

Montvale Environmental Learning Center Trail

Ever wondered what secrets lie beneath your hiking boots or beside that quiet pond in the woods? You've just stepped into a time machine disguised as a website. Here, you'll discover the hidden natural history of the East Coast—where dinosaur tracks peek out from ancient stones, fossilized plants whisper stories from prehistoric forests, and glacial rocks tell tales of a frozen past. From cedar trees to frog ponds to petrified wood, every stump, stone, and footprint has a story to tell.

Whether you're a curious explorer, a budding naturalist, or just someone who enjoys a good "wow" moment in nature, this is your guide to the incredible past beneath our present-day landscapes. Scroll through to learn about local fossils, glacial leftovers, ancient trees, and more—you might never look at a rock the same way again! Match the numbers on the placards with the information below to learn more about the trail.

1. Oak Tree:



Oak trees are large, long-living deciduous or evergreen trees known for their sturdy trunks, lobed leaves, and acorn seeds. White and red oaks are the most prevalent in this region. Their height can range from 50 to over 100 feet, depending on the

species, and they often have broad canopies that provide dense shade. Oaks grow slowly, with strong wood that makes them resilient to storms and attractive for timber. Their leaves typically change color in autumn, adding to their aesthetic and ecological value. The acorns they produce serve as a key food source for many animals, including squirrels, deer, and birds, helping to spread their seeds across the landscape.

These trees are native to the Northern Hemisphere and thrive in temperate climates with well-drained soil and seasonal rainfall. They are especially common in North America, Europe, and parts of Asia. In North America, oaks migrated after the last Ice Age, expanding from southern refuges into the northeastern U.S. and eastern Canada as glaciers retreated around 10,000 years ago. This slow northward expansion shaped the forest ecosystems of the East Coast, where oaks now dominate many mixed hardwood forests. Indigenous peoples valued oaks for their strong wood and acorns, and over time, European settlers also recognized their usefulness for shipbuilding, tools, and furniture, cementing the oak's place in both the natural and cultural history of the region.

2. Mulberry Tree:



Mulberry trees are medium-sized deciduous trees known for their broad, spreading canopies, heart-shaped leaves, and small, sweet berries that resemble blackberries. Depending on the species—white (*Morus alba*), red (*Morus rubra*), or black (*Morus nigra*)—mulberry trees can grow anywhere from 30 to 60 feet tall. They are fast-growing and adaptable, often thriving in a variety of soil types. Their fruits are

