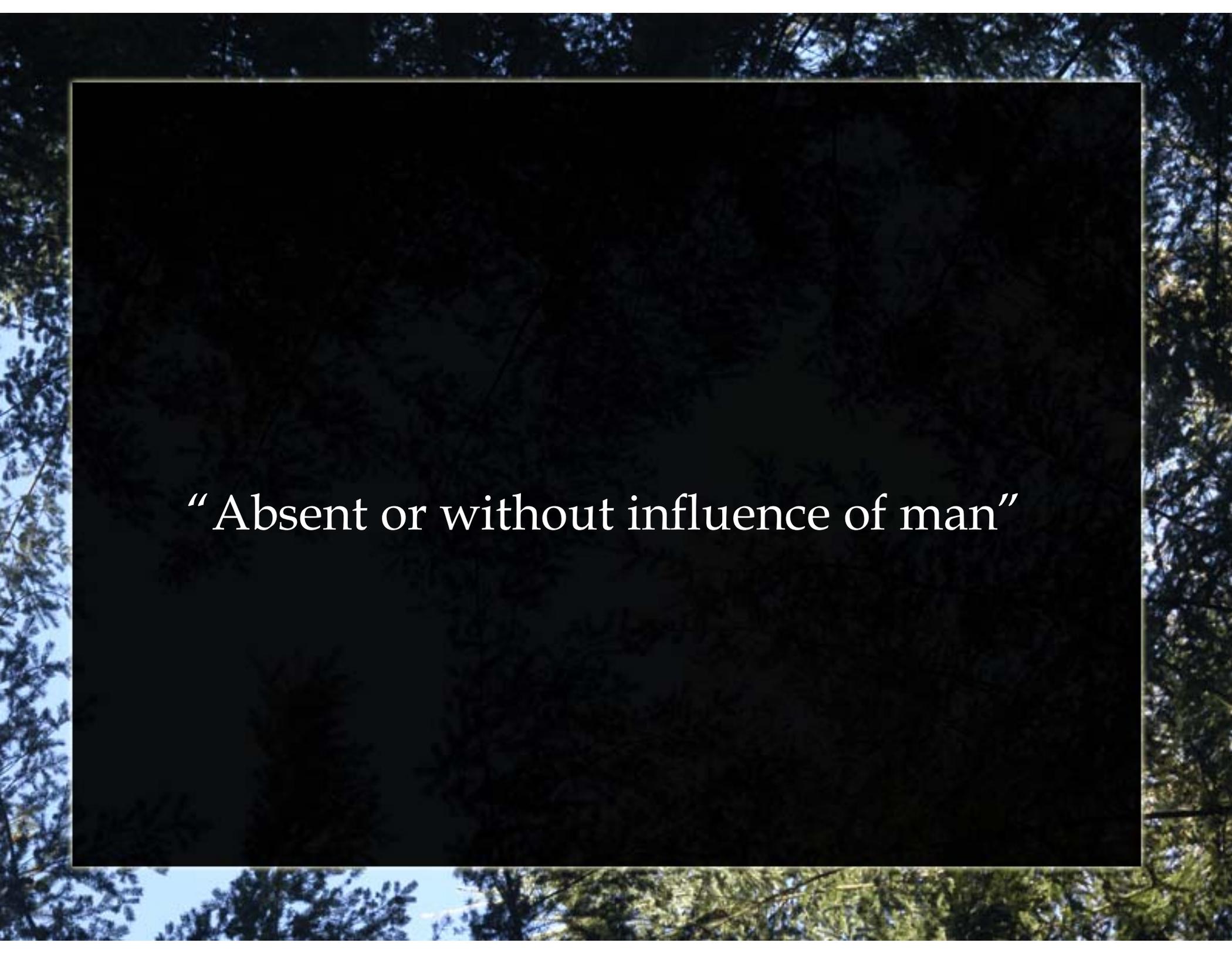


"NATURAL"



# Public Land Management

Forest “natural” in 1492 – Pre-settlement  
(Wilderness Act and National Park Service)



*“Absent or without influence of man”*



Today, the “natural” state of the landscape in Eastern North America is a closed hardwood forest

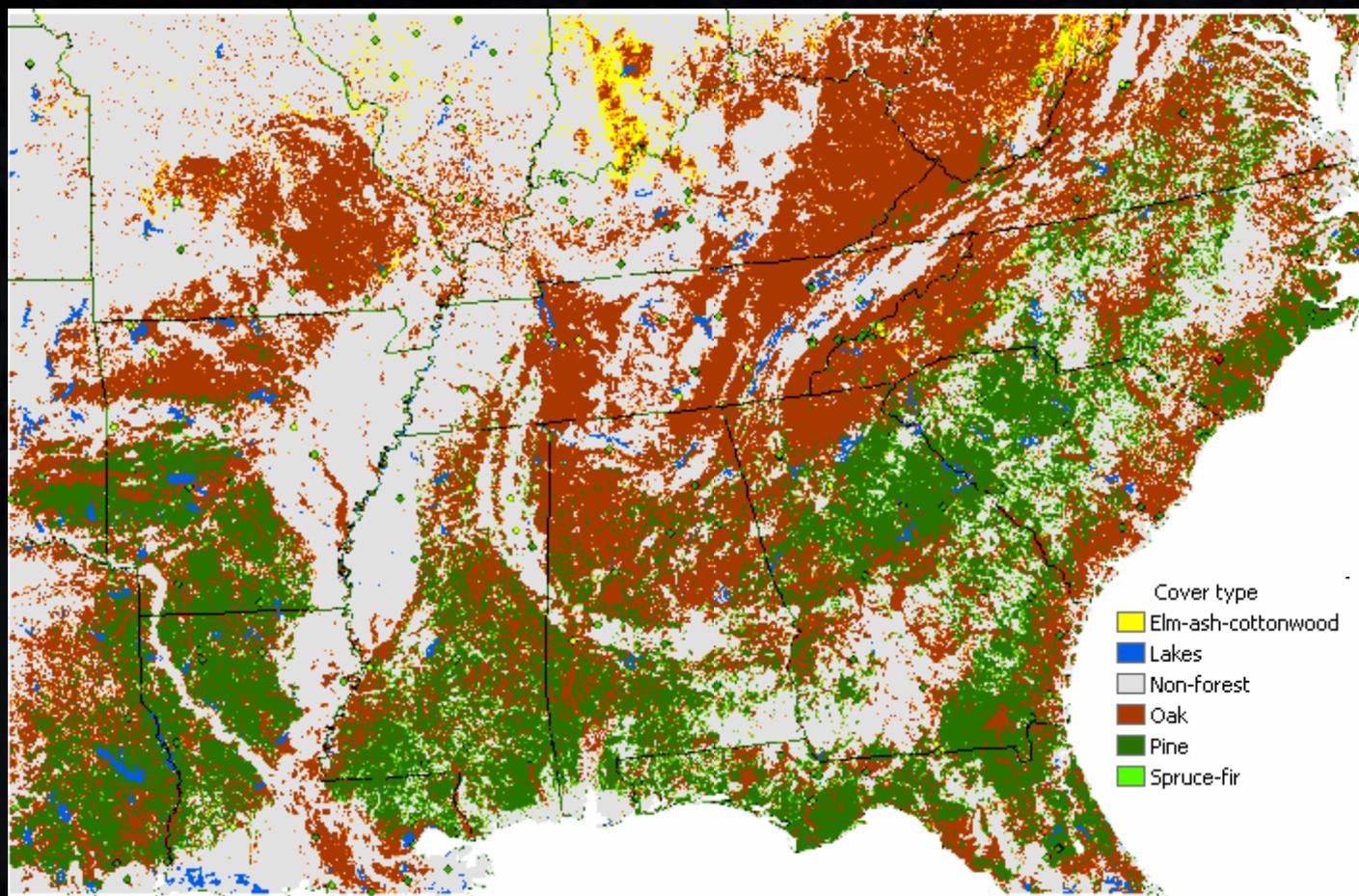
# Culture in the Evolution of the Eastern Landscape & Natchez Trace

"Getting to Now and the Future"

Dr. Ed Buckner (reconstructed by David Todd)

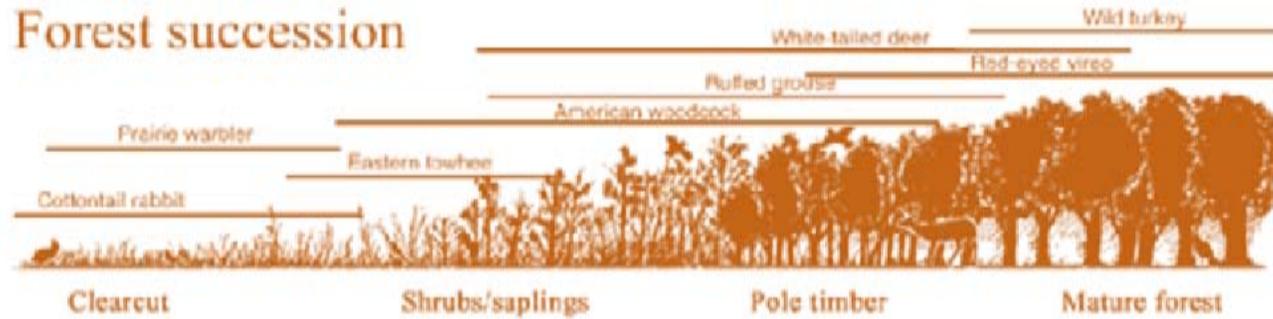


# Forest Cover of SE US



Distrubance  
 Fire  
 Tornado  
 Wind  
 Disease/Insects  
 Culture

## Forest succession



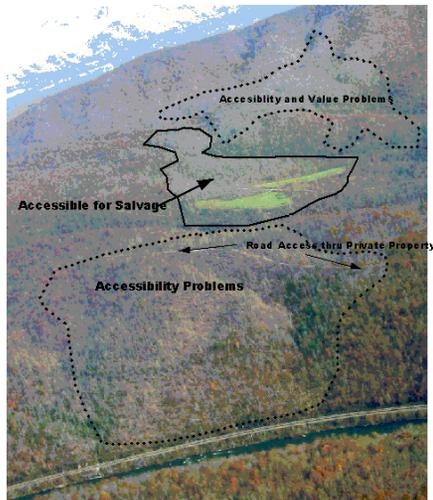
Time (yrs)	0 30-60	150-400	300 – 600 Forever
Successional Stages	Pioneer	Mid-serial	Climax
Species	Yellow-poplar Yellow pines Sweetgum Cypress	Several oaks (10-12) Red maple Black gum Several hickories (2-8)	American beech Hemlock Sugar maple
Shade Tolerance	Full Sun Shade Intolerant	Increasing Shade Intermediate tolerance	Heavy Shade Tolerant



