

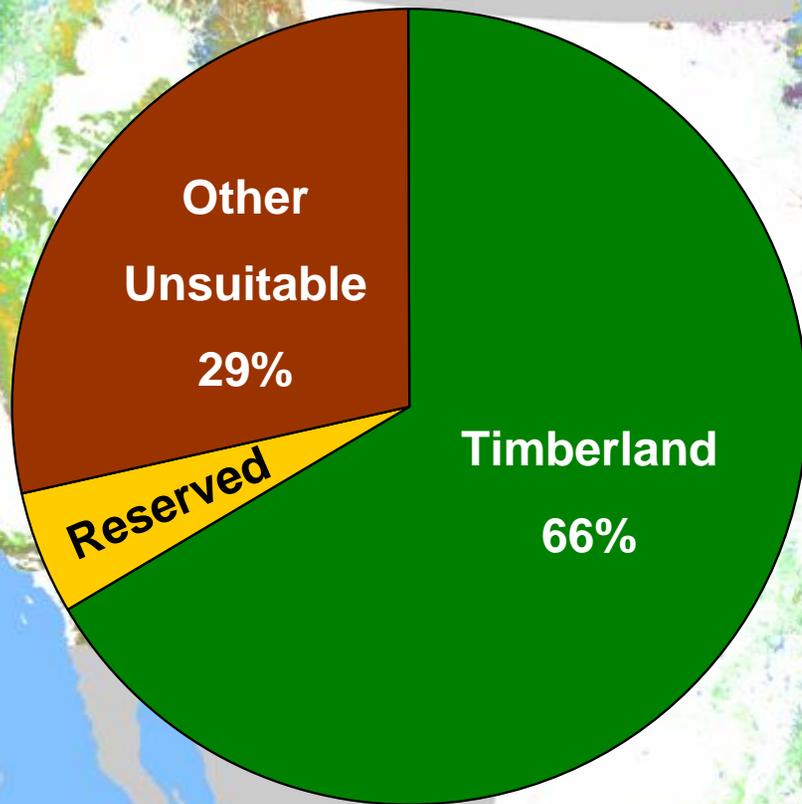
Forest Sustainability: Seven Simple Concepts

Steve Shifley
USDA Forest Service
Northern Research Station
Columbia, Missouri



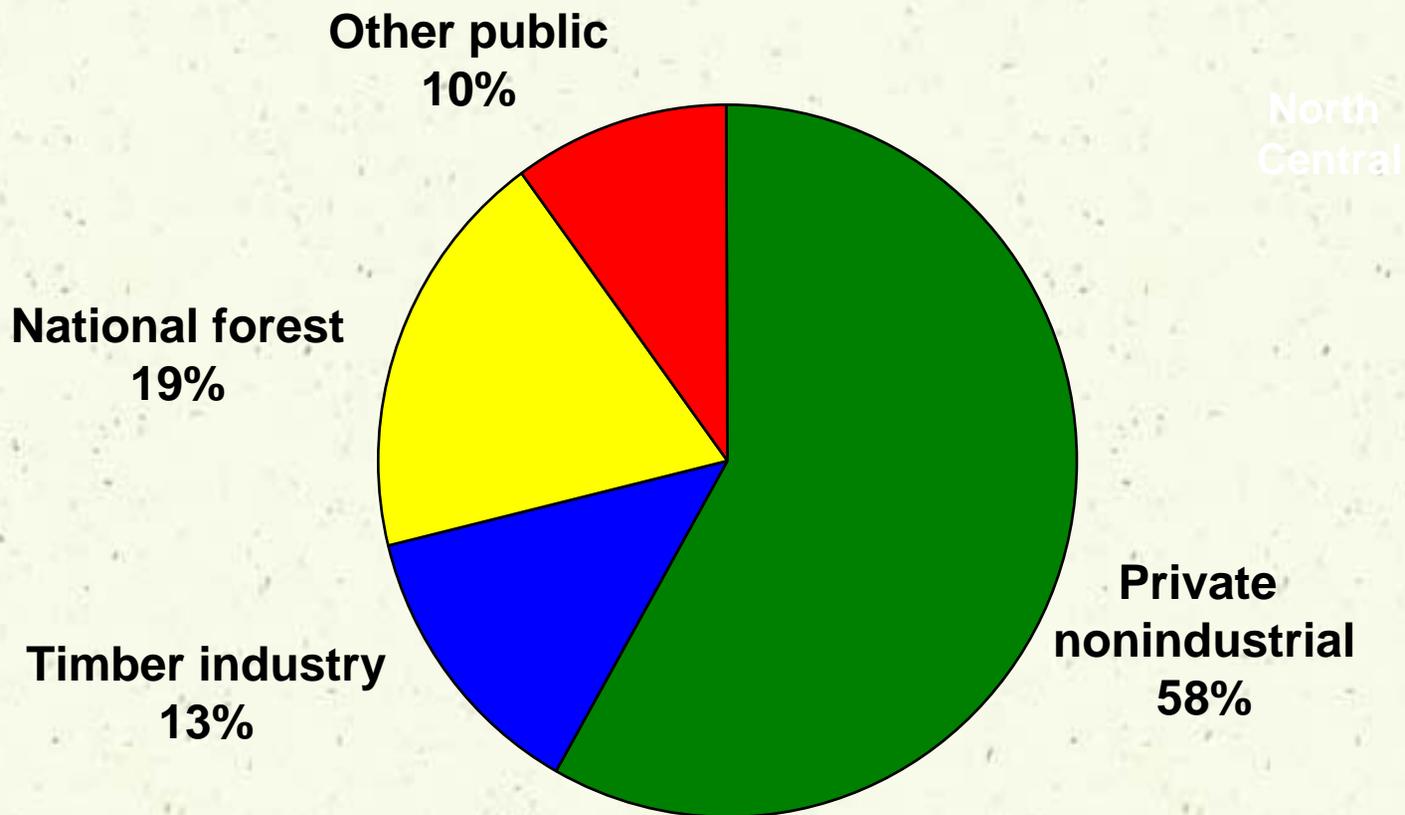
Outline

- **U.S Forests in Context**
 - Area
 - Ownership
 - History
- **Sustainable Forestry**
 - The big picture in seven simple concepts
 - ...One guy's view
 - With specifics for Missouri
 - With specifics for the Northeastern Area

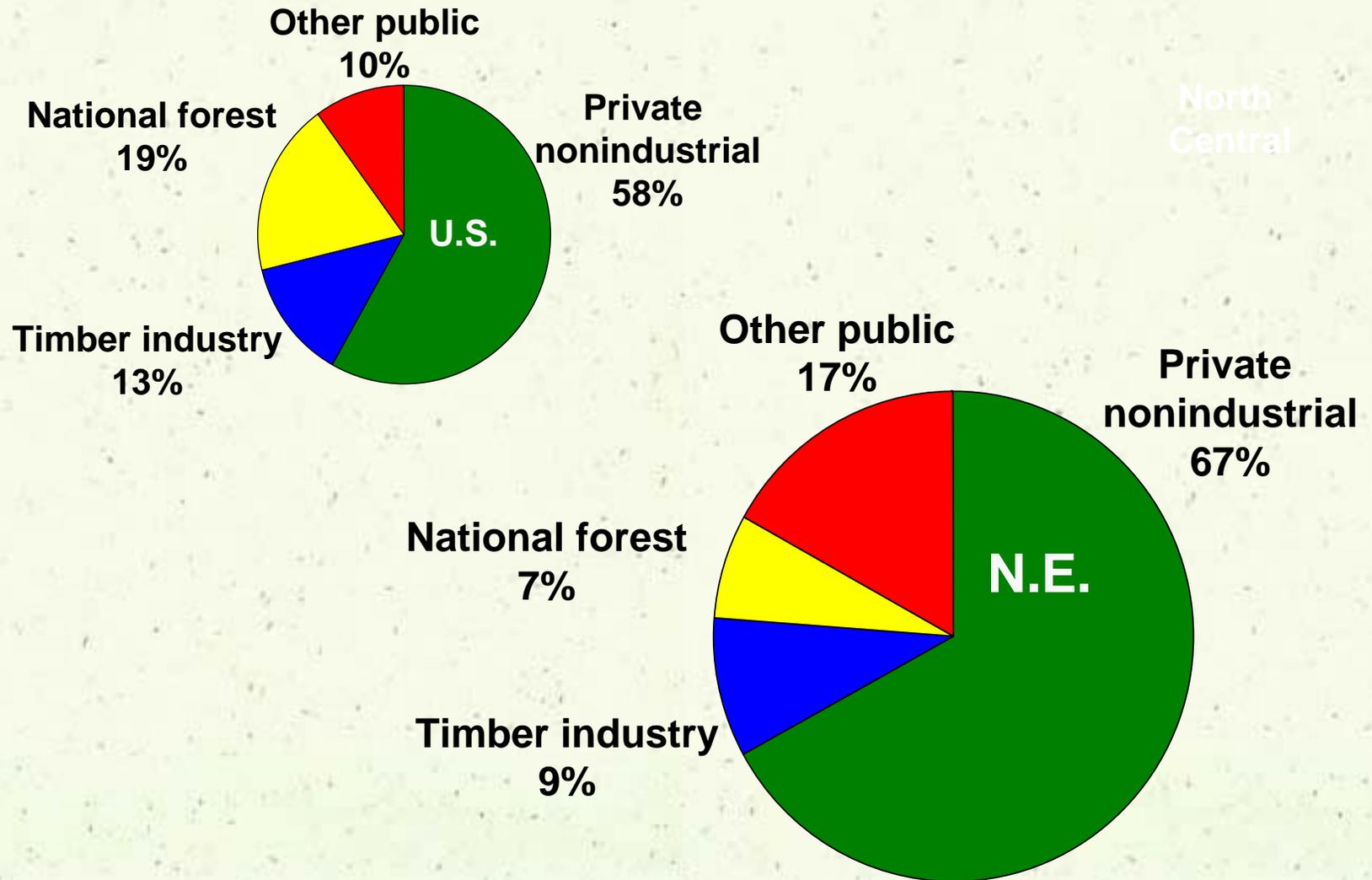


- There are 747 million acres of forest land in the U.S. That is one-third of the total U.S. land area.
- Of the total forest land in the U.S., 500 million acres (66%) are timberland (suitable for timber production). That is one-fifth of the total U.S. land area.
- The total area of forestland in the U.S. has changed little since 1920.

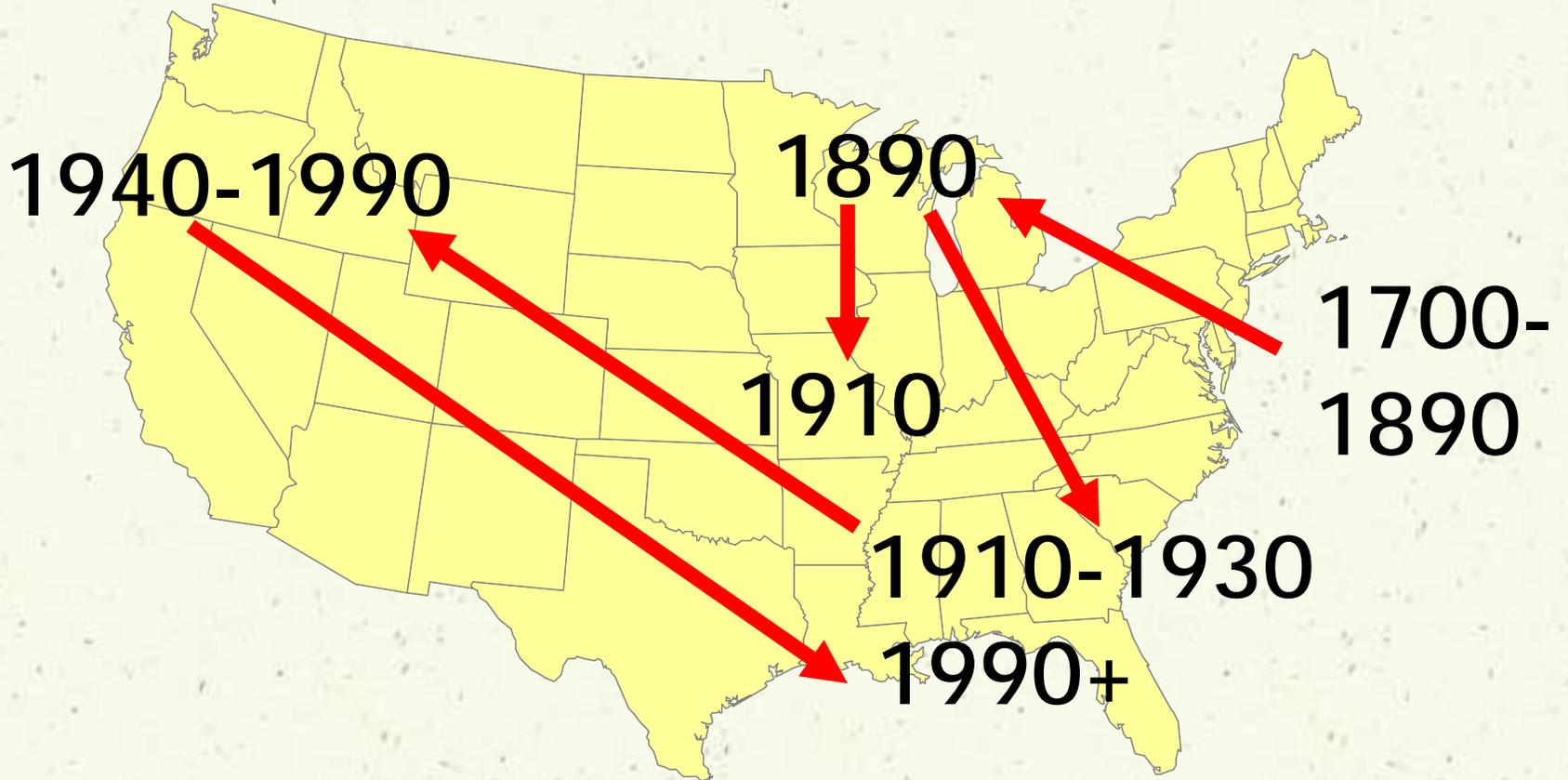
Timberland Ownership in the U.S.



