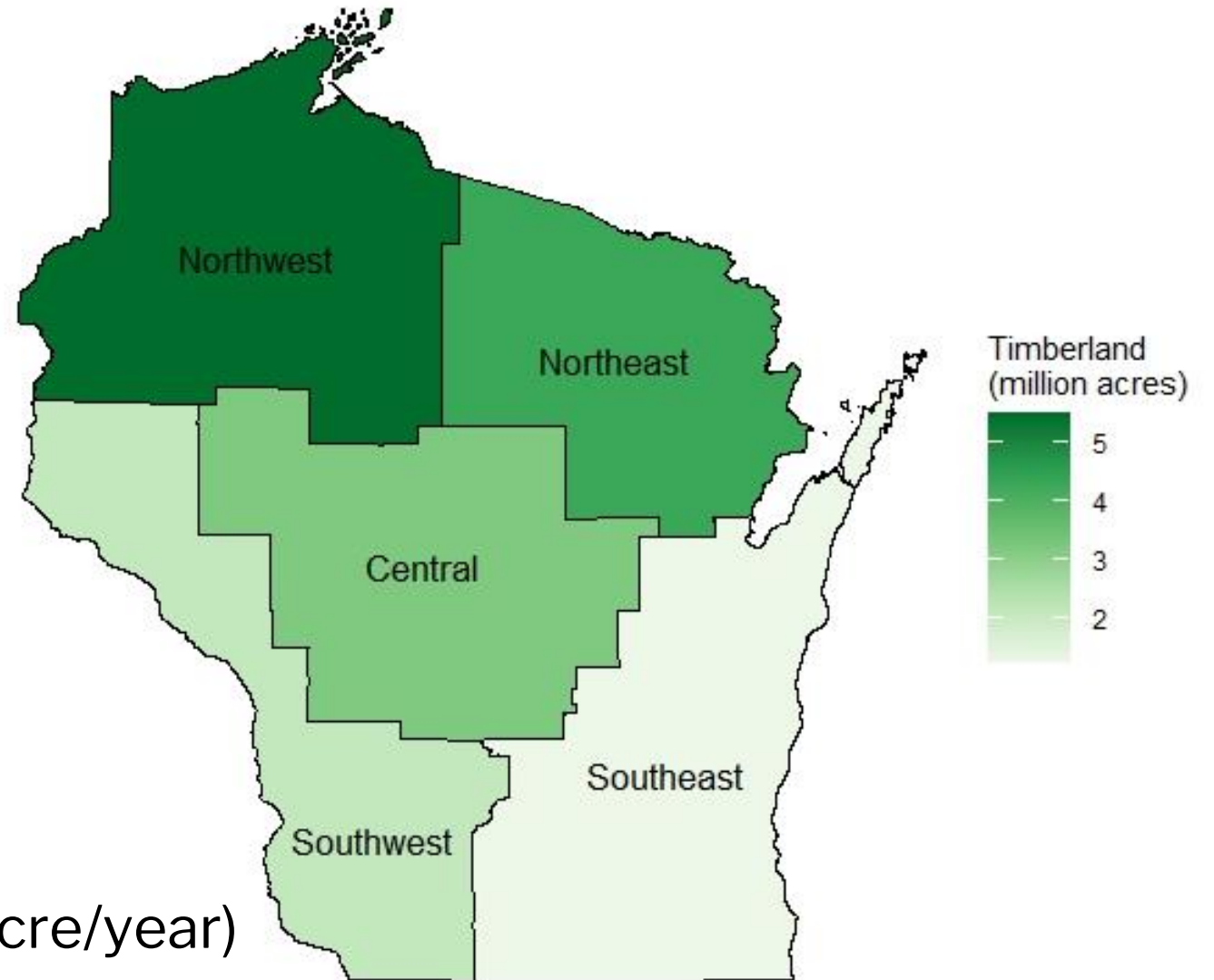
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Forested Plots: Fuzzed  
locations

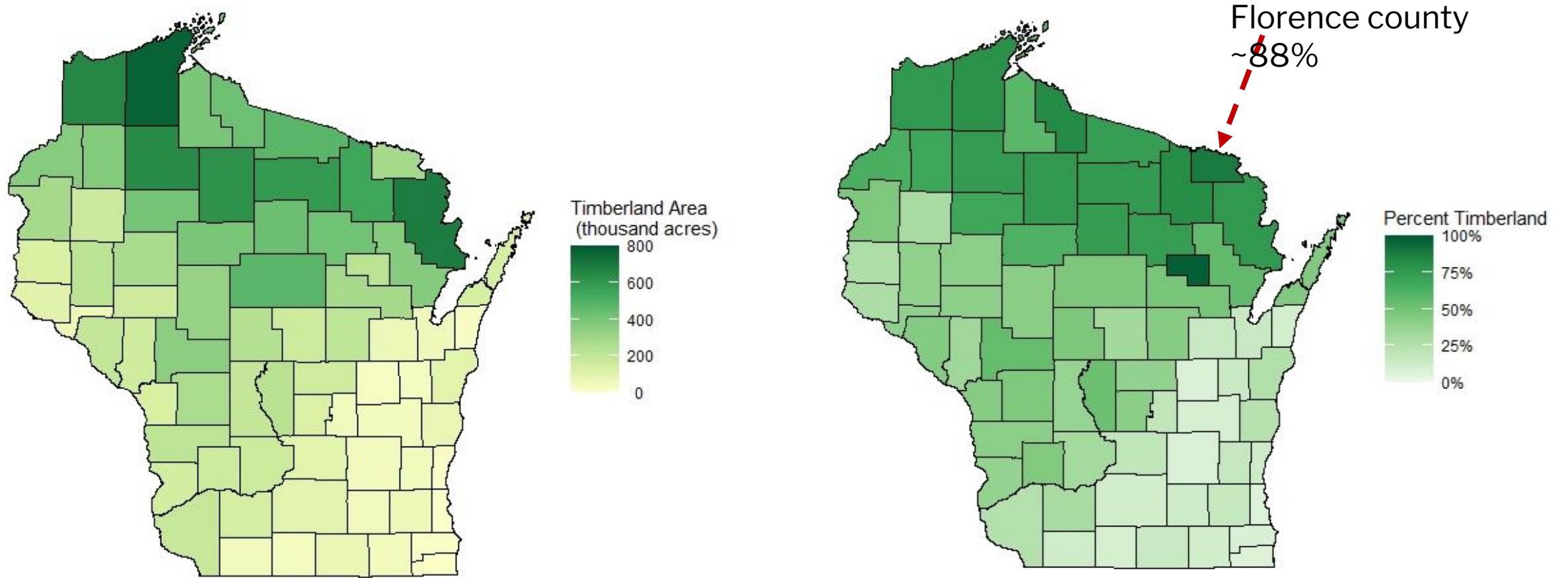


# Timberland



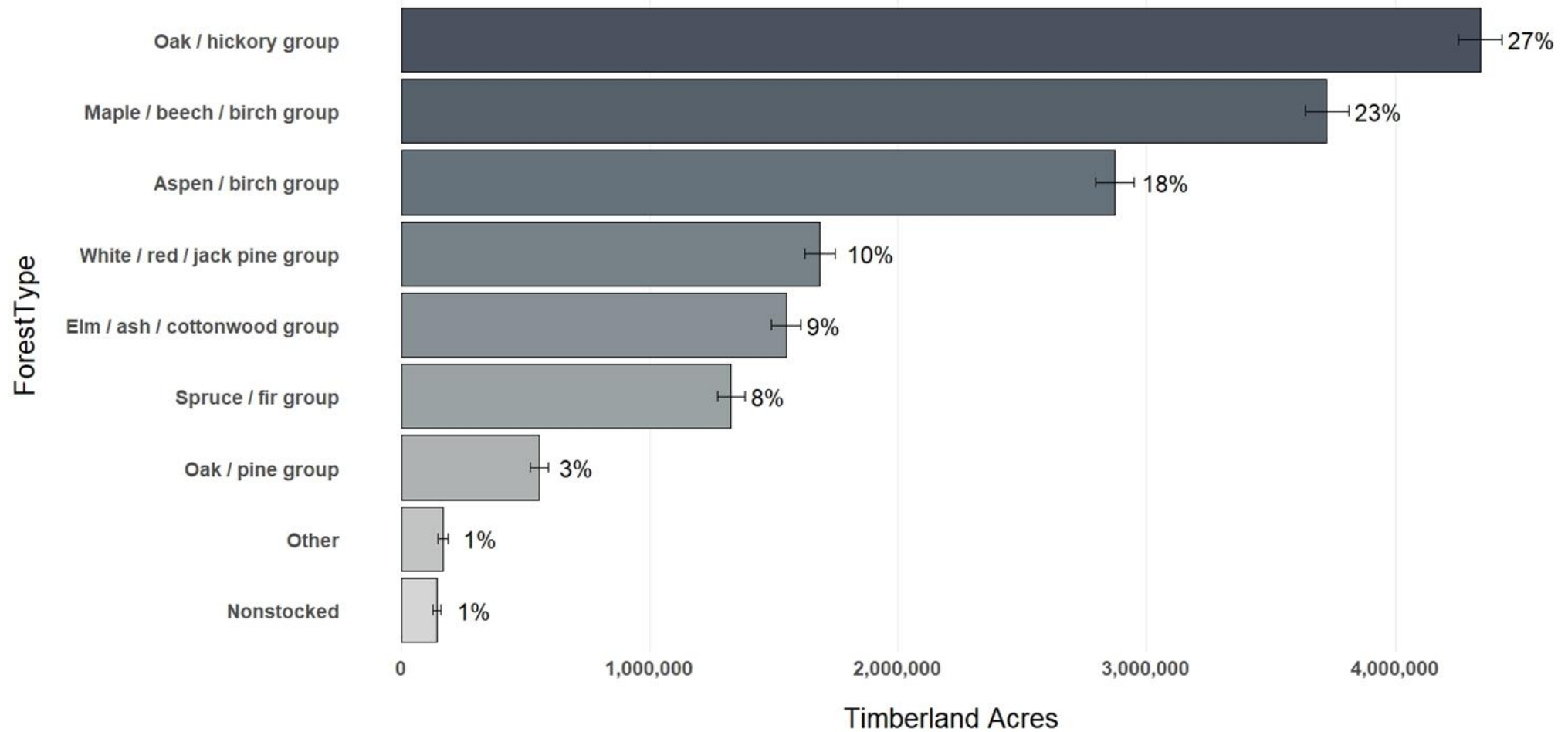
- Non-reserved
- Productive forestland (>20 CuFt/acre/year)
- 45% of the state is timberland
- State total = 16.4 million acres (16.9 mil forestland)