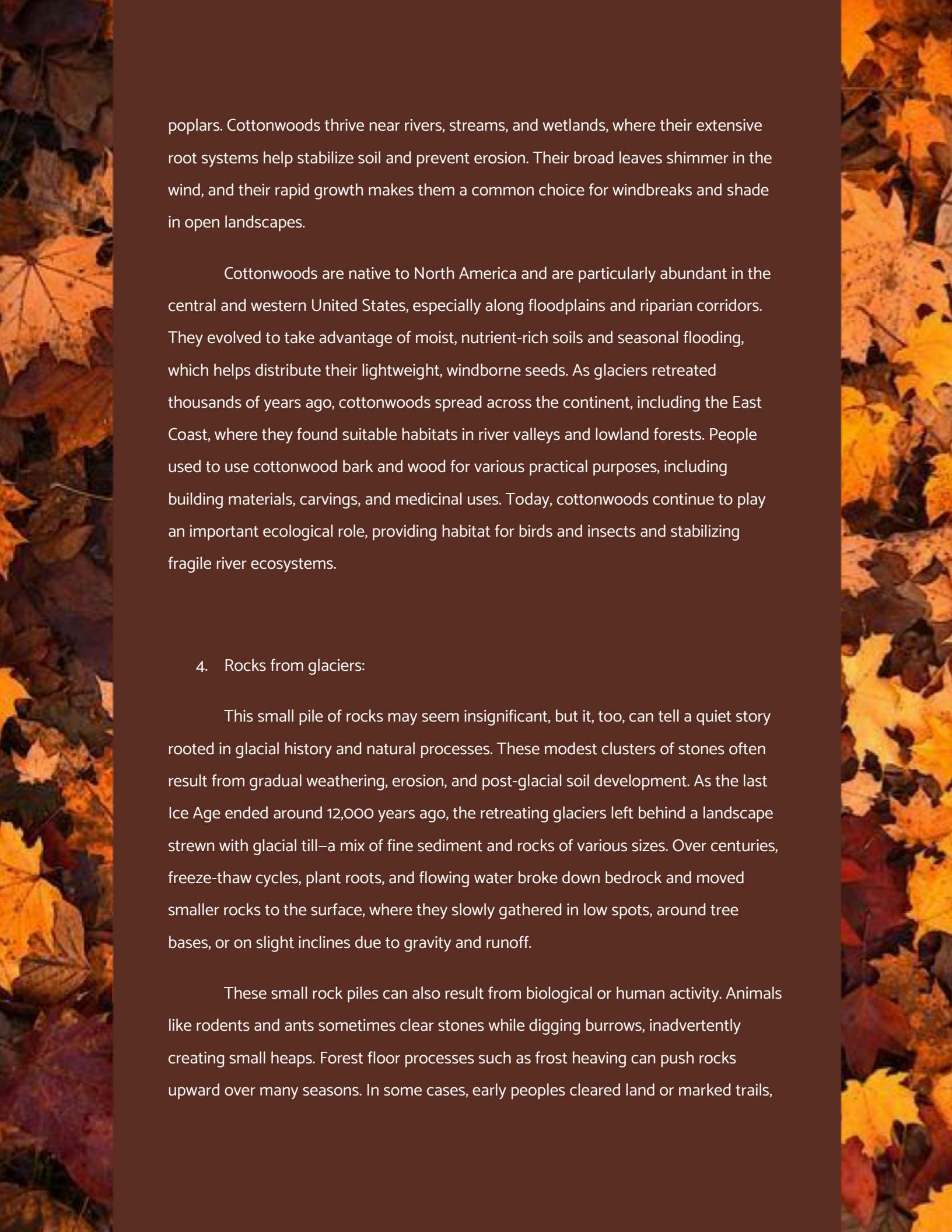
edible and enjoyed by humans and wildlife alike, while the leaves, especially of the white mulberry, are famously the primary food source for silkworms in sericulture. The trees also provide good shade and are sometimes used for erosion control due to their extensive root systems.

Originally native to Asia, Africa, and parts of Europe, mulberry trees have a long history of migration and cultivation. The white mulberry was introduced to North America in the 1700s in an effort to establish a silk industry, though the project largely failed. However, the tree naturalized easily and crossbred with the native red mulberry, especially along the East Coast. Today, both native and introduced mulberry species grow across much of the eastern and central United States. Their hardiness and rapid growth made them popular in both rural and urban landscapes, though in some areas, white mulberries are now considered invasive due to their tendency to outcompete native plants. Despite this, mulberry trees remain valued for their ecological benefits and historical connections to agriculture and trade.

3. Cottonwood Tree:



Cottonwood trees are large, fast-growing deciduous trees known for their towering height, triangular-shaped leaves with finely toothed edges, and distinctive cotton-like seeds that disperse in late spring and early summer. These trees can grow up to 100 feet tall and are part of the *Populus* genus, closely related to aspens and



poplars. Cottonwoods thrive near rivers, streams, and wetlands, where their extensive root systems help stabilize soil and prevent erosion. Their broad leaves shimmer in the wind, and their rapid growth makes them a common choice for windbreaks and shade in open landscapes.

Cottonwoods are native to North America and are particularly abundant in the central and western United States, especially along floodplains and riparian corridors. They evolved to take advantage of moist, nutrient-rich soils and seasonal flooding, which helps distribute their lightweight, windborne seeds. As glaciers retreated thousands of years ago, cottonwoods spread across the continent, including the East Coast, where they found suitable habitats in river valleys and lowland forests. People used to use cottonwood bark and wood for various practical purposes, including building materials, carvings, and medicinal uses. Today, cottonwoods continue to play an important ecological role, providing habitat for birds and insects and stabilizing fragile river ecosystems.