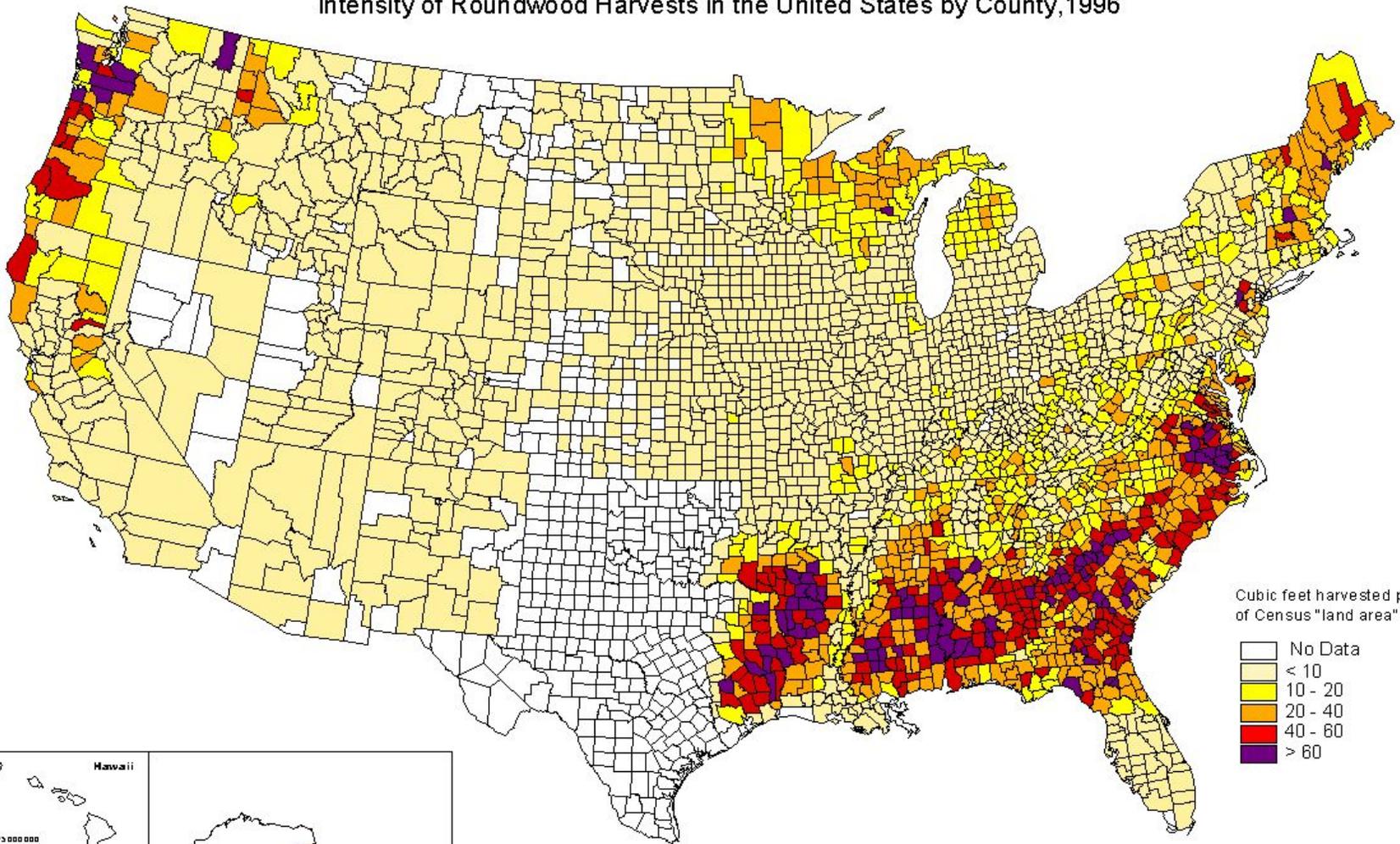
Timberland Ownership



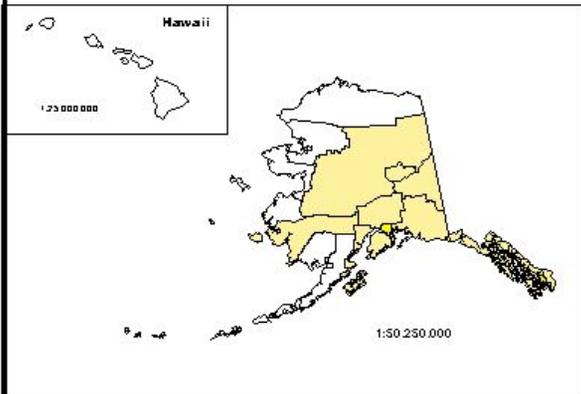
15-second history of U.S. logging industry



Intensity of Roundwood Harvests in the United States by County, 1996



Cubic feet harvested per acre of Census "land area"

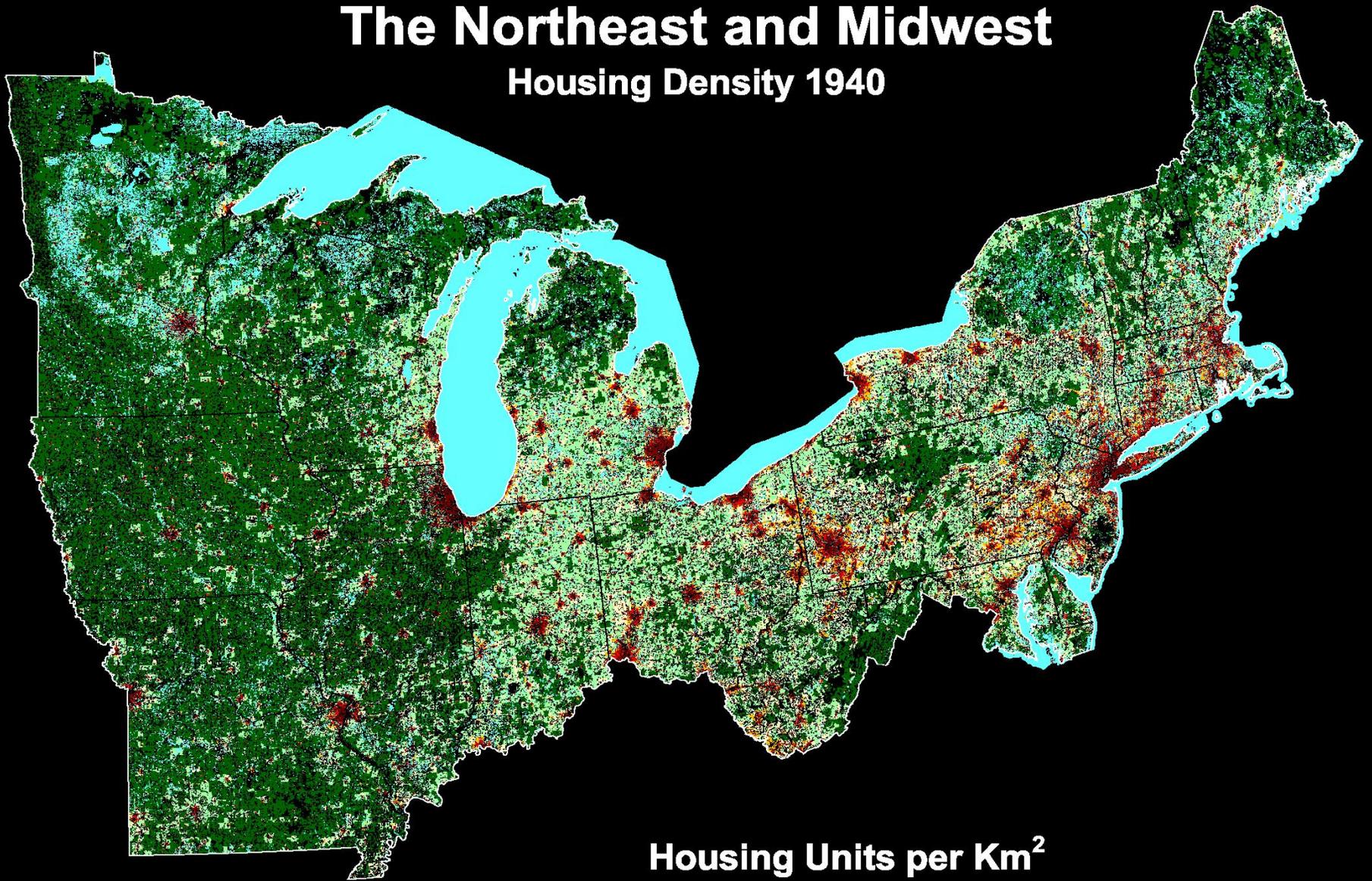


Data Sources: John Vissage
RPA Database Manager
USDA Forest Service
Forest Inventory and Analysis
1990 US Census
Map compiler: Dale Gormanson
NCRS - FIA
St. Paul, MN

Volume reported for grouped counties was evenly distributed across the counties in each group and divided by 1990 US Census "land area"

