And see the peaceful trees extend their myriad leaves in leisured dance—
they bear the weight of sky and cloud upon the fountain of their veins.
—Kathleen Raine, from Envoi,
Collected Poems, 1956

CHAPTER THREE FORESTS BEFORE SETTLEMENT (PRE-1800s)

Take a walk through one of Minnesota's many forests and you may likely get the impression that it was a relatively settled place—as though it always had been what it is now. Those towering trees didn't arrive yesterday, it's true...and their staid presence does give the forest a feeling of permanence that farmland and city subdivisions just don't share. Yet even the least disturbed, most "natural" areas of our state have seen many changes through time. Minnesota's forests today are the result of millennia of transformations.

The earliest known modern tree appeared about 350 million years ago. The Archaeopteris, a tree that looked similar to a Christmas tree, had buds, reinforced branch joints, and wood similar to today's timber. Its branches and leaves resembled a fern.

Ice Age Roots

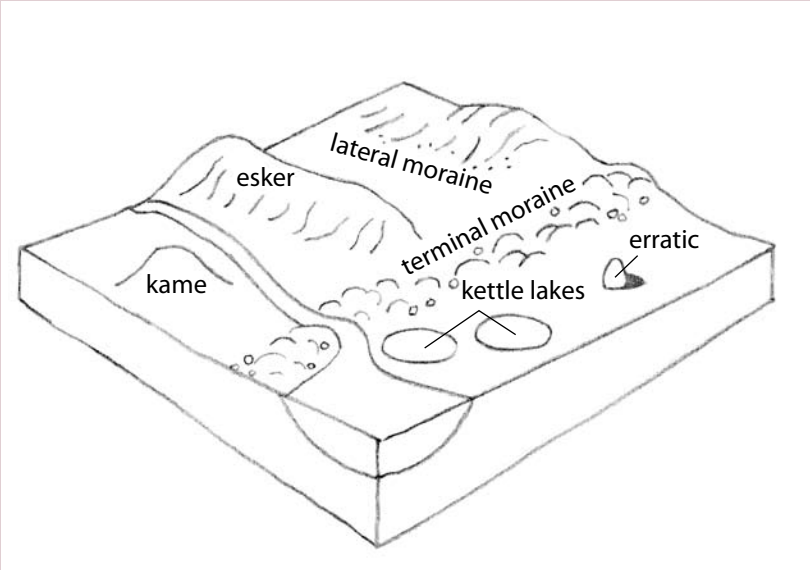
The Minnesota we know today was carved and etched by ice in the form of massive glaciers that periodically crept south from northern latitudes during cold phases of the warming–cooling cycle that has long characterized Earth's climate. Little is known about the vegetation covering the area before the most recent of these glaciers melted, though there is evidence that trees were indeed a part of the landscape even then.

The story of Minnesota's modern forests begins about 10,000 to 20,000 years ago, when the last of the great glaciers began its warming-weather retreat to the north. Some 20,000 years ago, the Wisconsin Glaciation covered all of Minnesota except for the southeastern corner, now known as the "driftless area." As the climate warmed, the massive frozen rivers of ice and snow carved hills, valleys, and plains, and scraped marks into rocks that still tell the tale of their passage.

When we look over the land, we recognize that much of what we see is a mere snapshot of glacial time. As great lobes—curved or rounded projections—of thick ice advanced, retreated, scraped, and dug their ways across the land, glaciers removed much of the topsoil, revealing bedrock. As glaciers receded, they covered the landscape with piles of deposited soil and rock, bumps, hills, holes, and other distinctive Minnesota landforms.

These remnant piles and bumps chose the key and set the meter for the symphony of vegetation that followed the glacier's icy footsteps. By forming the lay of the land and determining the quality of the soil, the glaciers—in concert with weather and climate—largely determined the shape, size, and species composition of the forests that grew under their direction.

Glacial Formations



Glaciers can scour off topsoil and scrape and scar the bedrock beneath. Good examples of glacial ice scrapes and scars on bedrock can be seen at Gooseberry Falls State Park and Palisade Head on Lake Superior's North Shore. Piles of unsorted rock deposited at the edge of a receding glacier are called ***moraines. Lateral moraines*** form along the side of a glacier. ***Terminal*** (or end) ***moraines*** form at the end of a glacier when it stops growing, pauses, and then retreats. ***Ground moraines*** are unsorted sediment dropped along the general path of the glacier. In central Minnesota, thousands of ***kettle lakes*** (also called ***potholes***) formed as giant chunks of glacial ice rested on the land to melt, formed depressions in the soil, and filled with groundwater. ***Eskers*** are strings of long, low ridges created as melting rivers of water beneath glaciers deposited soil. Hilly ***kames*** formed in one of two ways: from water pooling at the surface of a glacier, or, more dramatically, from a river of meltwater shooting water off the edge of a glacier. In either case, kames formed from soil and rocks being deposited in one spot. Strewn about the prairies and farm fields of southern Minnesota, farmers still find ***glacial erratics,*** which are rocks and boulders of distant origin deposited by glaciers. Geologists have determined that many of these erratics originated north of Minnesota, the same place where glaciers stripped the topsoil down to the bedrock. Good examples of eskers, kames, kettles, erratics, and moraines appear in Glacial Lakes State Park near Alexandria.