4. Rocks from glaciers:

This small pile of rocks may seem insignificant, but it, too, can tell a quiet story rooted in glacial history and natural processes. These modest clusters of stones often result from gradual weathering, erosion, and post-glacial soil development. As the last Ice Age ended around 12,000 years ago, the retreating glaciers left behind a landscape strewn with glacial till—a mix of fine sediment and rocks of various sizes. Over centuries, freeze-thaw cycles, plant roots, and flowing water broke down bedrock and moved smaller rocks to the surface, where they slowly gathered in low spots, around tree bases, or on slight inclines due to gravity and runoff.

These small rock piles can also result from biological or human activity. Animals like rodents and ants sometimes clear stones while digging burrows, inadvertently creating small heaps. Forest floor processes such as frost heaving can push rocks upward over many seasons. In some cases, early peoples cleared land or marked trails,

stacking rocks intentionally in unobtrusive piles. Although lacking the dramatic scale of erratics or moraines, these humble formations reflect a subtle convergence of geology, climate, and life over thousands of years.

5. Ash Tree:



Ash trees are tall, deciduous trees known for their straight trunks, compound leaves with 5 to 11 leaflets, and diamond-patterned bark. They typically grow 50 to 80 feet tall and develop a rounded or oval-shaped canopy. In the fall, their leaves turn shades of yellow and purple, adding seasonal color to forests and urban areas. Ash trees are fast-growing and adaptable, with both male and female flowers often found on separate trees. Their winged seeds, known as samaras or "helicopters," are carried by the wind, helping them spread across the landscape.

Ash trees are native to parts of Europe, Asia, and North America, with several species such as white ash (*Fraxinus americana*) and green ash (*Fraxinus pennsylvanica*) common on the East Coast of the U.S. After the last Ice Age, ash trees gradually migrated northward, following the retreat of glaciers and re-establishing themselves in temperate hardwood forests. They thrive in well-drained soils and moderate climates, often found near rivers, woodlands, and floodplains. In recent years, ash populations have been severely threatened by the spread of the invasive emerald ash borer, which