© A. Lee Bennett, Jr. / AIPM, www.atpm.com

# Tornado - Lone Mtn State Forest, 2002

## Lone Mtn Tornado Damage - Nov 2002



# Fire

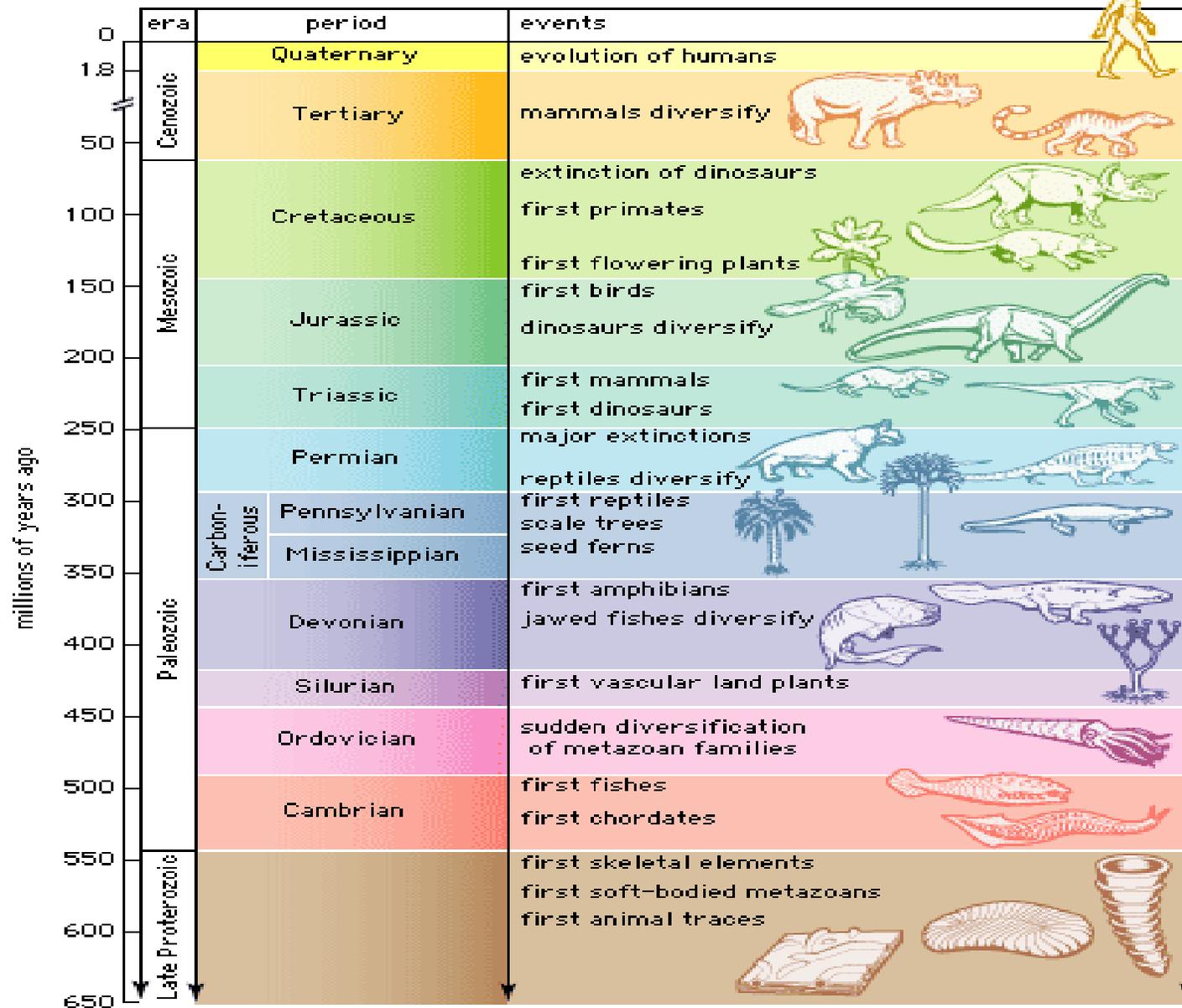




# Southern Pine Beetle Cumberland Plateau



# Geologic time scale, 650 million years ago to the present



# Continent Position Through Time



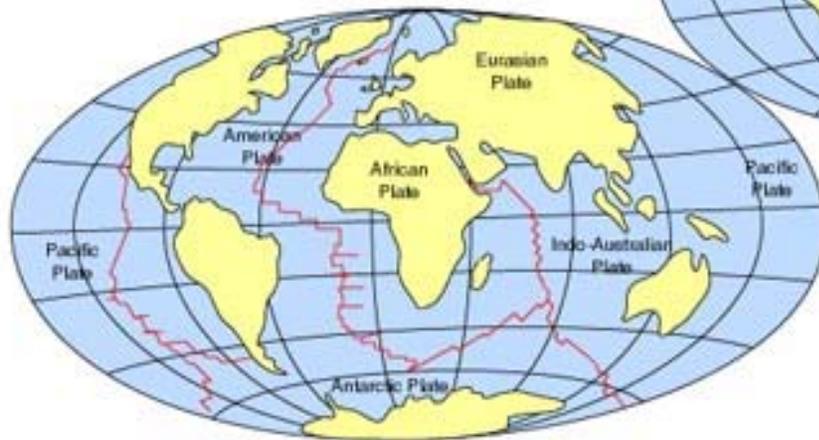
200 million years ago



135 million years ago



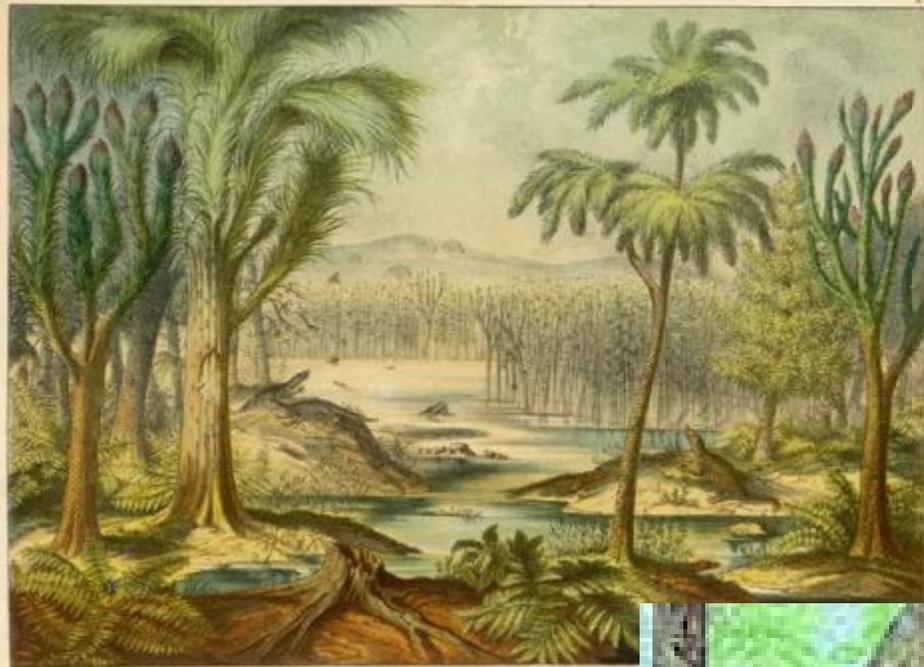
35 million years ago



Present day

# Paleozoic

Period	Geologic Event	Years Ago (Millions)
Permian	Appalachian Revolution – Appalachian Mtns	256
Pennsylvanian (Upper Carboniferous)	Major Coal-forming swamps (carbon sequestration)	320
Mississippian (Lower Carboniferous)	Origin of the Gymnosperms (conifers)	360
Devonian	Achaeopteris (first modern tree) forests widespread	408
Silurian	Vascular plants development – early land plants	438
Ordovician	Lifefoms move into freshwater environments	505
Cambrian	Only marine lifefoms	570



Animaux et plantes de la période houillère en Europe.



# Mesozoic

Period	Geologic Event	Years Ago (Millions)
Cretaceous	Origin of the Angiosperms (flowering plants, e.g. – hardwoods) along with insects  (715 sp of gymnosperms – over 250,000 sp. angiosperms)	144
Jurassic	Extinction of seed ferns	208
Triassic	Origin of dinosaurs	245

- -----the great extinction – 90 % of the earth's living organisms die-----

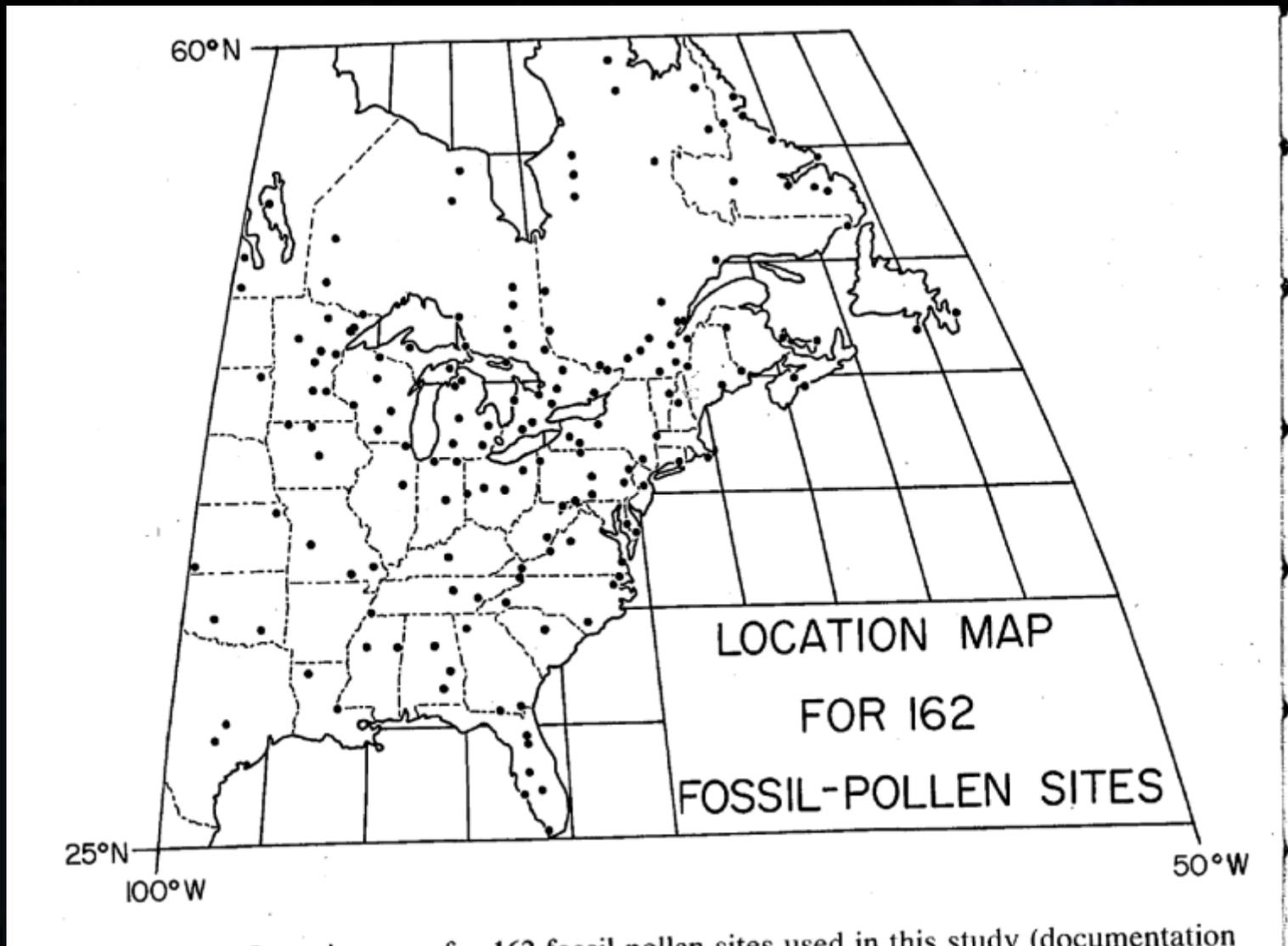


# Cenozoic

Period	Geologic Event	Years Ago (Millions)
Quaternary		
	Holocene	Development of Civilized Man
		0.01
	Pleistocene	Ice Ages = Speciation > Today's Plants
		2.5
Tertiary	Existing plant orders/families evolved (including grasses and most food plants)	65

.....extinction of dinosaurs and numerous lifeforms.....