# Timberland: Quick County Look

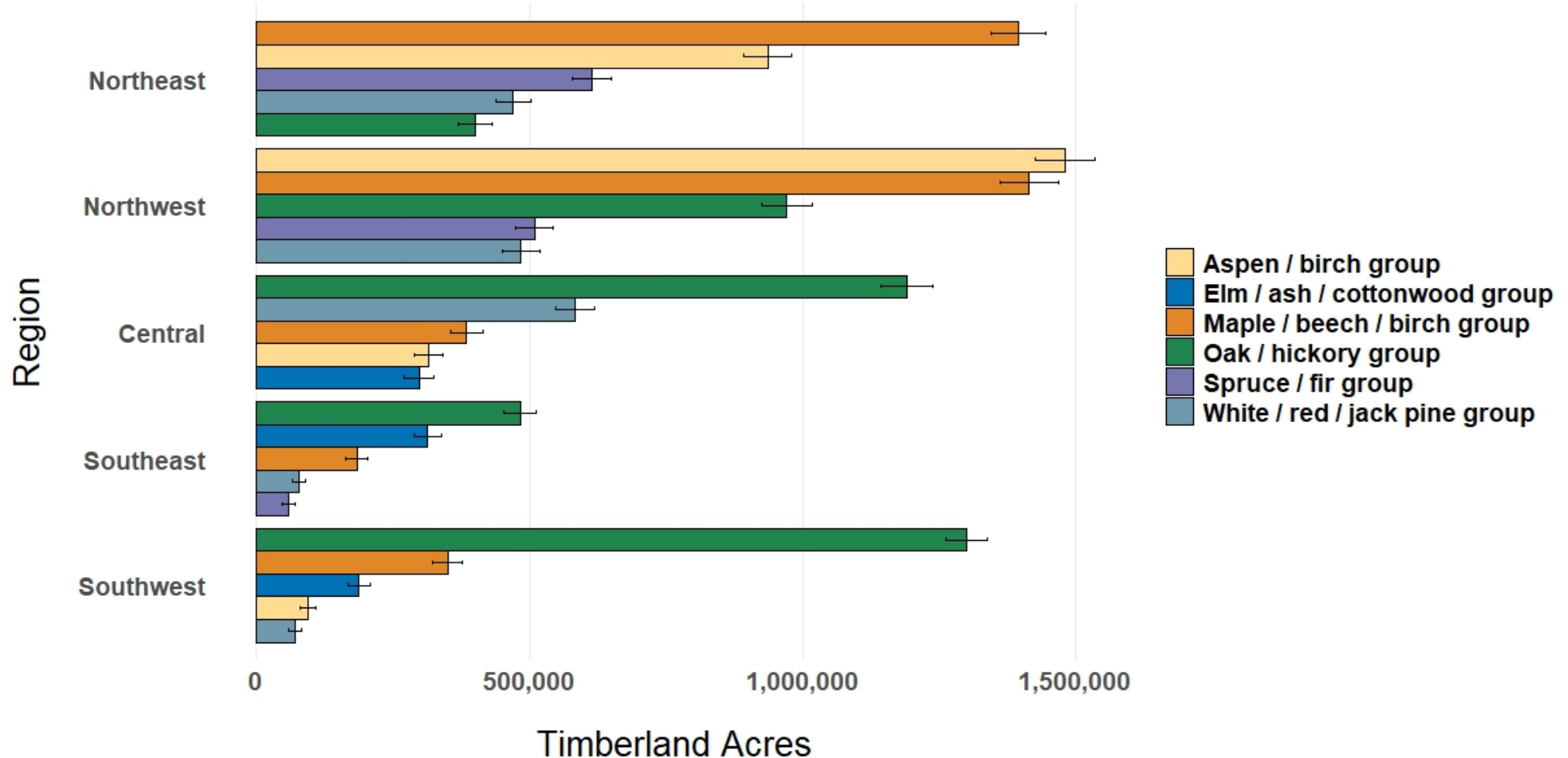


Menominee, Florence, Iron, Forest, Bayfield are ~80%+ forested

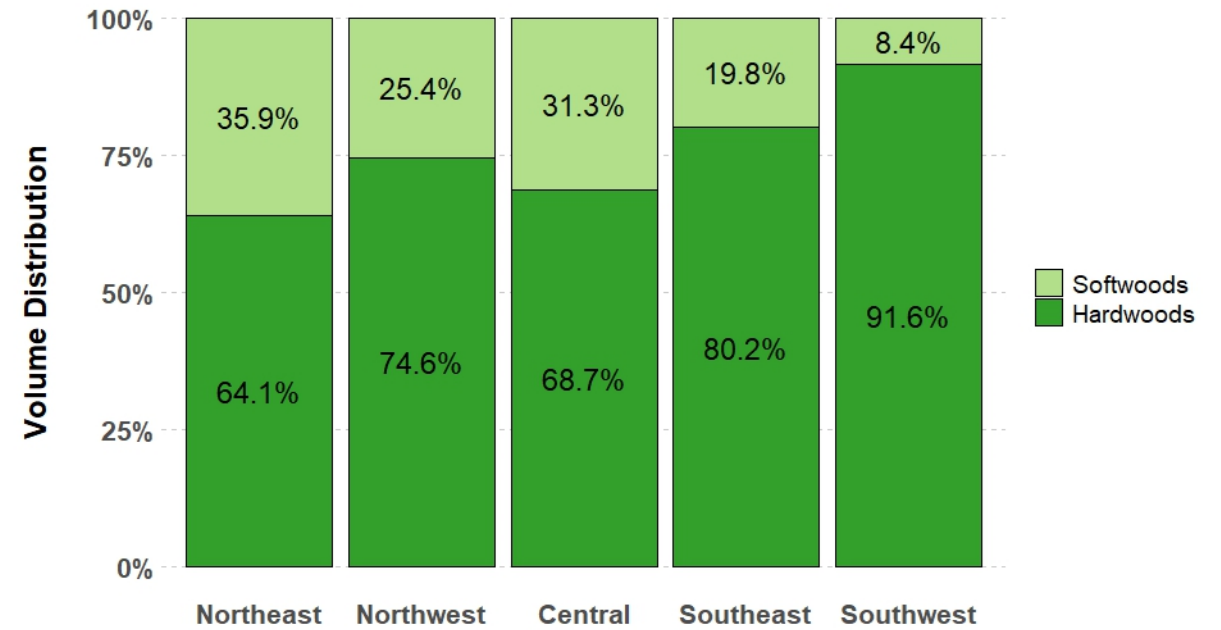
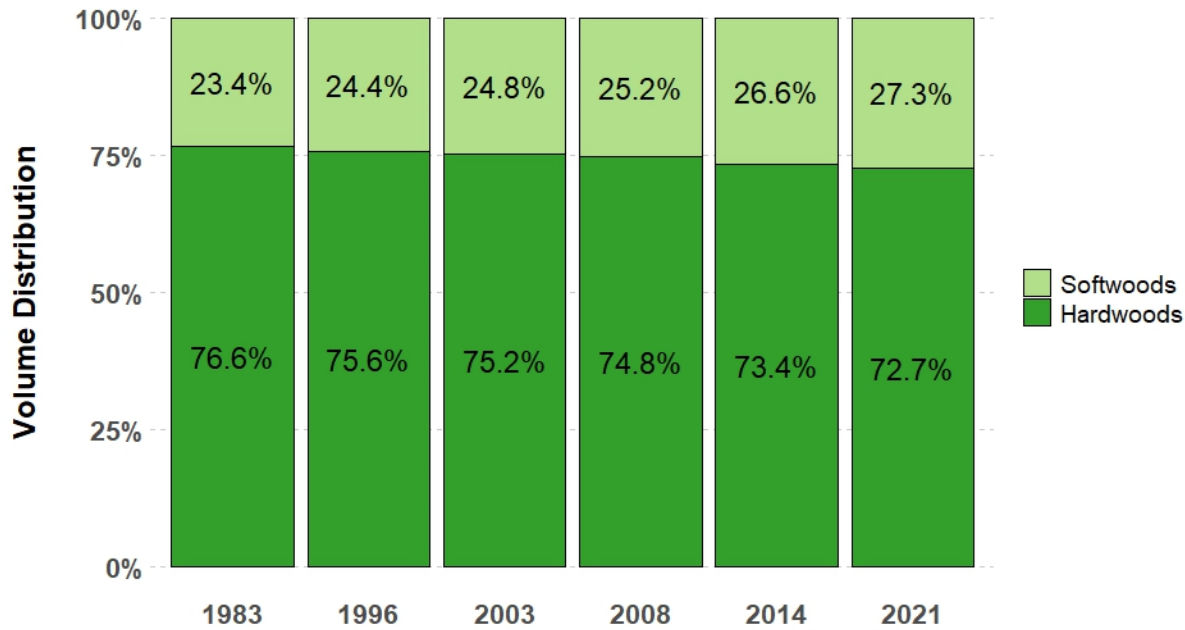
# Forest Types of Wisconsin



# Top Forest Types by Region



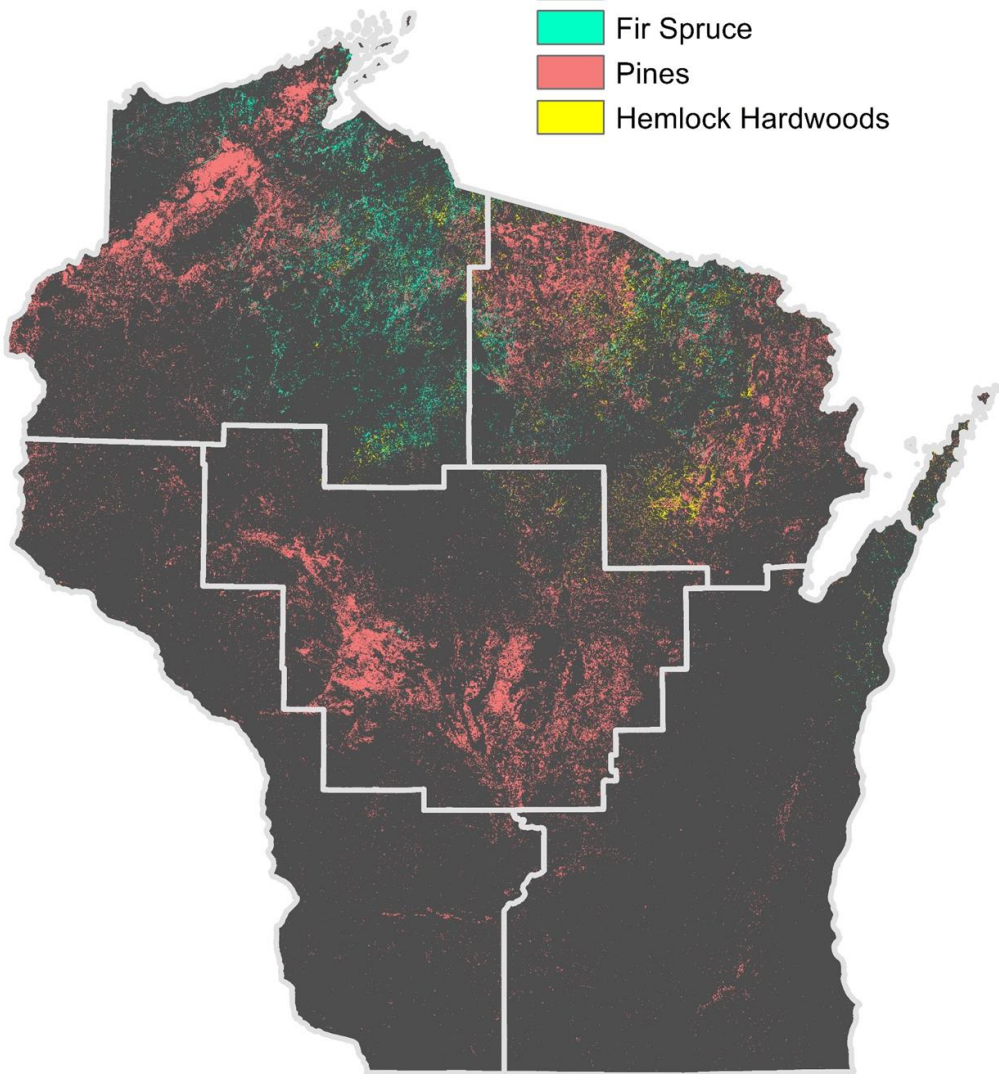
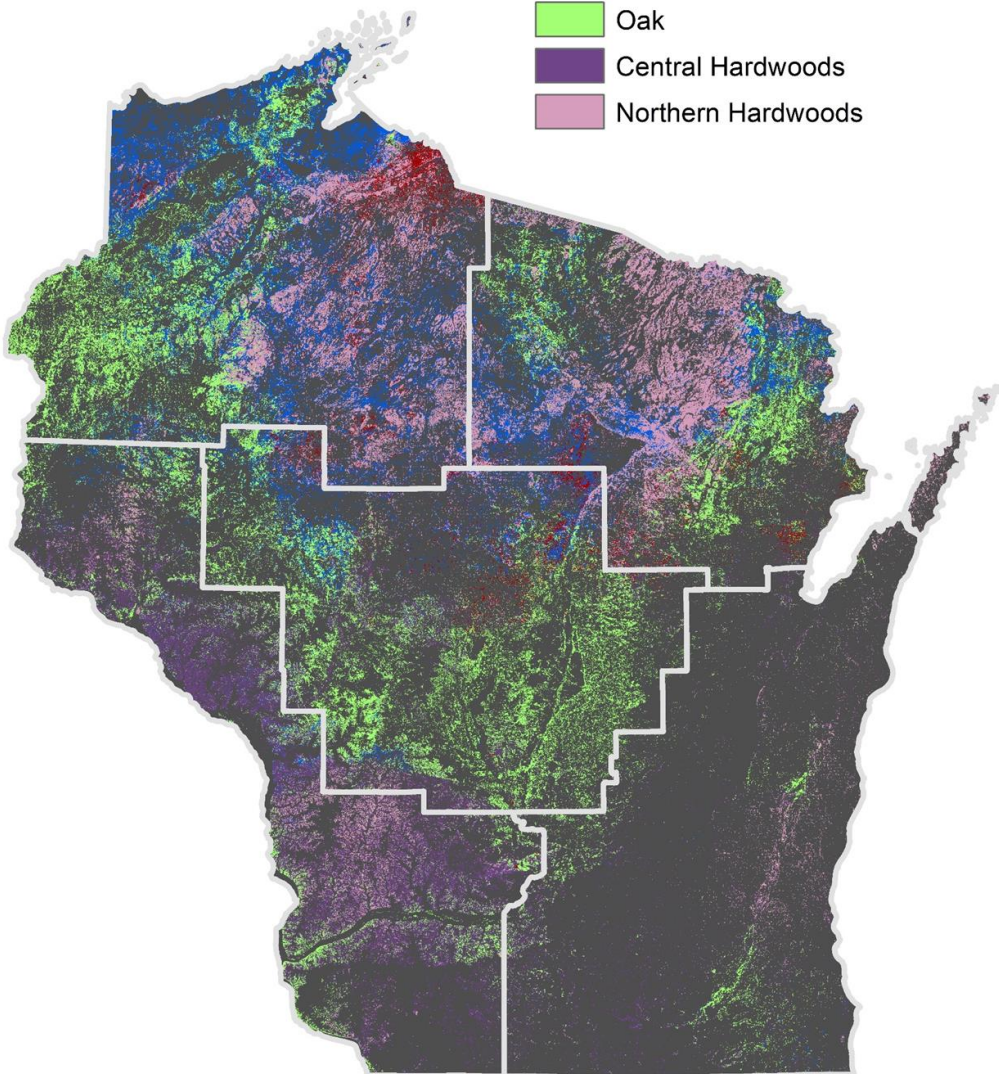
# Hardwood Dominated Landscape



Spruce, fir and hemlock in NE,  
NW  
Pine in Central, NE, NW

- Not Broad-leaved Deciduous Forest
- Aspen / Paper Birch
- Upland Red Maple
- Oak
- Central Hardwoods
- Northern Hardwoods

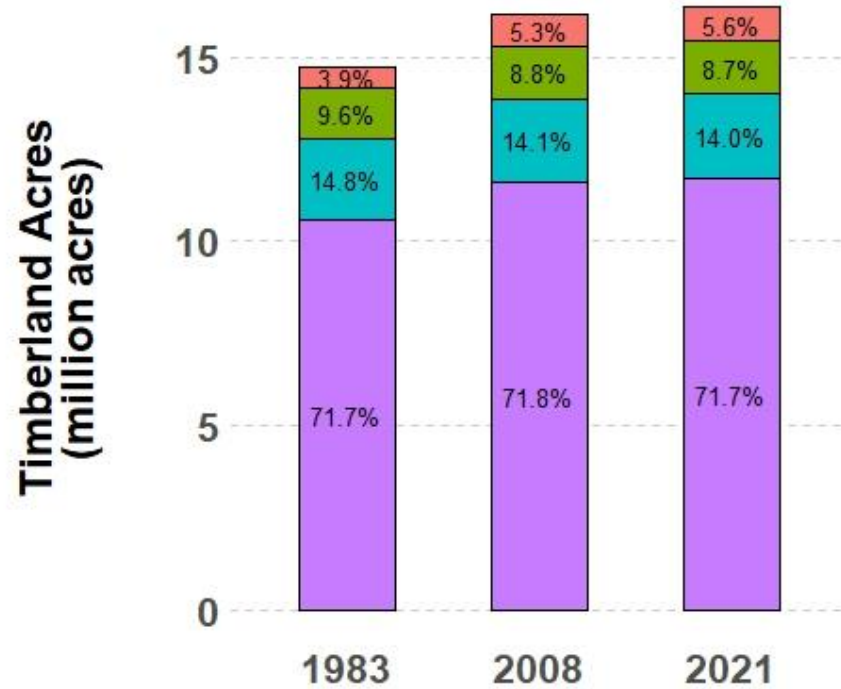
- Not Conifer Forest
- Fir Spruce
- Pines
- Hemlock Hardwoods