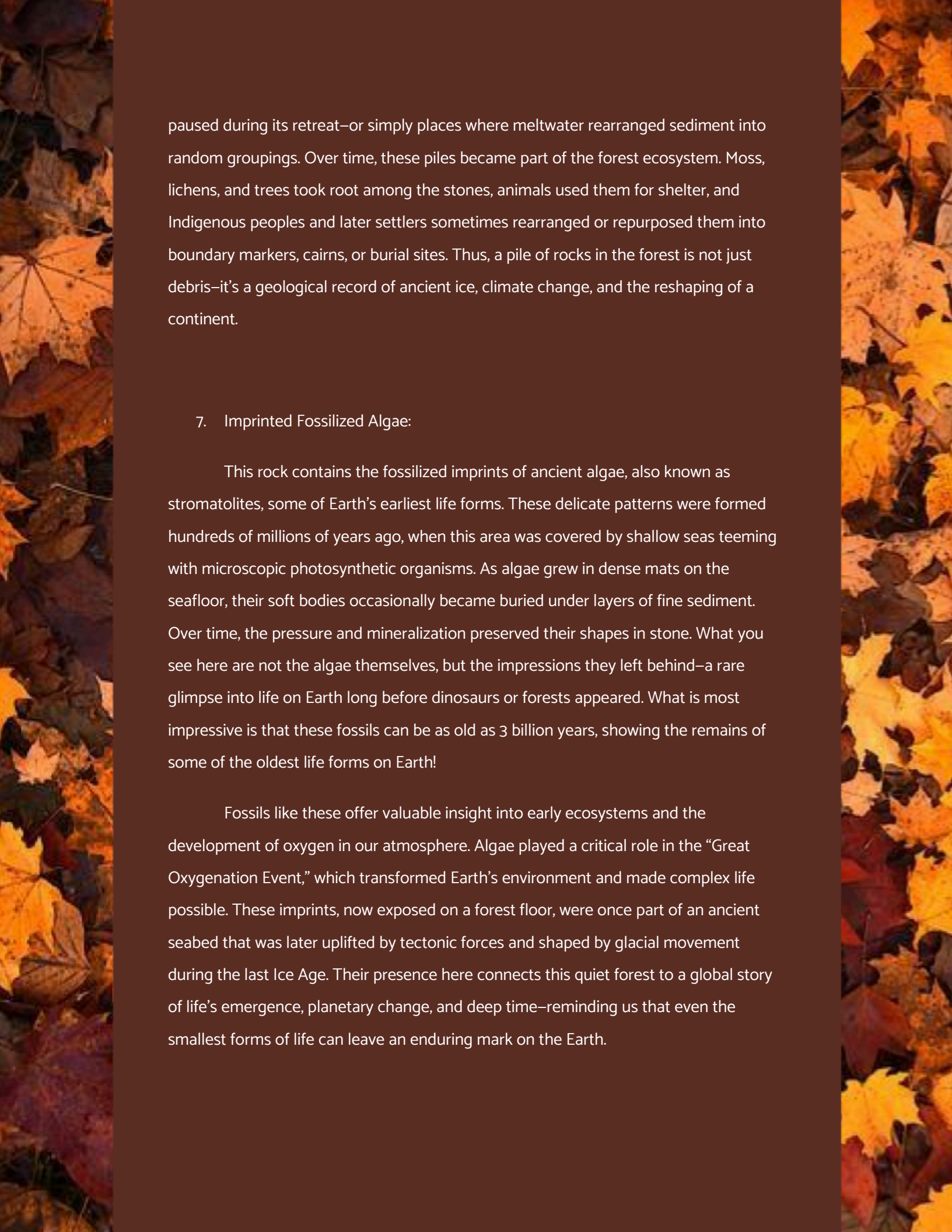
has caused widespread decline across North American forests, particularly in the eastern and midwestern regions. Despite this challenge, ash trees have long been valued for their strong, flexible wood, used in everything from tool handles to baseball bats.

6. Erratics:



This large rock, even though it may not seem important, holds a lot of natural historical information about the landscape of the East Coast. Rocks like these—sometimes called glacial erratics or moraines—are remnants of the massive Laurentide Ice Sheet that once covered much of the northern part of the continent over 20,000 years ago. As the glacier advanced southward, it scraped up rocks, soil, and debris from Canada and the northern interior, transporting them hundreds of miles. When the climate warmed and the ice began to retreat, these materials were deposited across the landscape, leaving behind scattered rocks and boulders that often seem out of place relative to local bedrock.

On the East Coast, from central and northern New Jersey and regions like New England and the Appalachian foothills, these glacial deposits can still be seen today. Piles of rocks may mark terminal or recessional moraines—the edges where the glacier



paused during its retreat—or simply places where meltwater rearranged sediment into random groupings. Over time, these piles became part of the forest ecosystem. Moss, lichens, and trees took root among the stones, animals used them for shelter, and Indigenous peoples and later settlers sometimes rearranged or repurposed them into boundary markers, cairns, or burial sites. Thus, a pile of rocks in the forest is not just debris—it’s a geological record of ancient ice, climate change, and the reshaping of a continent.

7. Imprinted Fossilized Algae:

This rock contains the fossilized imprints of ancient algae, also known as stromatolites, some of Earth’s earliest life forms. These delicate patterns were formed hundreds of millions of years ago, when this area was covered by shallow seas teeming with microscopic photosynthetic organisms. As algae grew in dense mats on the seafloor, their soft bodies occasionally became buried under layers of fine sediment. Over time, the pressure and mineralization preserved their shapes in stone. What you see here are not the algae themselves, but the impressions they left behind—a rare glimpse into life on Earth long before dinosaurs or forests appeared. What is most impressive is that these fossils can be as old as 3 billion years, showing the remains of some of the oldest life forms on Earth!