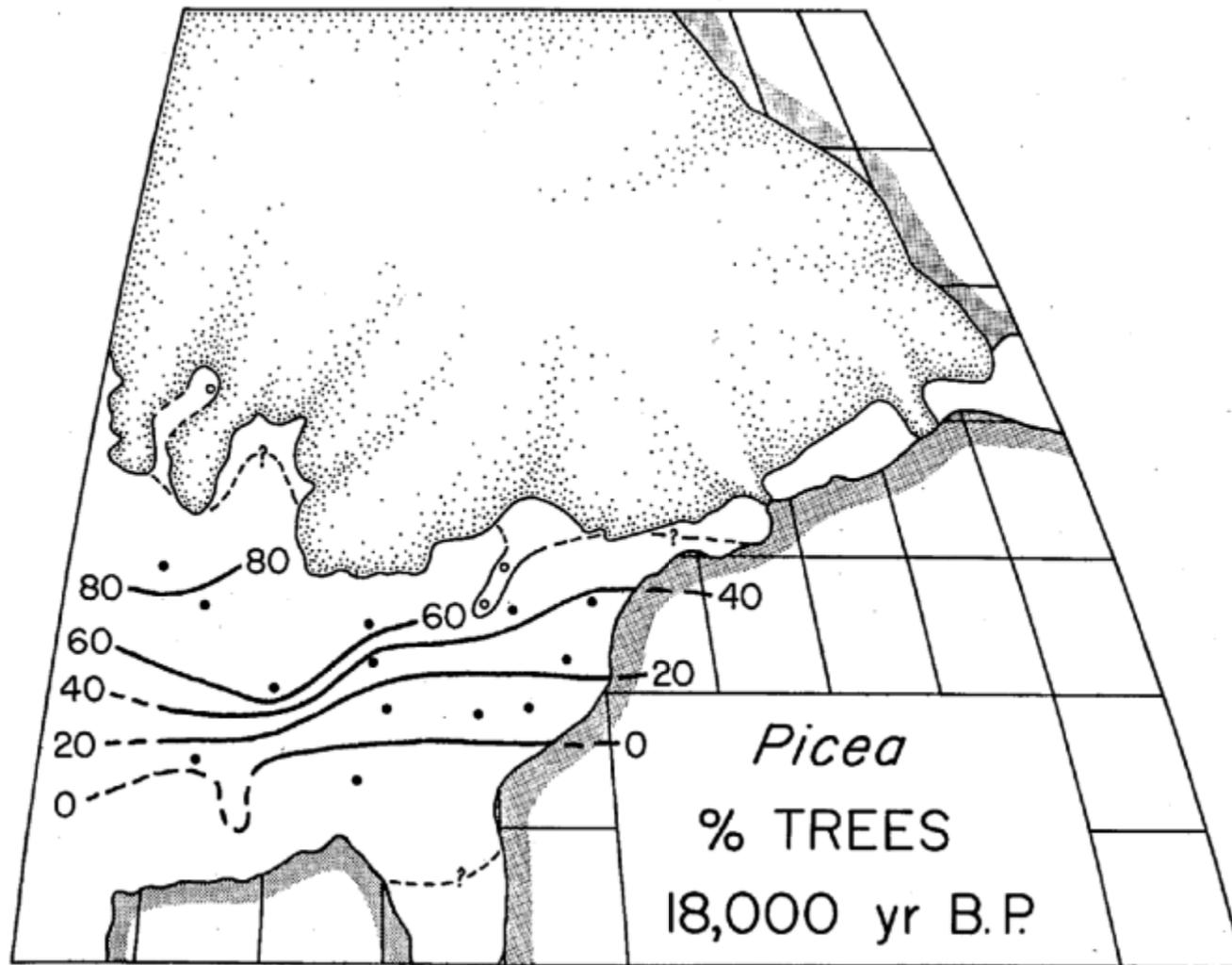
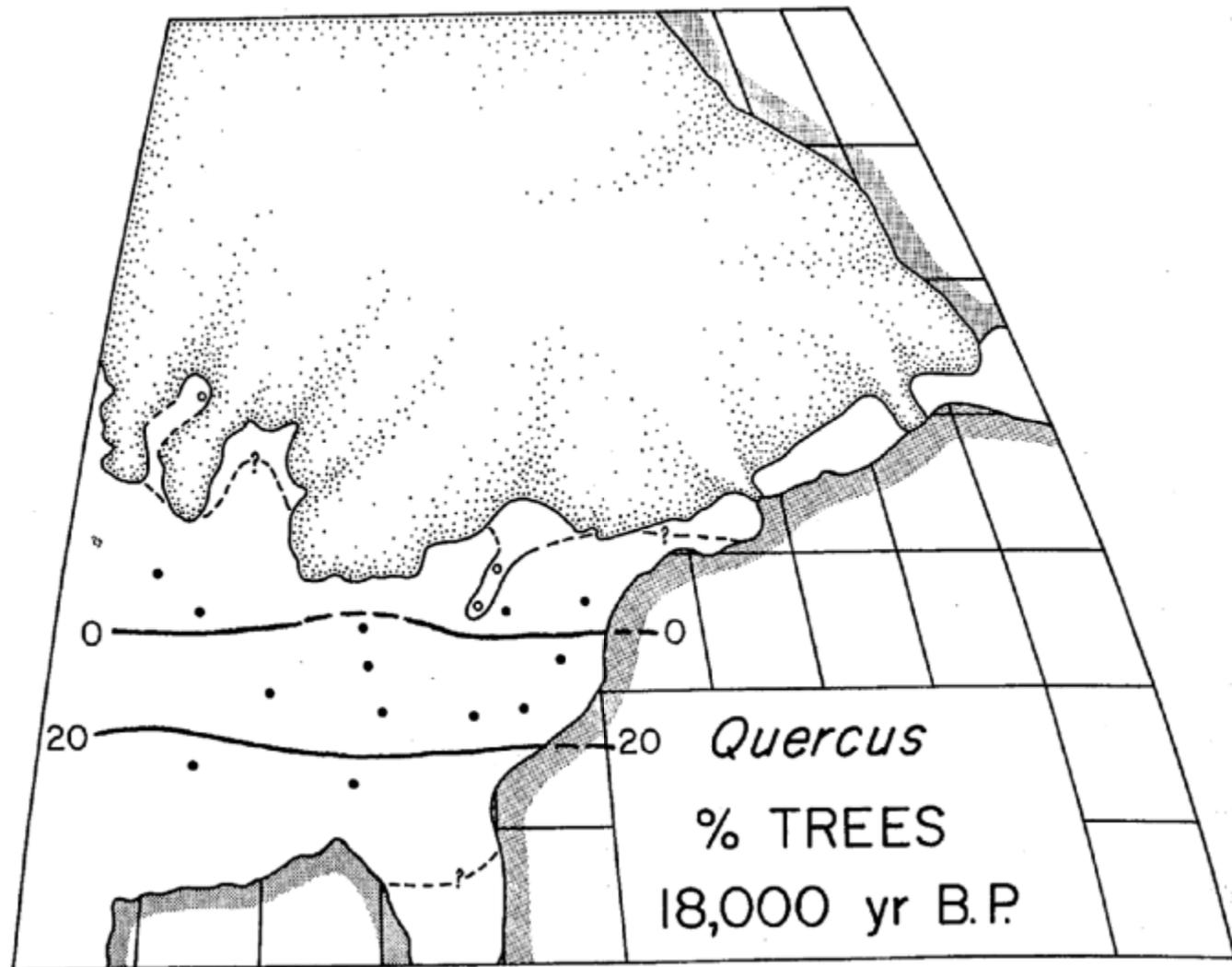
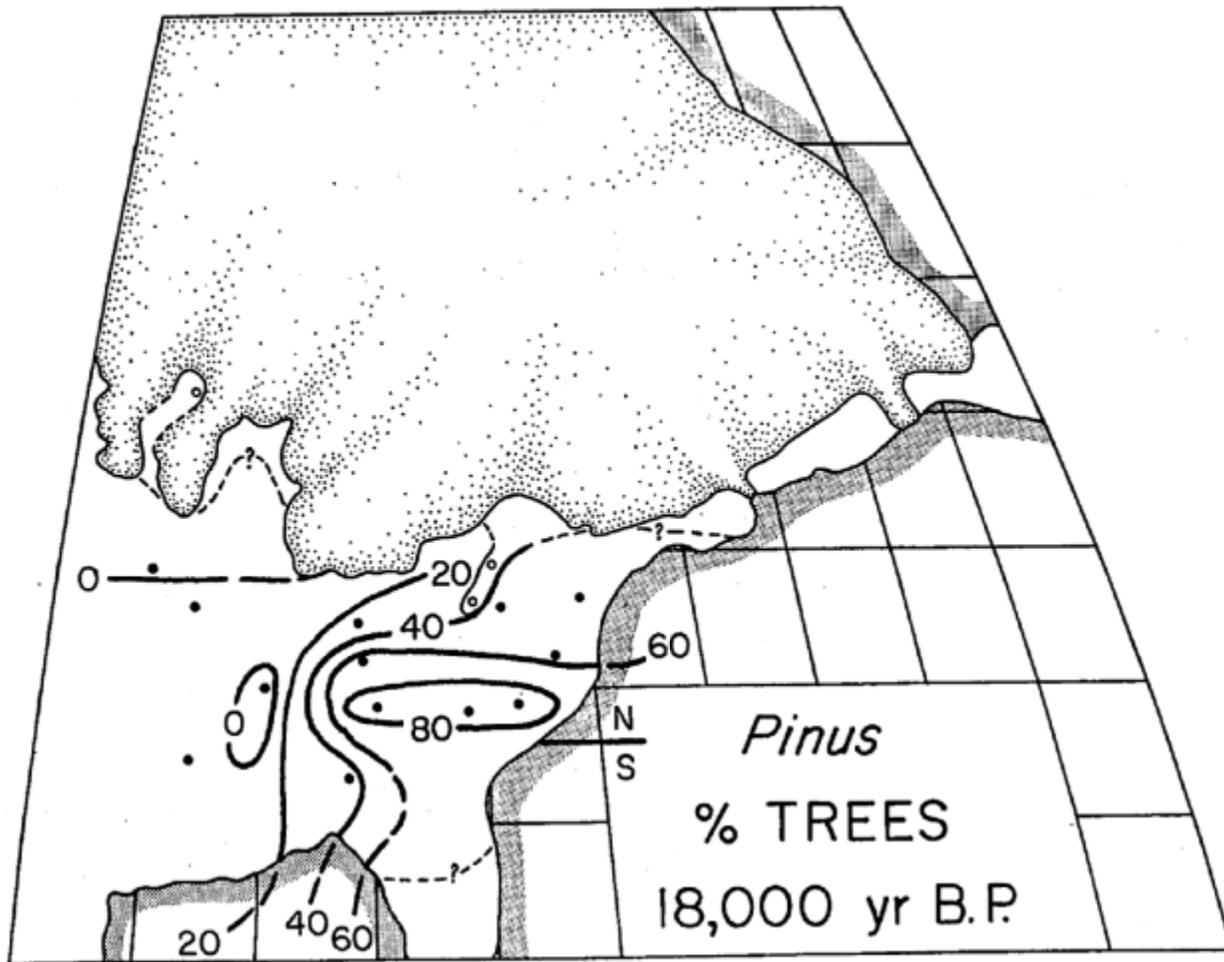
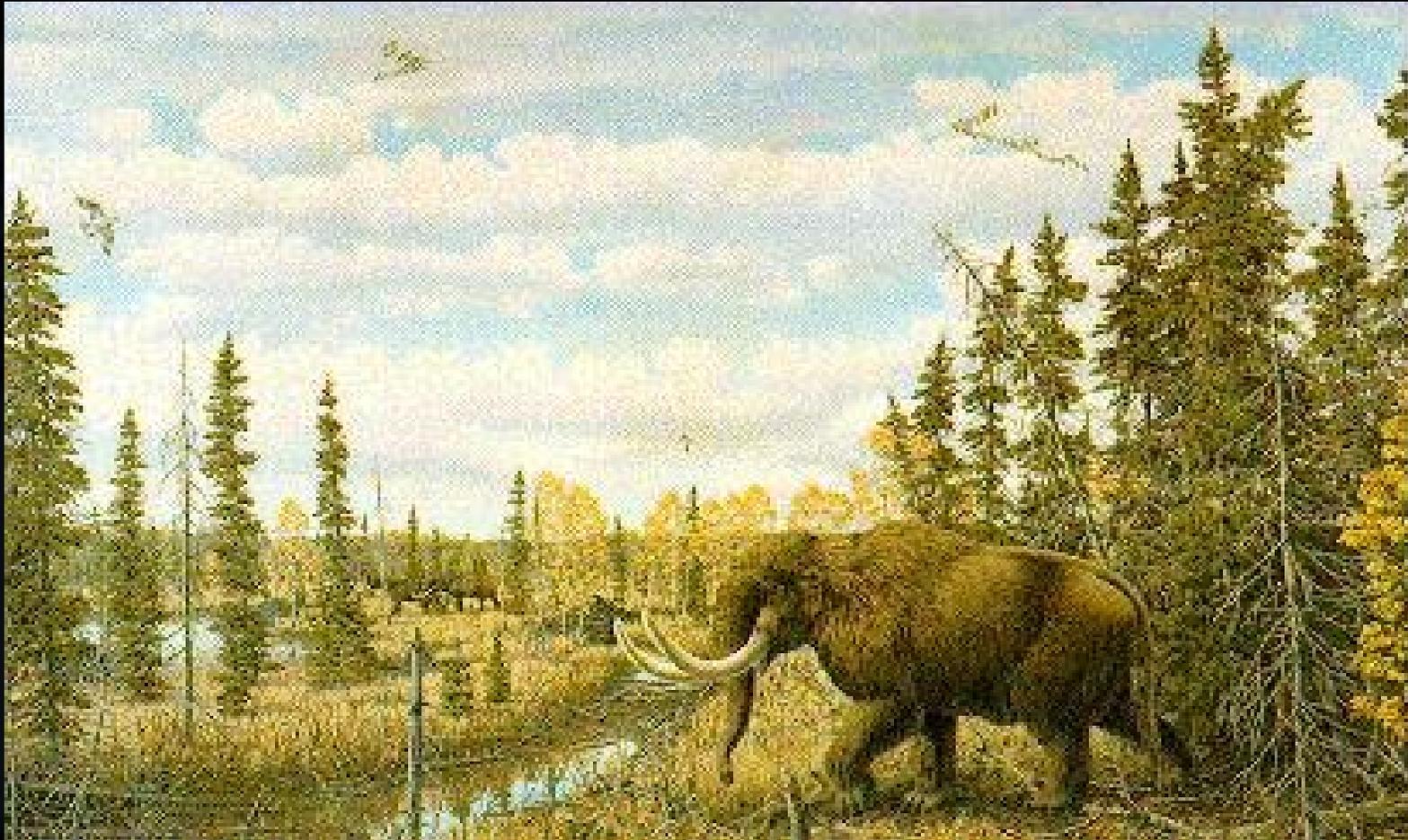


Figure 5.24. Spruce (*Picea*) in the Pacific Northwest, 18,000 yr B.P.

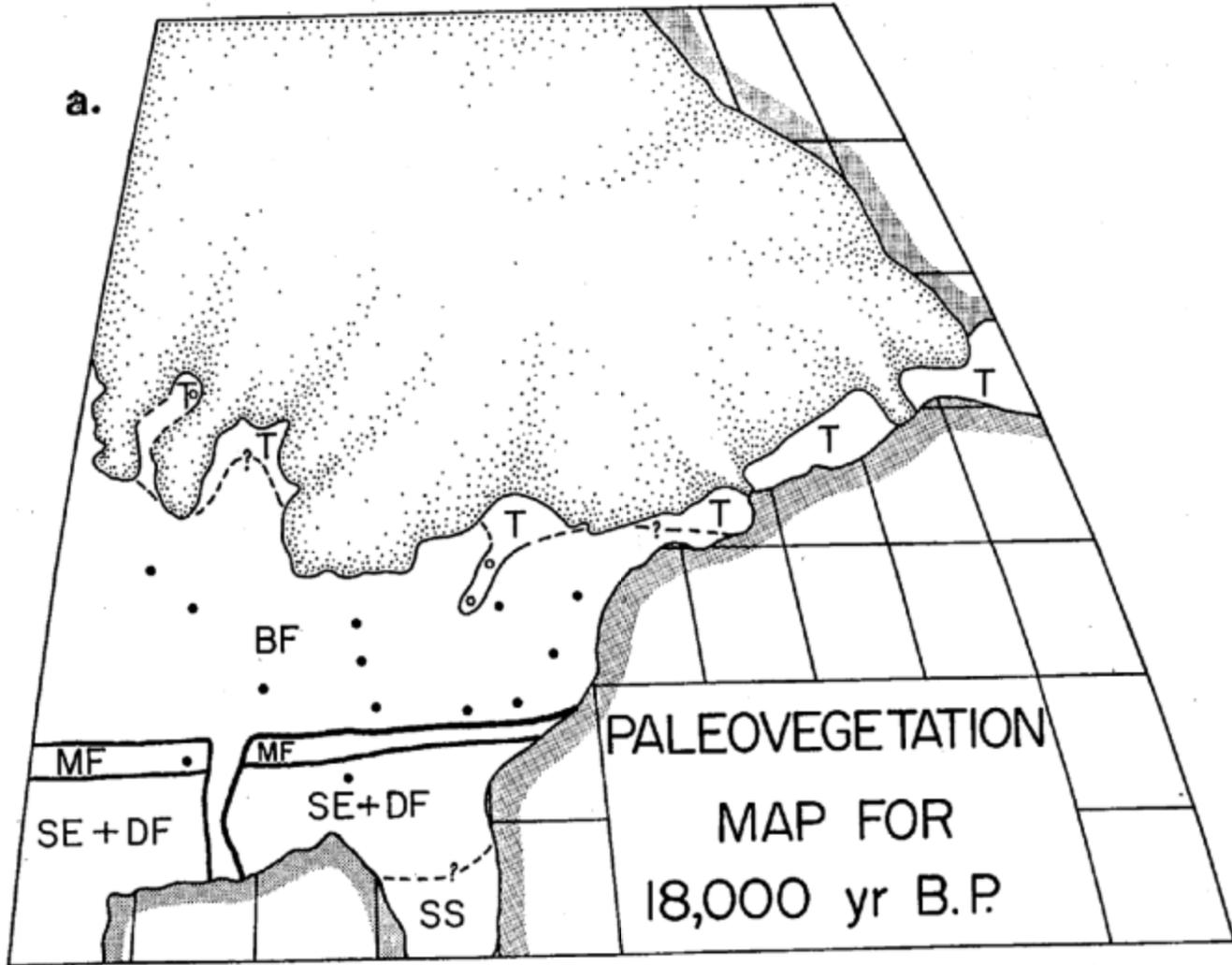




# Open Boreal Forest and Megafauna



a.



