

Alpine Pond

Cedar Breaks National Monument

Welcome. As you walk this trail, this leaflet will help you to understand the relationships between rocks, weather, soil, plants and animals – and how those elements are working together to make Cedar Breaks so special. While you are hiking you will join in this ecosystem and become a part of the inter-relationships we will explore in this brochure. You are entering a subalpine forest, where life is influenced by the high elevation, short cool summers and long winters. Remember, the next visitors will want to see and enjoy the same things you do. Please stay on the trail, keep the area clean, and do not collect or disturb any rocks, plants or animals. Avoid cliff edges, return to your car during thunderstorms, and watch your children.

This guide is keyed to numbered posts along the trail. The 3.2 kilometer (2 mile) hike is not difficult, but at an elevation of 3,200 meters (10,000 feet) you may tire quickly. Take your time. Stop frequently. Explore the forest around you with all your senses and absorb the mood of the land.

Written by Janet Ellis

1. One Day At a Time

Last winter the pink rock in front of you was buried under deep snow. As the snow melted, water entered cracks in the rock. As the water freezes it expands forcing the cracks to widen. With repeated freezing and thawing temperatures, this process slowly breaks the rock apart. This summer plants are working their roots between the cracks breaking the rock down further. Slowly – daily – weather and plants are working on this rock. What happens to the rock pieces that are broken off?

3. Lichens

The crusty green, gray and orange coatings on these rocks are lichens (pronounced LIE-kens). Lichens are actually composed of two tiny organisms from the fungi and algae groups. These organisms grow in a symbiotic (mutually beneficial) relationship. The fungi absorb water and provide an anchor to the rock. The algae manufacture enough food for both organisms.

When lichens grow, they produce weak acids which help dissolve the rock. These acids are one of the many forces transforming rock into soil. How many types of lichen can you find on these rocks?



4. From Rocks to Trees

As lichens break down the rock, tiny bits of mineral material mixed with pieces of dead lichen form soil that allows other plants to grow. Mosses, grasses and flowers have found footholds in this soil on the rock in front of you. As these plants die and the rock crumbles further, more soil is made. Eventually a thriving forest will be located here. This gradual change, from lichens colonizing rocks to a mature forest, is called succession.

5. A Wolf

One of Cedar Breaks common summer flowers is the lupine. It has a dense stalk of blue flowers and distinctive finger-like leaves. After blooming, the blossoms give way to fuzzy seed pods.