The Northeast and Midwest

Housing Density 1940

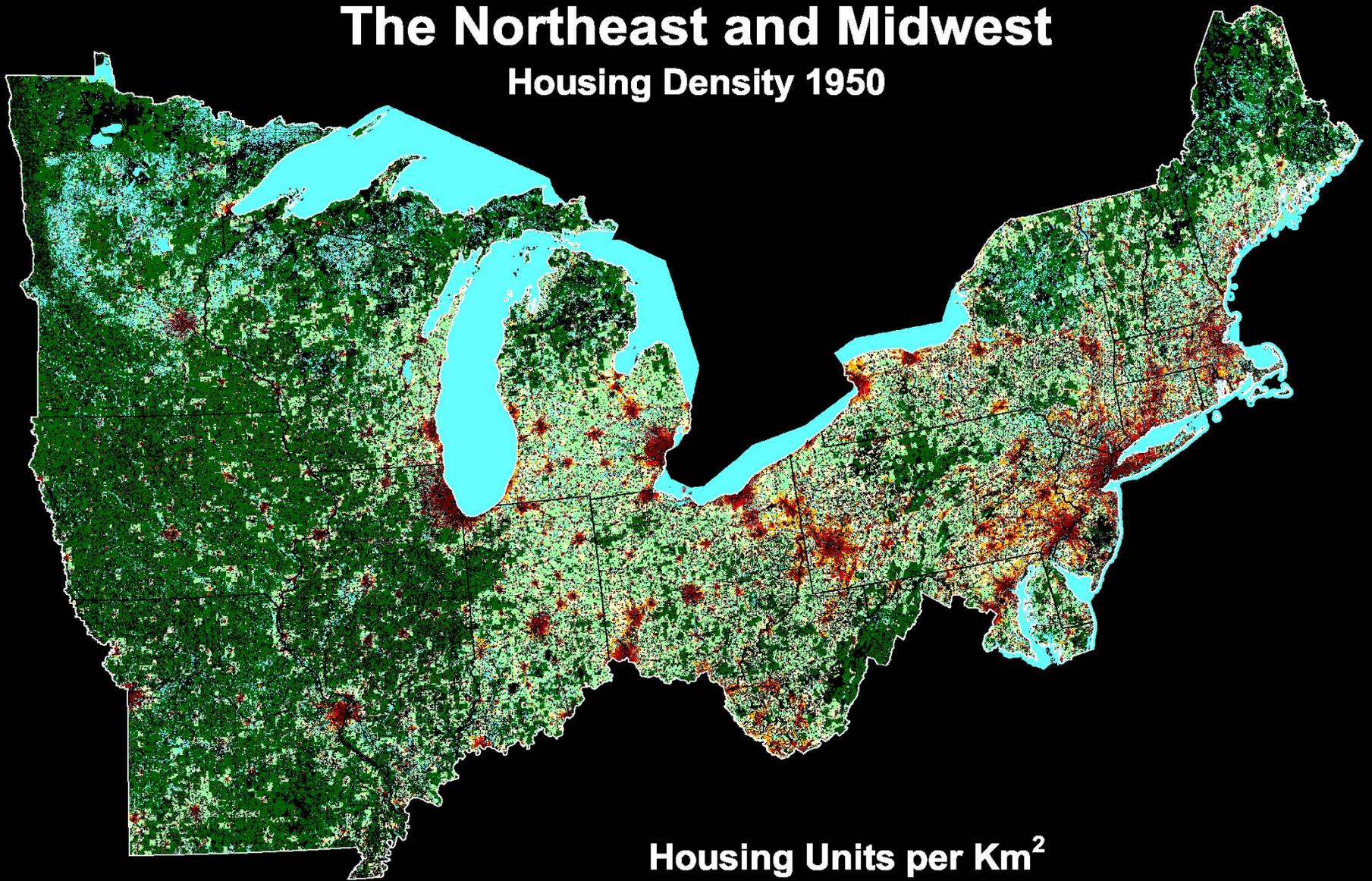


Housing Units per Km²



The Northeast and Midwest

Housing Density 1950

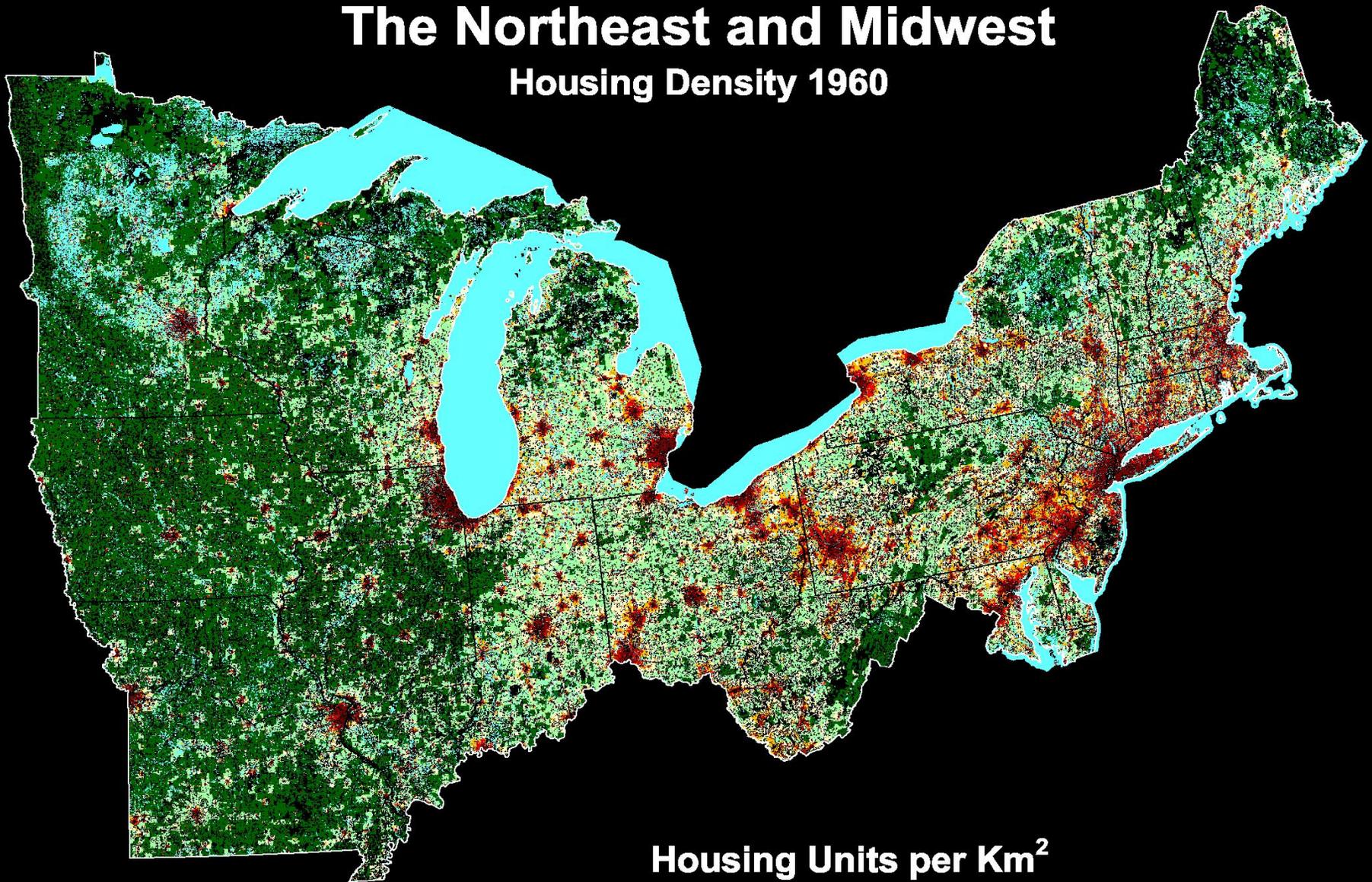


Housing Units per Km²



The Northeast and Midwest

Housing Density 1960

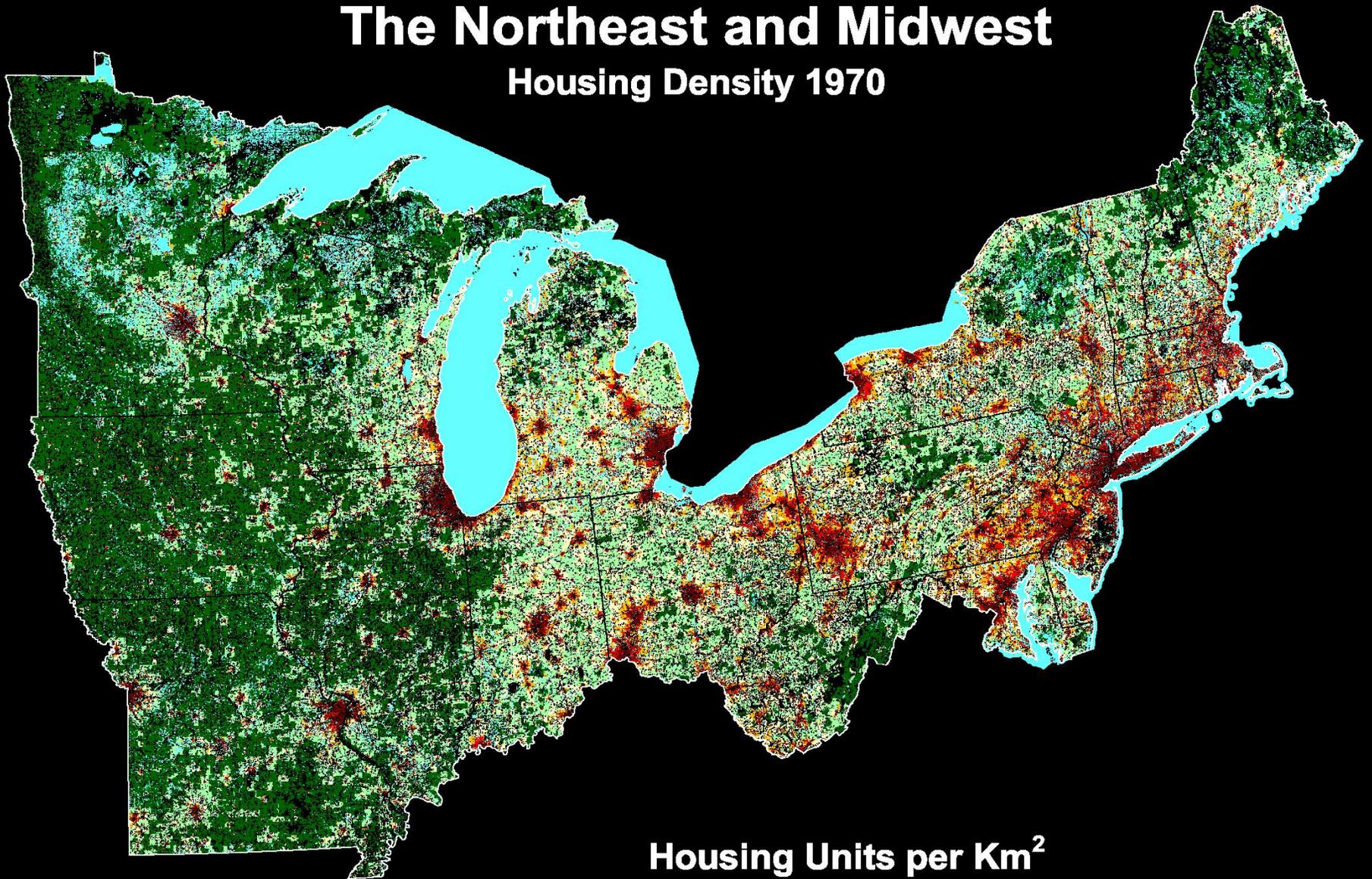


Housing Units per Km²



The Northeast and Midwest

Housing Density 1970

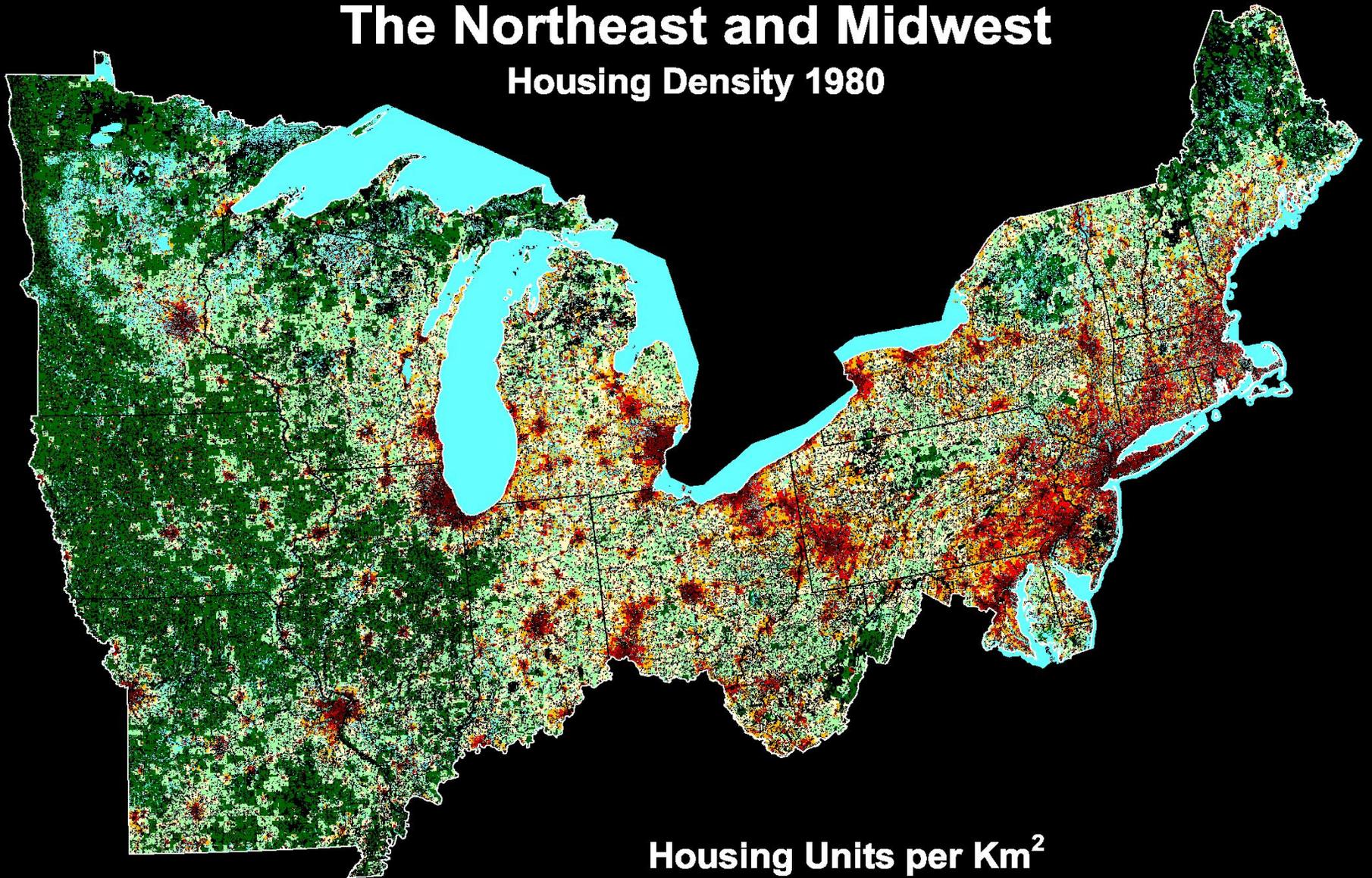


Housing Units per Km²



The Northeast and Midwest

Housing Density 1980

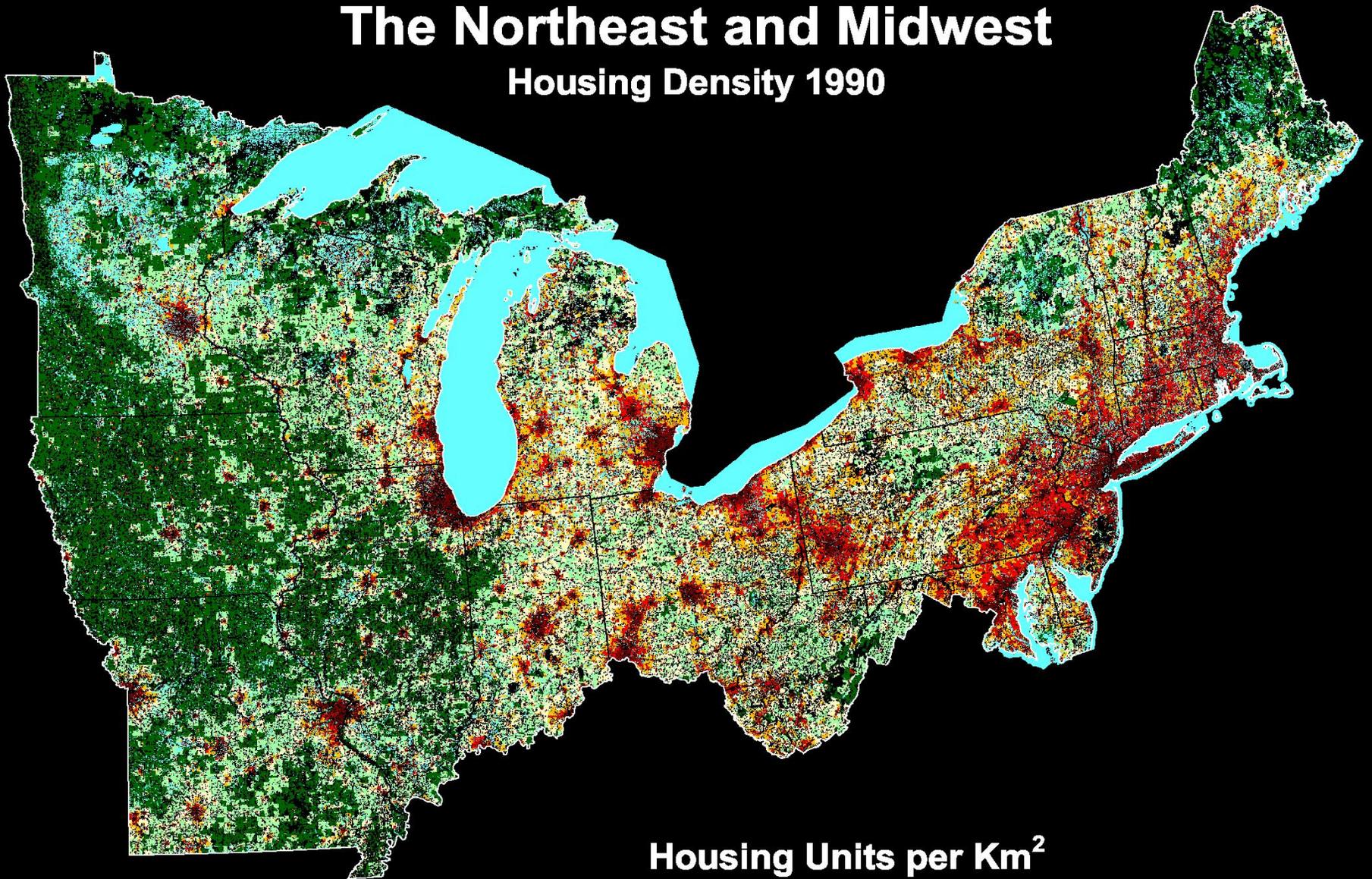


Housing Units per Km²



The Northeast and Midwest

Housing Density 1990

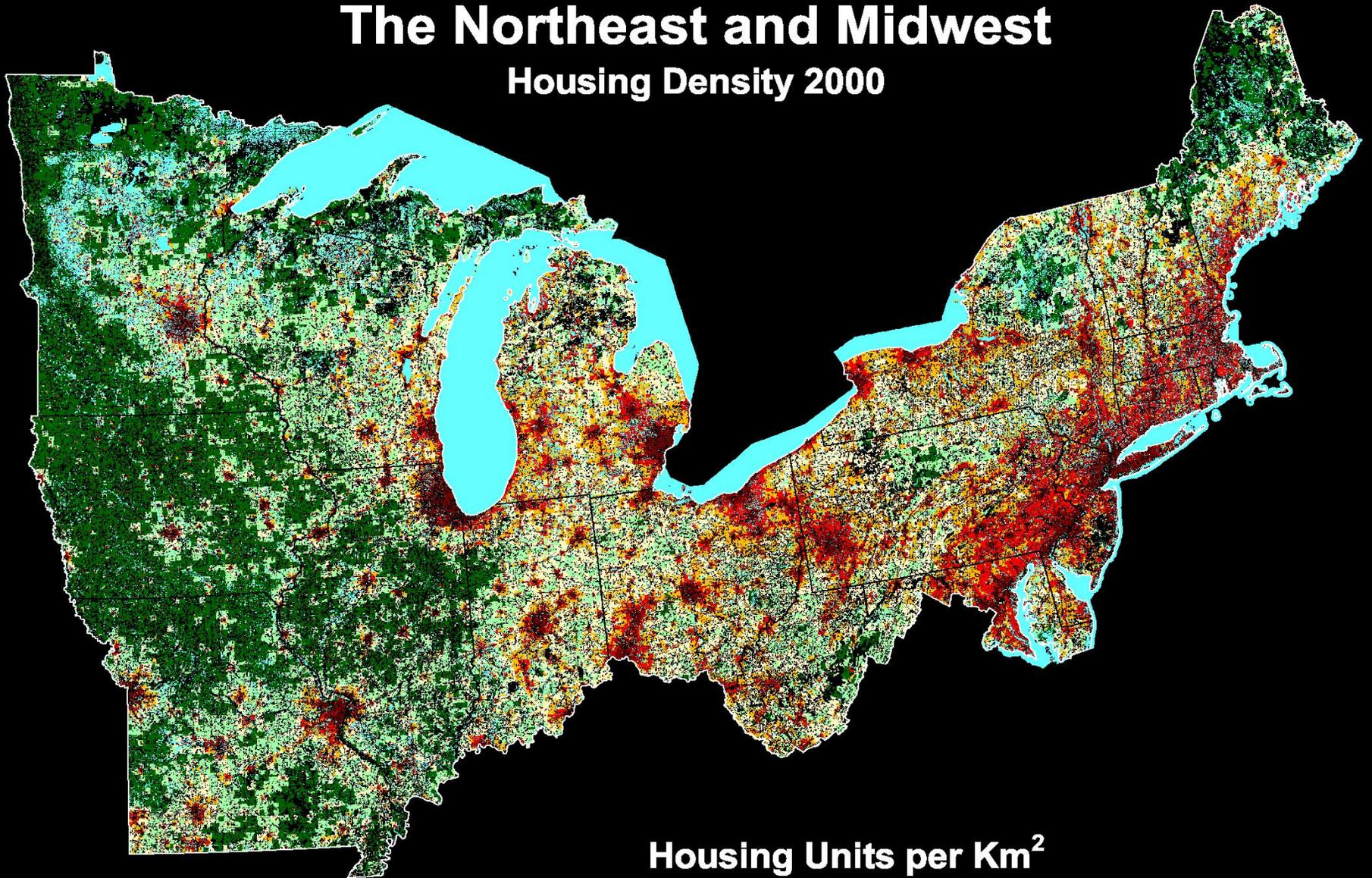


Housing Units per Km²



The Northeast and Midwest

Housing Density 2000

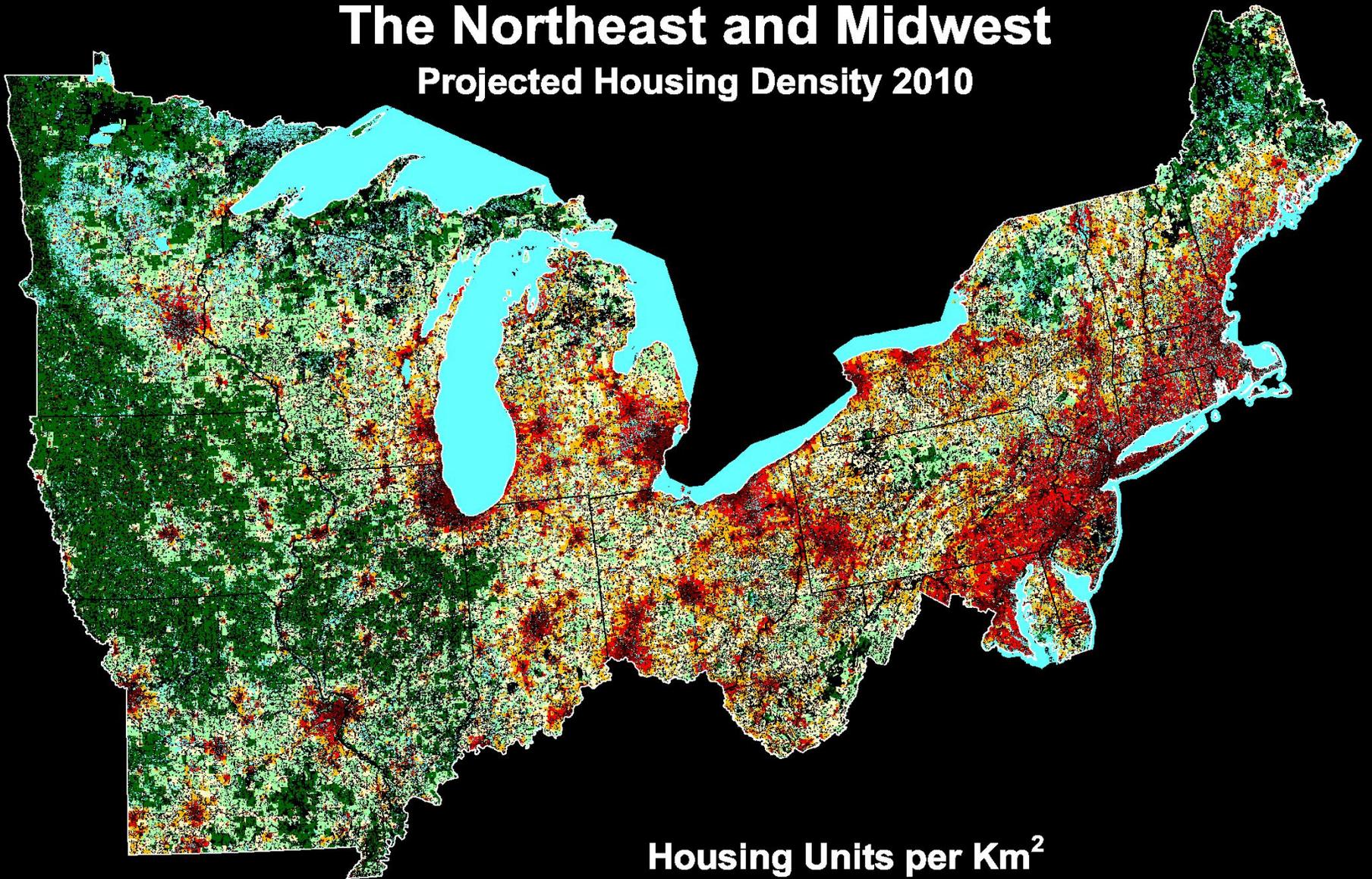