# How Long Has Man Been Altering the Landscape in the Southeast?

Man (*Homo sapiens*) has been in  
the regions for 12,000 to 14,000 years

# Holocene Cultural/Environmental Events

Period	Culture Events	Date	Environmental Connection
Historic	Conservation Priority	Today	Recovery of Americas forests
	European Settlement	1800	Further disturbance – “Deforestation”
	High Indian mortality		Reforestation of Indian managed lands
	Europe “discovers” America	1500	Indian culture& Fire throughout the lanscape
Mississippian	Indian Culture highly structured	1000	<b>Open landscape</b> agriculture and fire influenced
Woodland	Cultivation & Fire	800	Northern pine retreat to Canada
	Bow & Arrow	AD	Southern pines throughout SE
	Mound building		
		BC	Northern pine retreat to Canada
Archaic	Rapid population growth	1K	
	Cultural fire extensive	2K	Oceans rise to their current level
	Begin to clear land	3K	Bristle cone pine germinate
		4K	“Southern Pine Rise” Pines increase dominance (Hemlock on the Plateau)
	Indians use total landscape of SE	6K	Hardwoods major part of the landscape
		7K	Hypsithermal warming begins
Paleo-indian		8K	Permafrost as far south as Ashville, NC
	Fire available tool Hunter - Gathers	9K	Temperature increase spuce, larch, jack pine
	Cultural influence begins Man migration in SE	12k	Glacier Retreat Boreal forest TN & NC
Pre-cultured times	No cultural influence		
	Landscape “natural”	18K-20K	Full glaciations to the Ohio River

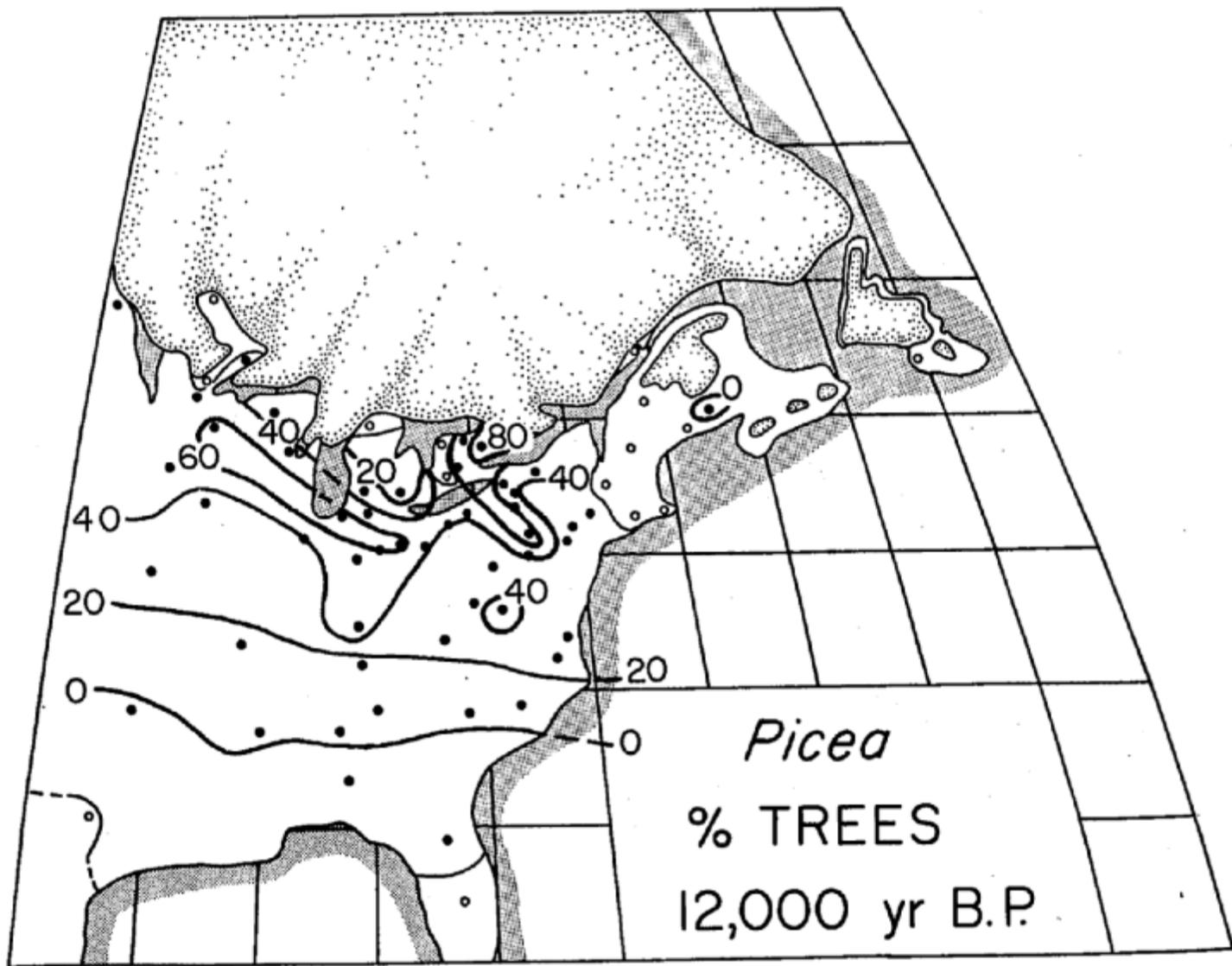
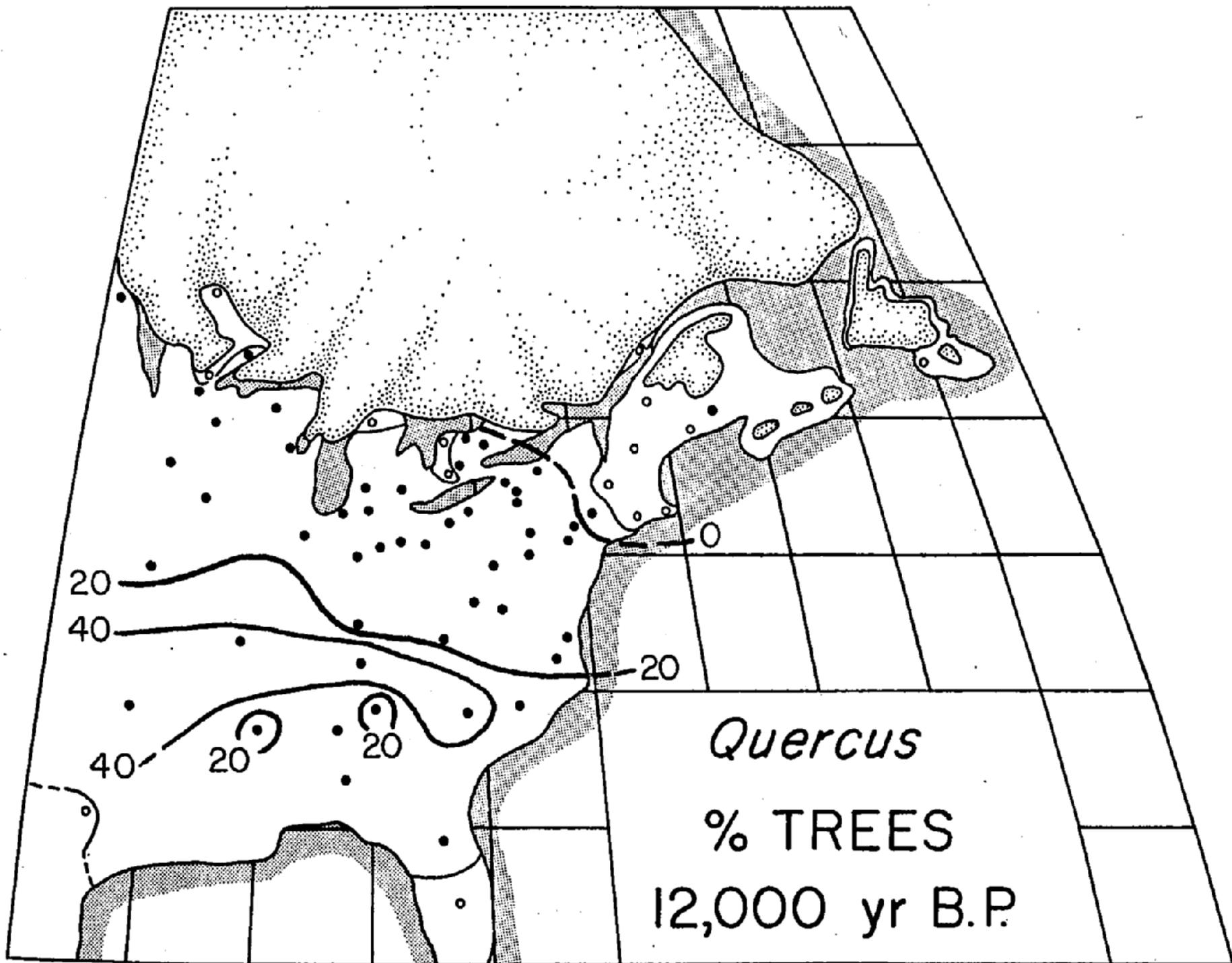


Fig. 5.24. Shaded (Picea) & Picea dominance map for 12,000 yr B.P.



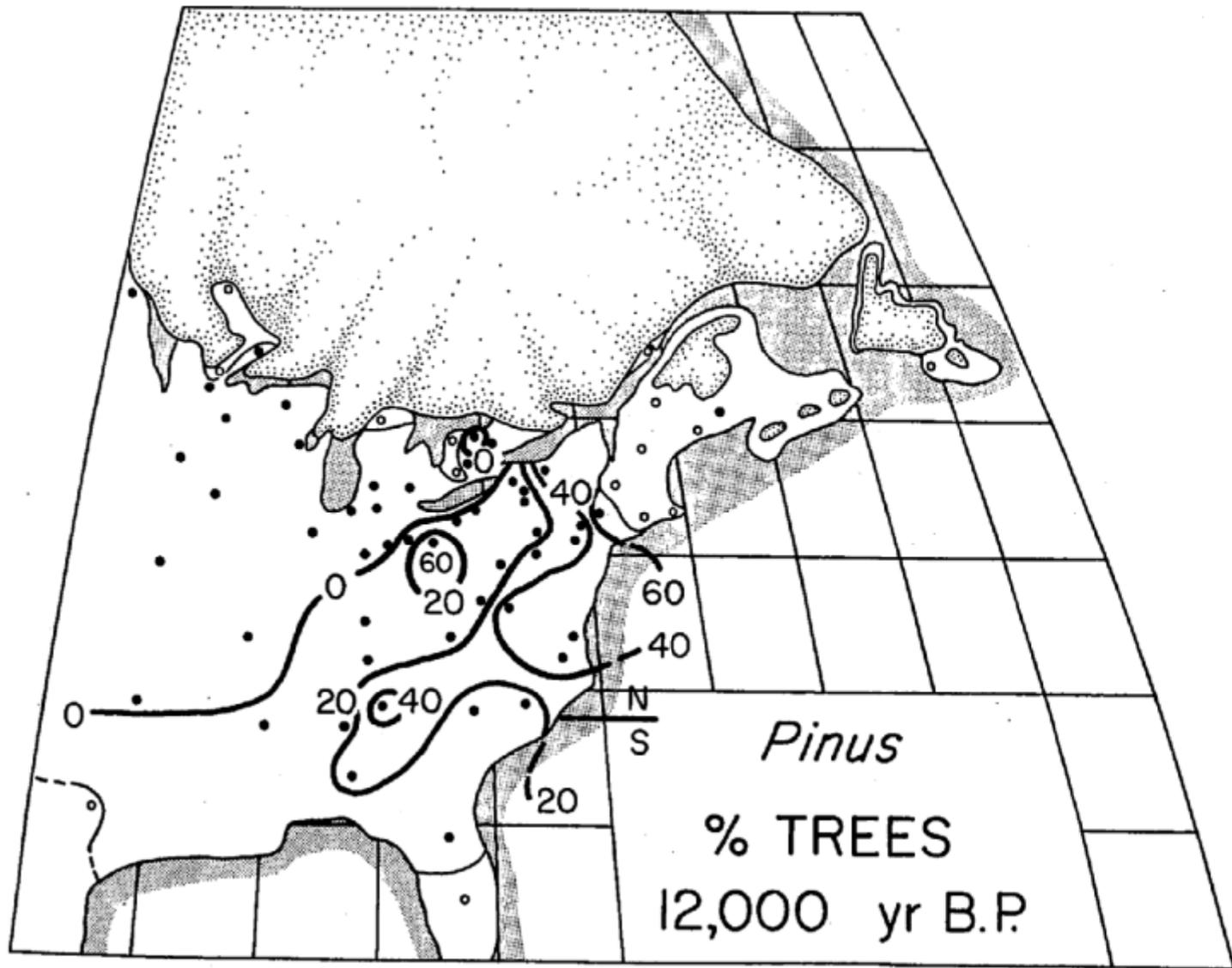
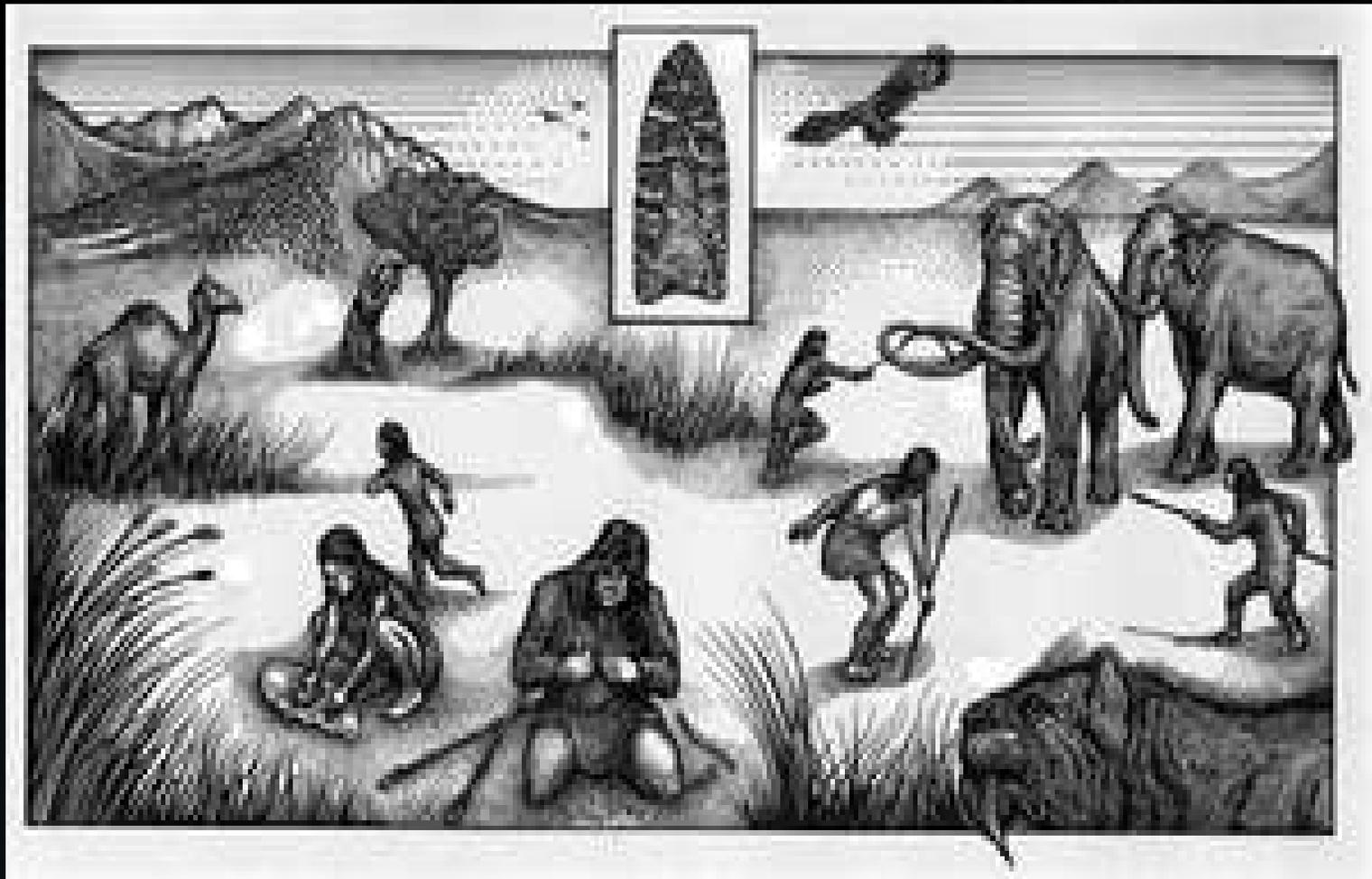