Fossils like these offer valuable insight into early ecosystems and the development of oxygen in our atmosphere. Algae played a critical role in the “Great Oxygenation Event,” which transformed Earth’s environment and made complex life possible. These imprints, now exposed on a forest floor, were once part of an ancient seabed that was later uplifted by tectonic forces and shaped by glacial movement during the last Ice Age. Their presence here connects this quiet forest to a global story of life’s emergence, planetary change, and deep time—reminding us that even the smallest forms of life can leave an enduring mark on the Earth.

8. Imprints of Fossilized Shells:

This rock bears the imprints of fossilized shells, evidence of marine life that thrived in this region hundreds of millions of years ago. During the Paleozoic Era, long before the Appalachian Mountains rose or forests covered the land, much of the East Coast was submerged under warm, shallow seas. Shell-bearing organisms like brachiopods, mollusks, and trilobites lived on the seafloor, their hard exteriors well-suited for fossilization. When these creatures died, their shells were buried in sediment, where mineral-rich water slowly replaced the organic material, preserving their shapes as stone impressions.

These fossilized shell imprints are more than just ancient remnants—they are records of dramatic changes in Earth's landscape and climate. Over geologic time, tectonic forces lifted these ancient sea beds, and glaciers from the last Ice Age further sculpted the terrain, scattering and exposing these fossil-rich rocks in inland forests.

9. Petrified wood:

This piece of petrified wood is a fossilized remnant of an ancient tree that lived a long time ago. Over time, the original wood was buried by sediment and gradually replaced by minerals such as silica, while still retaining the shape and structure of the tree's cells. This process, called permineralization, can take millions of years and results in a fossil that looks like wood but is actually stone.

Petrified wood like this often forms in areas that were once covered by volcanic ash or rich in groundwater carrying dissolved minerals. The tree may have originally grown in a very different climate or location, and the rock could have been transported to this spot by natural erosion, glaciers, or human activity. Today, this fossil provides a physical link to ancient forests and helps scientists understand what types of plants once grew on Earth and how they changed over time.

10. Frog pond:

This small frog pond is an important part of the local ecosystem, providing a habitat for a variety of amphibians, insects, and plants. Frogs rely on still or slow-moving water like this to lay their eggs in the spring. As the eggs hatch into tadpoles, the pond offers protection and food during their transformation into adult frogs. In addition to frogs, the pond supports other wildlife such as dragonflies, salamanders, and birds, all of which depend on wetland environments for part of their life cycles.