Housing Units per Km²



The Northeast and Midwest

Projected Housing Density 2010

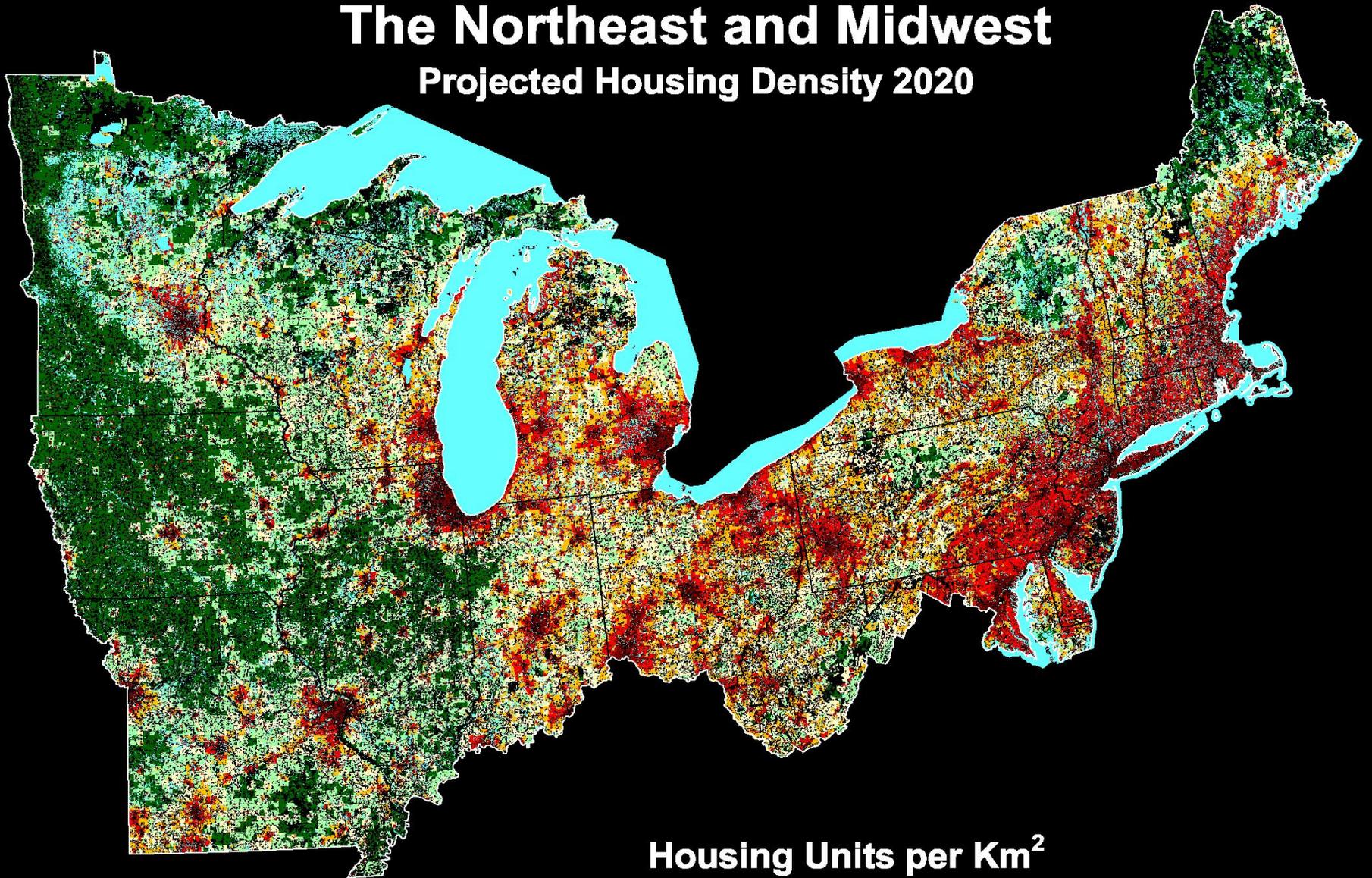


Housing Units per Km²



The Northeast and Midwest

Projected Housing Density 2020

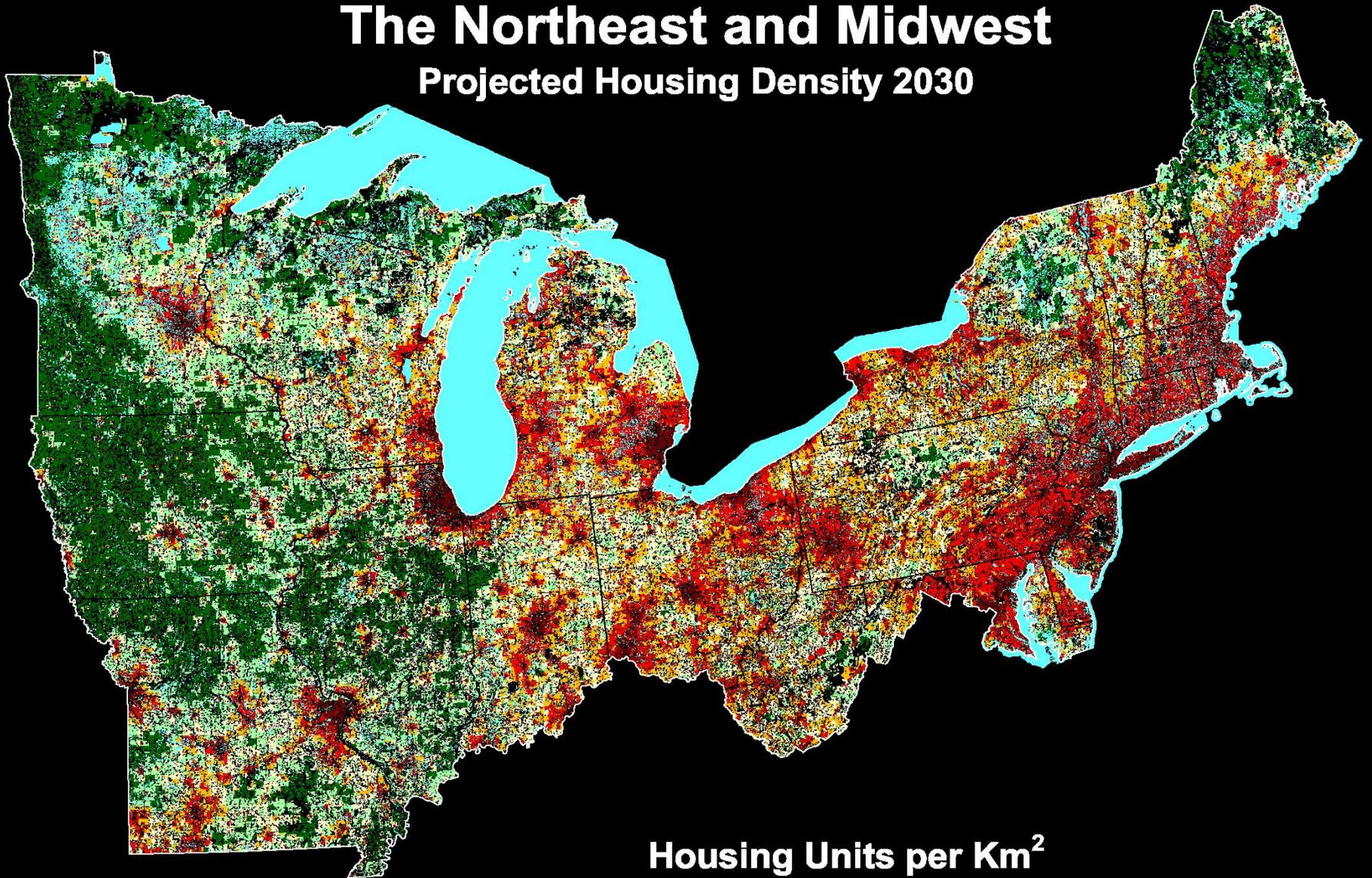


Housing Units per Km²



The Northeast and Midwest

Projected Housing Density 2030

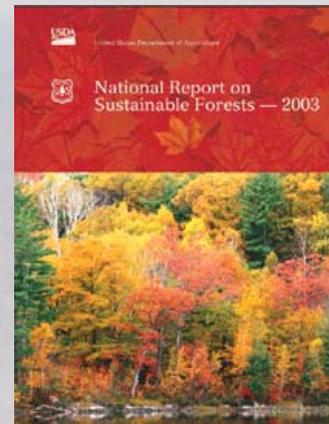


Housing Units per Km²



Sustainable Forests

- Issues can be very complex.
- We are good at gathering data.
 - Montreal Criteria and Indicators
- Not so good at defining critical thresholds based on those data. What constitutes unsustainability?
- What are some first principles of sustainable forestry?
- Limited understanding of the long-term, large-scale context.