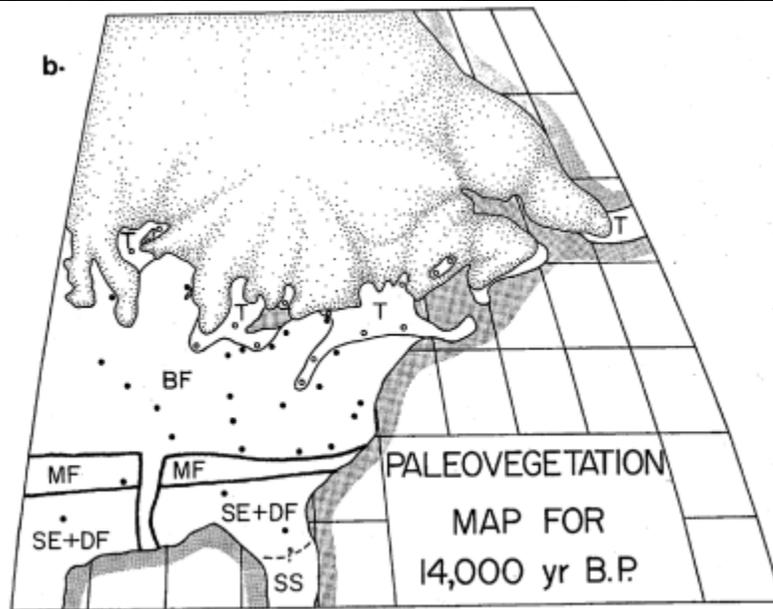
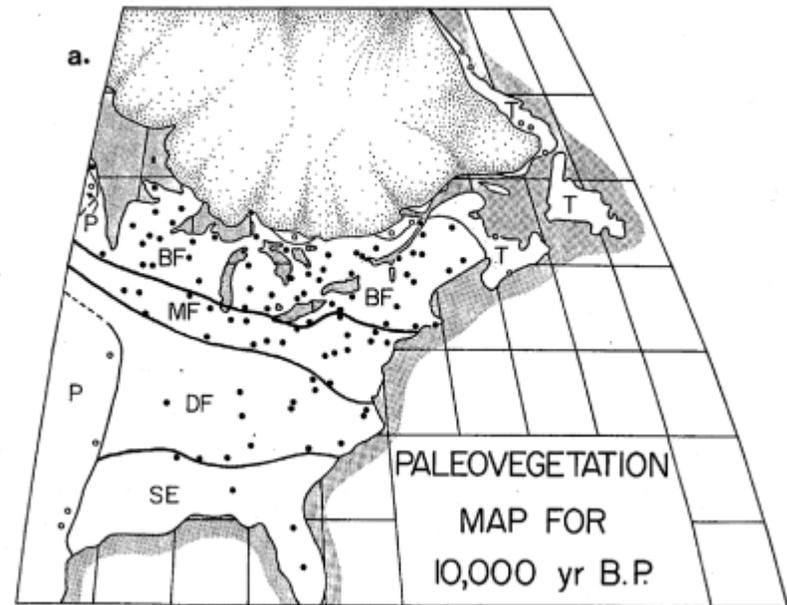
Figure 5.26 Pine (*Pinus*) of Paleo-Indians, c. 12,000 yr B.P.