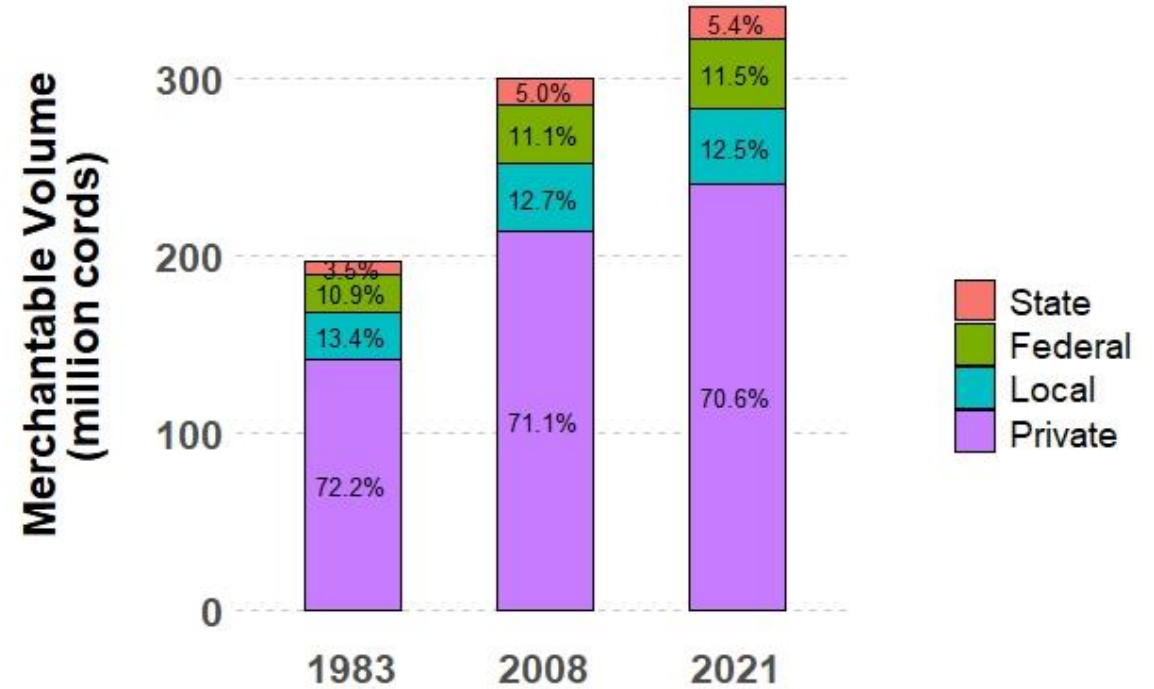
**Wisland  
2.0**

# Timberland Ownership

A

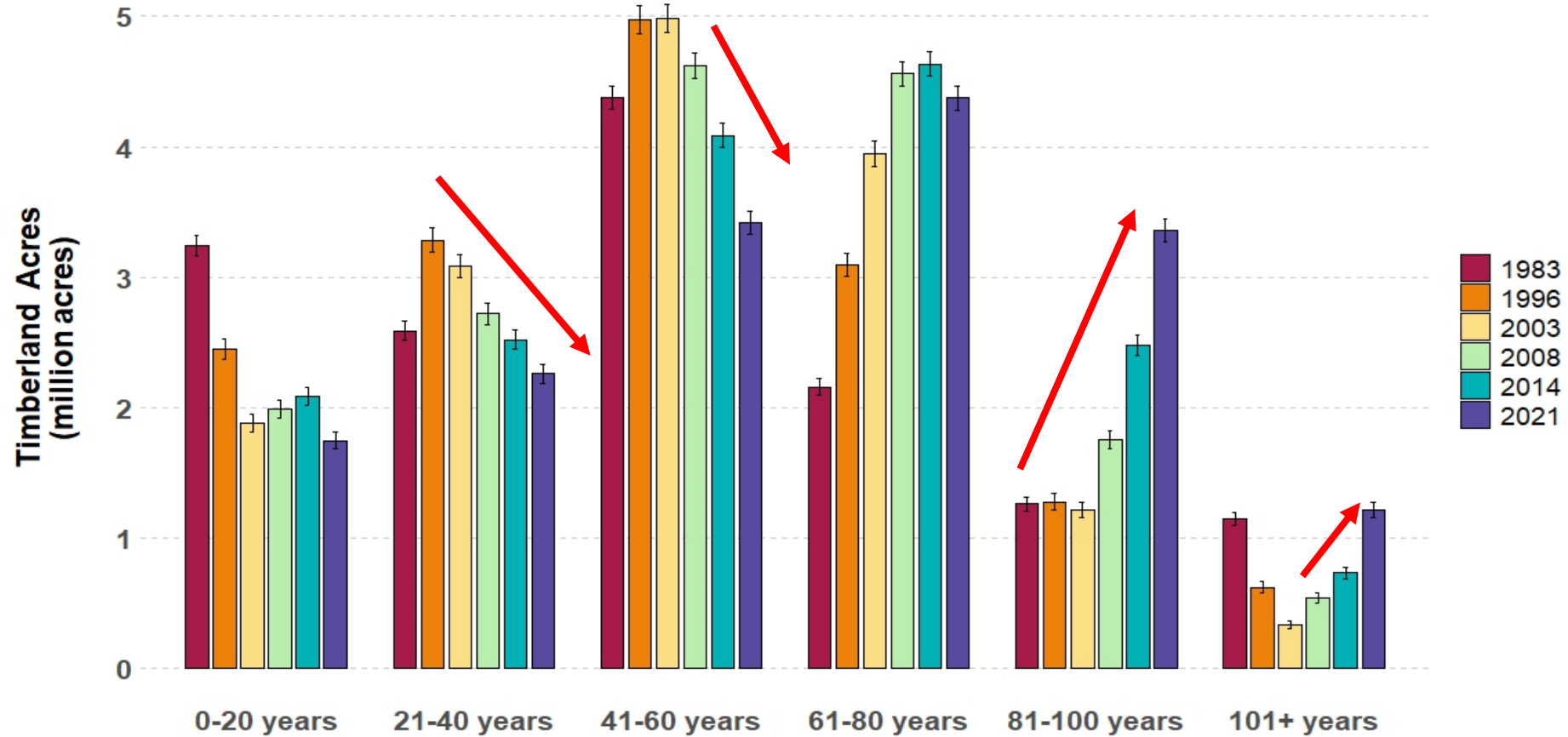


B



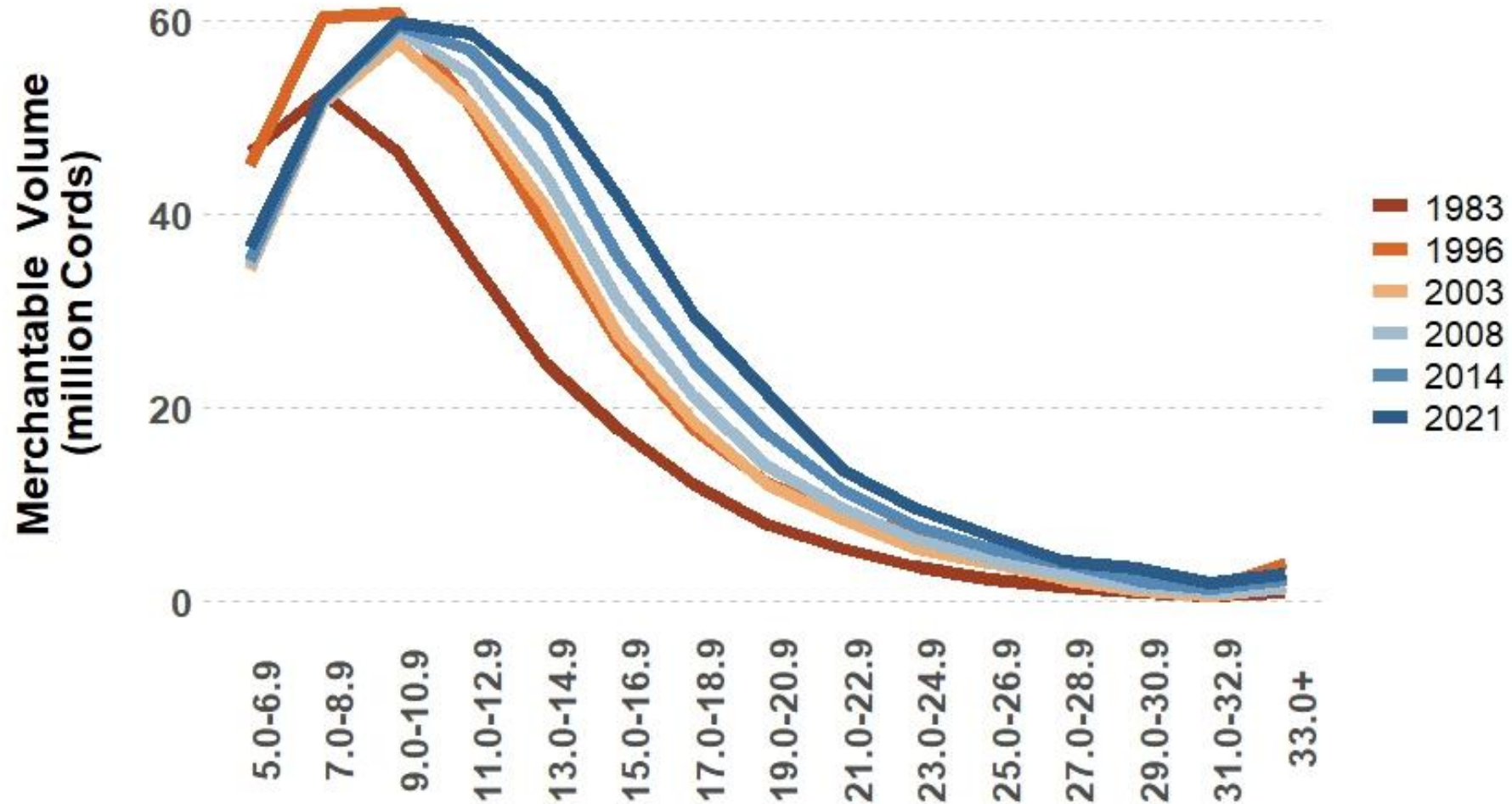
Ownership (A) timberland acres; (B) merchantable volume  
Source: USDA Forest Inventory and Analysis data. Wisconsin, 2021