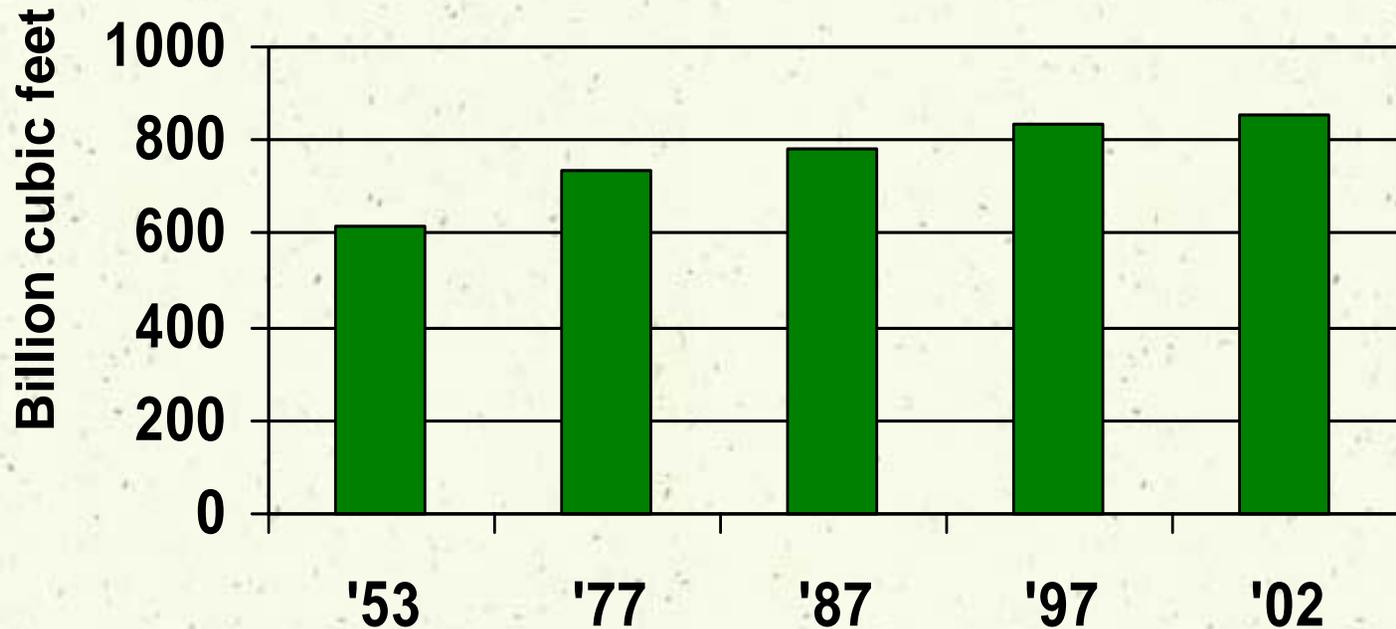


Sustainable Forestry

Concept #1 of 7

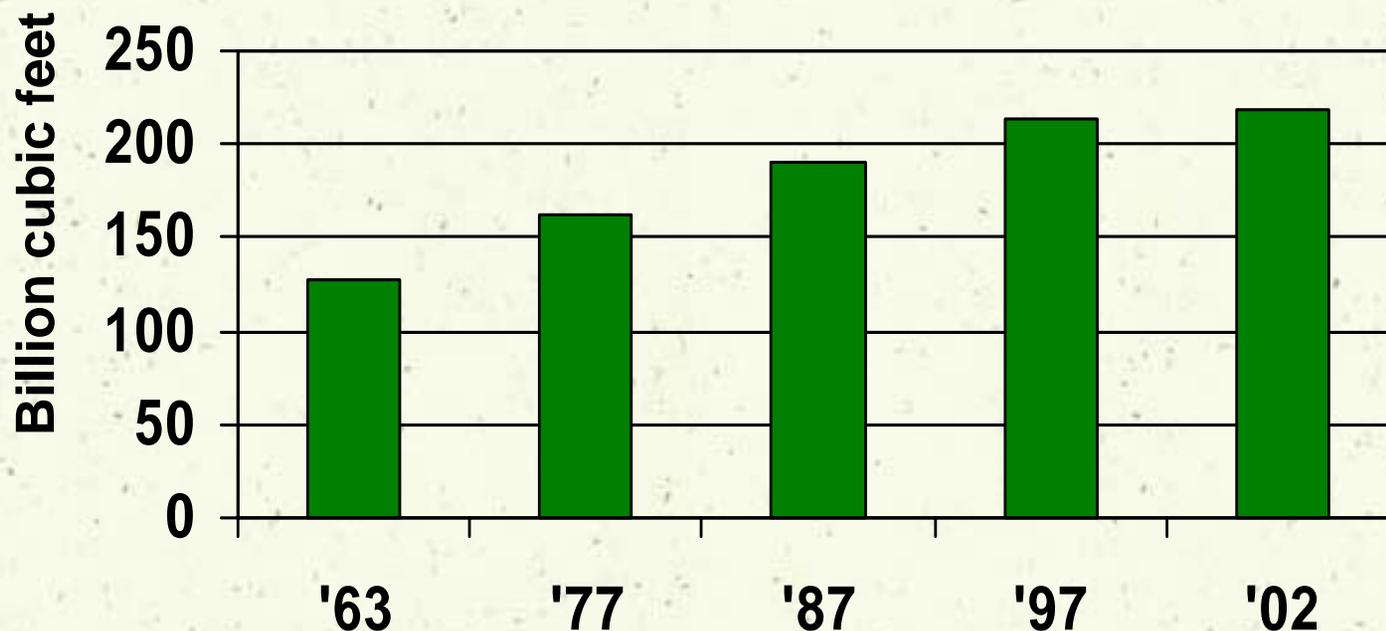
- **Forested ecosystems are not sustainable if volume or biomass losses exceed growth over large areas or long time periods.**
- **The concept of sustained yield**

U.S. Growing Stock (856 billion cubic ft. in 2003)



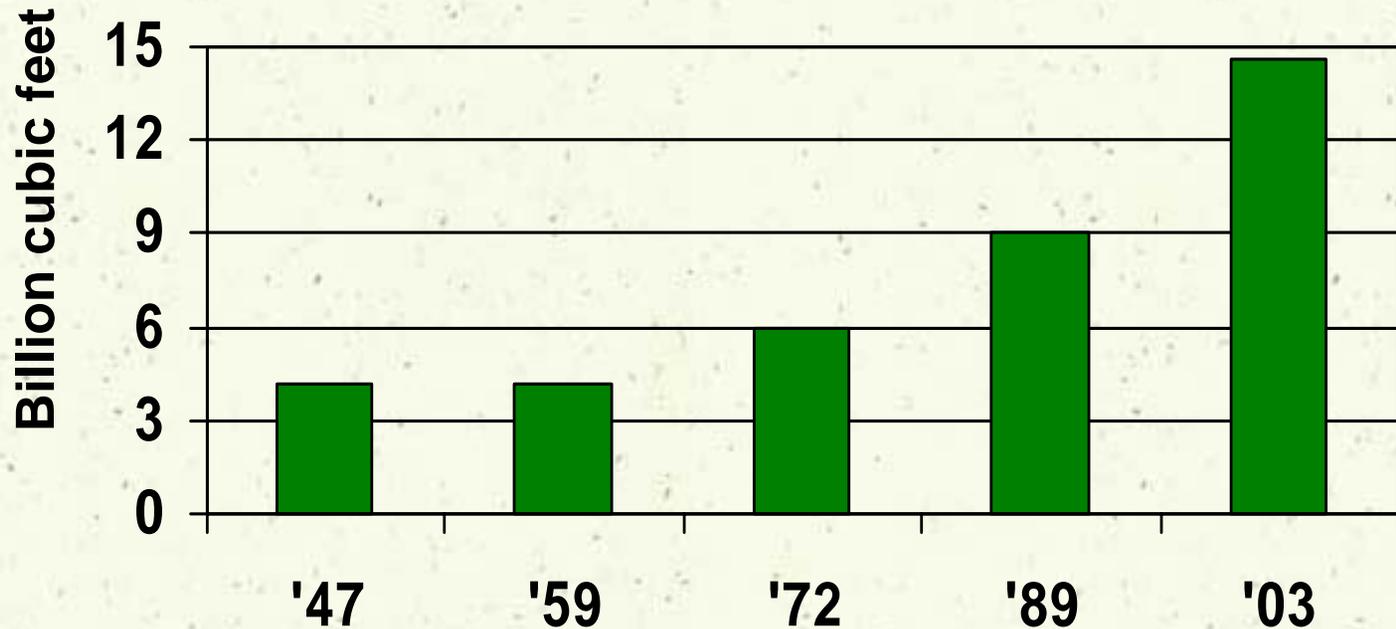
- For the U.S. as a whole, over the past 50 years the volume of timber increased from 616 to 856 billion cubic feet (39%).
- Over the same period total area of timberland decreased by 1 percent.

Growing Stock in Northeastern U.S. (218 billion cubic ft. in 2002)



- In the Northeastern U.S., over the past 50 years the volume of growing stock has increased from 128 to 218 billion cubic feet (59%).
- Current ratio of growth to removals is 2.0 for the Northeastern Region

Missouri Growing Stock (14.6 billion cubic ft. in 2003)



- Since 1947, the volume of Missouri growing stock has increased by more than 10 billion cubic feet (more than tripled).



How are we doing?

Sustainability Concept # 1

- **We are doing pretty well**
 - **Growth > Timber Removals + loss of timberland**
- **Maybe we should pat ourselves on the back and go tell that story—it is a good message to share.**
- **But let me share 6 other ideas that may alter that perception of sustainability ...and for reasons you may not expect.**









Concept # 2

- **Most people are not enamored with timber harvesting.**
 - **Harvests abruptly change what we were used to seeing—upsetting our sense of place.**
 - **Despite their functionality, timber harvests are not pretty.**
 - **Just because they are unattractive doesn't mean harvests are “destructive”... We understand that, but others often do not.**



Concept # 3

- **We use a lot of wood in the U.S.**
 - **about 20 billion cubic feet per year**
 - **About 70 cubic feet per person.**



- **Annually we each consume roughly**

- **410 pounds of paper**



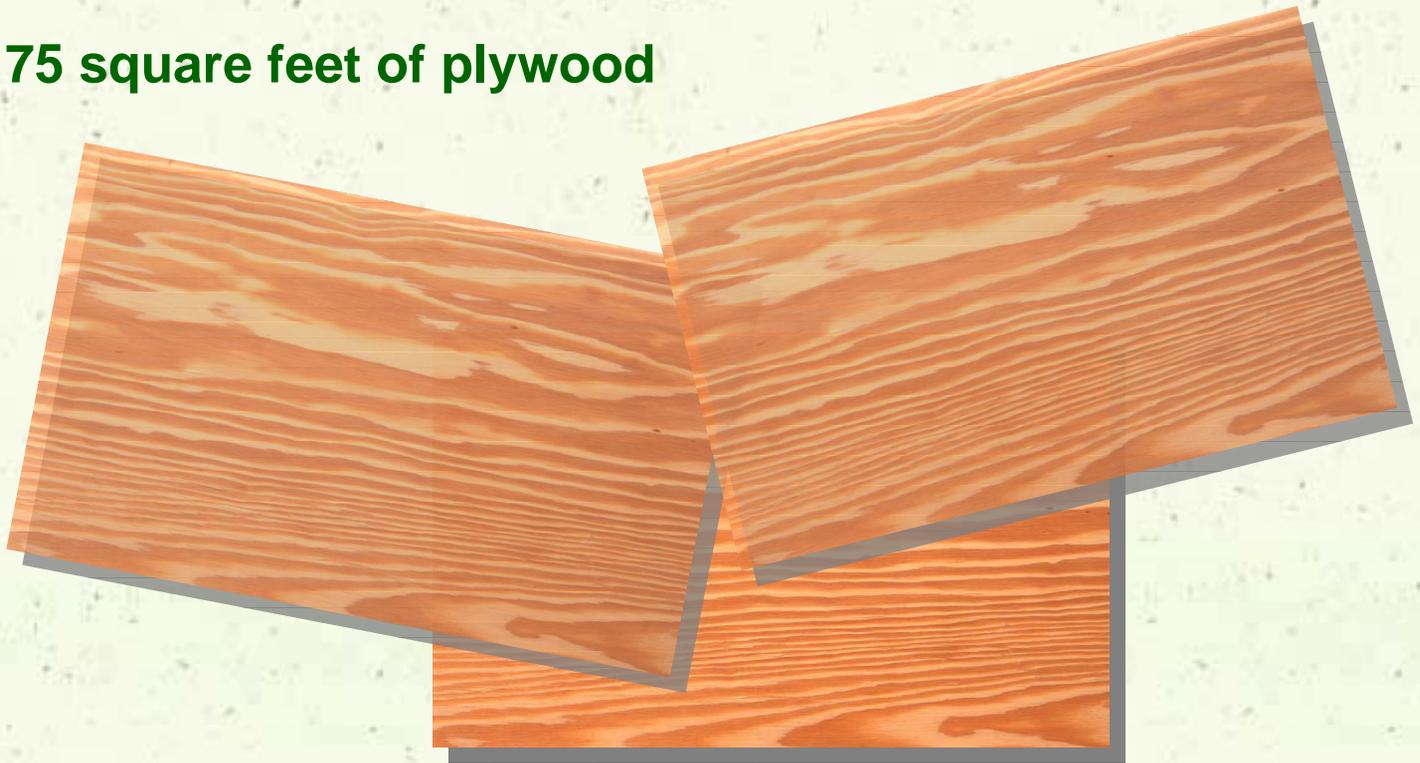
• **Annually we each consume roughly**

- **410 pounds of paper**
- **330 pounds of boxes, packaging and other pulp products**



• **Annually we each consume roughly**

- **410 pounds of paper**
- **330 pounds of boxes, packaging and other pulp products**
- **75 square feet of plywood**



• **Annually we each consume roughly**

- **410 pounds of paper**
- **330 pounds of boxes, packaging and other pulp products**
- **75 square feet of plywood**
- **25 square feet of particleboard and fiberboard**



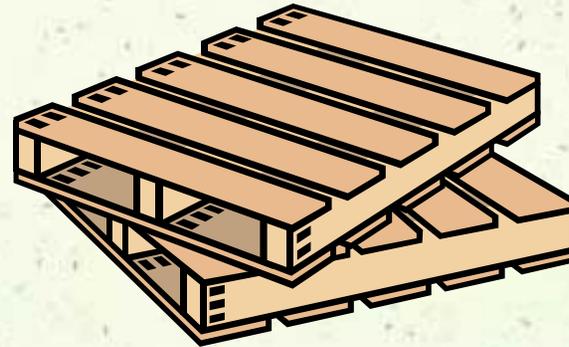
- **Annually we each consume roughly**

- **410 pounds of paper**
- **330 pounds of boxes, packaging and other pulp products**
- **75 square feet of plywood**
- **25 square feet of particleboard and fiberboard**
- **235 board feet of lumber**



- **Annually we each consume roughly**

- **410 pounds of paper**
- **330 pounds of boxes, packaging and other pulp products**
- **75 square feet of plywood**
- **25 square feet of particleboard and fiberboard**
- **235 board feet of lumber**
- **2 shipping pallets**