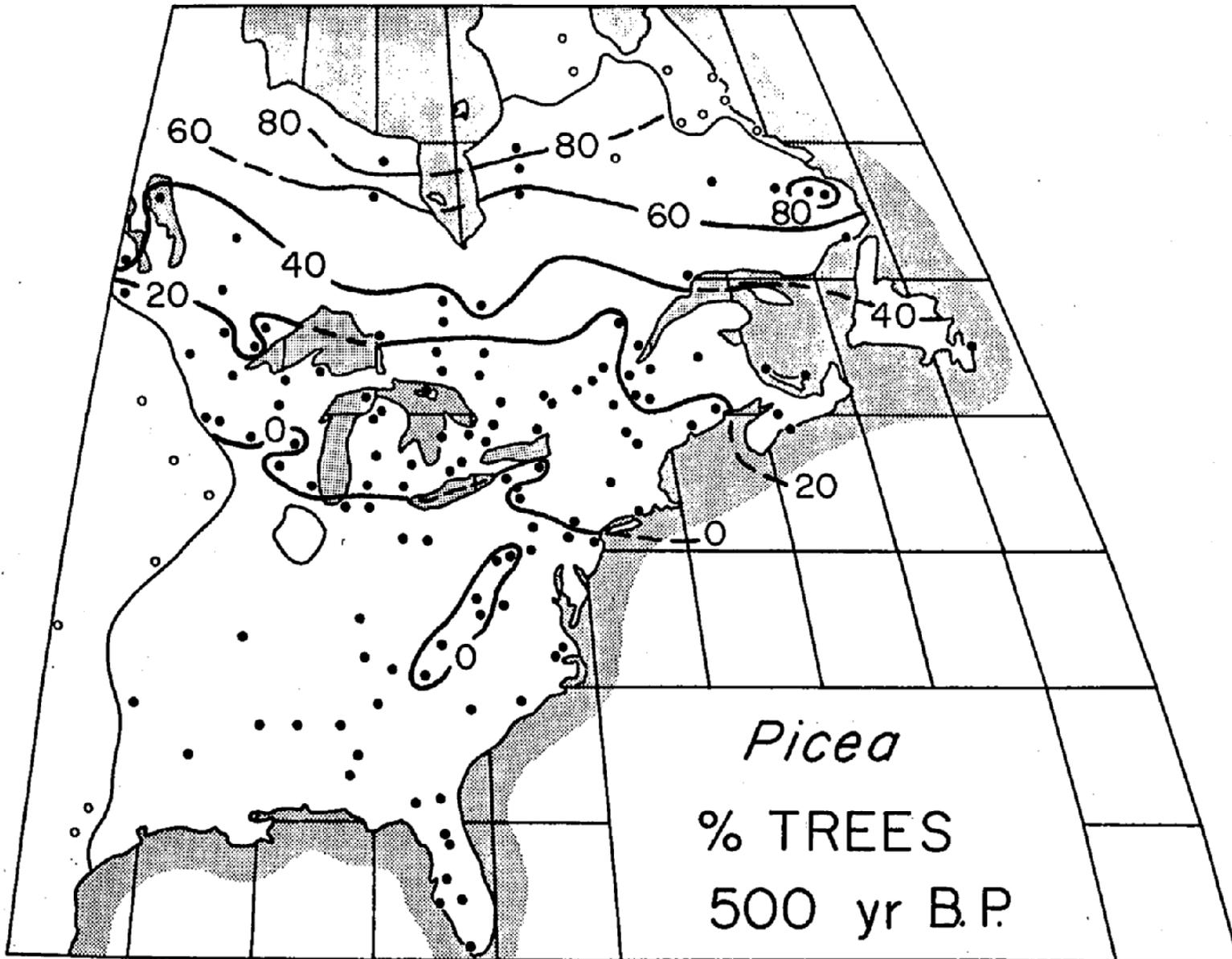


# Gray Fossil Beds - E. TN

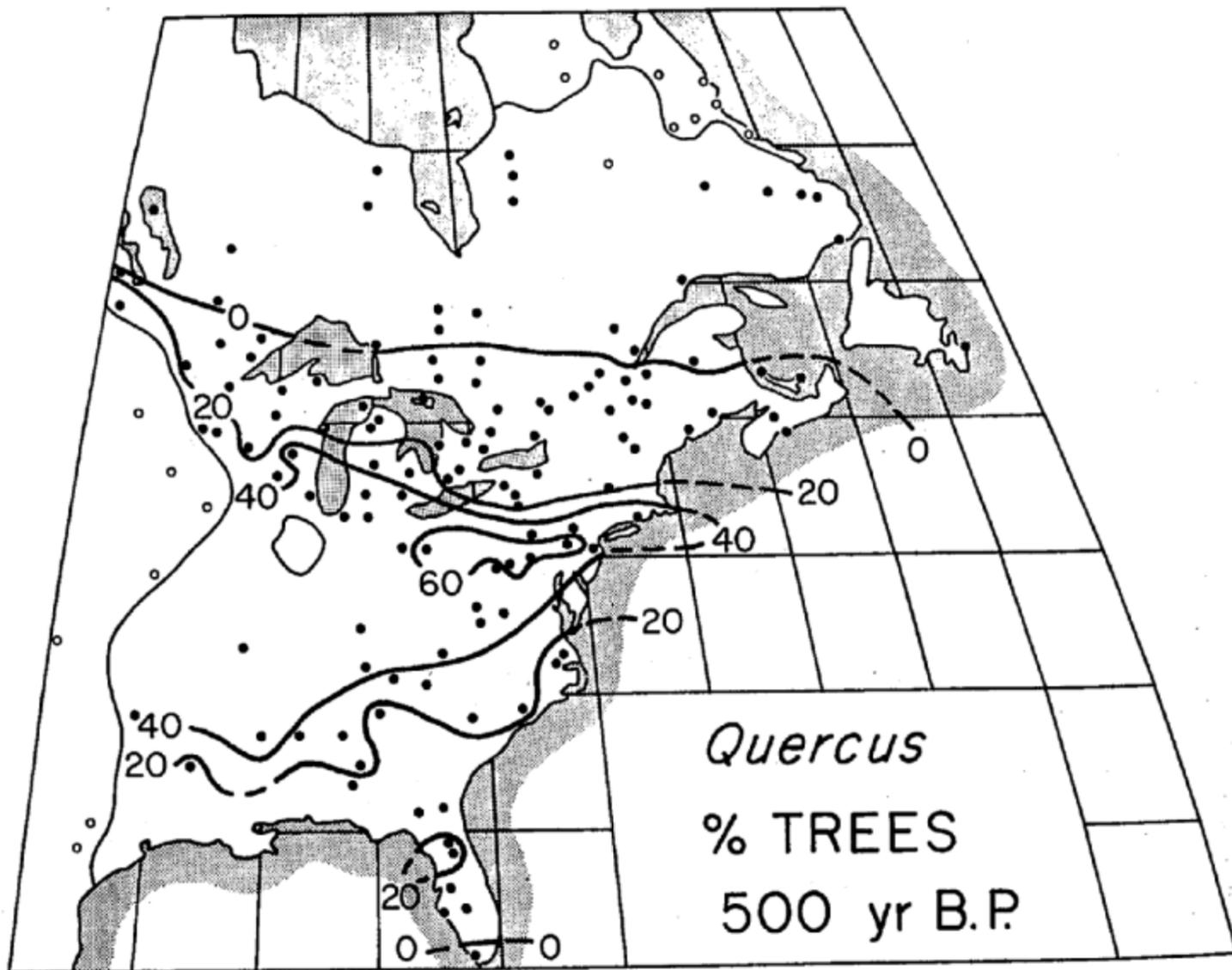
10,000 -12,000 ybp

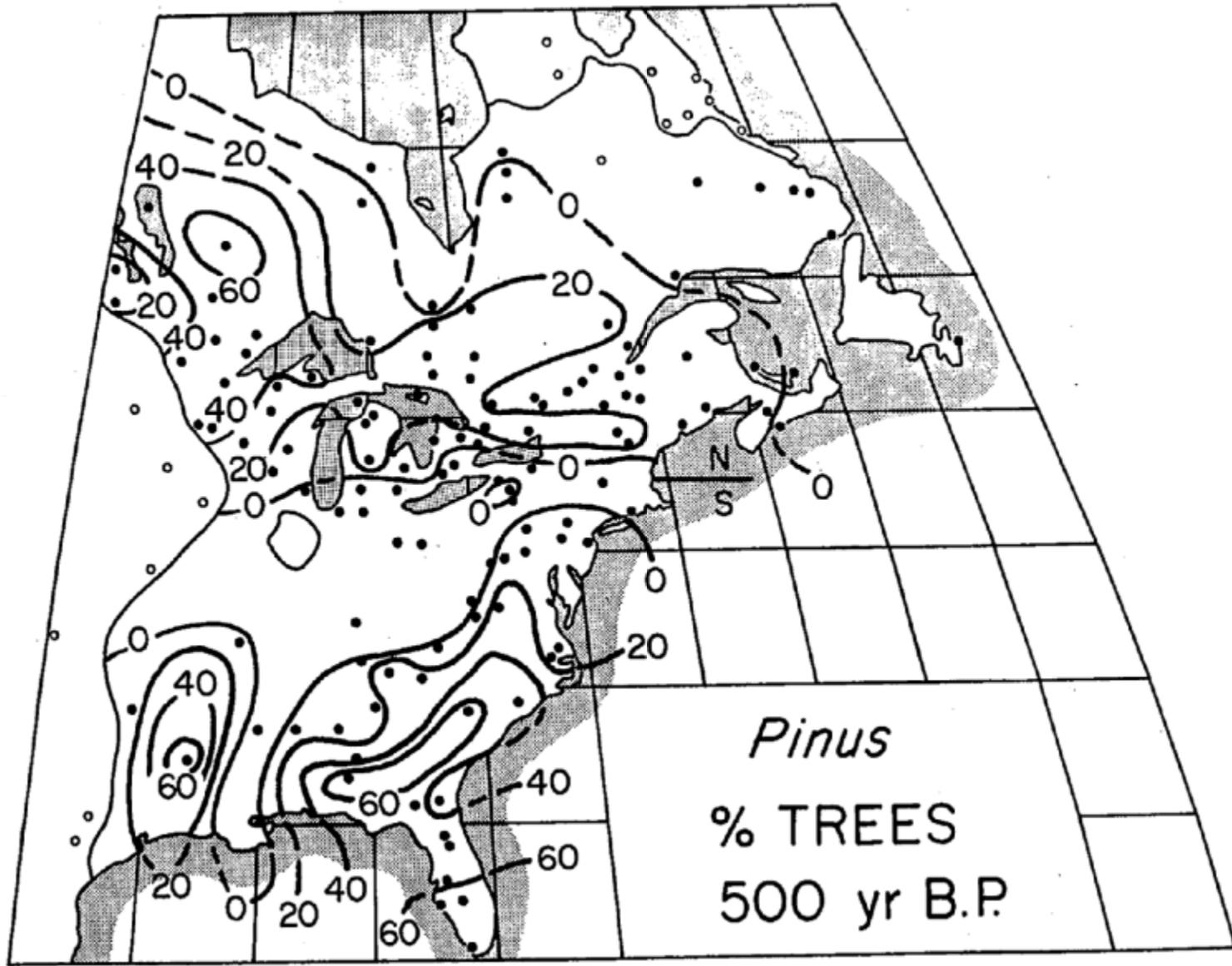




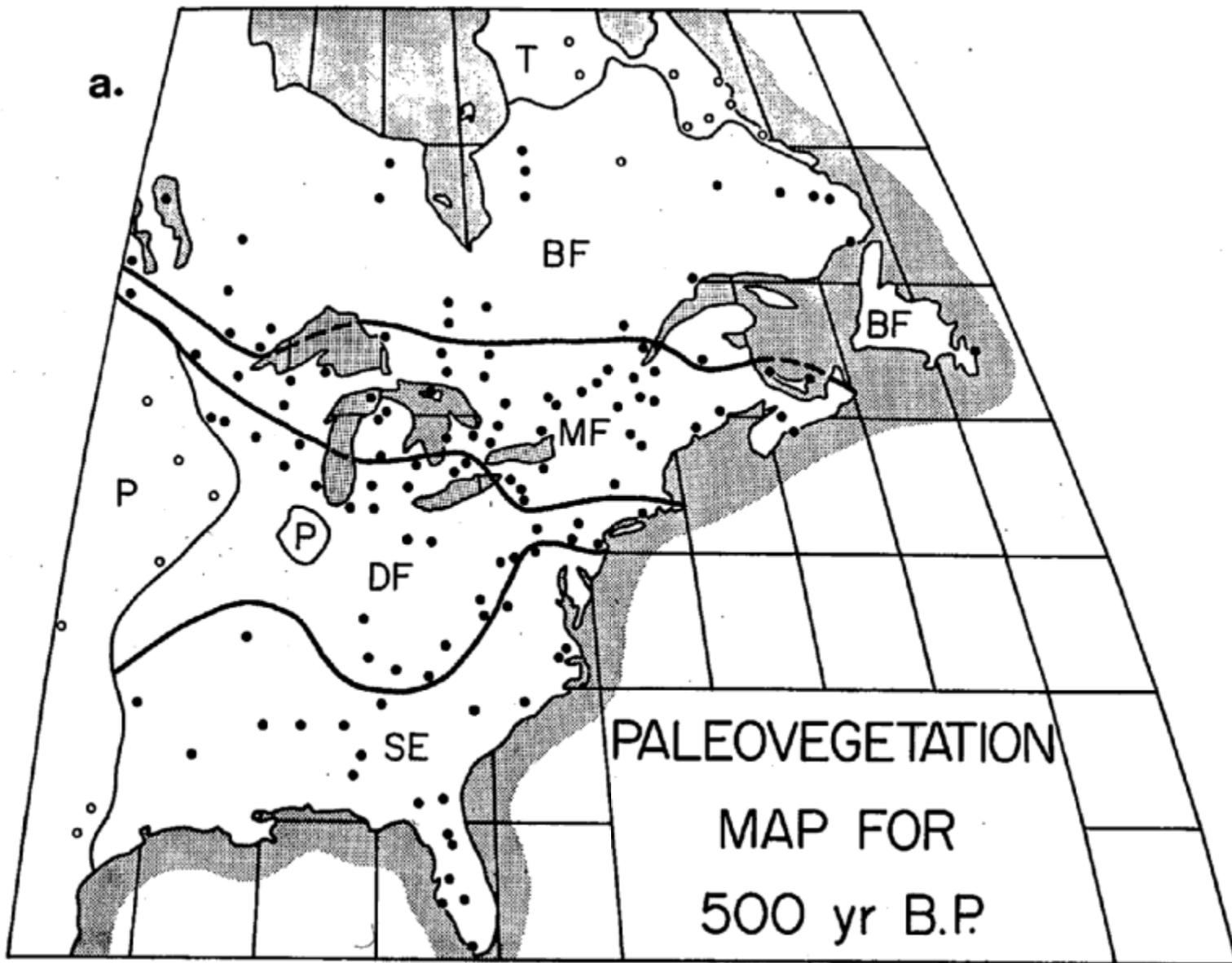


*Picea*  
% TREES  
500 yr B.P.





Map of the Northeastern United States showing the percentage of Pinus trees 500 years B.P.



# Historic Events Influencing Southeastern Forests

Date	Event	Landscape Conditions	
Today		Increase forest acres	Forest largely recover from turn of century
1975	Environmental movement		
1941	WWII	Effective fire control	Crisis conditions over SE landscape
1900	Great Depression	Abandonment of farms	
	Chestnut Blight Introduced WWI Boll Weevil Birth of Forestry in America	Forest Exploitation	
1861	Civil War		Forest largely closed
1820	Trail of Tears (Indians removed)		
1776	American Revolution		Forest without cultural Practices
1607	First Permanent Settlement		Forests without cultural Practices
1500	Pandemics (8-10) Cortez, DeSoto - diseases		Indian Culture Presents on the landscape largely removed
1492	Columbus “discovers” America		Landscape largely open

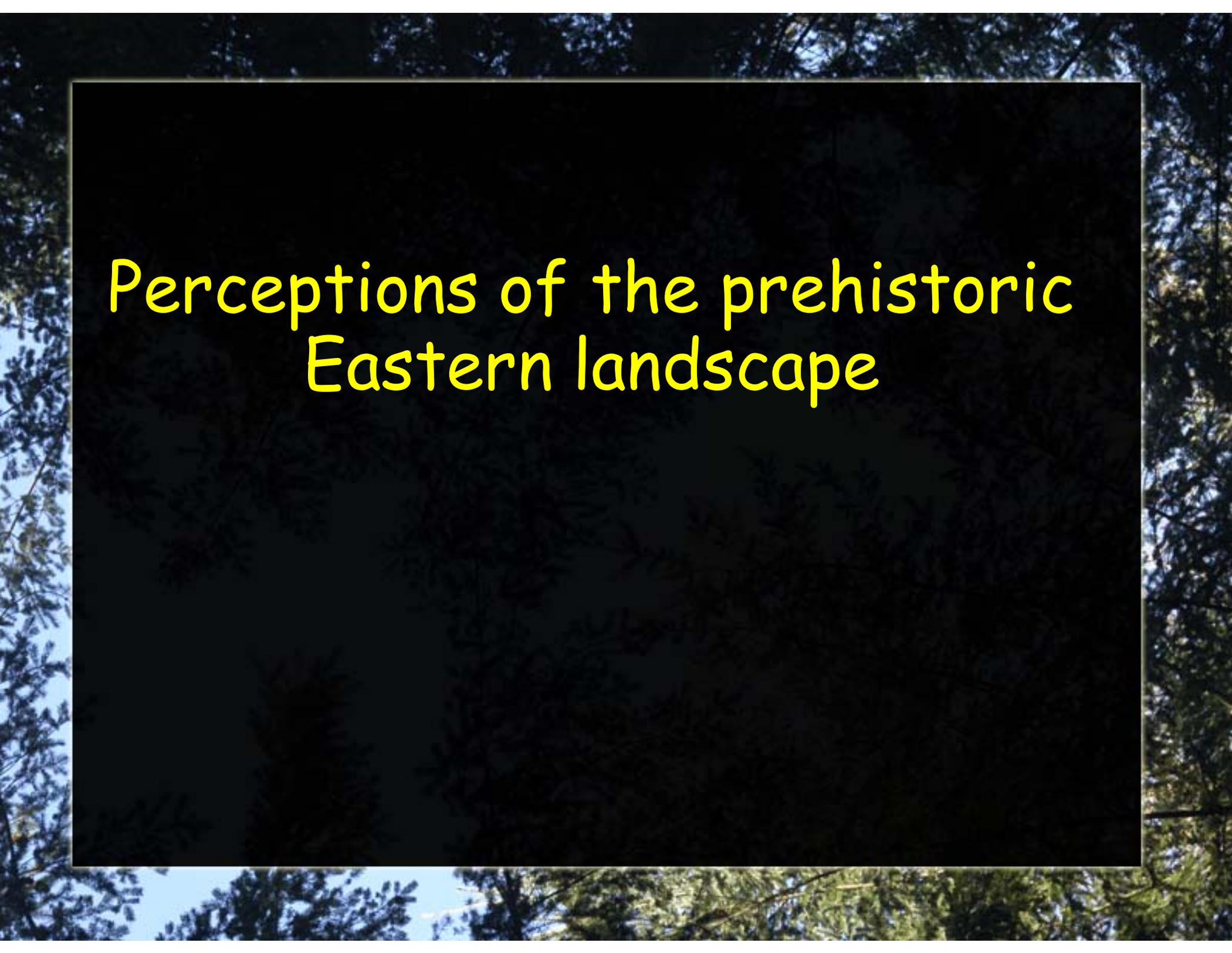


Pre-Columbian Forests

Where they "natural"?

Anthropologists have "accumulated sufficient evidence to argue that, at any point in time or space, where man has occupied a region he has materially affected the soil, the fauna, the flora, and even the climate through the intermediacy of that one distinctive human possession which we call culture."

Helzer, 1955



# Perceptions of the prehistoric Eastern landscape

For various reasons, the effects of preliterate and/or prehistoric ("primitive") man on his environment has received scant attention by geographers, anthropologist and ecologist. Among them is a "...romantic and unscientific idea that "primitive" man was a part of nature in direct opposition to "civilized" man who was apart from nature".

YET, "...CONSIDERABLE DISAGREEMENT OVER THE NATURE AND EXTENT TO PRELITERATE MAN'S MODIFICATION OF THE ECOSYSTEM..."

"...A PROBLEM PARTICULARLY ACUTE IN EASTERN NORTH AMERICA, WHERE POPULAR BELIEF THE EARLIEST EUROPEANS FOUND" EVERYWHERE AN UNBROKEN FOREST OF GIANT TREES".

THE COMPOSITION, STRUCTURE, AND CHARACTER OF THE EASTERN NORTH AMERICAN FOREST ECOSYSTEMS AT THE TIME OF EUROPEAN CONTACT WERE NOT THE RESULT OF PURELY "NATURAL" FACTORS. BUT WERE THE RESULT OF THE INTERACTION OF "NATURAL" FACTORS WITH HUMAN CULTURES FOR 12,000 TO 14, 000 YEARS.

A TIME PERIOD WITHIN WHICH THE GENETIC  
MAKEUP OF THE FLORA WAS BEING ALTERED BY  
THESE INTERACTING FACTORS

SPECIES LEVEL PRIMARILY



# References to the Open Character of the Pre-Settlement Landscape

EARLY ACCOUNTS BY EUROPEANS ARE REplete WITH DESCRIPTIONS OF THE OPEN CHARACTER OF THE FOREST,..." GUFFEY 1977

- NOTING THEIR SIMILARITY TO THE PARKS OF ENGLAND - MORTON, 1632 AND JOHNSON 1654

AROUND SALEM, MASS., "OPEN PLAINS, IN SOME PLACES 500 ACRES,... NOT MUCH TROUBLESOME FOR TO CLEAR FOR THE PLOUGH TO GO IN."

EARLY EXPLORES FOUND "LARGELY, LEVEL PLAINS, AND FINE SAVANNAS THREE OR FOUR MILES WIDE."

"SHENANDOAH VALLEY, A MAJOR PRE-COLUMBIAN THOROUGHFARE, WAS TREELESS ITS ENTIRE LENGTH."  
MAXWELL, 1910  
MYER, 1921

Fire Was Responsible for These Open  
Conditions

# Fires Aided In Obtaining Food from Plants

Fires consume woody plants making  
room for herbaceous annuals.

**FIRES AIDED IN OBTAINING FOOD FROM PLANTS - FIRES CONSUME WOODY PLANTS MAKING ROOM FOR HERBACEOUS ANNUALS.**

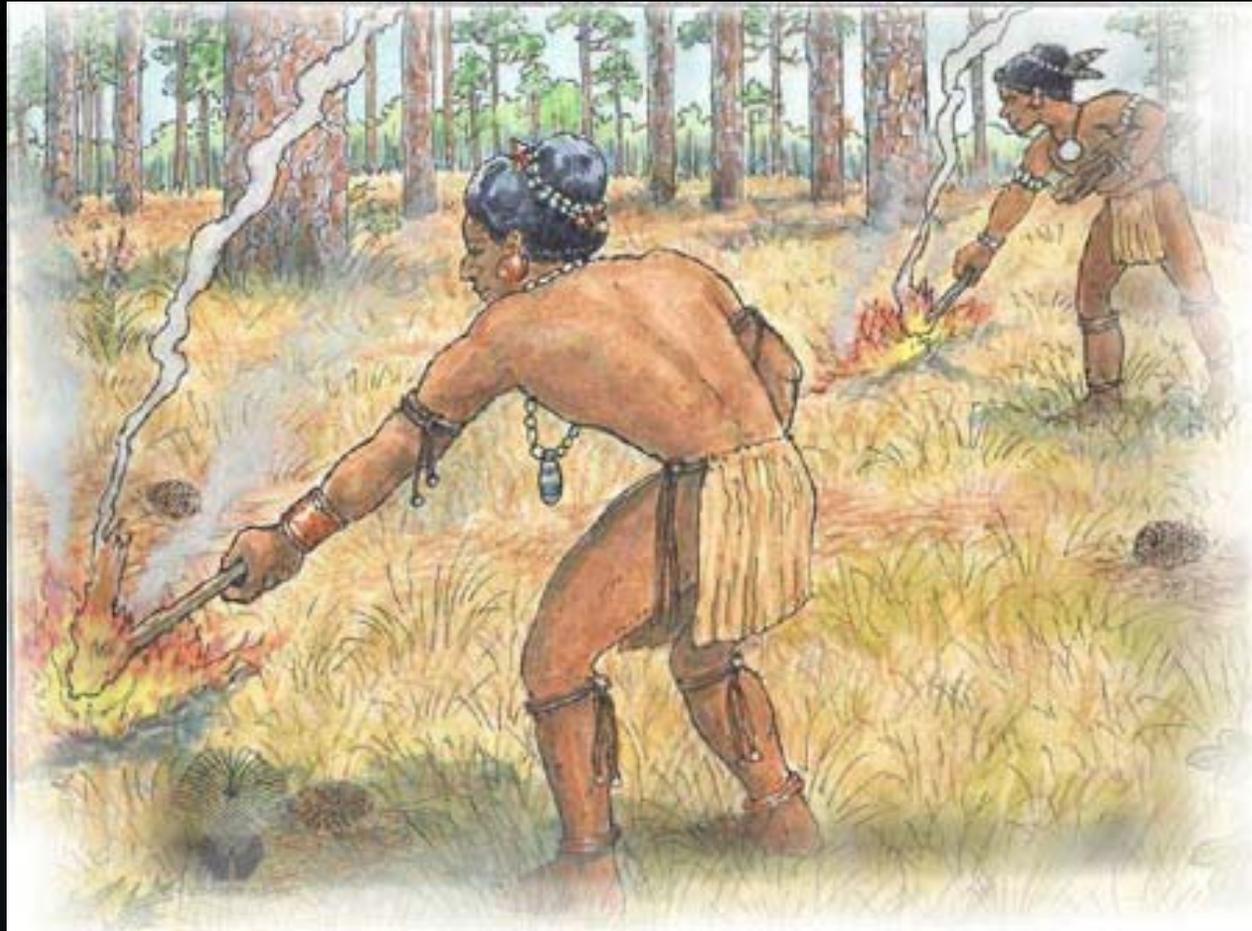
**"THROUGHOUT THE WORLD, MOST OF MAN'S FOOD PLANTS, BOTH WILD AND CULTIVATED, HAVE BEEN ANNUAL "HELIOPHILES". - OAKES 1939**