# Wisconsin's forests are aging



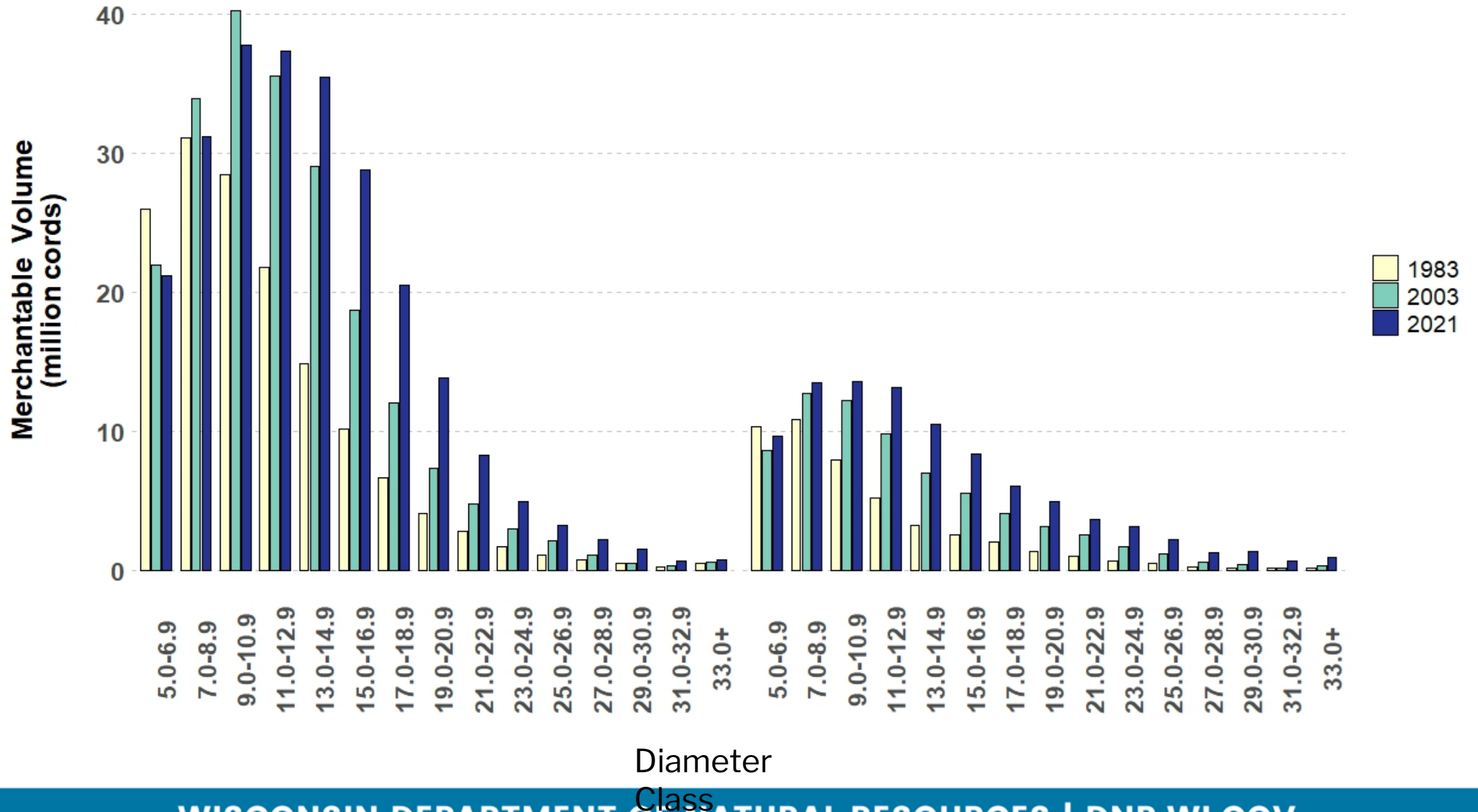


# Volume moving to larger diameter classes

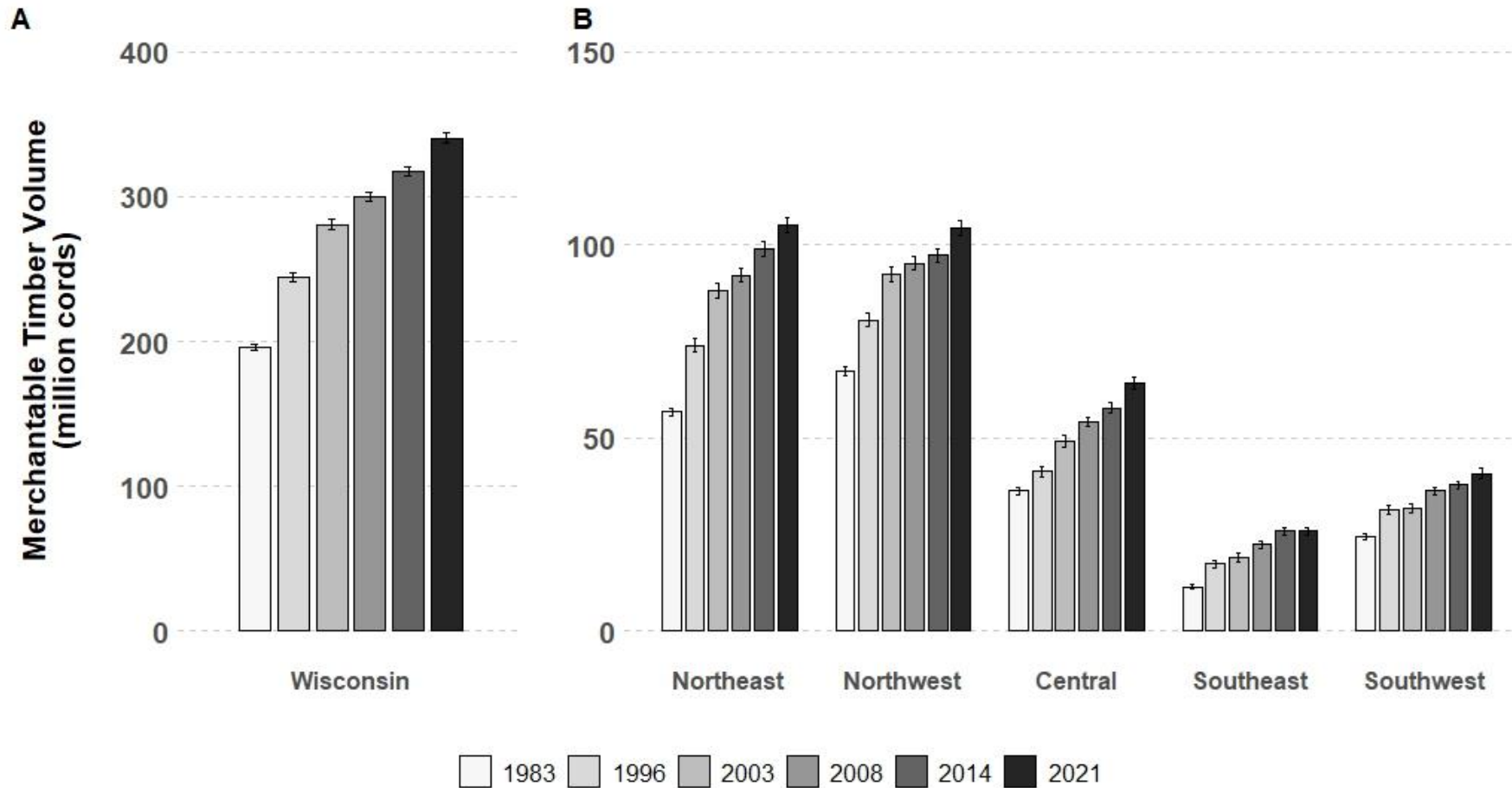


### Hardwoods

### Softwoods

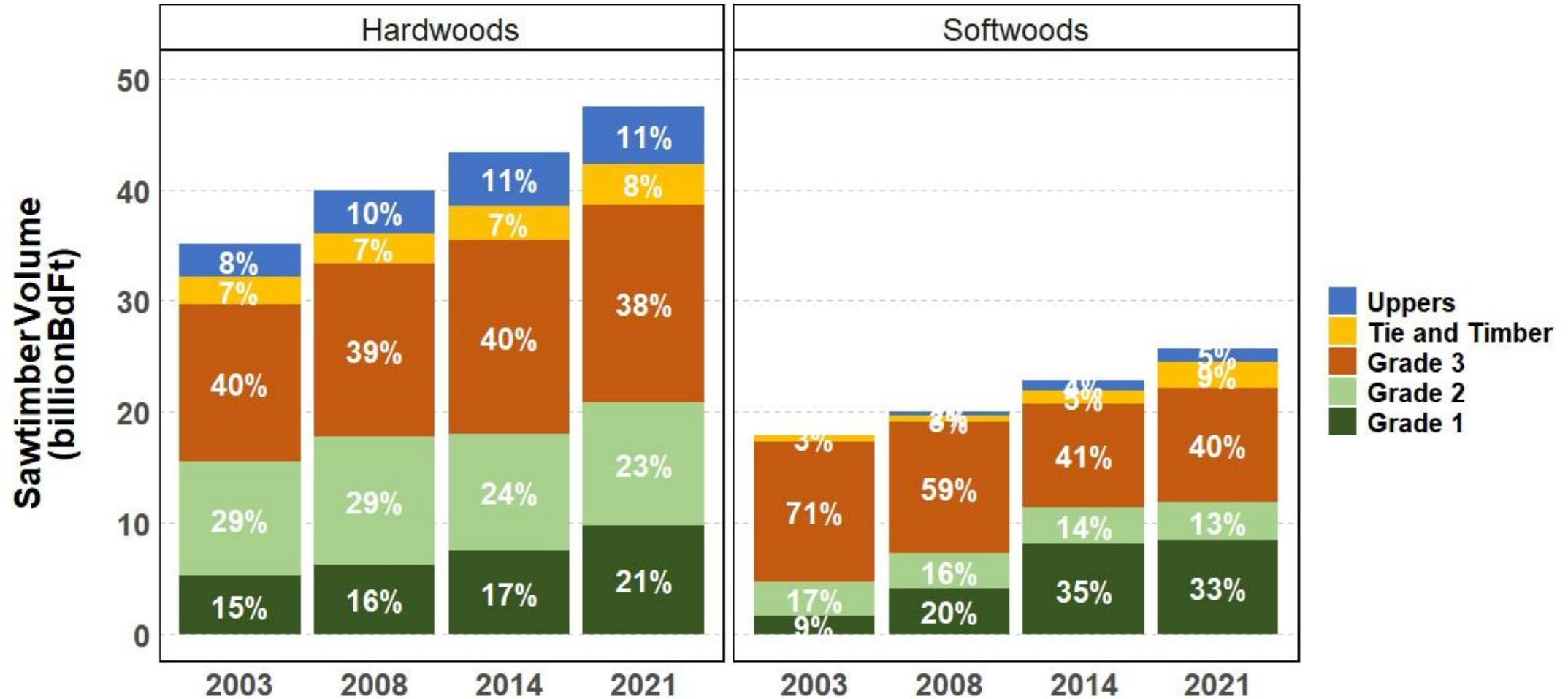


# Growing Stock Volume



Merchantable, growing-stock volume (A) all Wisconsin timberland; (B) by Region  
 Source: USDA Forest Inventory and Analysis data. Wisconsin, 2021

# Sawtimber Trends



# Removals: Species

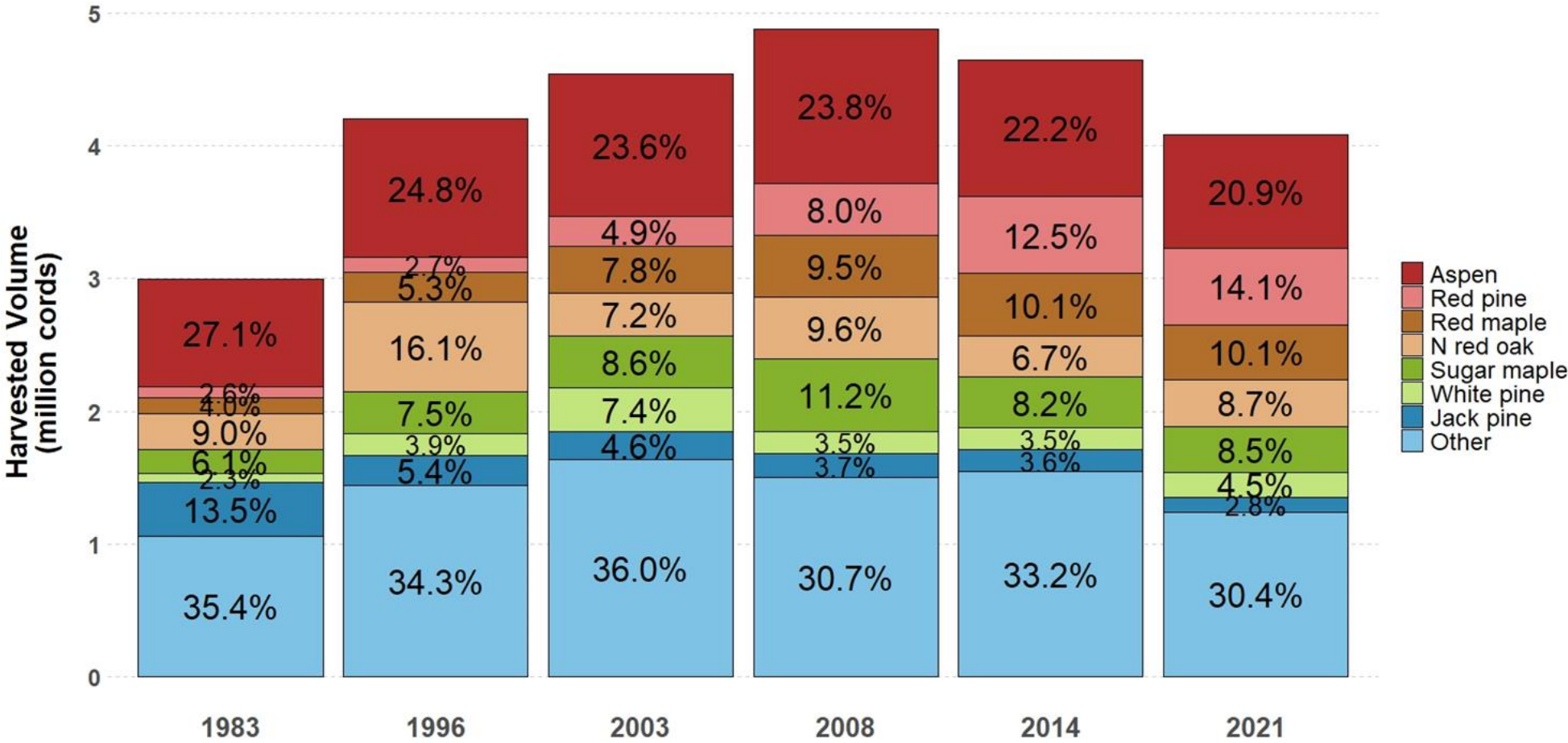
- 2021: (2015-2021) still needs to catch-up to see trends of recent mill closures
- Slight downward trend in overall removals past 15 yrs
- Certain species up, others down
  - ex: Jack pine vs red pine

**Average annual removals of merchantable, growing-stock volume (thousand cords) by species group**

Species	1983	1996	2003	2008	2014	2021
Aspen	811	1,044	1,072	1,162	1,032	854
Red pine	79	115	223	393	579	575
Red maple	121	222	353	463	471	414
N red oak	270	676	325	467	311	356
Sugar maple	183	313	390	546	380	347
Ash	75	130	194	157	177	191
Black & Pin Oak	75	132	144	187	266	191
White pine	68	166	335	171	164	182
Basswood	103	159	132	218	218	161
Jack pine	404	228	208	179	167	115
White oak	53	195	154	178	113	114
Minor hwd	43	163	346	141	152	111
Balsam fir	115	74	63	76	94	102
Paper birch	159	269	248	198	211	96
Black cherry	9	43	50	37	37	53
Elm	231	132	114	41	33	49
Tamarack	15	5	60	18	10	38
Hemlock	61	34	71	38	43	38
Spruce	39	33	18	91	69	36
Yellow birch	45	41	36	38	58	26
Black walnut	1	2	0	31	25	15
Minor swd	0	0	0	4	6	7
Beech	1	15	4	18	6	7
N white-cedar	36	11	4	29	28	6
<b>Total</b>	<b>2,996</b>	<b>4,205</b>	<b>4,541</b>	<b>4,882</b>	<b>4,650</b>	<b>4,082</b>

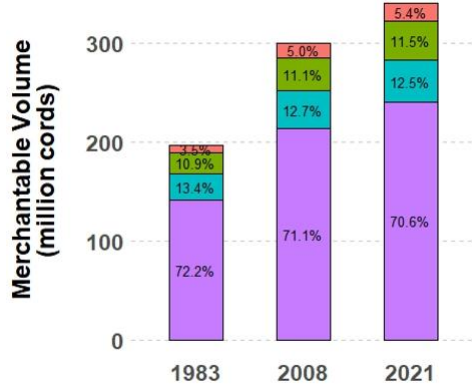
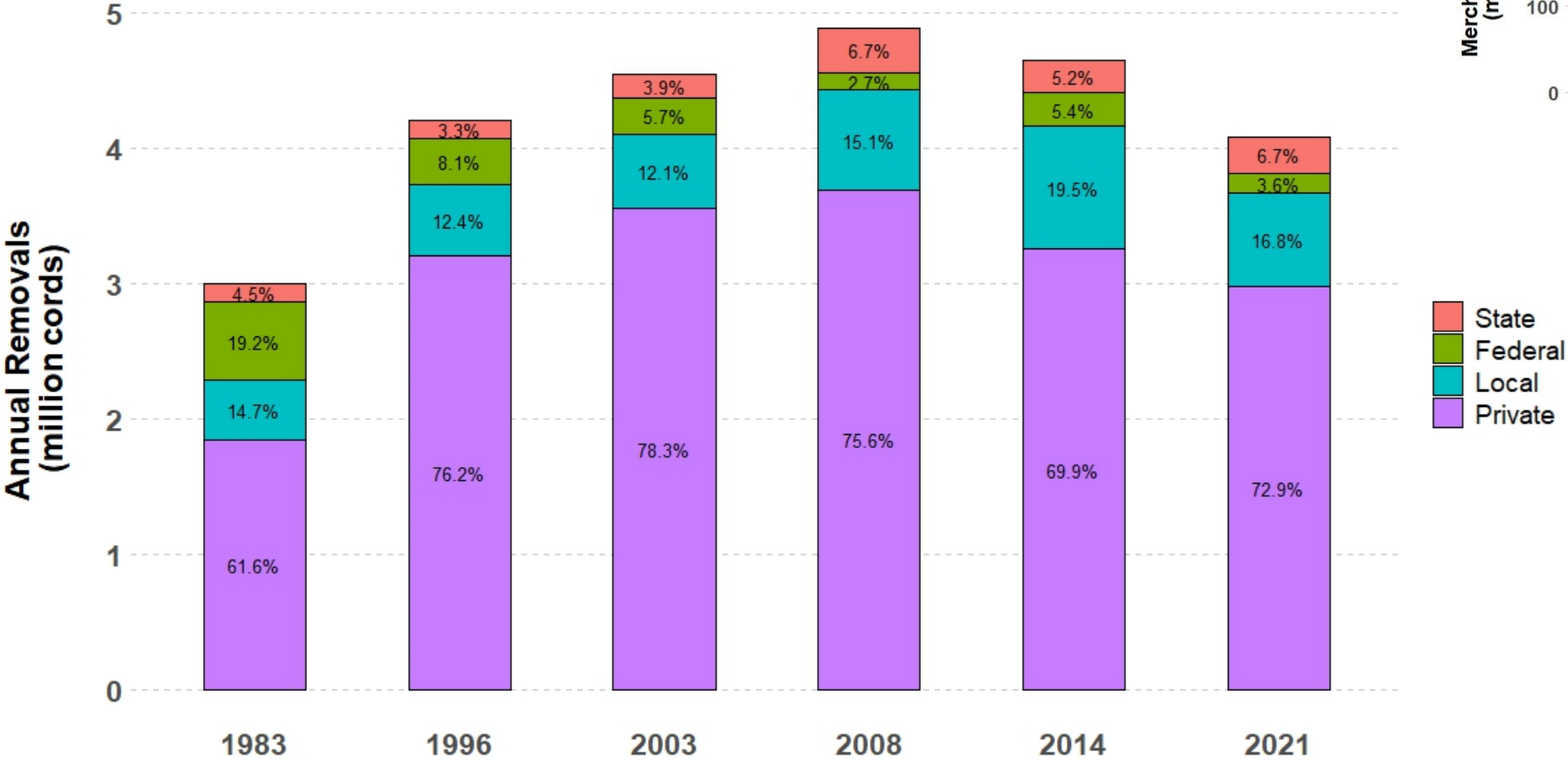
Source: USDA Forest Inventory and Analysis data. Wisconsin, multiple years