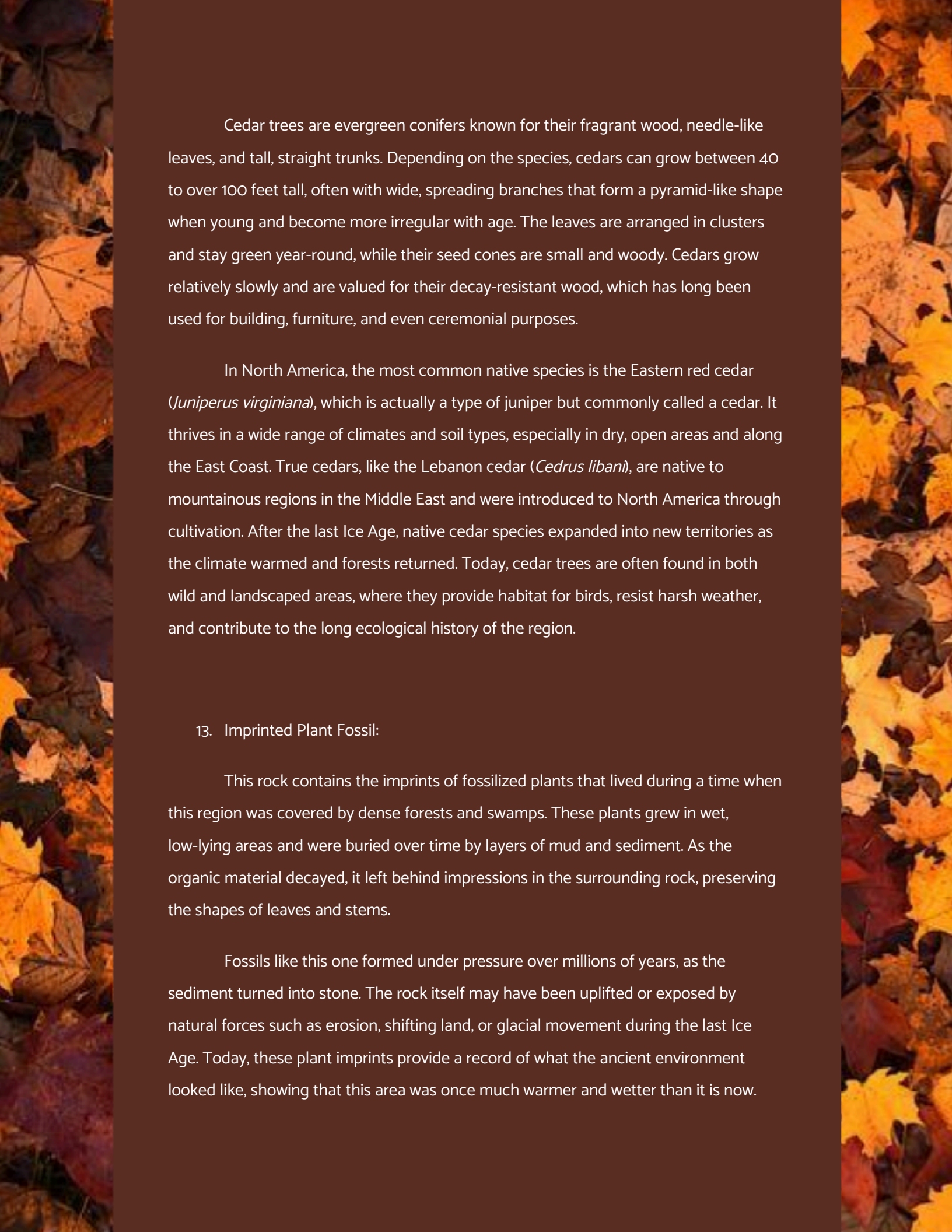
Frog ponds like this one are often formed naturally in low-lying areas where rainwater and groundwater collect, or they may be created by people to support local biodiversity. Over time, leaves, algae, and other organic matter accumulate, helping form a rich and balanced habitat. Even small ponds can reflect larger environmental trends, such as water quality, temperature shifts, and seasonal changes. By observing the life in and around this pond, we gain a better understanding of the health of the surrounding forest and the vital role freshwater habitats play in supporting life.

11. Imprinted Fossilized Algae:

This rock has imprints of fossilized algae similar to the one before (#7).

12. Cedar Tree:





Cedar trees are evergreen conifers known for their fragrant wood, needle-like leaves, and tall, straight trunks. Depending on the species, cedars can grow between 40 to over 100 feet tall, often with wide, spreading branches that form a pyramid-like shape when young and become more irregular with age. The leaves are arranged in clusters and stay green year-round, while their seed cones are small and woody. Cedars grow relatively slowly and are valued for their decay-resistant wood, which has long been used for building, furniture, and even ceremonial purposes.

In North America, the most common native species is the Eastern red cedar (*Juniperus virginiana*), which is actually a type of juniper but commonly called a cedar. It thrives in a wide range of climates and soil types, especially in dry, open areas and along the East Coast. True cedars, like the Lebanon cedar (*Cedrus libani*), are native to mountainous regions in the Middle East and were introduced to North America through cultivation. After the last Ice Age, native cedar species expanded into new territories as the climate warmed and forests returned. Today, cedar trees are often found in both wild and landscaped areas, where they provide habitat for birds, resist harsh weather, and contribute to the long ecological history of the region.