**THE PLANTS THAT BENEFIT MOST FROM BURNING**

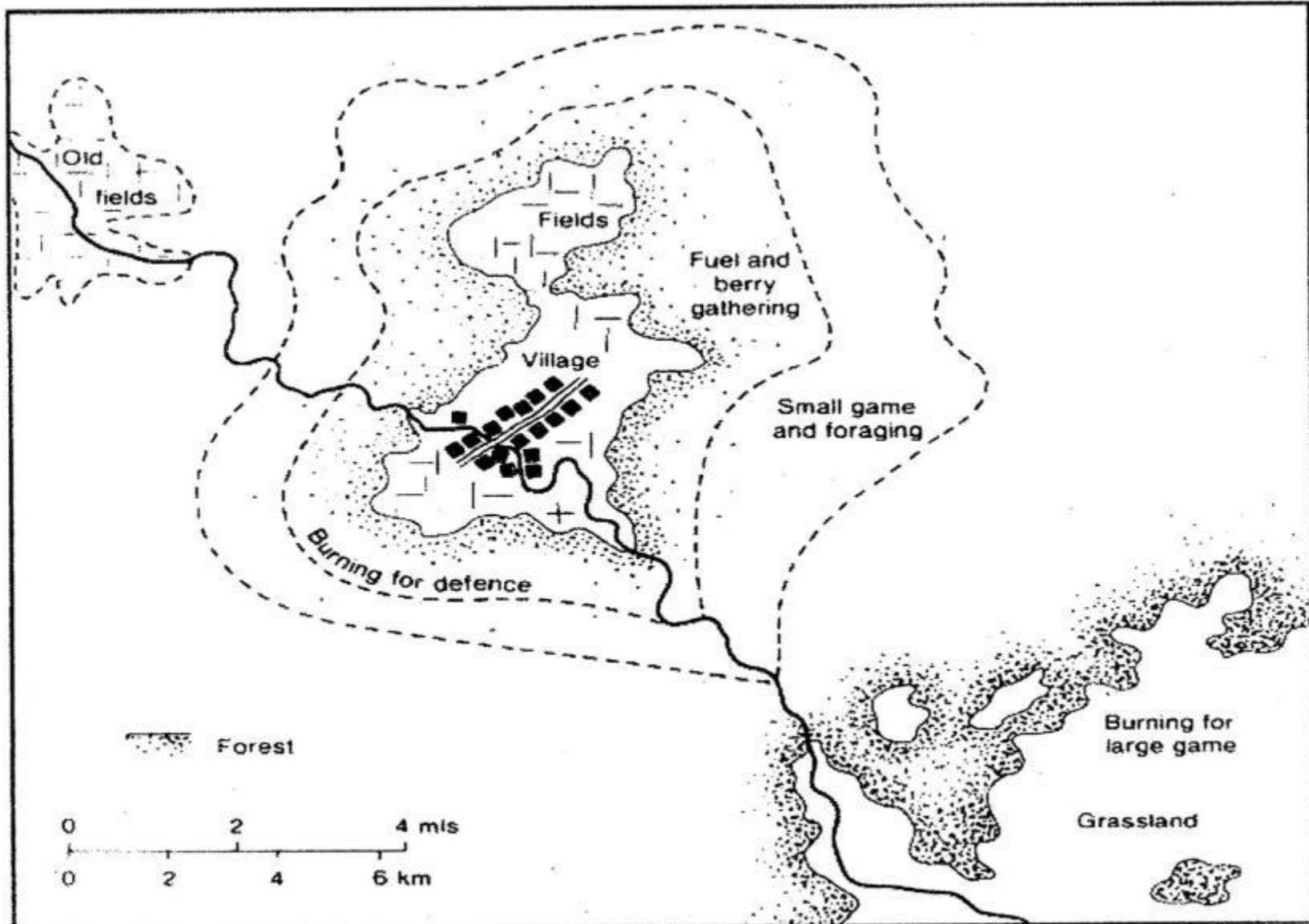
**...REASON FOR BURNING WAS "TO THE END THAT MORE WILD GAME MIGHT ABOUND, WITH IMPROVED OPPORTUNITIES FOR HUNTING IT." - MAXWELL, 1910**

HAVING FOUND THE DEERE, THEY ENVISION THEM WITH MANY FIRES, ... THEY CHASE THEM SO LONG WITHIN THE CIRCLE, THAT MANY TIMES THEY KILL, 6,8,10 OR 15 AT A HUNTING." - FROM CAPTAIN JOHN SMITH'S LOG BY AMBER, 1910

# References to Indians Use of Fire In Eastern North America



**"THE SAVAGES ARE ACCUSTOMED TO SET FIRES OF THE COUNTRY IN ALL PLACES WHERE THEY COME; AND TO BURN IT, TWICE A YEARE, VIXE, AT THE SPRING, AND AT THE FALL OF THE LEAFE... AND THIS CUSTOM OF FIRING THE COUNTRY IS THE MEANS TO MAKE IT POSSIBLE." - MORTON, 1632**



*Schematic presentation of Indian forest use, from Michael Williams, Americans and Their Forests. Cambridge University Press, 1969, p.40.*

FIRE WAS THE CAUSE OF THE "SPACEOUS  
MEADOWS OF KENTUCKY AND TENNESSEE."  
- MICHAUX, 1803, GUFFEY, 1977

KENTUCKY "BARRENS HAVE ALL BEEN  
INVADED BY WOODS" WITH THE  
CESSATION OF BURNING. - STEWART,  
1956

# VIRGINIA

"WAS PASSING THROUGH ITS FIERY ORDEAL, AND WAS APPROACHING A CRISIS, AT THE TIME COLONISTS SNATCHED THE FAGOT FROM THE INDIAN'S HAND. THE TRIBES WERE BURNING EVERYTHING THAT WOULD BURN, IF DISCOVERY OF AMERICA HAD BEEN POSTPONED 500 YEARS, VIRGINIA WOULD HAVE BEEN A PASTURE LAND OR DESERT." - MAXWELL, 1910 AND LEDERER, 1669

Kuchler (1964) claims that hardwoods are the potential natural (climax) vegetation over the entire Southeastern United States.

- without widespread pre-Columbian fires there is no explanation for the existence of the “Southern Pinery” as the predominate vegetation type over most of the Southeast at the time of settlement.





Prescribed fire



Open landscape  
using fire



Without fire – shrubs, no or little grass

# Serotinous cone species in North America

(fire required to open cones)