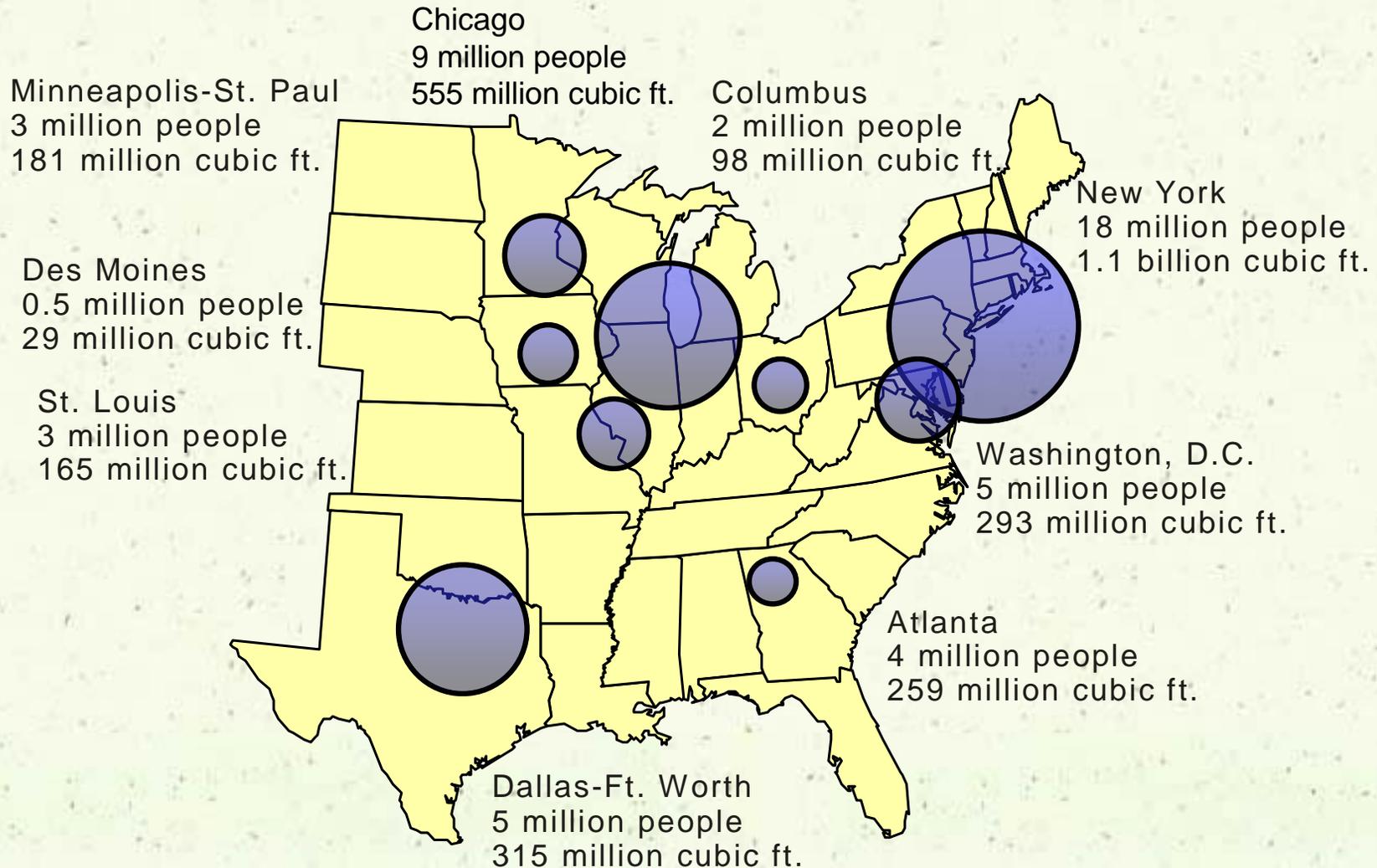


• Annually we each consume roughly

- 410 pounds of paper
- 330 pounds of boxes, packaging
- 75 square feet of plywood
- 25 square feet of particleboard and
- 235 board feet of lumber
- 2 shipping pallets
- 1 new house for every 62 households



Conceptual Woodsheds for “timber-dependent” municipalities





Consumption will increase

- **By 2050 total U.S. wood consumption will increase by about 40%.**
 - Not because we will consume more wood per person, rather because we will have more people.
- **Today 300 million people in the U.S. By 2050 about 420 million.**

Concept # 4

- **The U.S. is a net importer of wood.**
 - We have been for at least 90 years.
 - We export a lot of timber and wood products, but we import more.
 - On balance our NET imports are about 10% of total consumption.
 - By 2050 it is estimated that net imports will be nearly 20% of total consumption.
 - Most imports from Canada, Mexico & Asia.

Concept # 4

- **The U.S. is a net importer of wood.**
 - **We have been for at least 90 years.**

- **Does it Matter?**

- **Maybe....**

t

s will

Asia.



Concept # 5

- **As we import wood and wood products we also export to other nations the environmental, economic, and other social consequences (both the positive and negative) associated wood production, manufacturing, and consumption.**
 - ***“Not in my backyard!”***

- 
- ***“Out of sight, out of mind”—that is the danger of a system that separates consumption of forest products in one place from production in another. Our system today raises serious questions of both equity and sustainability. We need more of a dialog on how to bring consumption in the most developed parts of the world into balance with production elsewhere.”***

– Forest Service Chief Dale Bosworth (2003)



Exporting environmental consequences

- **Nationally we currently export the consequences associated with net annual imports of about 3 billion cubic feet of wood products.**
 - **By 2050 we could be exporting the consequences associated with net annual imports of nearly 5 billion cubic feet of wood products.**
 - **If producing wood is environmentally “good” we should embrace it. If producing wood is environmentally “bad” we should accept responsibility for our share.**
 - **In fact, producing and consuming wood is a mix of positives and negatives—we should take ownership of all aspects.**

Concept #6

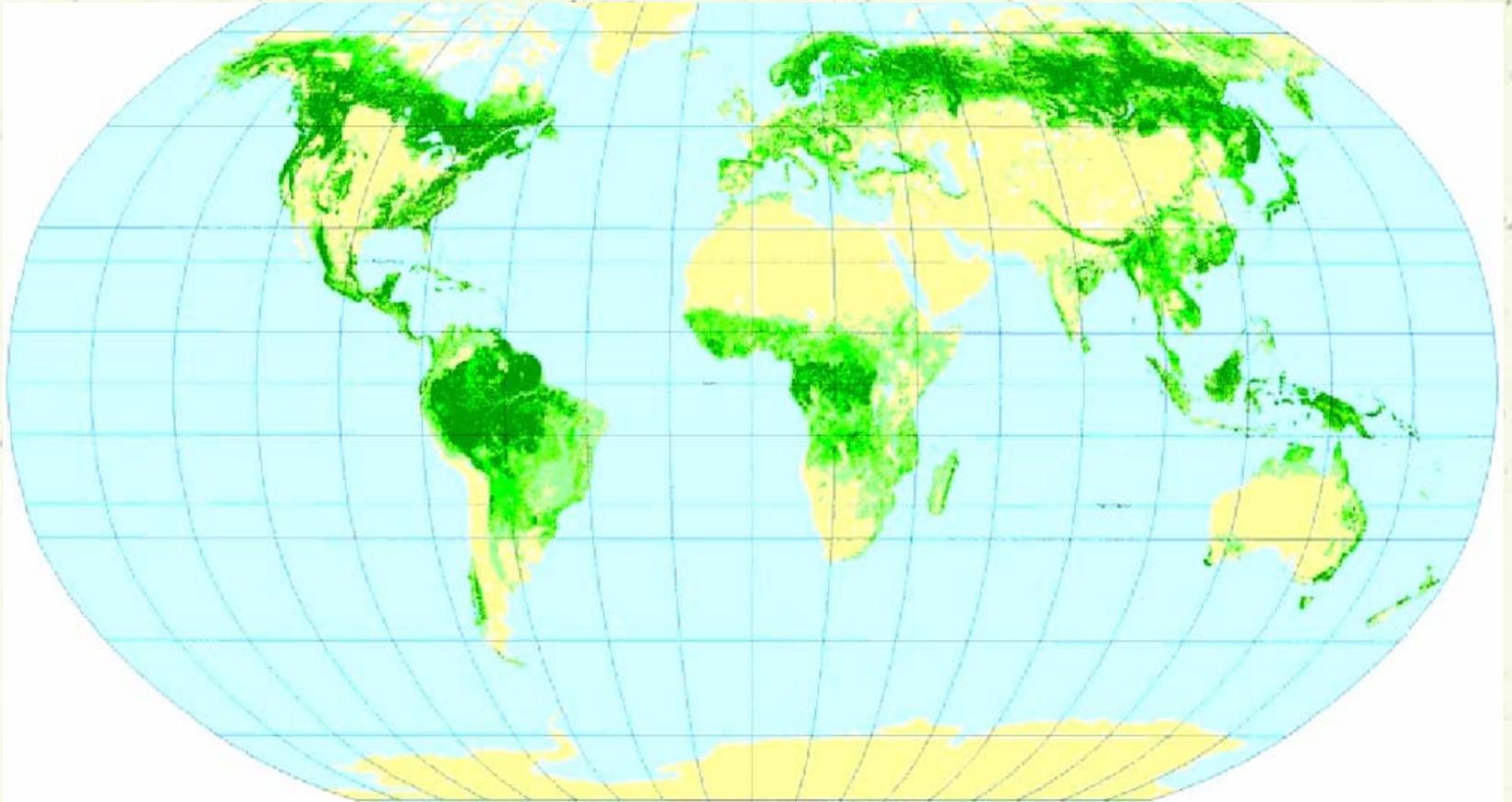
- **There are many good reasons to utilize wood as a natural resource.**
 - **Natural**
 - **Renewable**
 - **Recyclable**
 - **Biodegradable**
 - **Low energy to produce**
 - **Life cycle analysis**
 - **Stores carbon**
 - **Forest resources vs. oil, steel, coal, cement**
Sustained yield vs. Use it up and look for more

- **Utilization → Management → options for forest health**

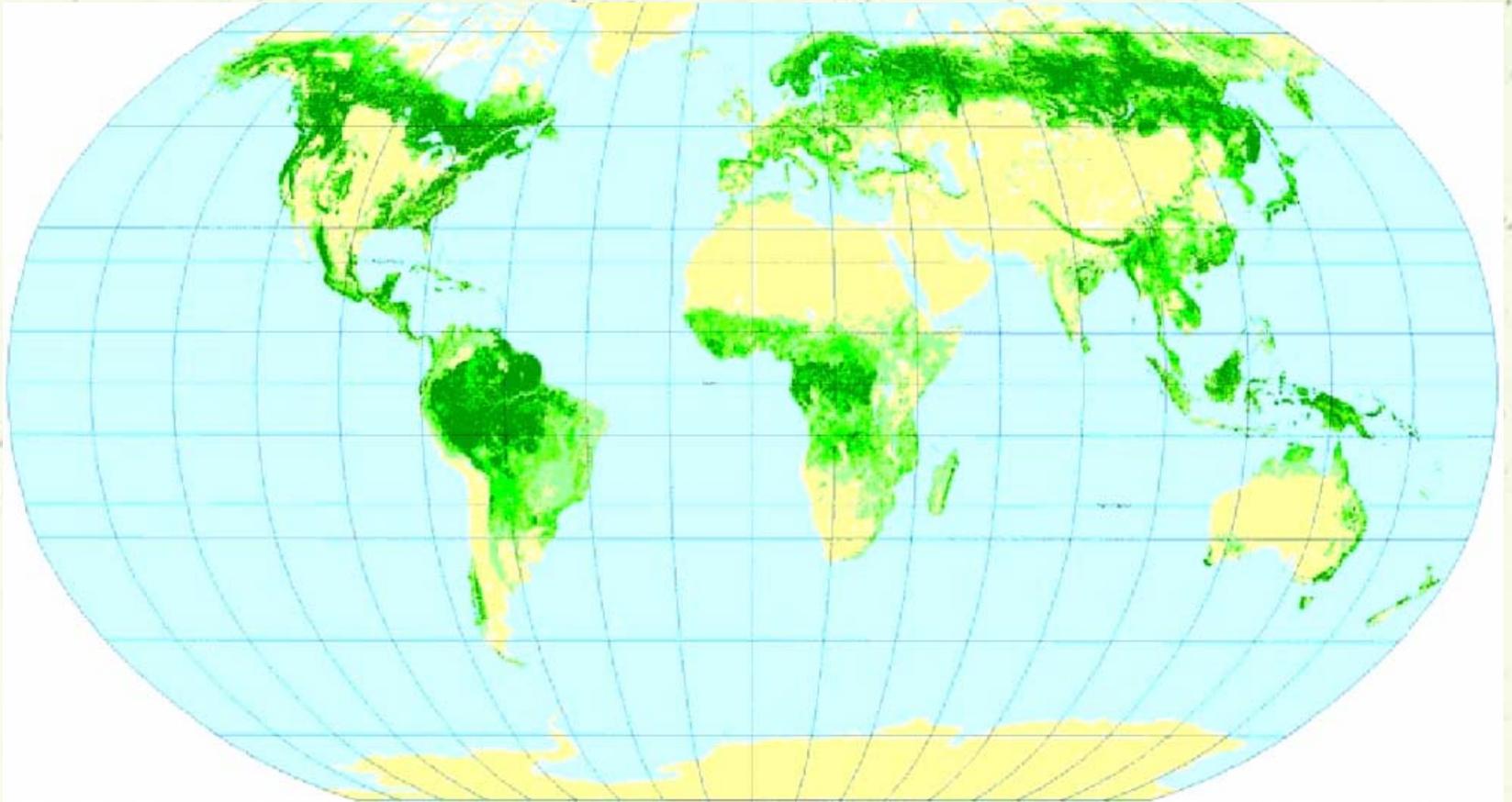


Concept #7

- **There is a finite area from which the wood we use must come**
 - **World has about 9.6 billion acres of forest**