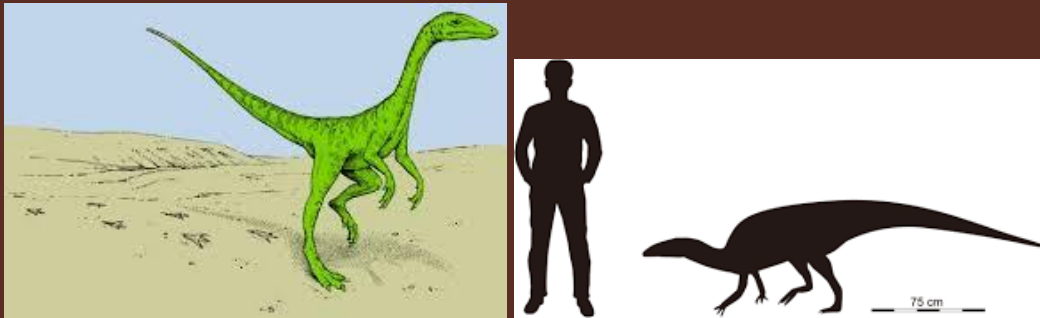
13. Imprinted Plant Fossil:

This rock contains the imprints of fossilized plants that lived during a time when this region was covered by dense forests and swamps. These plants grew in wet, low-lying areas and were buried over time by layers of mud and sediment. As the organic material decayed, it left behind impressions in the surrounding rock, preserving the shapes of leaves and stems.

Fossils like this one formed under pressure over millions of years, as the sediment turned into stone. The rock itself may have been uplifted or exposed by natural forces such as erosion, shifting land, or glacial movement during the last Ice Age. Today, these plant imprints provide a record of what the ancient environment looked like, showing that this area was once much warmer and wetter than it is now.

Though the details of the plant are unknown, the fossil helps scientists understand how early plant life spread and changed over time.

14. Dinosaur Footprint:



This stone contains the fossilized footprint of the dinosaur *Anchisauripus Gallator*. Although this specimen was found in Montvale during the construction of condominiums off West Grand Avenue, its origin was from a quarry near Clifton, New Jersey. It was brought to the construction site with the rocks and fill from that quarry.

At that time, the area was part of a rift valley with shallow lakes and muddy floodplains—ideal conditions for preserving tracks. The print was made when a dinosaur stepped into soft, wet sediment, which later hardened and was buried under layers of rock. Over millions of years, natural processes such as erosion and uplift brought the footprint to the surface once again.

Fossilized tracks like this are called trace fossils and provide important evidence of dinosaur behavior, movement, and habitat. Unlike bones, which tell us about a dinosaur's anatomy, footprints offer a snapshot of its daily life—walking, running, or interacting with its environment. Montvale and the surrounding region are part of the Newark Basin, a geologic formation well-known for preserving dinosaur tracks in sedimentary rock. This footprint is a rare and valuable window into the ancient past of New Jersey, reminding us that dinosaurs once roamed the very ground beneath our feet.

15. Wetland:

This wetland is a vital part of the forest ecosystem, acting as a natural filter for water, a buffer against flooding, and a rich habitat for a wide variety of plants and animals. Wetlands are areas where water collects, either seasonally or on a year-round basis, creating saturated soil conditions that support specialized vegetation like cattails, sedges, and mosses. They are also home to amphibians, birds, insects, and small mammals that rely on the moisture and shelter the wetland provides. Frogs breed here, dragonflies hunt over the surface, and migrating birds stop to rest and feed.

Wetlands on the East Coast of North America formed thousands of years ago, shaped by glacial retreat, rising sea levels, and natural changes in terrain and water flow. Some wetlands were created by slow-moving rivers, while others developed in depressions where water naturally pools. Despite their ecological importance, wetlands have been reduced in many areas due to drainage and development. This preserved wetland helps maintain biodiversity, store carbon, and support the health of surrounding forests. Please stay on the designated path to help protect this sensitive and essential habitat.

Author: Hridank Shukla - Eagle Scout Project Troop 334

Last Reviewed: 20 June 2025