Jack pine

Pitch pine

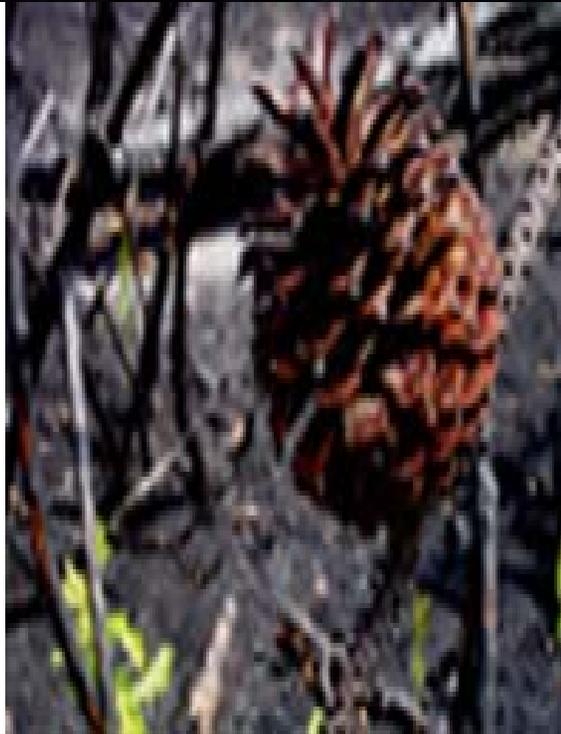
Table Mountain Pine

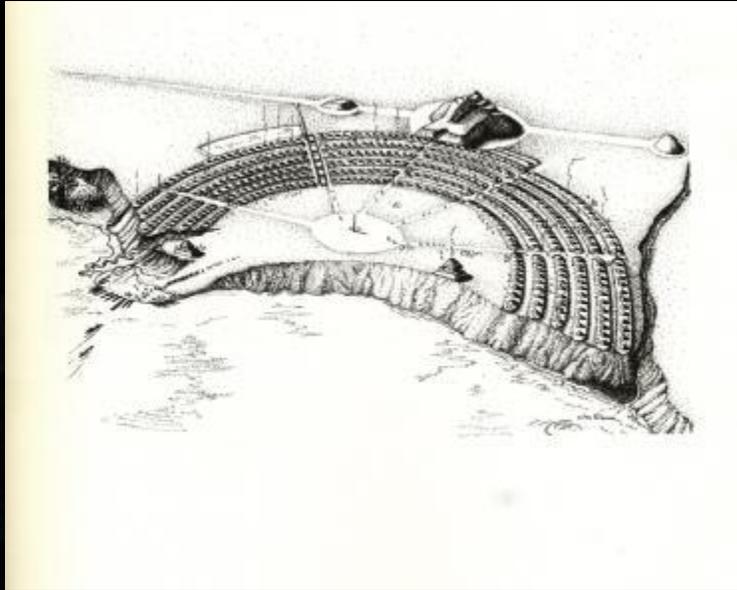
Pond pine

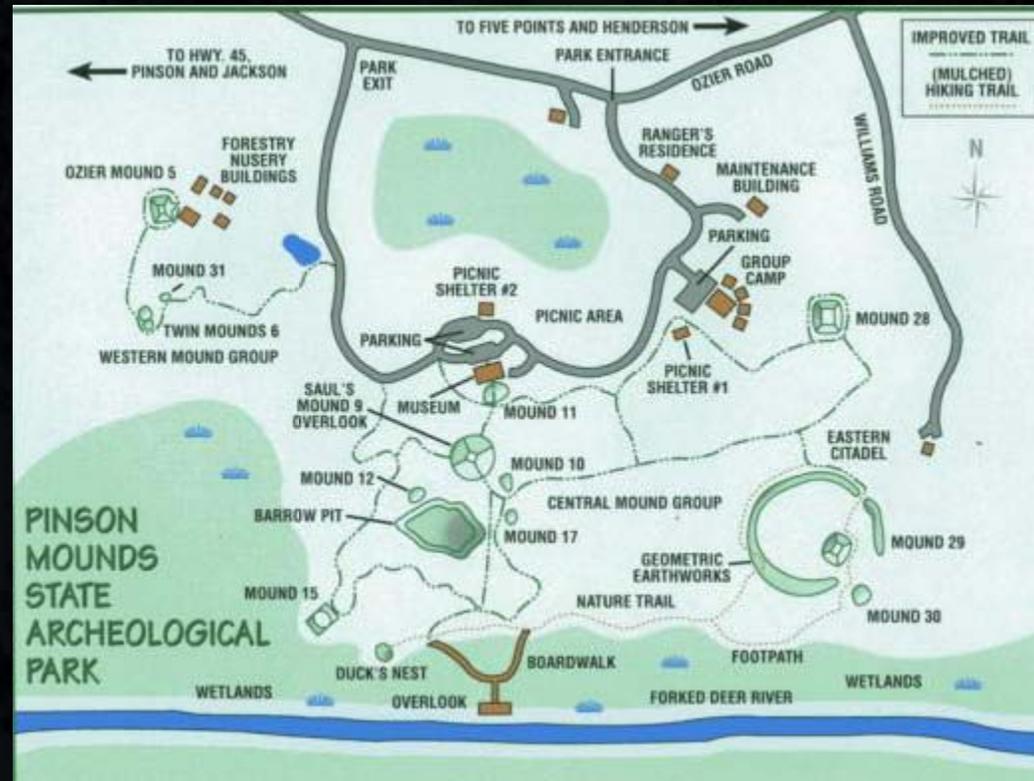
Sand Pine











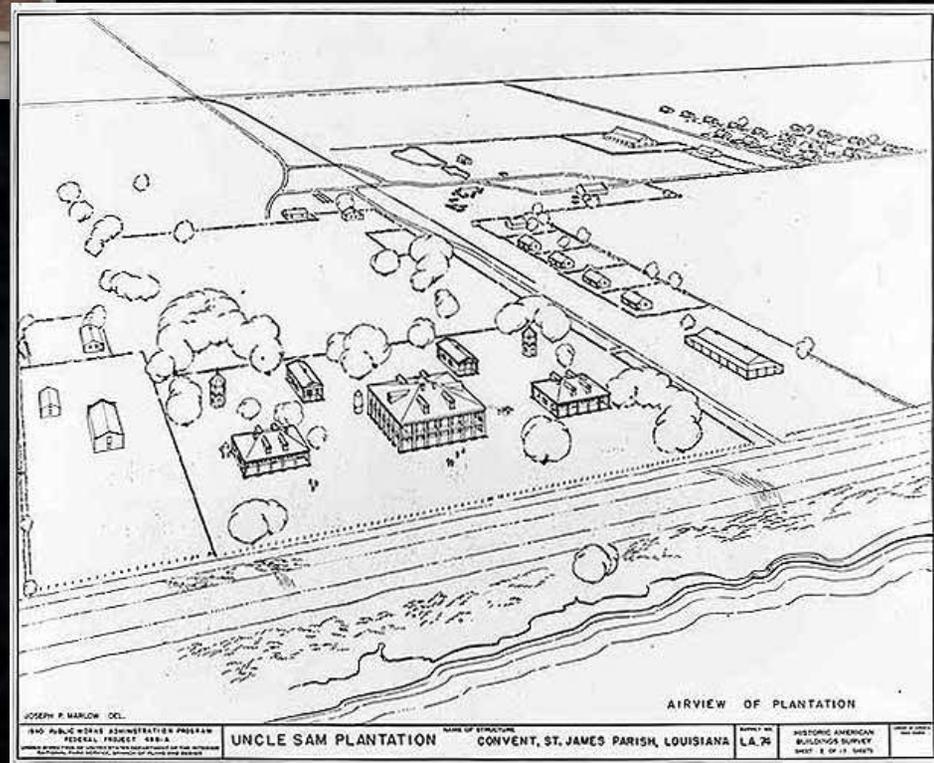




# Historic Landscapes



## Settlement and Plantations





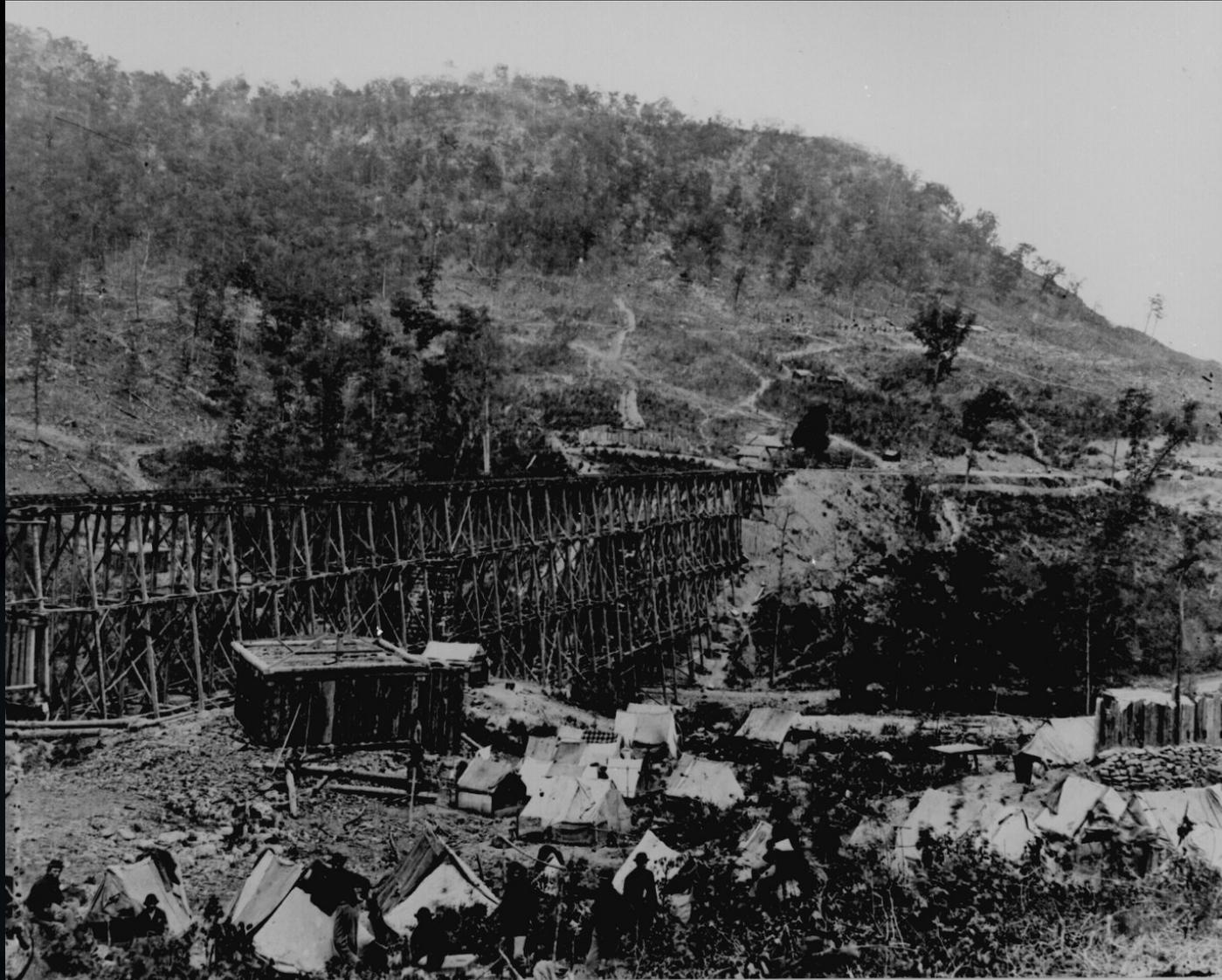


3674

# Nashville circa 1863



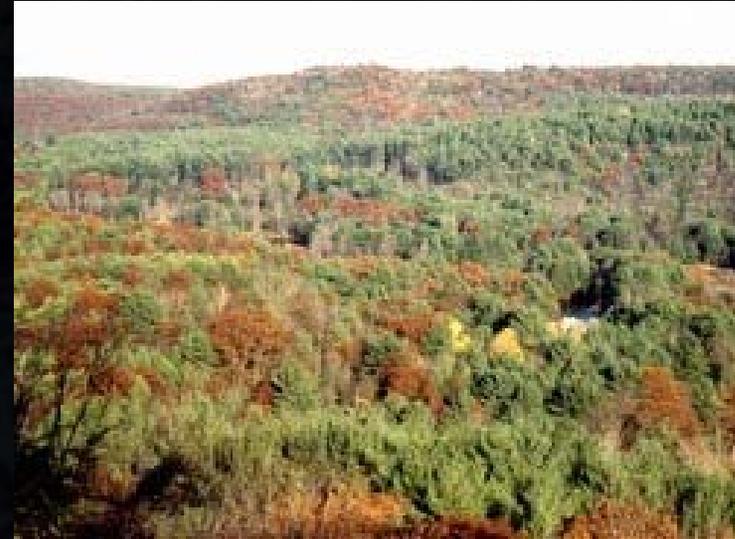
## Civil War Photos



# Past and Present



1880



1990

MISCONCEPTIONS ABOUT NATURALNESS ARE SERIOUSLY ERODING THE PUBLIC'S ABILITY TO DEAL EFFECTIVELY WITH LAND. THE UNDISTURBED OLD-GROWTH LANDSCAPE MANY ENVISION NEVER EXISTED, AND THE QUEST TO ACHIEVE IT IS UNDERMINING SCIENCE-BASED EFFORTS TO RESTORE A RANGE OF MORE VIABLE GROWING CONDITIONS. THE PUBLIC IS LOVING ITS FORESTS TO DEATH.

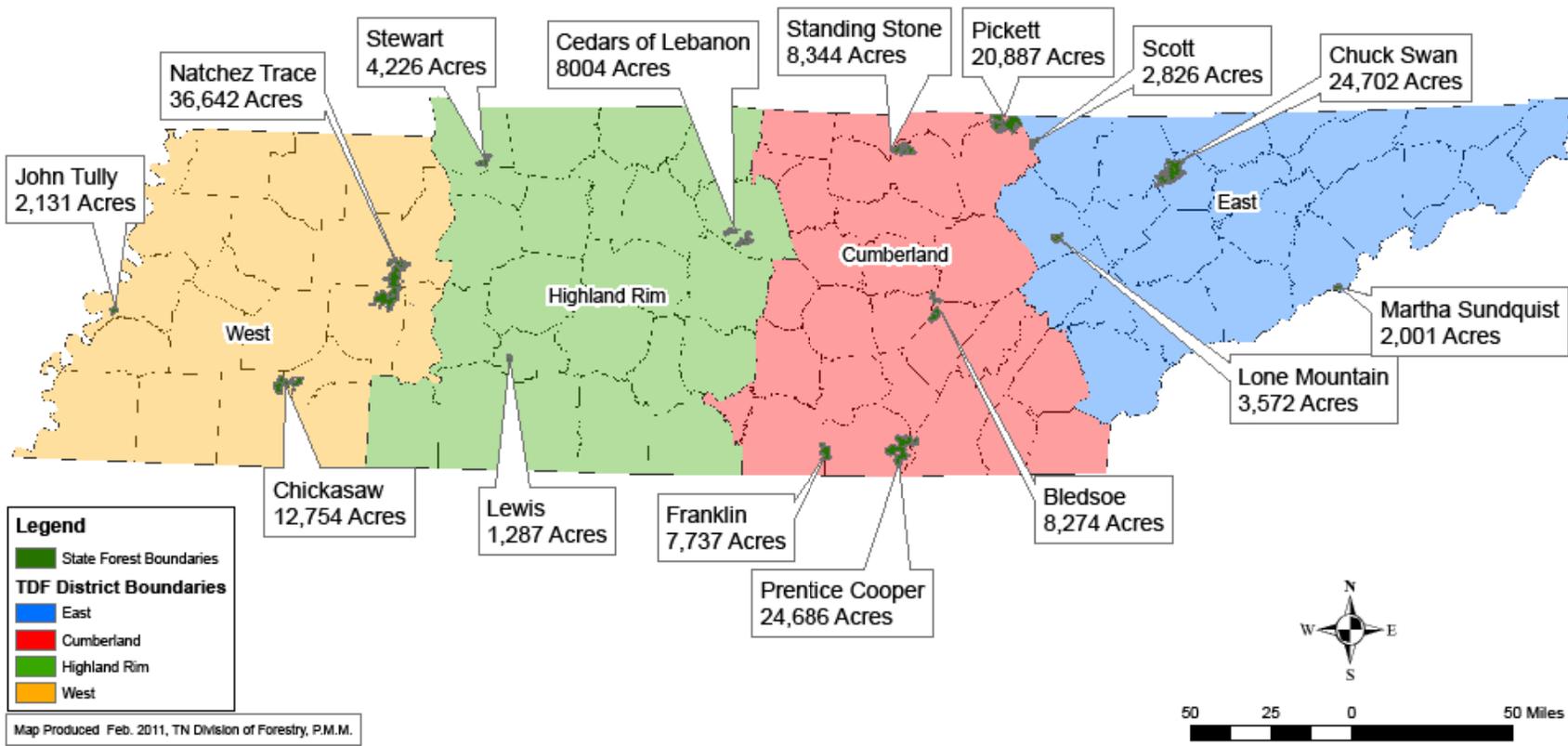
- DR. EDWARD BUCKNER, OVERTON PROFESSOR OF FORESTRY, UNIVERSITY OF TENNESSEE, KNOXVILLE, OCTOBER 1997

WAITING FOR NATURE POSES A GREATER RISK OF LARGE-SCALE ECOSYSTEM DESTRUCTION THAN THE RISKS ASSOCIATED WITH SMALL-SCALE HUMAN INTERVENTION. OUR REGIONS FORESTS HAVE A HISTORY OF FREQUENT, VIOLENT, LARGE-SCALE DISTURBANCE. IF WE WALK AWAY AND LEAVE THESE FORESTS TO NATURE, WE RUN THE RISK OF LOSING THE VERY ECOSYSTEMS WE ARE TRYING TO PRESERVE. MOREOVER, WE HAVE NO ASSURANCE THAT FOREST SET ASIDES WILL ACTUALLY GROW OLDER. THERE IS A GREATER PROBABILITY THEY WILL BURN UP OR BLOW DOWN FIRST.

- DR. CHADWICK OLIVER, SILVICULTURIST, COLLEGE OF FOREST RESOURCES, UNIVERSITY OF WASHINGTON, SEATTLE, EVERGREEN, SEPTEMBER 1993



# Tennessee State Forests



# Natchez Trace circa 1935







Natchez Trace circa 1935  
Erosion Control Structures





Pine Planting - Erosion Control & Timber Production



Natchez Trace Aerial View circa 1938

Natchez Trace 2007



# Chickasaw State Forest

1936  
and  
2004



Figure 1. Brush dam construction on Chickasaw State Forest in the late 1930's to prevent further gully erosion.



Figure 2. Quality sawtimber on Chickasaw State Forest today



Here We Are NOW

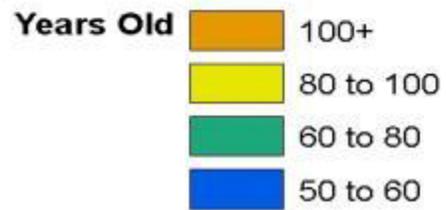
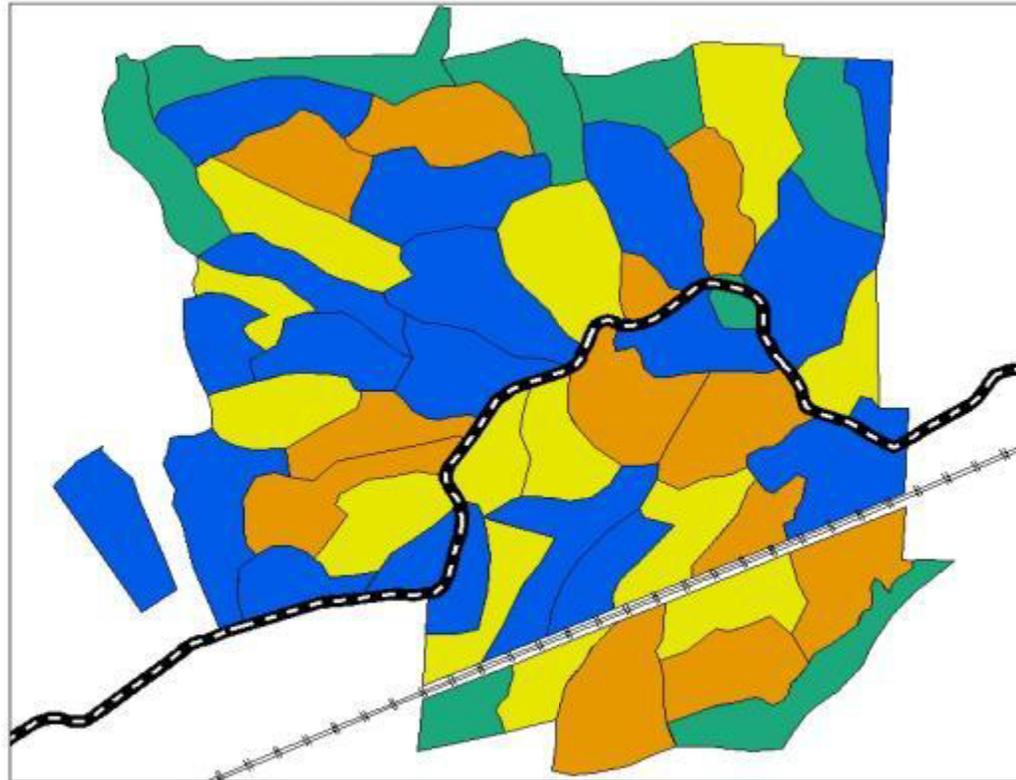
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# Compartment 28 of Natchez Trace State Forest



# Modeling Future Forest Conditions