# Removals: Species

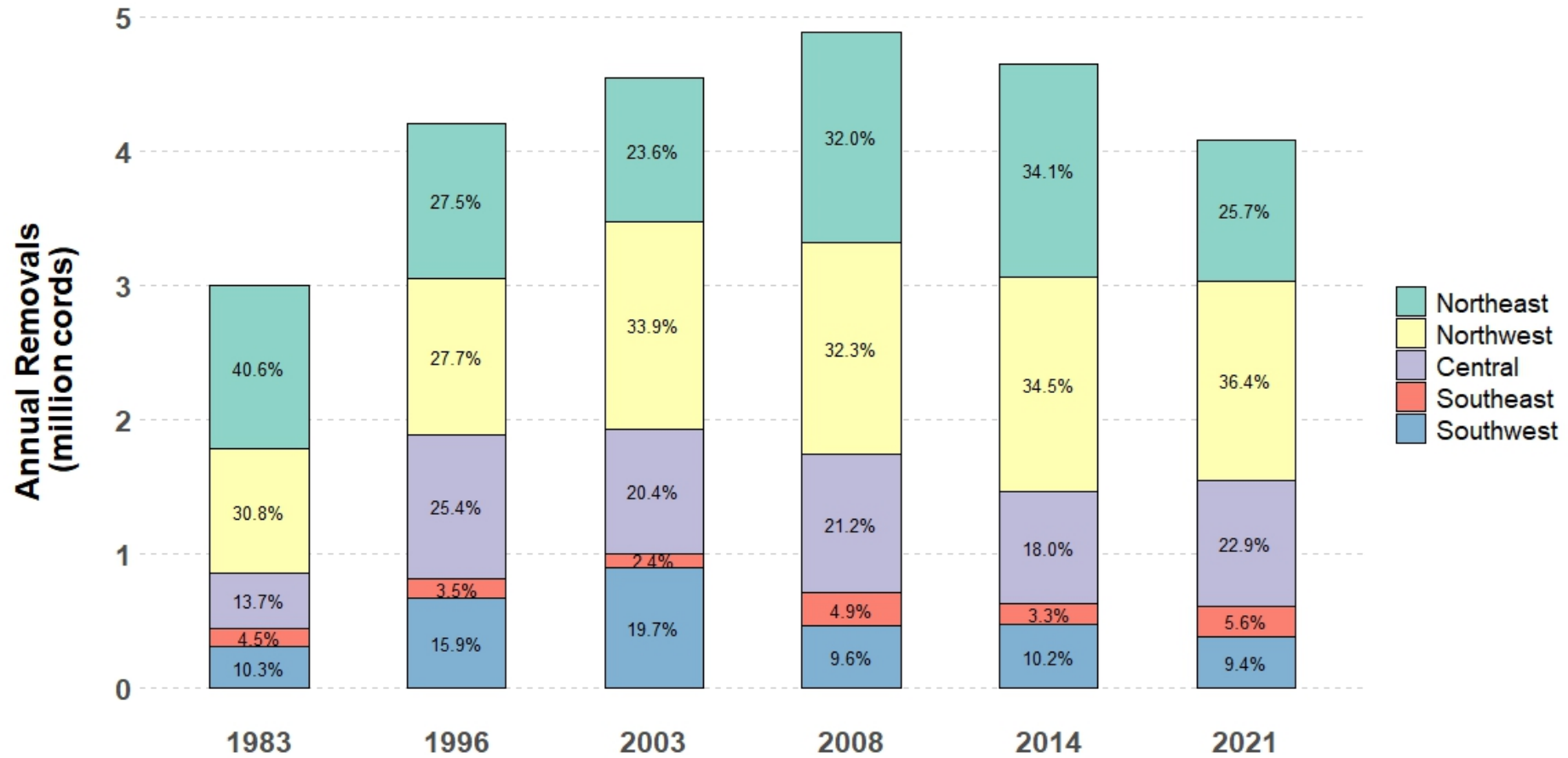


\*Relative to current vol: local/priv over-rep, fed under-rep

# Removal: Ownership



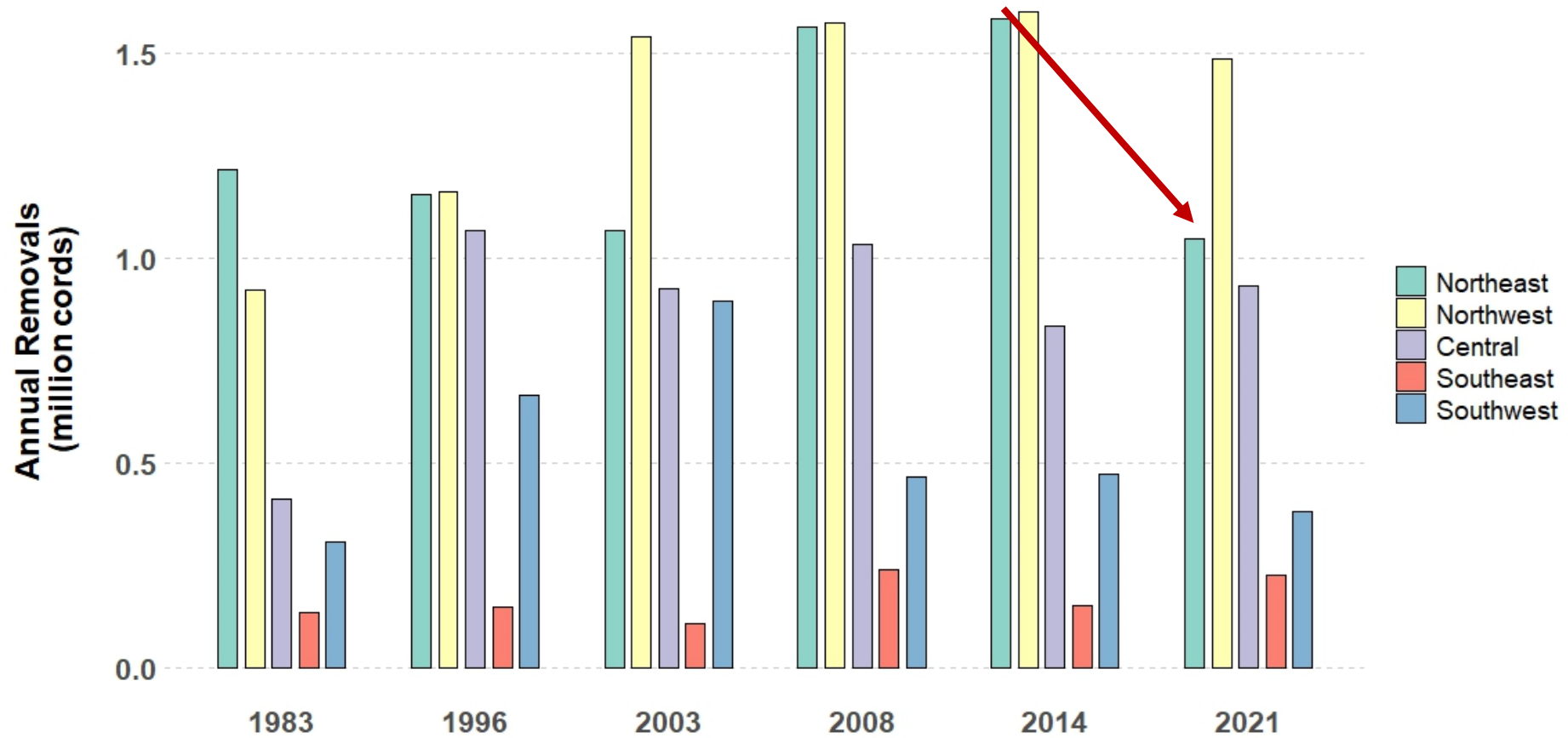
# Removals: Region



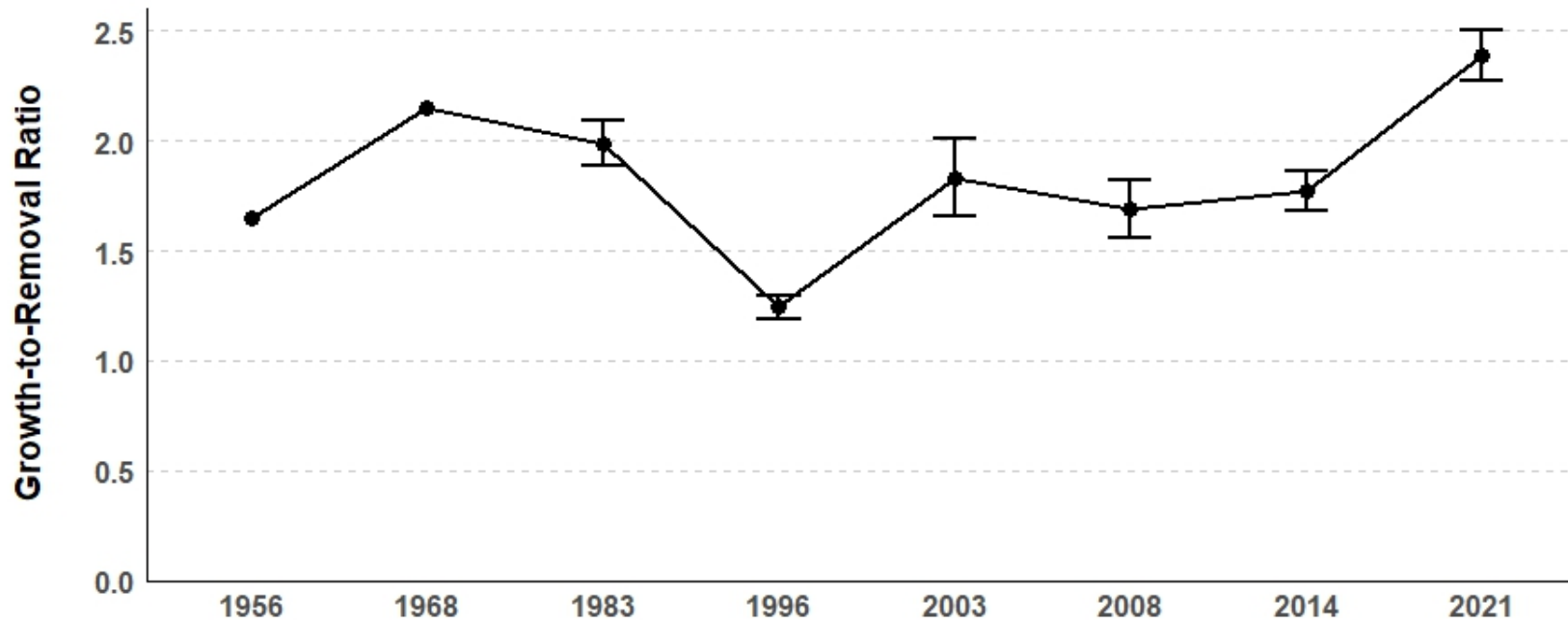


# Removals: Region

Impact of *recent* mill closures yet to be seen in data



# Growth-to-Removal: a measure of sustainability



**Statewide: 2.4 growth-to-removal ratio**

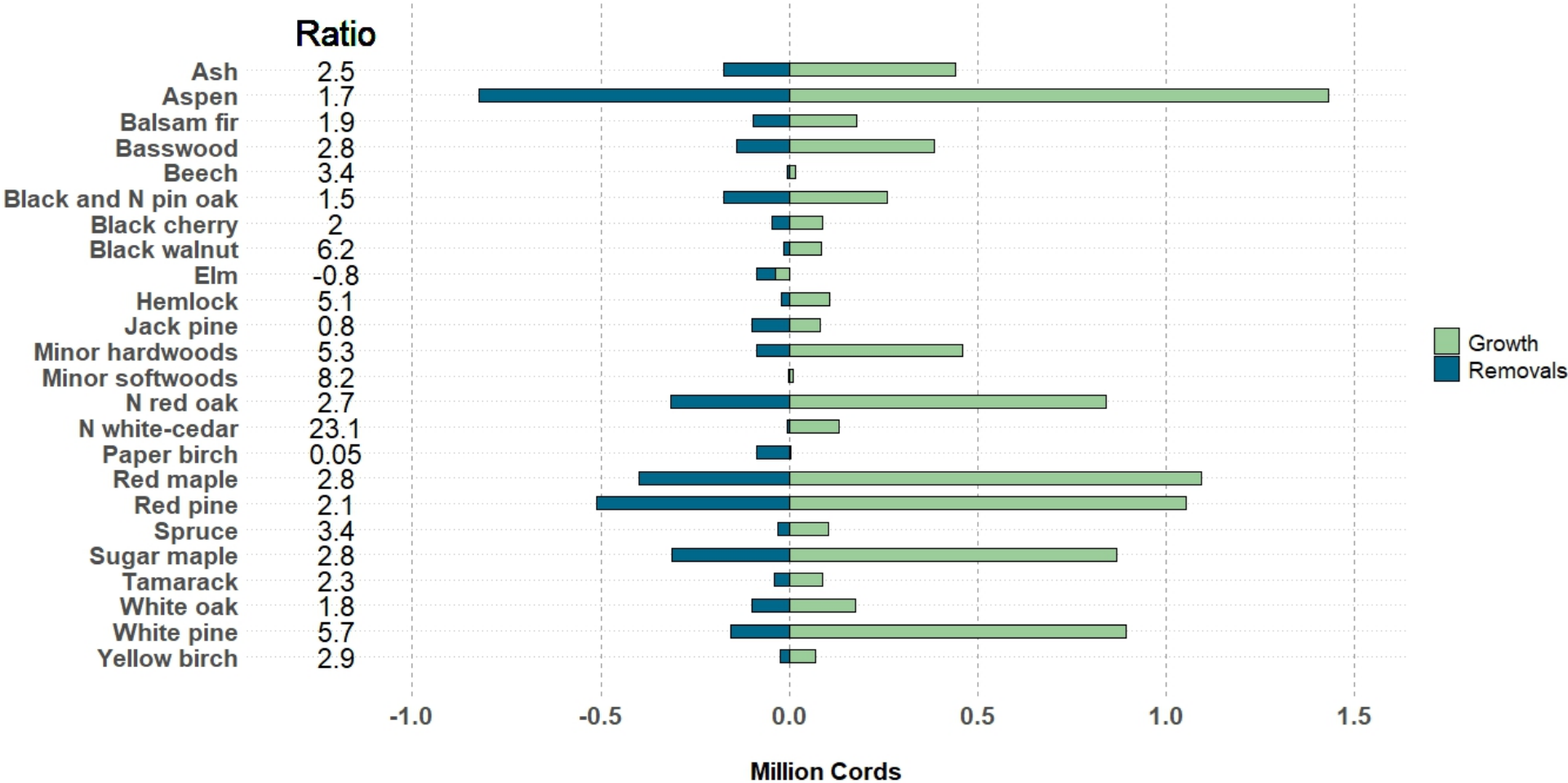
NE: 2.47, NW: 2.12, C: 2.52, SE: 2.67, SW: 2.91

Indication of strong supply of timber, while maintaining the ecological, environmental and recreational values of Wisconsin forests

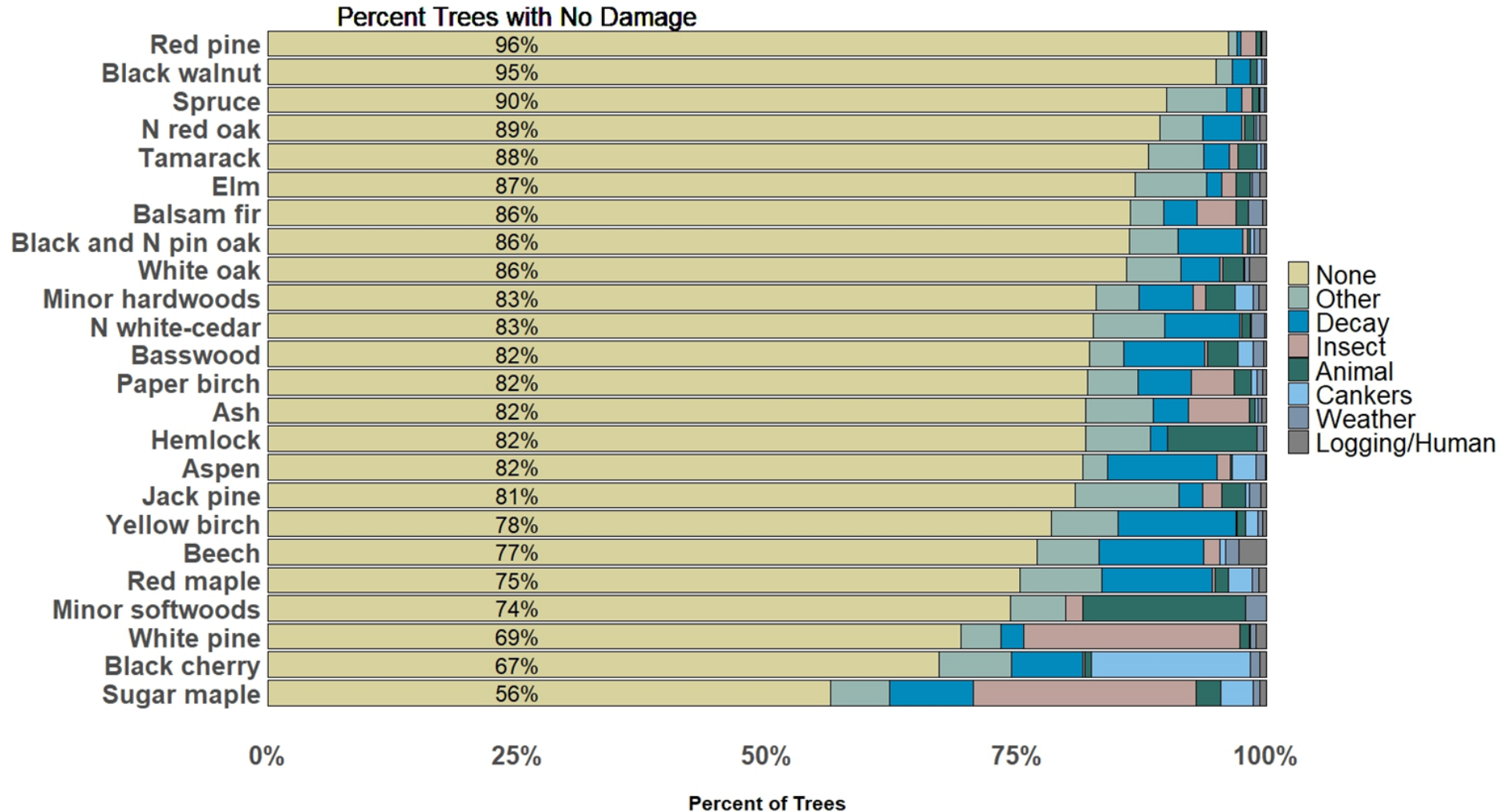
Figure 7: Trends in growth-to-removal ratio of growing stock on Wisconsin timberland  
Source: Forest Inventory and Analysis, Wisconsin, multiple years; Spencer and Thorne, 1972; Stone and Thorne, 1961