First Forests

The first trees to move in as the glaciers retreated, perhaps some 10,000 to 11,000 years ago, were spruce. These trees, offspring of the conifers that had rimmed the fingers of ice at their southernmost reach, thrived well in the still-cold climate. But as the earth warmed even further, seeds from southern deciduous trees began to take root in Minnesota, and the spruce were relegated to the northern part of the state. By 9,000 years ago, the warming and drying trend brought prairies nipping on the heels of the deciduous trees as fires prevented trees from encroaching on the grasslands to the west.

Forest Change

The prairie brought in by postglacial warmth covered much of the southern half of the state for thousands of years. Then, about 5,000 to 6,000 years ago, rapid change began once again. The climate cooled and soil moisture increased. This decreased the frequency and severity of fire, and enabled new trees to move in from the east and become established forests.

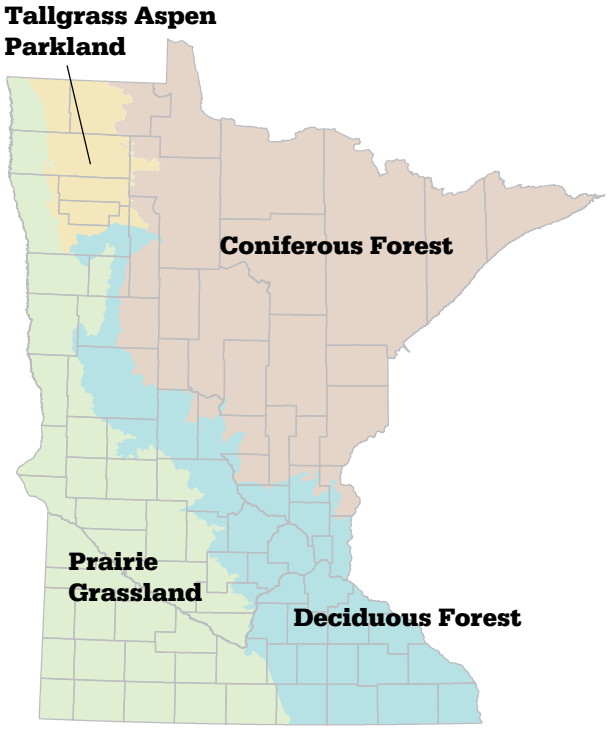
About 1,000 years ago, the forests of what is now Minnesota looked much the same as they did before the 1800s—when Europeans first set eye upon them. Because of the cycle of warming and cooling that followed the retreat of the last glaciers, trees eventually graced more than half of the state. Before European settlement, some 31.5 million acres (about 61 percent) of the 51 million acres that constitute Minnesota's land base was forested.

Biomes

This was far from a single, massive forest, however. Across the state, differing conditions stimulated the growth of different types of forest communities, called biomes. A ***biome*** is a regional ecosystem characterized by the plant, animal, and microbial communities that have developed under specific soil and climate conditions. Minnesota is home to four biomes: coniferous forest, deciduous forest, prairie grassland, and tallgrass aspen parkland. The Minnesota Department of Natural Resources (DNR) and U.S. Forest Service have developed a detailed ecological classification system for Minnesota that outlines the parts of each of Minnesota's four biomes. (The ecological classification system refers to biomes as ***provinces.***)

Coniferous Forest Biome

In the northeast, where glaciers recently ended their poleward retreat, they left behind thin soils blanketing bedrock. Climate was harsher, too, with north winds bringing temperatures plunging far below zero during long, dark winters. These cool but moist conditions favored the growth of conifers, which can thrive on poorer soils because, unlike deciduous trees, they don't need to stockpile nutrients to grow new leaves each spring. Conditions also favored trees such as paper birch, quaking aspen, and balsam poplar that have special adaptations for surviving super-cold temperatures (see Chapter 1). As a result, much of the land north of what is now Pine City and east of the Mississippi became the home mainly of coniferous forests—pine, spruce, fir, and tamarack, often mingled with aspen and birch.



For biome comparison, see table on next page.