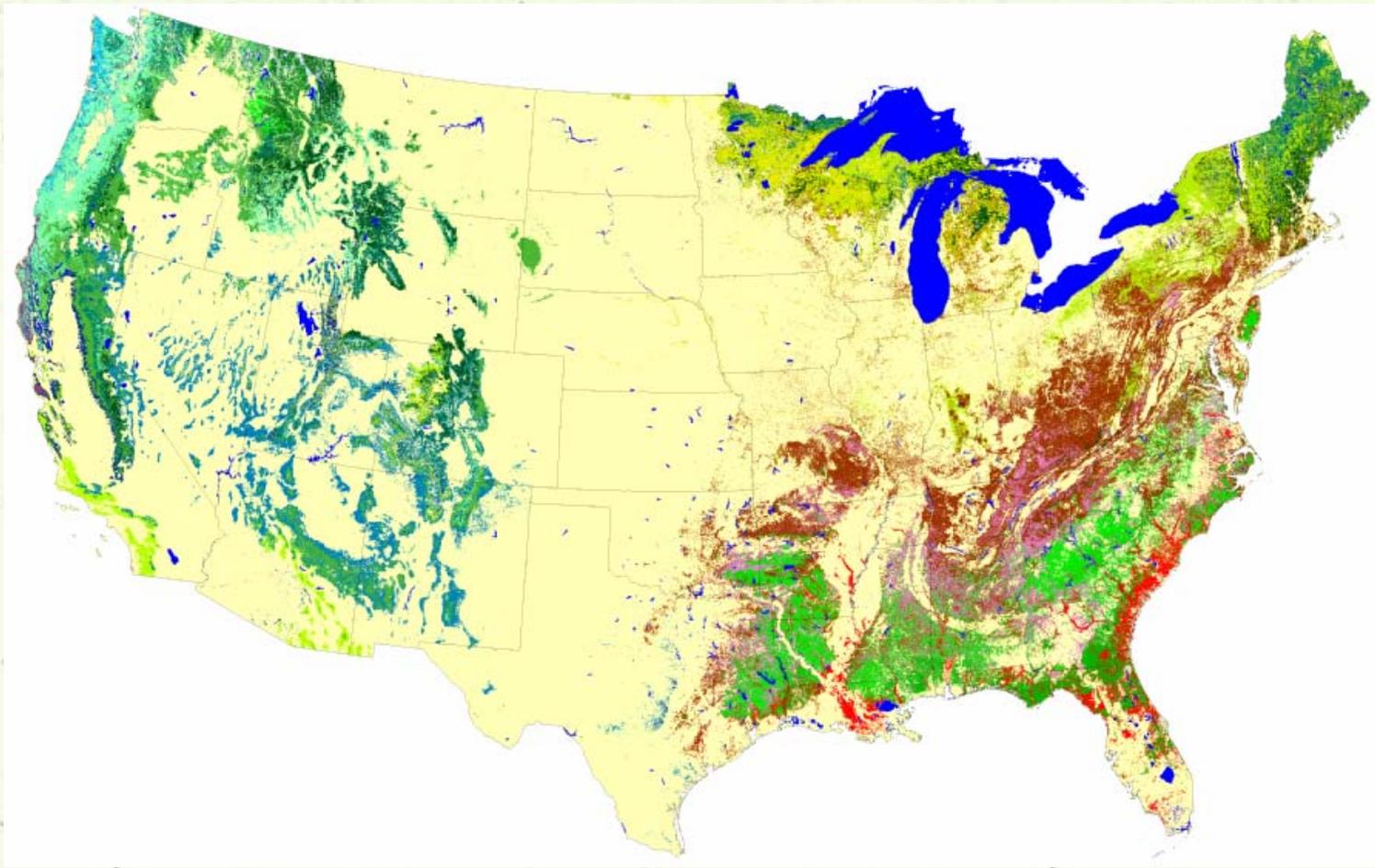
The Earth is about one-third land



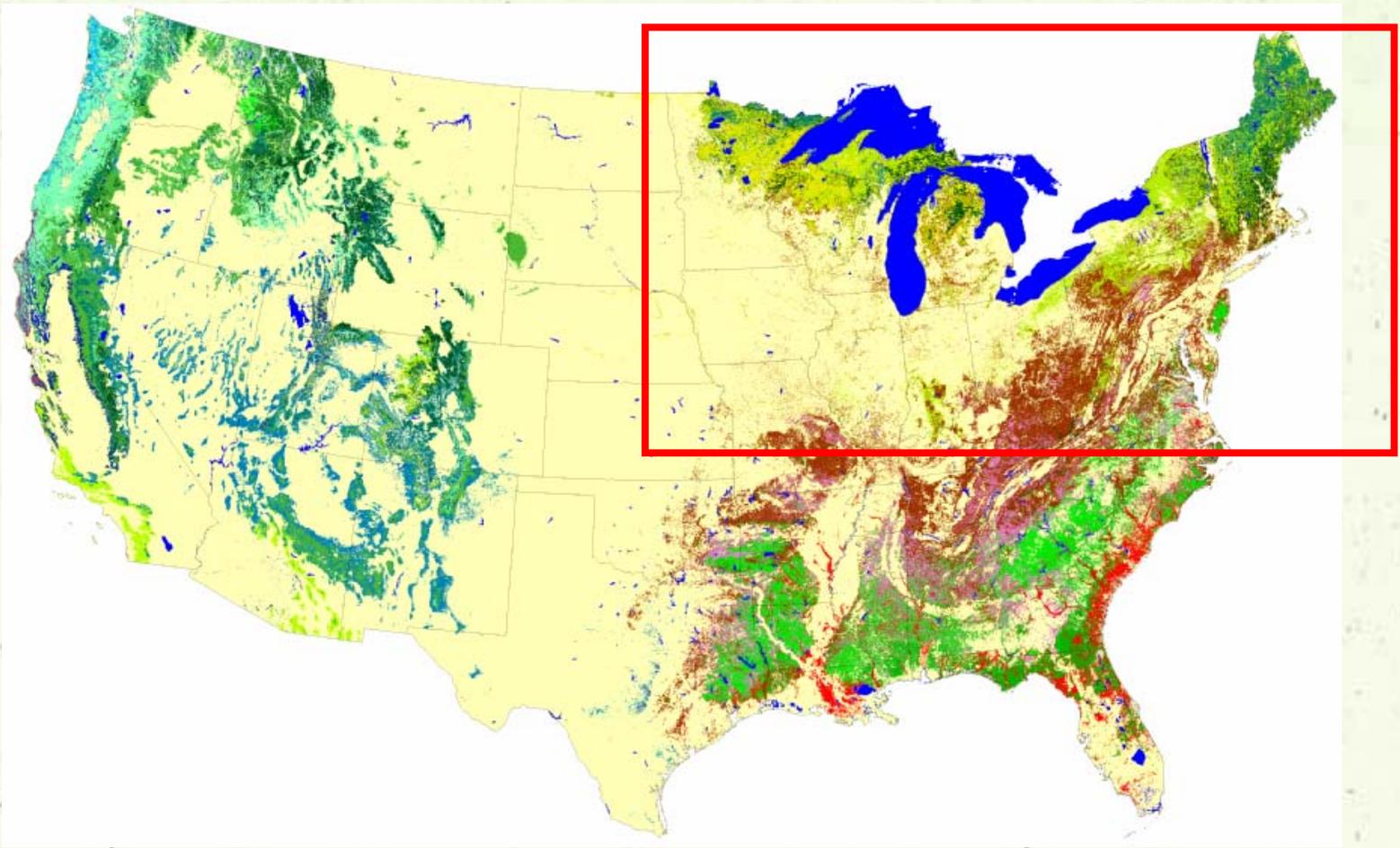
The land mass of the Earth is about one-third forested



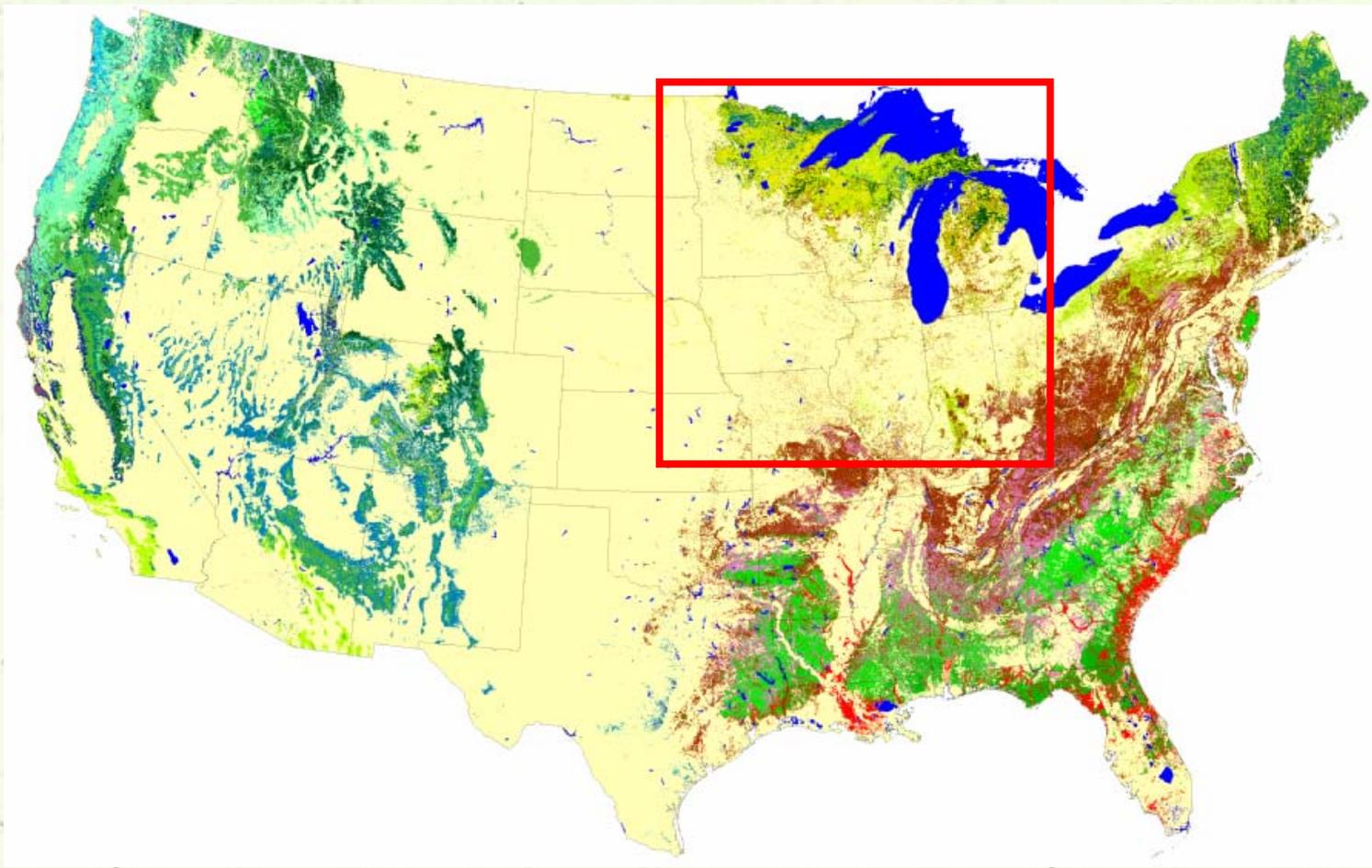
North America is about one-third forested



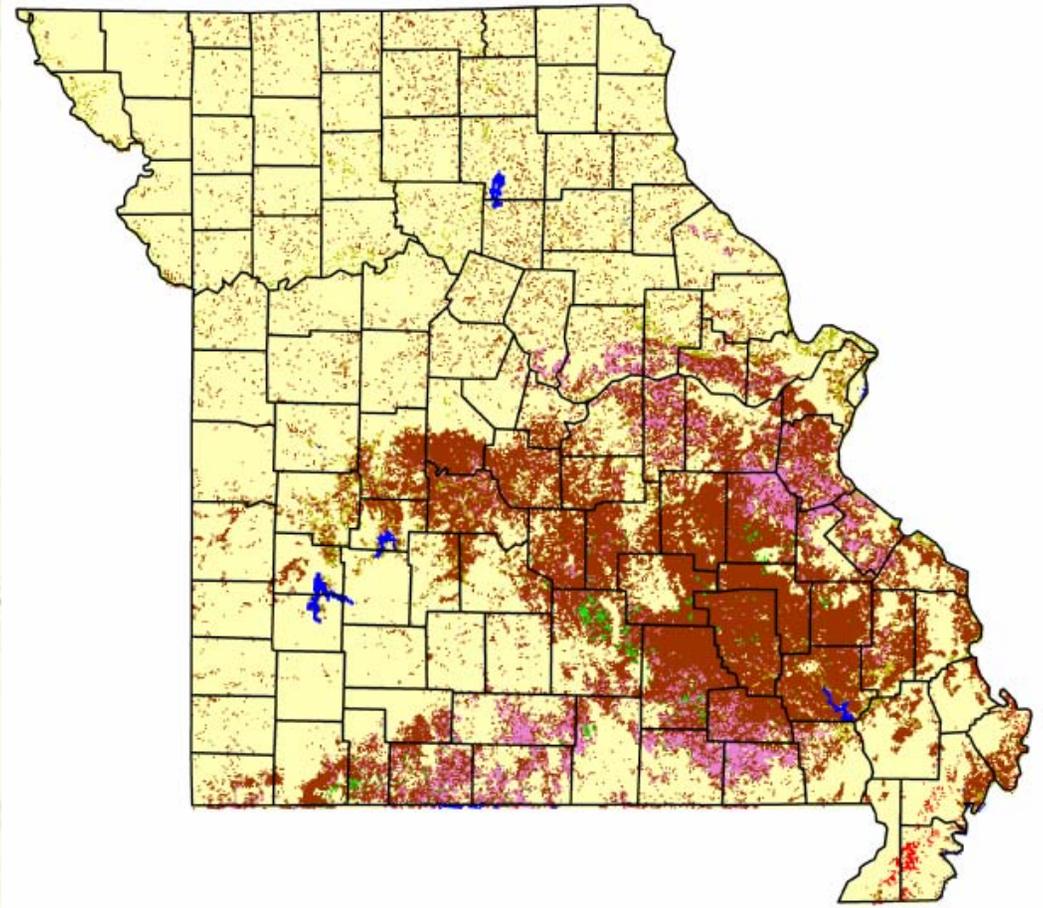
The U.S. is about one-third forested



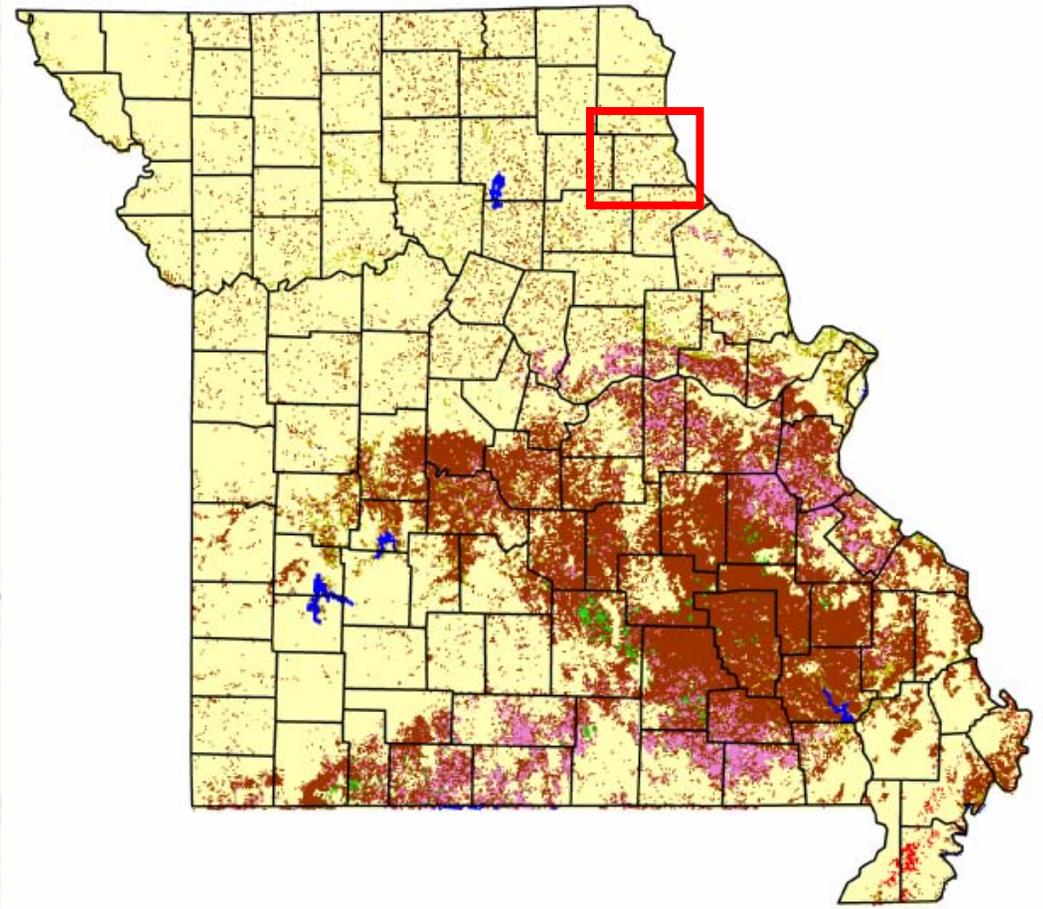
The Northeastern U.S.
is about 40% forested
Rich in forest area