Statewide: 2.4 growth-to-removal ratio

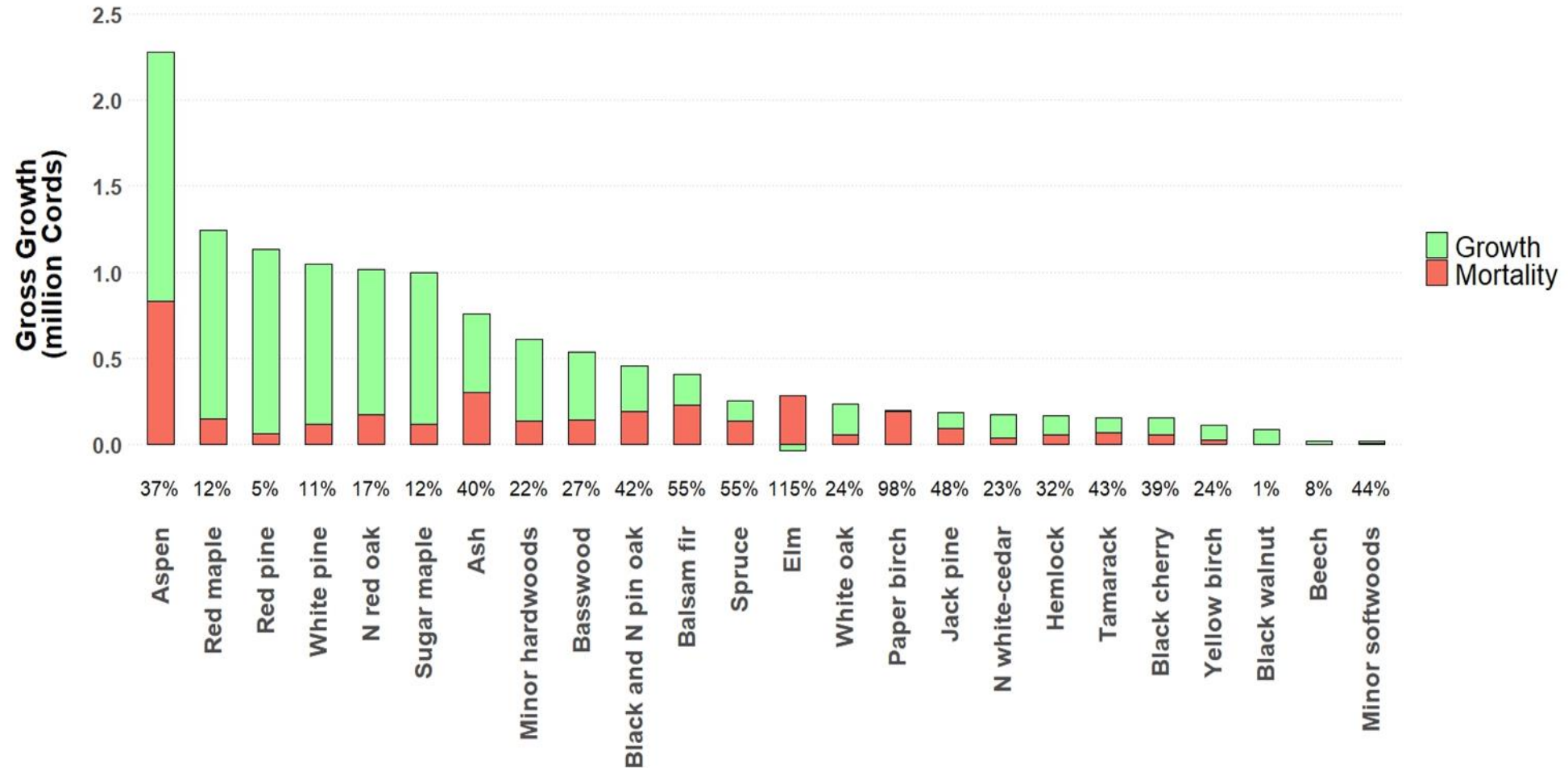
# Growth-to-Removal: Species



# Tree Health and Damage

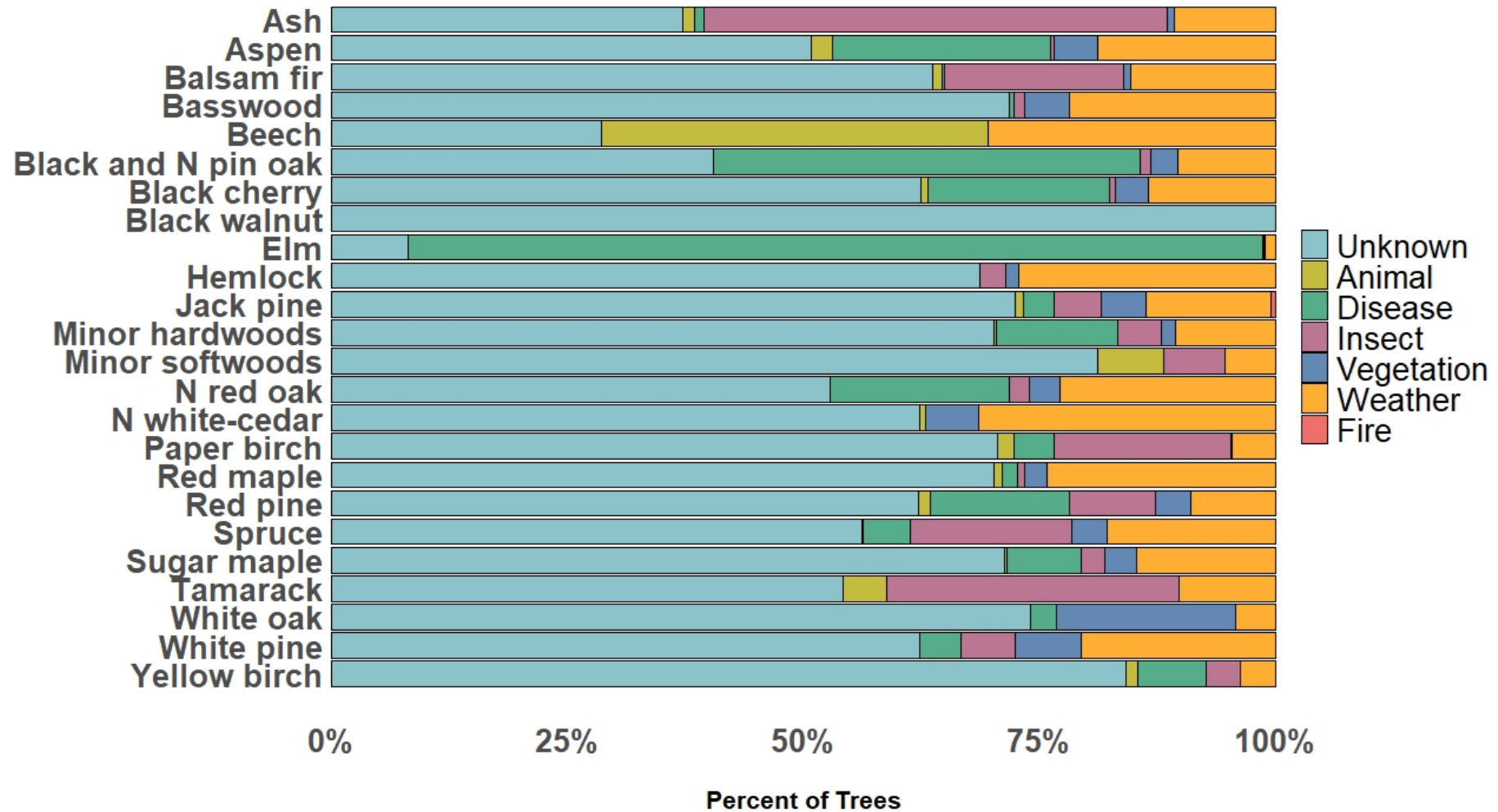


# Mortality-to-Gross Growth: Current (2021)

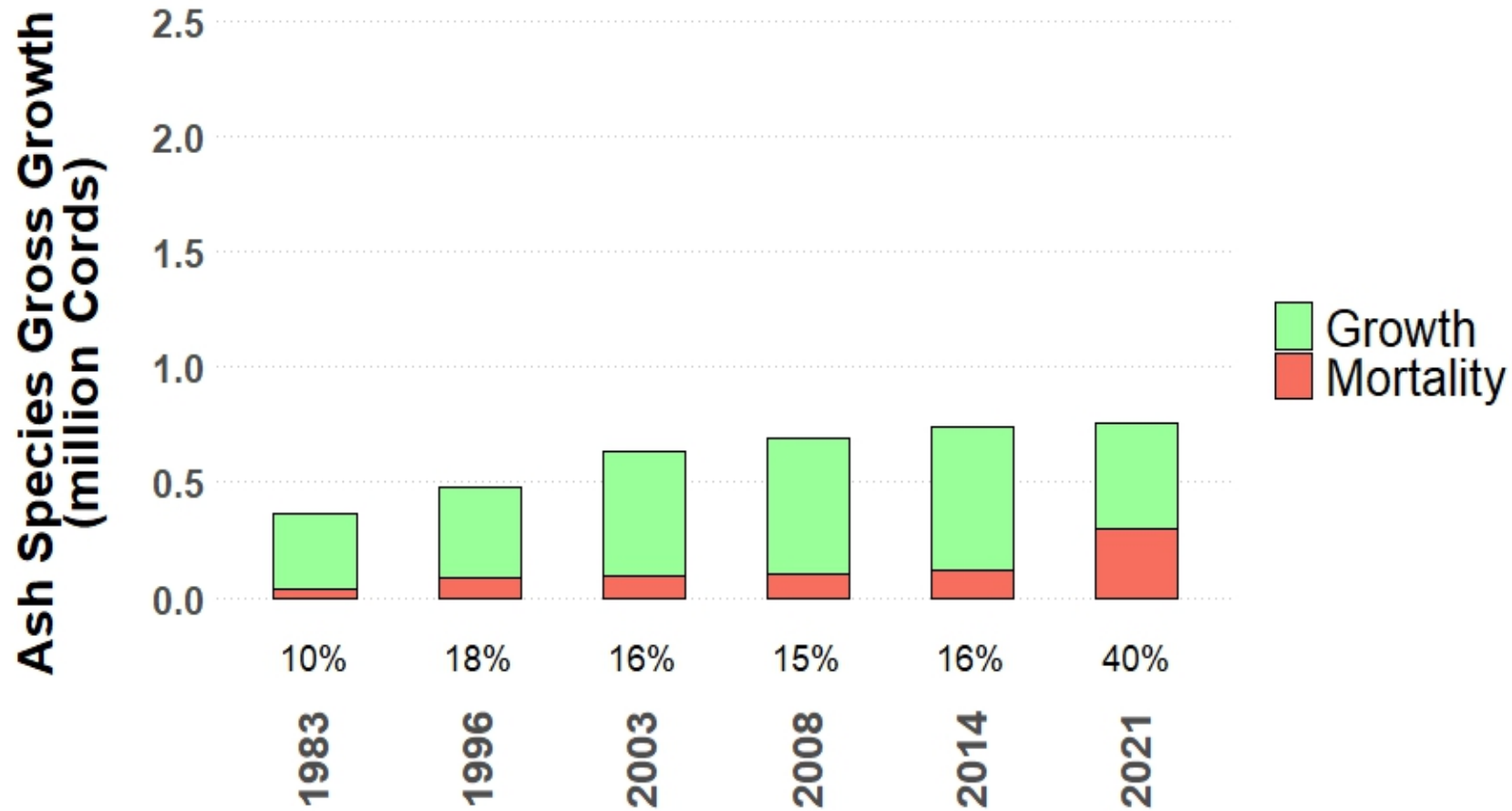


Overall ratio  
~27%

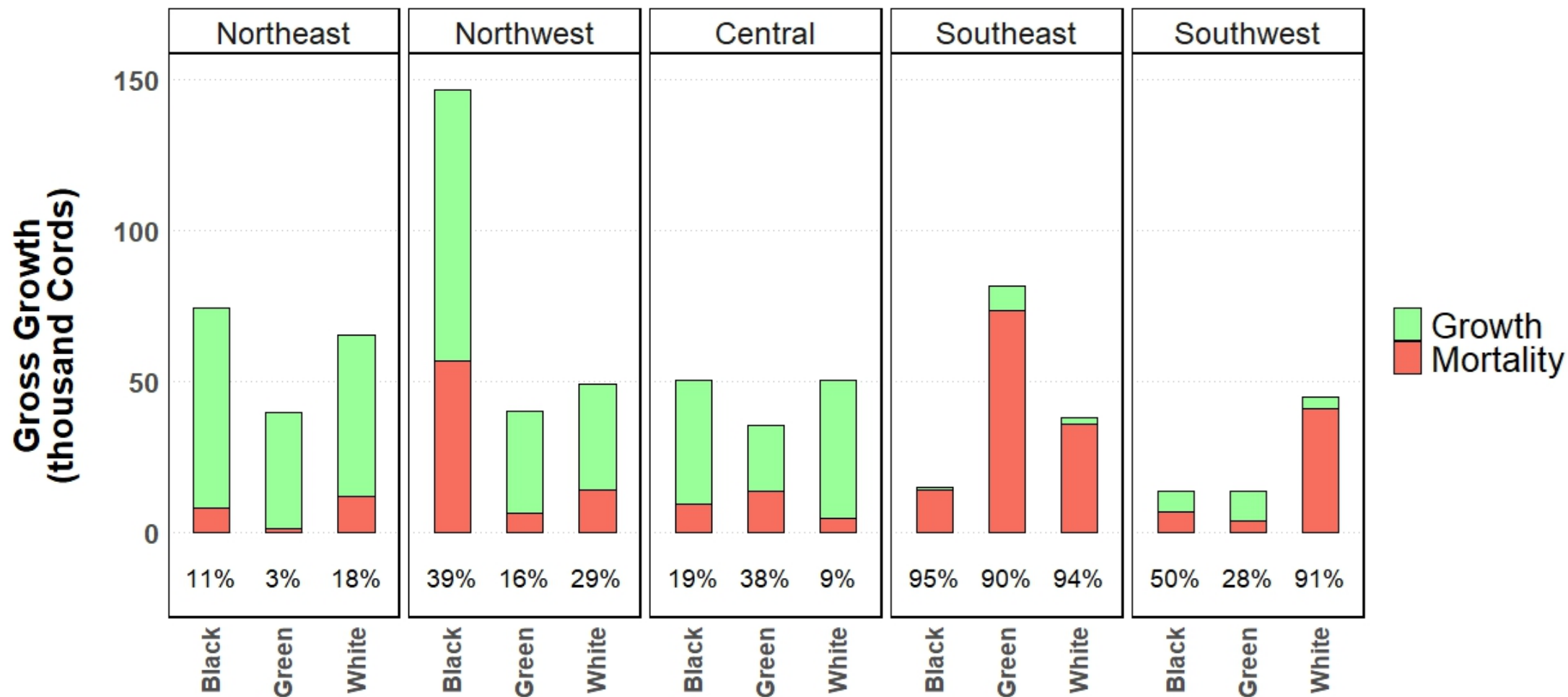
# Cause of Tree Mortality



# Temporal Trends in Ash Mortality

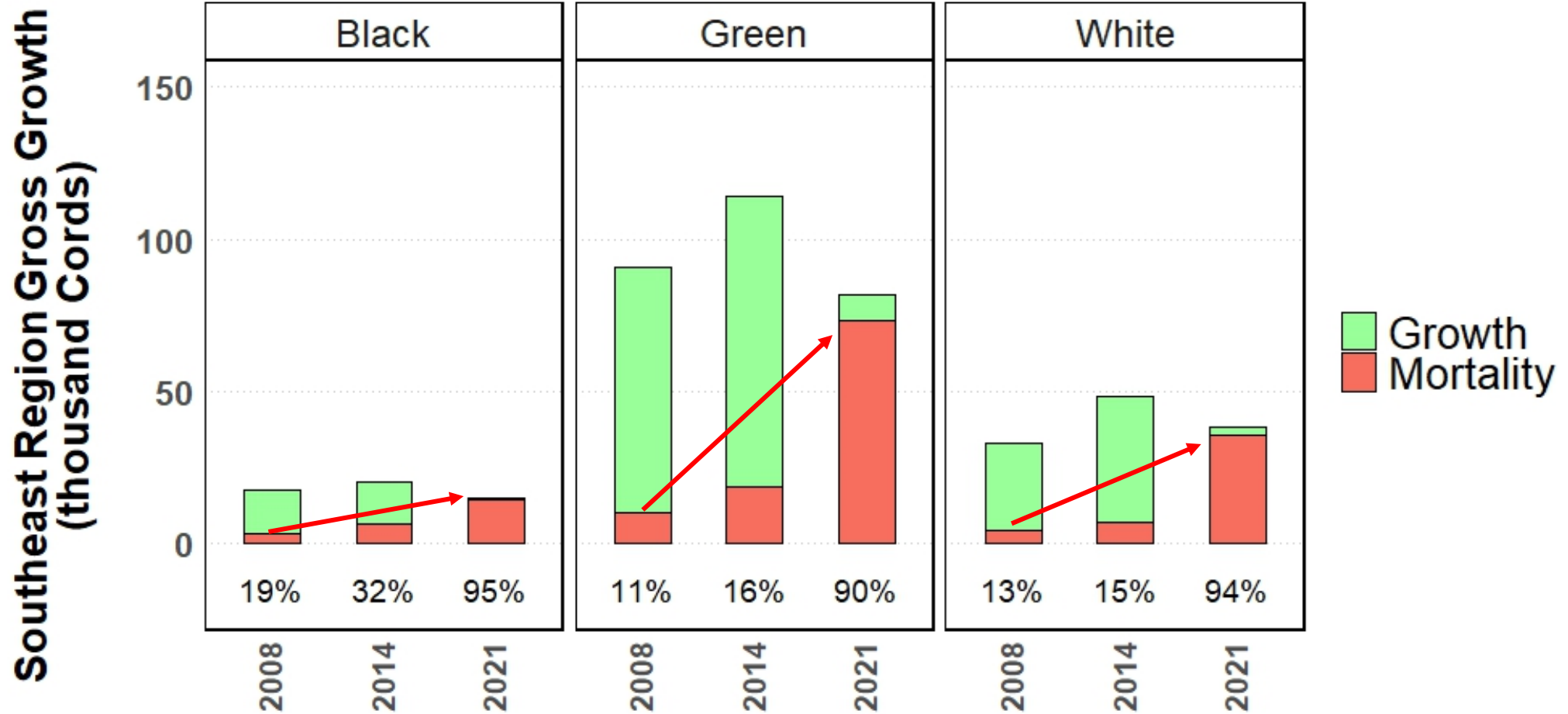


# Regional Ash Mortality: Current (2021)



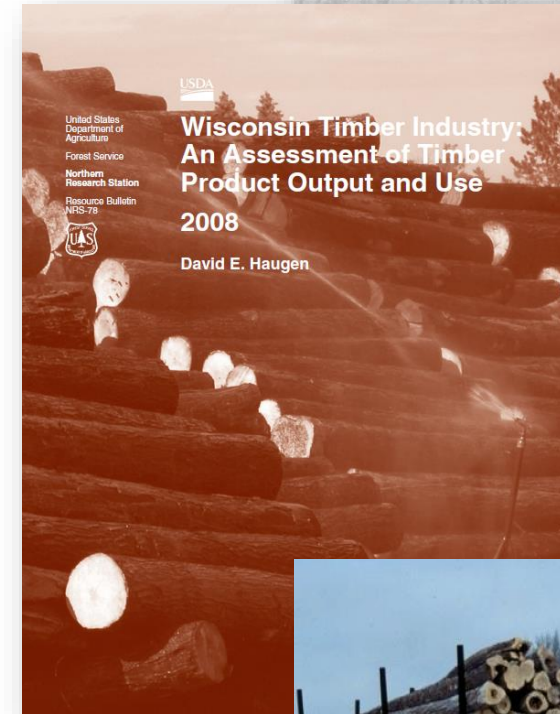