Tallgrass Aspen Parkland Biome

Although this biome seems quite small on the map of Minnesota, it is actually part of a much larger biome that extends north through parts of the Canadian provinces of Manitoba, Saskatchewan, and Alberta. In Minnesota, this biome is a natural transition zone sandwiched between the windy prairies to the west and the wetter coniferous forests to the east. Characterized by low moisture, high winds, and cold winters, much of this landscape still depends on frequent fires. Consequently, plants and animals here have to be tough, such as aspen, bur oaks, bluejoint grass, yarrow, arctic shrews, and snowshoe hares. Because much of the area consists of level and poorly drained lake plains of now-extinct glacial Lake Agassiz, today much of this biome is farmed.

Deciduous Forest Biome

The deciduous forest is marked by a band stretching diagonally through the state from northwest to southeast and thickening in what is now the Twin Cities area. The band excludes the tallgrass aspen parkland in the north. The deciduous forest thins along the Minnesota River to the west and thickens around the Mississippi River south to the Iowa border. Within this band, there is a strong contrast between winter and summer. In winter, cold air masses descend from the Arctic and in summer, warm, moist air masses rise from the Gulf of Mexico. In this environment, deciduous trees such as elms, maples, hornbeams, ashes, and oaks, thrive. Where fires were common, scattered oaks interspersed with grasses and forbs, once dominated much of south-central Minnesota. Each fall, the forest floor is blanketed with trillions of leaves, shed by deciduous trees to prepare for winter. As leaves, branches, and logs decay, they add nutrients to the soil. The famous Big Woods also grew in the deciduous forest. Formed on moraines, and protected from fires in the western prairies by many lakes and rivers, the Big Woods covered more than 3,000 square miles of the south-central part of the state. The trees that characterized it—sugar maple, basswood, oak, elm, and the like—thrived on the calcium-rich soils. In

places, the Big Woods grew so dense that sunlight could not even reach the forest floor. Remnants of this huge forest can still be seen in Nerstrand Big Woods State Park, near Faribault.

Minnesota DNR

Wildflower enthusiasts favor the Big Woods for its yearly display of spring ephemerals, the wildflowers that bloom early, quickly, and all at once as soon as the sun melts the snow and before the forest canopy shades out sunlight.

A landscape of trees scattered or spaced across a grassland (periodically grazed or burned) is called a savanna.

Prairie Grassland Biome

Where are all the trees? Not in western Minnesota! Here, rolling hills, high winds, and grasses dominate. Even though this area is characterized by rich, deep soils, this was the domain of tallgrass prairie, stretching east from Illinois, across Iowa and up through the western portion of Minnesota. Fire was a frequent check on woody vegetation, and trees persisted mostly in fire-tolerant oak ***savannas,*** in protected valleys (cottonwoods, elms, ashes, and willows), or not at all. Today, less than 1 percent of the original 18-million-square-mile landscape exists, and the tallgrass prairie is considered functionally extinct as an ecosystem. Recent travelers through this area note acres of farms, mostly corn and soybeans. Yesterday and today, trees grow along rivers and streams. Today, trees also grow as planted windbreaks around farmsteads and along fencerows to prevent soil erosion from the ever-blowing winds.

A Comparison of the Climatic Elements in Minnesota's Four Biomes

Biome	Average Annual Precipitation	Average Annual Temperature	Plant Examples	Animal Examples	Average Growing Season Length (days)
Coniferous Forest	21"– 32"	36°– 41°F	Black spruce, Northern white cedar, Balsam fir, Red pine, Fly honeysuckle	Wood frog, Boreal chickadee, Compton's tortoise, Shell butterfly, Gray wolf, Moose	90–100
Tallgrass Aspen Parkland	20"– 22"	35° – 44° F	Aspen, Heart-leaved willow, Wiregrass sedge, Small white lady's slipper, Little bluestem	Sharp-tailed grouse, Sandhill crane, American bittern, Canadian toad, American elk	90–130
Deciduous Forest	24"– 35"	39° – 45° F	Northern red oak, American basswood, Sugar maple, Prickly gooseberry, Rue anemone	Eastern hognose snake, Cerulean warbler, Eastern pipistrelle bat, Gray fox, Eastern spotted skunk	100–130
Prairie Grassland	18"– 33"	37° – 45° F	Big bluestem, Blazing star, Purple prairie clover, Prairie dropseed, Leadplant	Great plains toad, Greater prairie chicken, Upland sandpiper, Pocket gopher, Badger	130–180

Early Humans

Even while Minnesota's forests were still saplings taking tenuous root on the newly laid glacial soils, human footsteps were treading pathways through them.