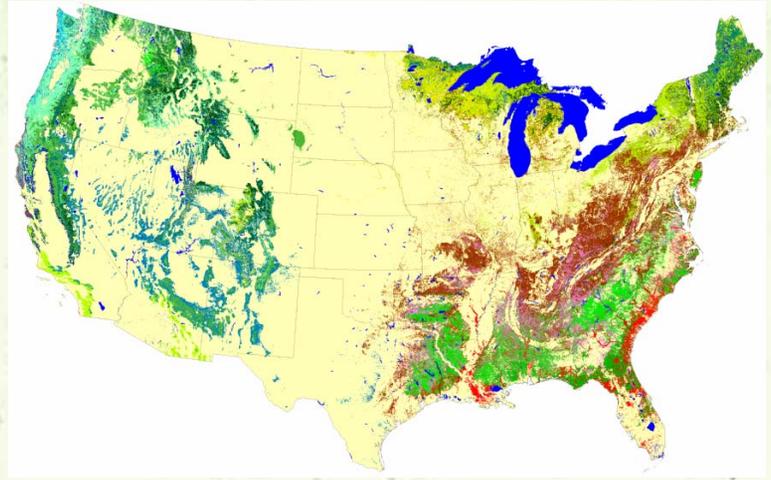
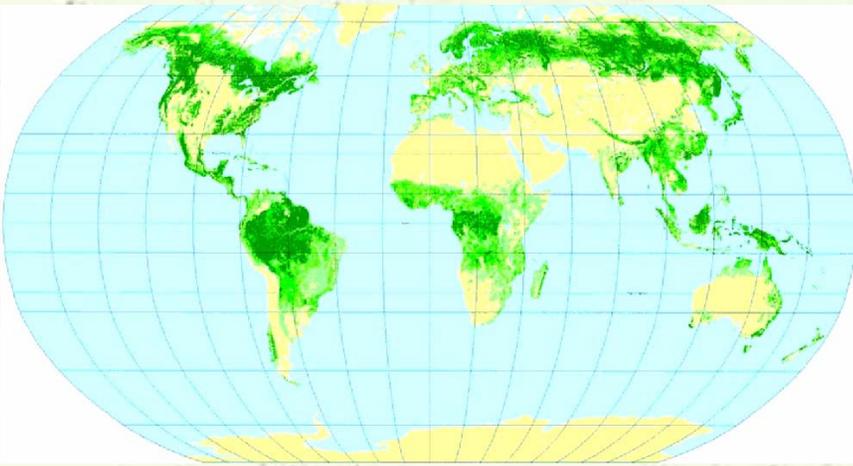
The North Central Region of the U.S.
is about one-third forested



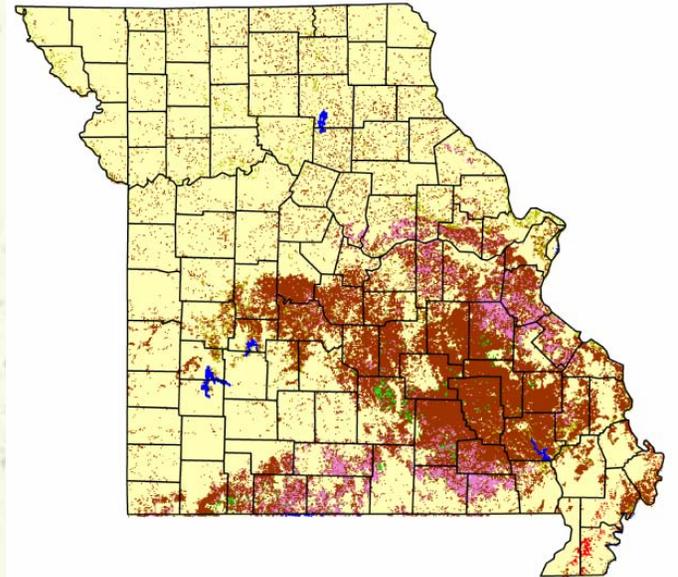
Missouri is about one-third forested



Marion County is 18% forested



**So what is Missouri's role in wood supply?
What *should* it be?**





A “fair share” for Missouri?

- **In Missouri we are average or better in our Forest Resources.**
 - Missouri has 2% of the U.S. population and 2% of U.S. consumption
 - Missouri has 2% of U.S. forest land
 - Missouri has 2.7 % of U.S. timberland
 - We grow more wood than we harvest every year (5x)
- **Nevertheless in Missouri we produce the equivalent of only 1.1 percent of the U.S. wood supply**
 - Far less than we consume in MO
 - Far less than our proportion of forestland or timberland
- **And current Missouri forest growth is far below the potential with intensive management.**

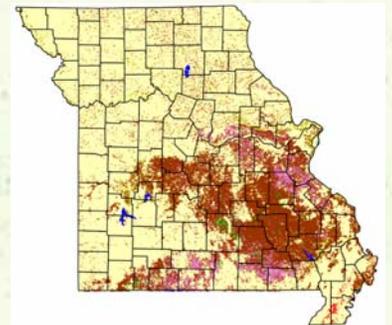
So what should be Missouri's role in wood supply?

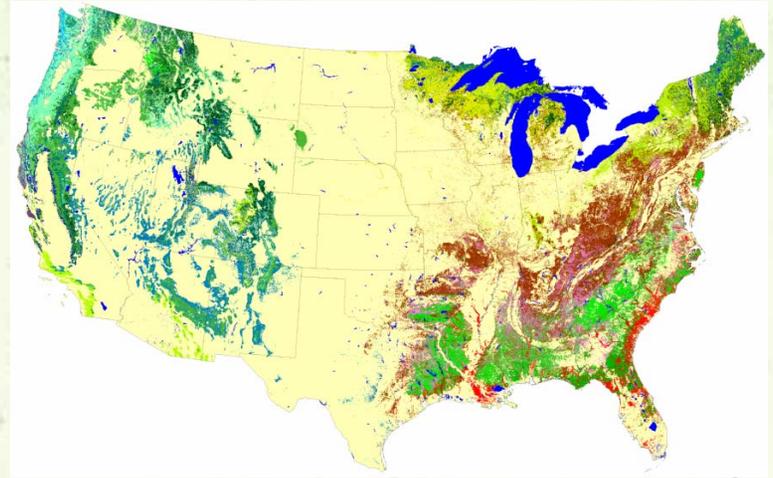
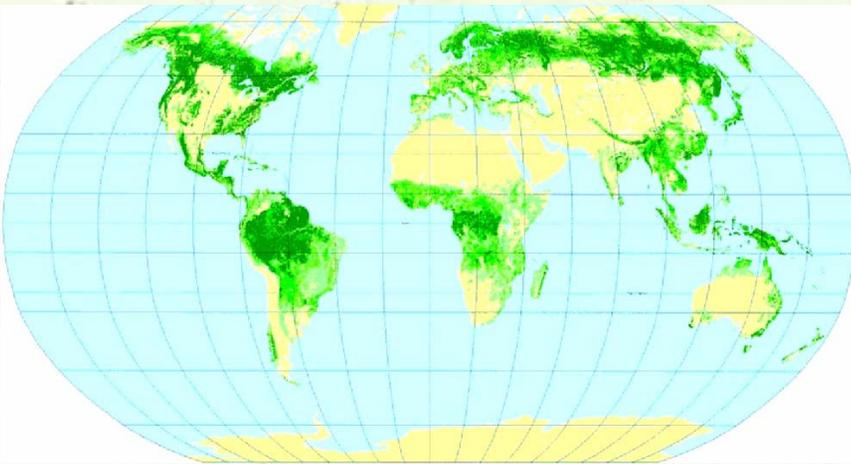
Why don't we sustainably produce the equivalent (on a total volume basis) of about 2 percent of U.S. consumption—about 383 million cubic feet? We currently produce less than half that amount.

Could we do it?

That is more that double current removals, but less than current net growth (2003) and far less than potential net growth.

**If not here, then
Where... by Whom... and Why?**



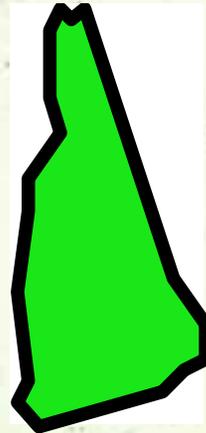


What is your state's role in wood supply?

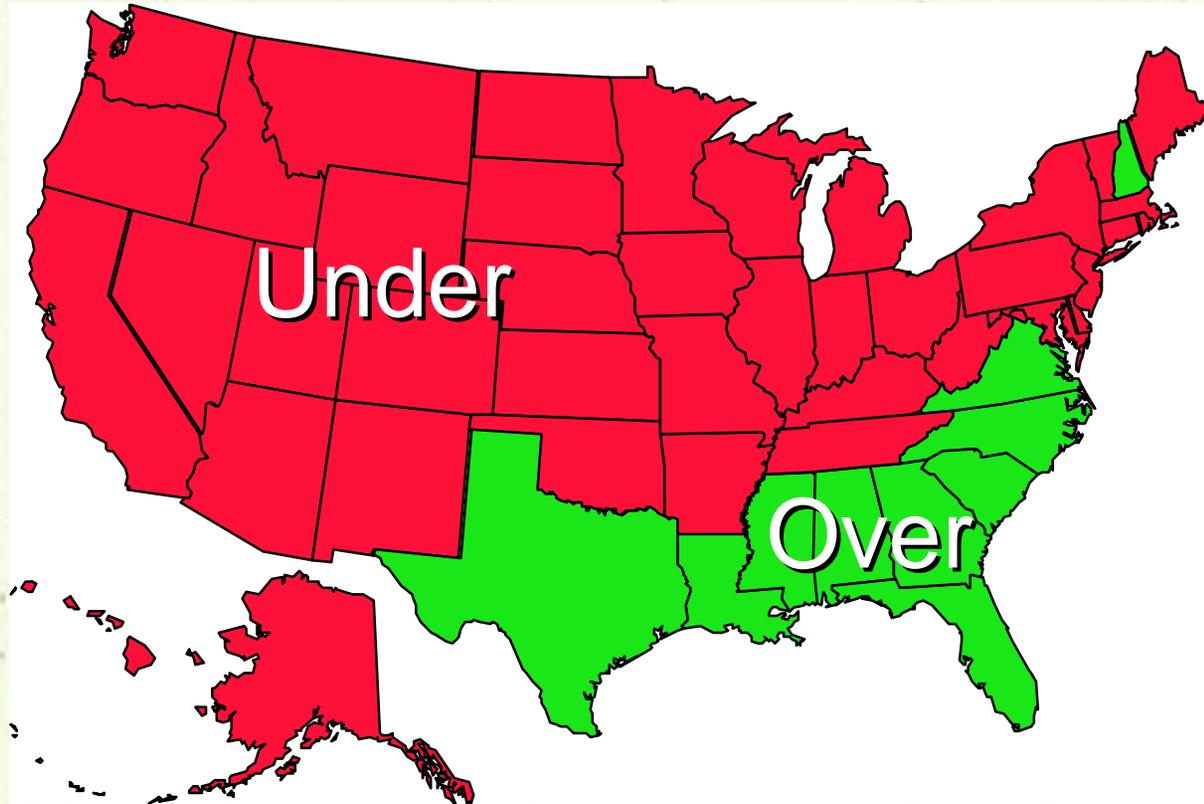


**Map of States in the Northeastern Region
where removals are commensurate with
current levels of U.S. wood consumption.**

States doing their “fair share” relative to timberland
area assuming 20 billion cubic feet of consumption



Removals by state relative to theoretical “fair share” based on timberland area (assuming 20 billion cubic feet of consumption)





When We Consider Sustainability...

- From one perspective it's very complicated
 - Global economy
 - Multi-national corporations
 - Vast imports and exports
 - Substitution of products
 - Forest are more than timber
 - Biodiversity, species viability

- 
- From another perspective it's exceedingly simple
 - Wood is a relatively benign product
 - We will continue to increase its consumption
 - "It's got to come from somewhere"
 - Our Northern forests are part of the supply and our participation in supply (or lack) affects forest elsewhere.
 - Our Northern region has 40% forest
 - in a nation that has 30% forest
 - on continent that has 30% forest
 - on an earth that has 30% forest.



Options for Cooperation

- **Consumers can:**
 - Consume less
 - Recycle more
 - Alter consumption of wood relative to alternative products and commodities and relative to environmental costs and benefits

- **Resource managers/owners can:**
 - Increase forest growth per acre through improved management of natural forests
 - Increase forest growth per acre through plantation culture
 - Increase the number of forested acres in production through tree planting and agro-forestry.
 - Change the amount of wood they sell.

- **Manufacturers can:**
 - Increase the efficiency of converting wood into products
 - Engineer products that extend the utility of a given amount of timber
 - Engineer products that are environmentally benign over their life cycle (production, use, disposal)

- **All of us can devote effort to discussing the issues and formulating solutions.**



Sustainable Forestry Seven Simple Concepts

1. Sustained yield.
2. Forest management isn't always pretty.
3. We use a lot of wood.
4. U.S. is a NET import of wood and has been for a long time.
5. When we import wood we export consequences of production—good and bad. We should “own it”
6. Wood is a good resource to use relative to alternatives.
7. There is a finite area for wood production
 - Our U.S. share is proportionate to the rest of the world
 - Our production is out of balance with our consumption

We can do better.

We can think more comprehensively.

Sustainability begins at home with scalable solutions



World and U.S. Comparison

	World	U.S
Forest Area (acres/person)	1.5	2.8
Total wood consumption (cubic ft)	21	73
Fuelwood consumption (cubic ft)	11	9