# Southeast Ash Mortality Trends

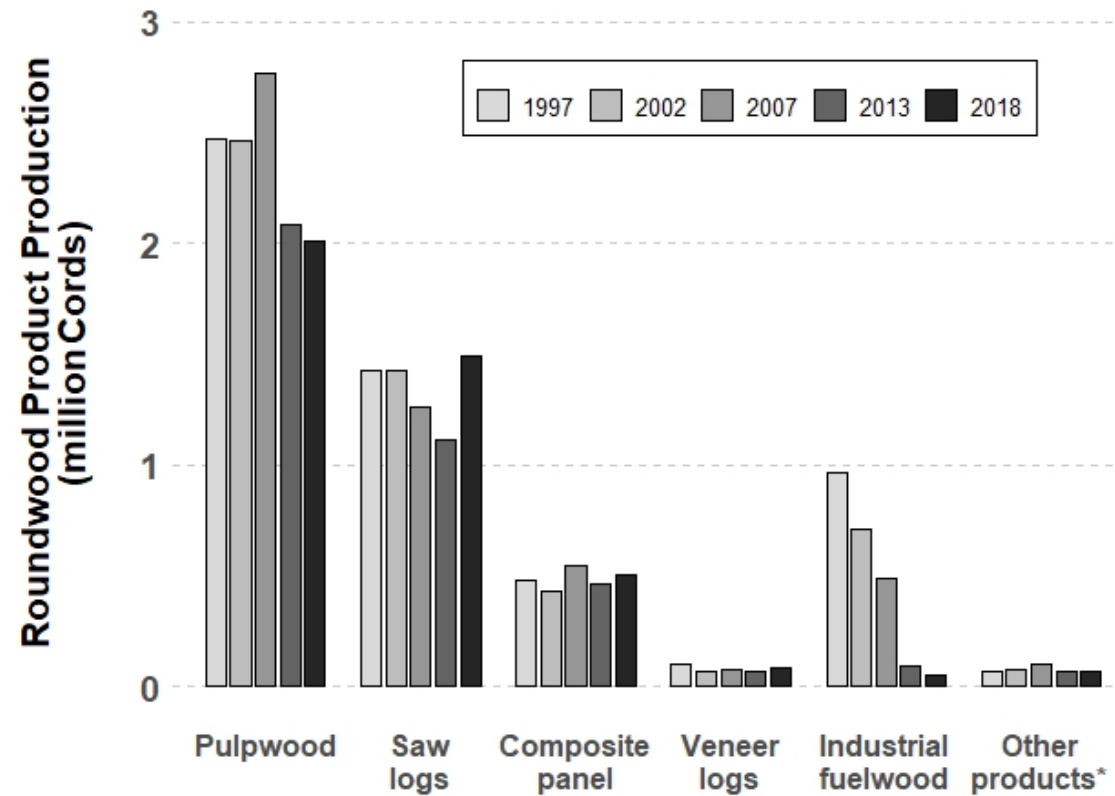


# Timber Products Output (TPO)

- Current cycle surveys 25% of mills
- 312 mills on list
- Latest available data is 2018
- USFS Challenges
  - Data backlog
  - Staffing, reporting
- Potential opportunities:
  - Customize survey, in-house
  - Increase efficiency, response with digital survey

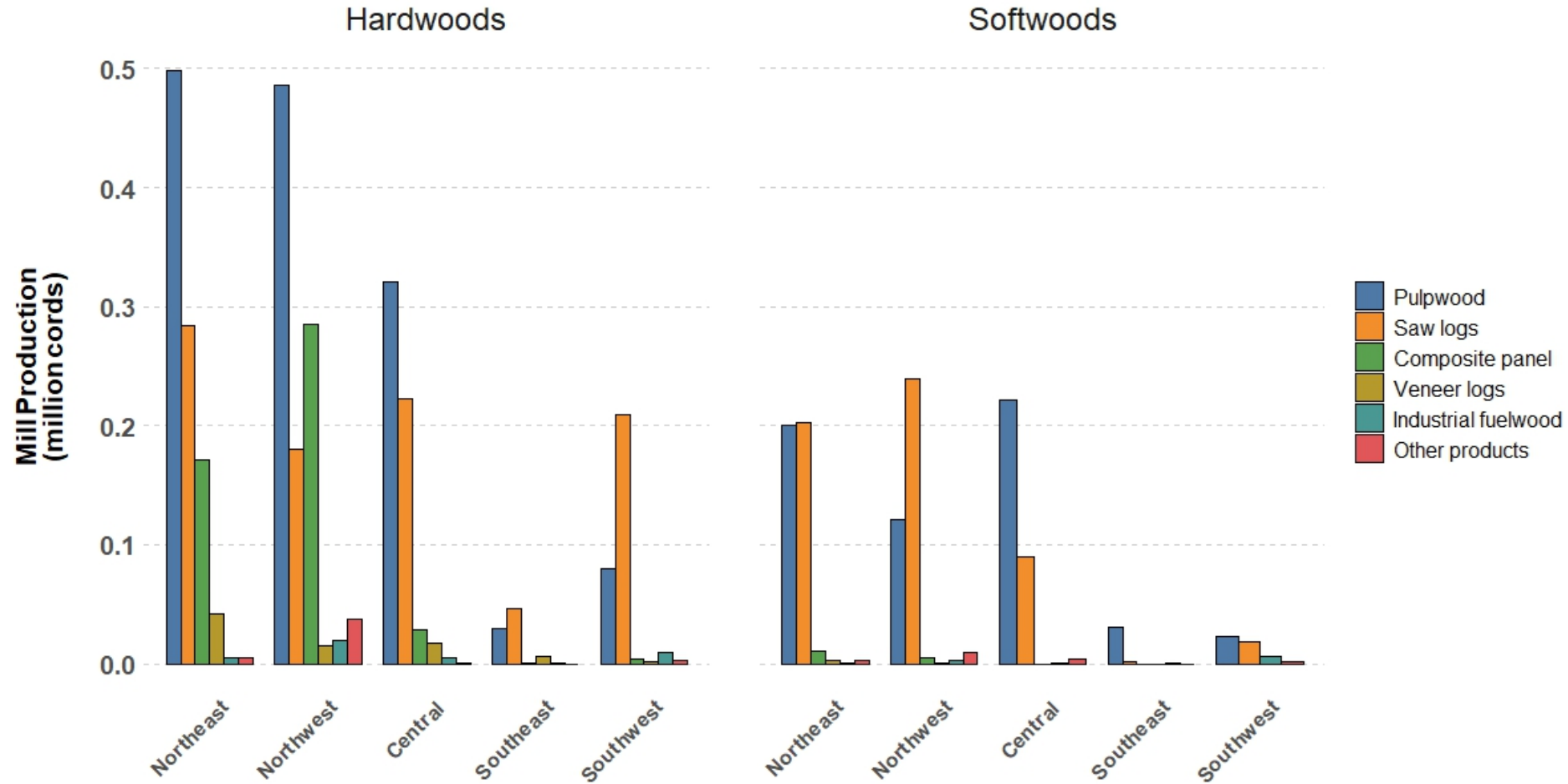


# Wisconsin Timber Products

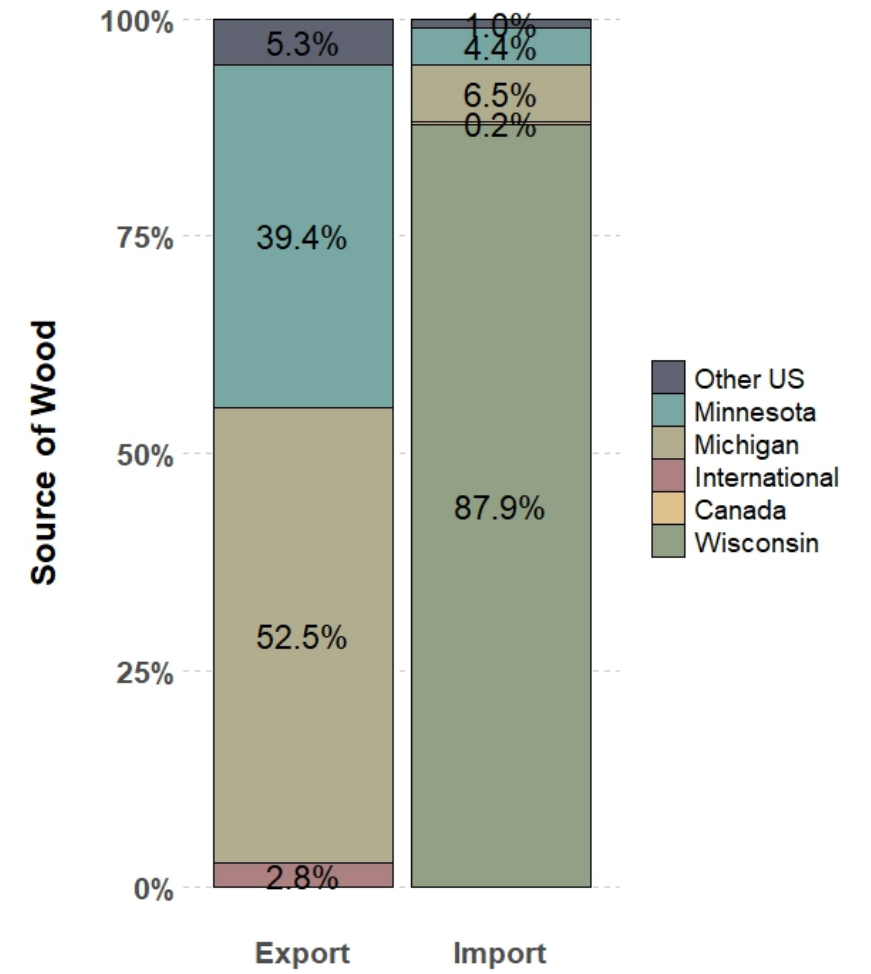
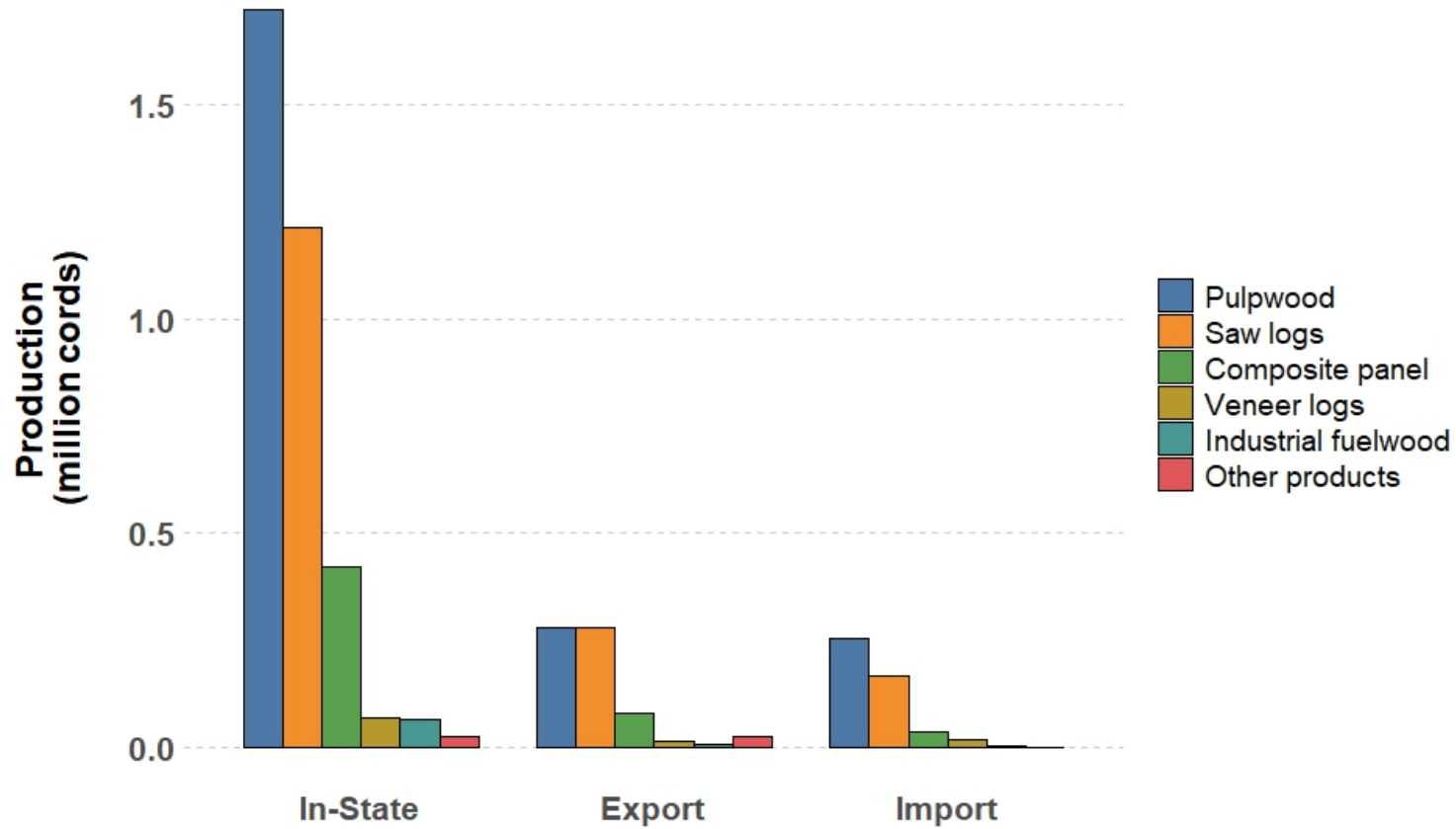