The few clues we have to the lives of the people who first lived here after the glaciers suggest that they were big-game hunters. The trees that grew upon the land likely played a role both in providing habitat for their prey and for supplying raw materials for tools, weapons, and other necessities of life. As the forests changed with the shifting climate, so did the people and their interaction with forests. When deciduous forests began to follow the first conifers, people learned to use the berries and nuts they yielded as food, along with the small mammals that thrived beneath their boughs. Durable stone points and evidence of campsites in McCarthy Beach State Park near Hibbing dating back to 10,000 years ago lead archaeologists to think that traveling bands of hunters followed woodland caribou and now-extinct species of bison and woolly mammoth.

Dakota and Ojibwe

The Woodland Period began about 1,000 years ago. A people called the Dakota had arrived on the scene. The Dakota cultivated plants rather than depending solely on hunting and gathering for food. This undoubtedly added a new perspective to the early inhabitants' relationship with the forest. However, it is clear from archaeological records that the forest continued to be a valuable source of food and raw materials for housing and other necessities of life.

In the 16th century, when the first European explorers arrived in the eastern United States, the Dakota were still the main inhabitants of the land we now call Minnesota. However, their claim on this land was soon challenged by the Ojibwe, or Anishinabe. The Ojibwe moved in from the northeast, pushing into new territory in response to pressure from European colonization.

By the mid-1700s, the Dakota and Ojibwe were fighting over rights to the limited resources of the land. By 1800, the Ojibwe had largely taken over northern Minnesota, and the Dakota had moved southwest to the prairies.

Both for the Dakota and for the Ojibwe who moved in later, the forest was a home as well as a resource. It was treated with respect and the recognition that harming forests would harm their own lives.

The forest provided its human inhabitants with the necessities of life. It gave them shelter in the form of a natural break from the wind and rain, and yielded building materials for tepees, lodges, and other housing. It was a source of an endless array of foods, from meat and berries to maple sugar. It provided dishes from birch bark and wood, transportation in the form of birchbark and dugout canoes, travois poles, sleds, and snowshoes. It was a source of

Fire

Strong and staid though they were, Minnesota's early forests were not stagnant. One of the major forces of change they faced was fire. Fires of varying intensities would periodically sweep through the trees. Rather than being agents of destruction, low-intensity fires actually benefited plant and animal communities and soil. They released nutrients trapped in the soil, enriching the environment for new plants moving in. For some trees such as the jack pine, fire aided reproduction. For sun-loving trees such as birch or oak that are unable to grow up in the shade of an established forest, fires cleared the way for new growth.

European explorers arriving at wooded areas of the United States before the 19th century often described forests as "open" and "park-like" and marveled at how easily one could travel and hunt. Later in the 19th century, writers described forest as "dense" and "dark." Historians and scholars who study charcoal deposits, pollen counts, and eyewitness accounts from explorers and settlers, believe that American Indians extensively used fire to manage their land to improve wildlife habitat and hunting, improve visibility, encourage desirable plants such as raspberries or blackberries, clear land for farming, and prevent large, hot, damaging fires. When Indian populations decreased, regular burning also decreased.

beauty, and provided a foundation for stories and a deep awareness of the interconnectedness of all things that is a unifying theme in much of American Indian life. The attitude of American Indians toward this resource is illustrated by the Dakota word for things of nature: mi-ta-ku-ya-pi, or "my relatives."

Even with their tremendous respect for the forest, American Indians knew that the resource could be modified for human purposes without destroying it. Some periodically set fires to create open areas, which then drew game for hunting. Stands of maple trees sometimes were managed to maximize sap production. Despite these modifications, however, the primary relationship of these first human inhabitants of Minnesota's forests with their environment was one of living in cooperation with, and not just off of, the land.

To sum up

Chapter Three: Forests Before Settlement (Pre-1800s)

- Glaciers covered most of Minnesota before they retreated 10,000 years ago.
- Minnesota has four biomes formed by varying conditions in the state: coniferous forest biome, deciduous forest biome, prairie grassland biome, and tallgrass aspen parkland biome.
- Early people used the forest and its products to sustain their lives.
- Early people managed the forest through setting small, intentional fires.
- The first Europeans to arrive in Minnesota came for the wealth of furs from animals that lived in the forest.

European Explorers

The first European explorers to set foot in what is now Minnesota in the 1600s were in awe of the vast expanses of forest they found here. They quickly became aware of the latent economic value of the forest—not so much in the form of the trees themselves, but in the form of pelts of beaver, fox, and other animals that made their homes in the forest. A thriving fur trade soon sprang up, with its roots reaching deep into the forests along lakes and rivers that formed the highways of the voyageurs—men employed by fur companies to transport pelts to and from remote areas. But the forests themselves remained relatively undisturbed.

Minnesota Historical Society—Artist: Frances Ann Hopkins. Used with permission.

Scene of early voyageurs called *Canoes in a Fog, Lake Superior.*