Trends in roundwood product production  
\*includes posts, poles, pilings, timbers and other misc products  
Source: USDA Timber Products Output, Wisconsin, multiple years

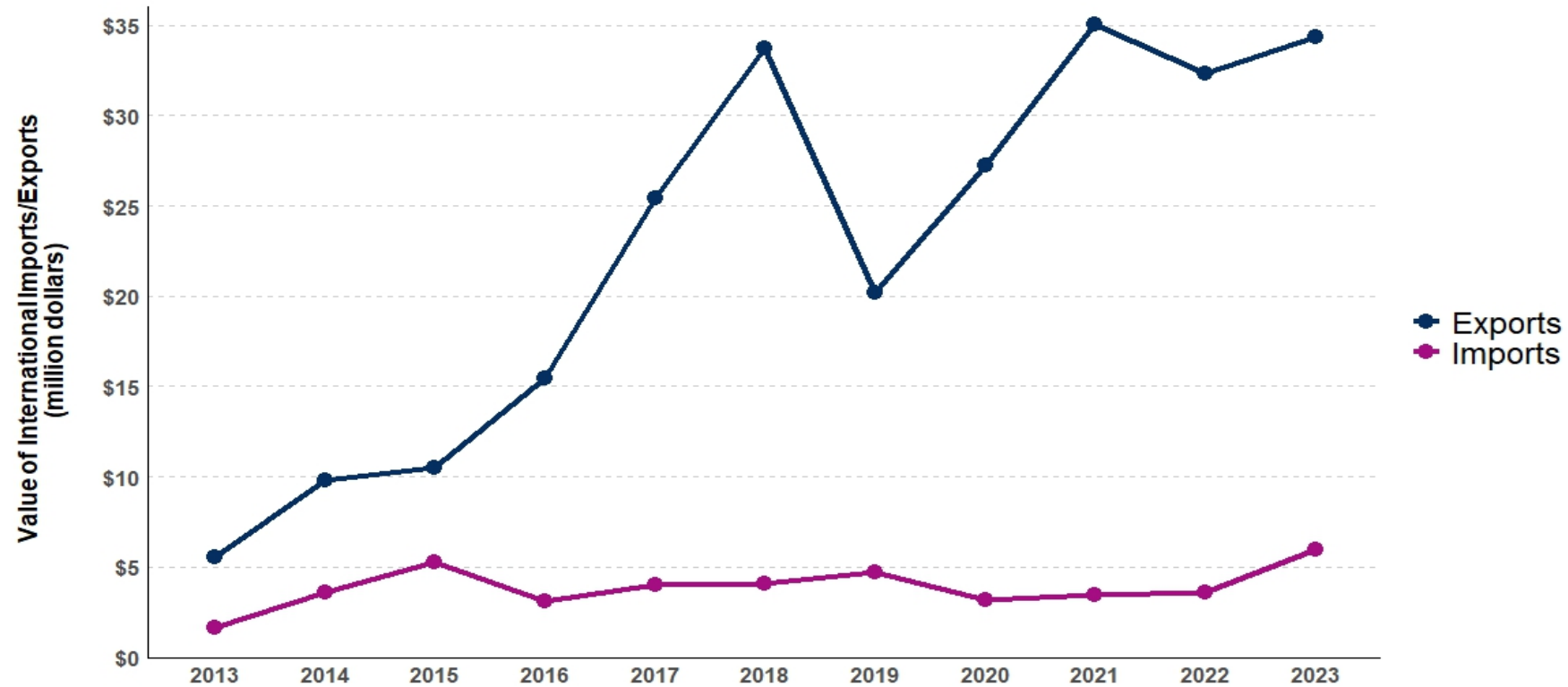
# Wisconsin Timber Products



# Imports/Exports

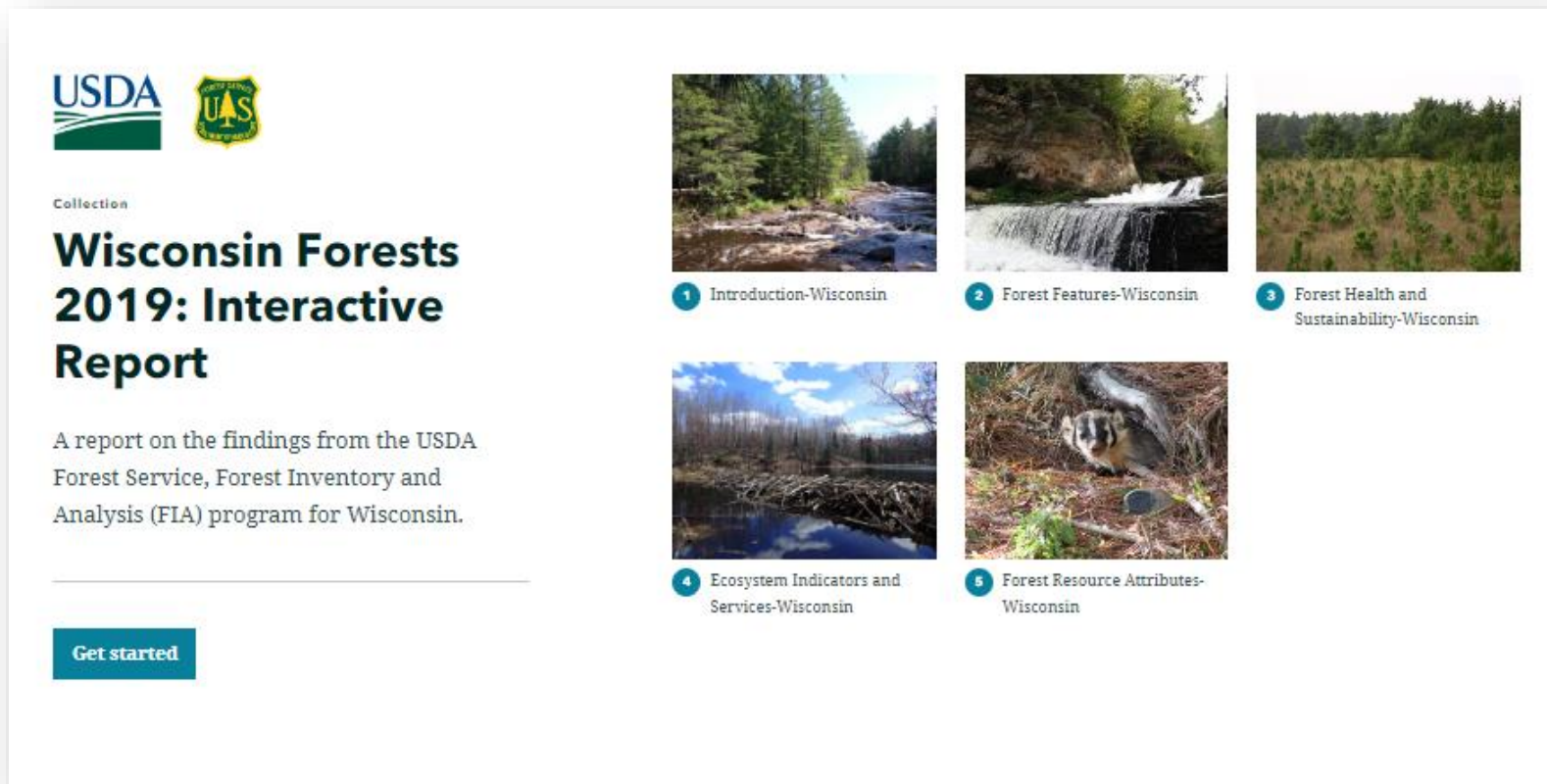


# International Imports/Exports




Wisconsin trends in value of international timber imports and exports  
Source: US Census Bureau

# USFS FIA Interactive Report



The screenshot shows the homepage of the USFS FIA Interactive Report for Wisconsin. At the top left, there are logos for USDA and the US Forest Service. Below the logos, the text reads "Collection" followed by the main title "Wisconsin Forests 2019: Interactive Report". A subtitle states: "A report on the findings from the USDA Forest Service, Forest Inventory and Analysis (FIA) program for Wisconsin." A blue "Get started" button is located at the bottom left of the main content area. On the right side, there are five numbered thumbnail images with captions: 1. Introduction-Wisconsin (river in forest), 2. Forest Features-Wisconsin (waterfall), 3. Forest Health and Sustainability-Wisconsin (field of young trees), 4. Ecosystem Indicators and Services-Wisconsin (beaver dam in pond), and 5. Forest Resource Attributes-Wisconsin (squirrel).






USDA 

Collection

## Wisconsin Forests 2019: Interactive Report

A report on the findings from the USDA Forest Service, Forest Inventory and Analysis (FIA) program for Wisconsin.

[Get started](#)

-  1 Introduction-Wisconsin
-  2 Forest Features-Wisconsin
-  3 Forest Health and Sustainability-Wisconsin
-  4 Ecosystem Indicators and Services-Wisconsin
-  5 Forest Resource Attributes-Wisconsin


<https://doi.org/10.2737/NRS-RB-127-INT>

# USFS TPO “One-Click Report”

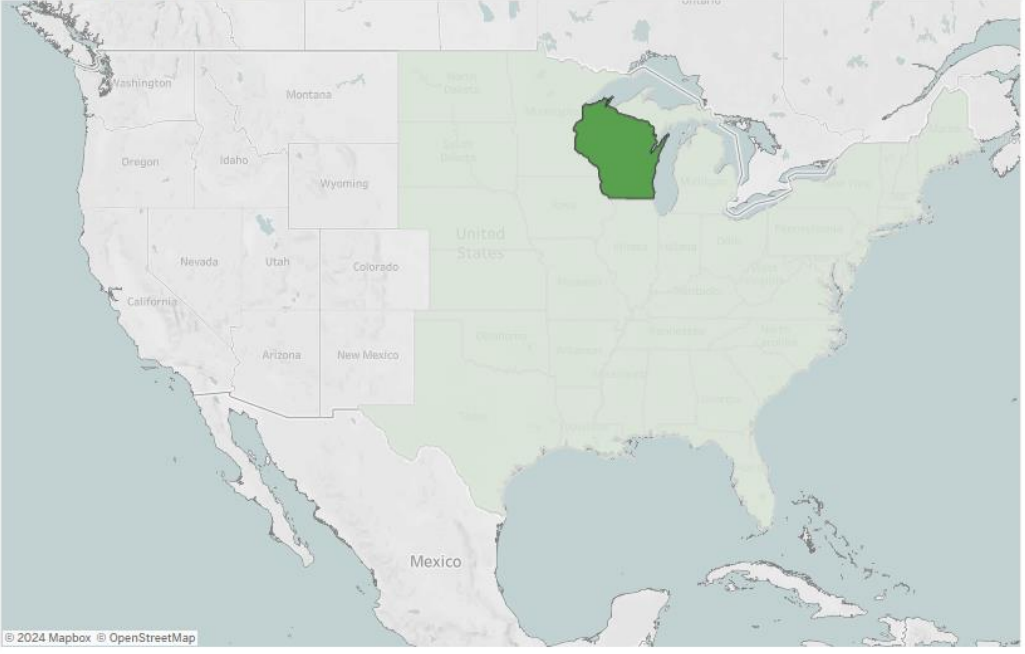
State Selection Factsheet Backpage

## Forest Inventory & Analysis One-Click TPO Factsheet

The USDA Forest Service Forest Inventory & Analysis program supplies annual updates that provide a brief overview of forest resources in each state based on an inventory conducted by the FIA program in cooperation with each State forestry agency.



Pick a state of interest and the factsheet will be generated for you. Use the back button to navigate back to the map to choose another state. Use the download button to obtain your own copy of the factsheet that interests you.

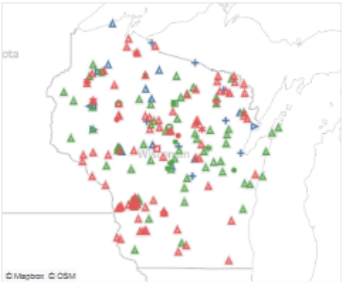


© 2024 Mapbox © OpenStreetMap

USDA United States Department of Agriculture

## Timber Product Output and Use for Wisconsin, 2018

Wisconsin forests accounted for a total of 332,927 thousand cubic feet (MCF) of timber products while the forest products industry produced a total of 316,258 MCF within the State.



This resource update contains the findings of a survey conducted on a sample of all primary wood-using mills in Wisconsin. It complements the Forest Inventory and Analysis (FIA) annual inventory of volume and removals. The survey was conducted to determine the amount and source of wood receipts and annual timber product imports/exports. Only primary wood-using mills were surveyed. Primary mills are those that process roundwood in log or bolt form or as chipped roundwood. Examples of industrial roundwood products are saw logs, pulpwood, veneer logs, poles, and logs used for composite board products. Mills producing products from residues generated at primary and secondary processors were not surveyed. Data used in this update were accessed from the FIA Timber Product Output database (see back page).

© Mapper © DSM


- Biomass/energy p...
- Composite Panel/...
- + Log home mill (inc...
- ◇ Misc - Concentrat...
- △ Miscellaneous mill
- ▽ Pole mill
- Pulp/Paper mill
- ◆ Residential Fuelw...
- ▲ Saw mill (includes...
- ★ Veneer/plywood mill
- Hardwood
- Hardwood/Softwood
- Softwood

Wisconsin had a total production of 332,927 MCF in 2018.

There were about 208 primary wood processing mills in the State.

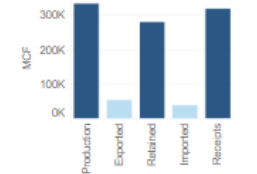
Statewide roundwood production (% of total) by product

Pulpwood	47.8%	85
Saw logs	35.5%	42
Composite panel	12.0%	17
Veneer logs	2.0%	2
Bioenergy/Fuelwood	1.2%	1
Miscellaneous*	1.1%	1
Poles/Posts/Pilings	0.2%	2
House logs	0.2%	1



\*Misc. includes all roundwood uses not listed

Wisconsin imported 38,186 MCF into the State and exported 84,885 MCF out of the State making them a net exporter of roundwood.



Total roundwood production

Year	Hardwood (MCF)	Softwood (MCF)
2018	~180,000	~150,000

USDA Forest Service - Forest Inventory & Analysis



# CONNECT WITH US

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**608-225-0704**



/WIDNR



@WIDNR



@WI\_DNR



/WIDNRTV



"WILD WISCONSIN:  
OFF THE RECORD"