The name lupine comes from the Latin

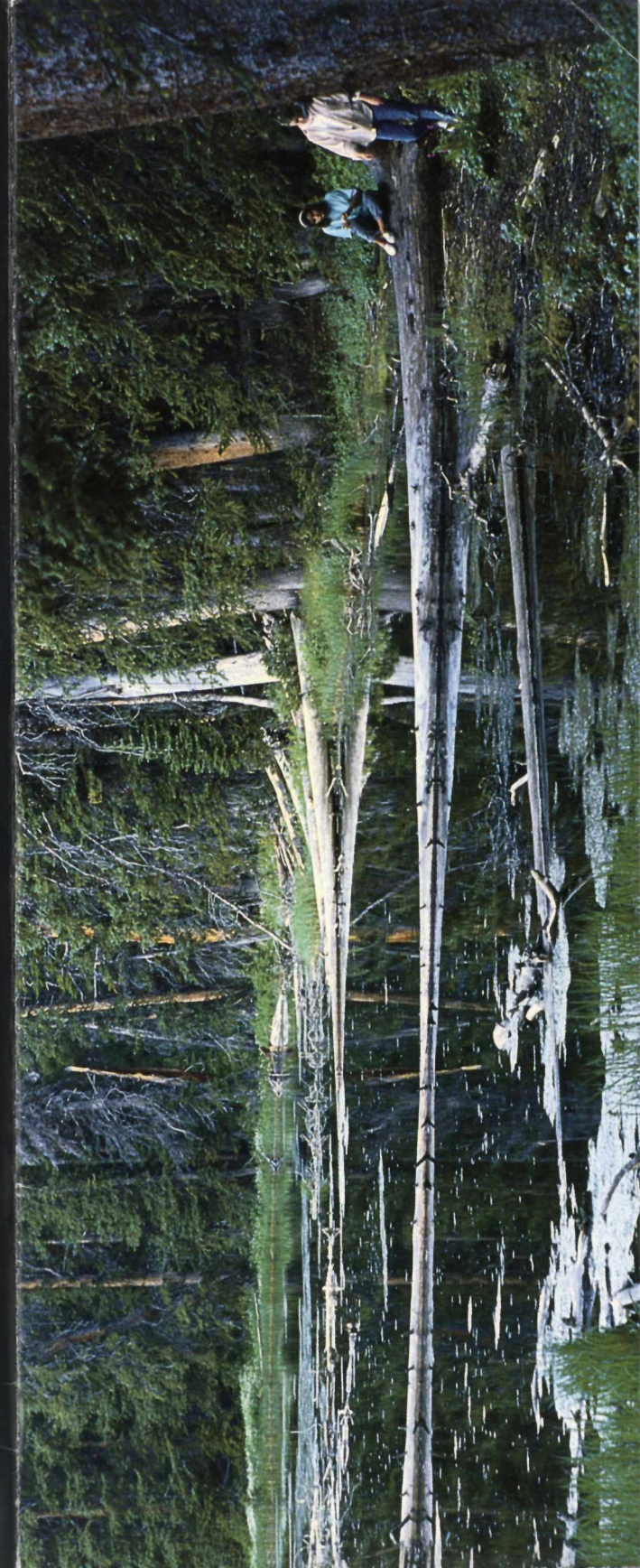
ALPINE POND TRAIL



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From the Alpine Trailhead parking area, begin following this brochure at station ①. If you are starting at Chessmen Overlook, turn to the other side and begin at station ⑬.

TRAIL MAP ON BACK SIDE OF BROCHURE





2. Rock Apartment

This rocky slope is nature's apartment building for marmots, chipmunks, ground squirrels and pikas. Sit quietly and you may see several of these animals.

How do these small mammals live through the long winters? Marmots eat enough food in summer to double their body weight and then live entirely off their fat as they sleep (hibernate) through the winter. Chipmunks and ground squirrels hibernate most of the winter, waking up periodically to eat food they have stored. Pikas (pronounced PIE-kas) do not hibernate at all. In the summer these "hay-makers" lay out cut grass to dry and then store it under a rock. Throughout the winter they are active beneath the deep snow blanket, feeding on their hay piles. Aren't you glad you don't have to spend seven months under a snowbank each year?



word lupus, meaning "wolf." Lupines were once believed to be wolf-like, devouring soil nutrients. Exactly the opposite is true. Special bacteria on the lupine's root nodules release nitrogen into the soil, enriching it for other plants. Many farmers use a closely related plant, clover, to improve the level of nitrogen in crop soils.

6. It's All Recycled

Dead trees aren't removed from a National Park or Monument because of the important role they play in the forest ecosystem. When a tree dies it starts to decay from a variety of processes, such as wood-chewing ants and beetles and wood decaying fungi. The tree returns the nutrients it gathered during its lifetime back to the ground. Eventually, a fertile soil is formed where new plants can grow. Nothing in nature is wasted.



7. Alpine Pond

Surrounded by meadows and forests, Alpine Pond is an active area. Because it is a source of water, and has lush vegetation, the pond is a focal point of activity for wildlife. Look for water bugs skittering on the surface, insects pollinating flowers, and tracks showing where animals had their nightly drink, or stalked their prey.

Water enters Alpine Pond from a spring. Can you hear the water leaving the pond? It flows through the Cedar Breaks amphitheater and out to the Great Basin desert to the west.





8. Witches' Broom

Notice the odd, bushy growth on the fir tree across the creek. This "witches broom" is caused by a fungus. This fungus must live on two different plants to complete its lifecycle. Part of its life is spent on a fir tree and part on a chickweed. Chickweed is a small plant common at Cedar Breaks. The fungus depends upon firs and chickweed for its survival and does not kill the plants it lives on.

A diversity of plants and animals is essential to the survival of this forest. If something affects the fir trees or the chickweed the fungus will also be affected. Man is still learning about such complicated inter-relationships among species in nature. Protected areas such as National Parks and Monuments are an essential part of this scientific quest.

9. The Amphitheater

Cedar Breaks was established as a National Monument because of the scenic beauty of the amphitheater in front of you. The red and white rock layers are composed of limestone, shale, and sandstone. Fossils within the rock help tell the story of an ancient lake located here about 55 million years ago. At that time, Cedar Breaks was the lowest, not the highest, area around. Sediments collected in the lake in layers. The area was later uplifted to its present elevation. Nature, using water, wind and ice for tools, has slowly carved the amphitheater you see today.

10. Sinkhole

The pit located here is called a sinkhole. The upper rock layers at Cedar Breaks are primarily limestone. Limestone is soluble in water. As water dissolves the rock and carries it away a tunnel (cave) or depression can form. If the overlying soil sinks into the depression or collapses into the tunnel a sinkhole is created. Sinkholes and caves may be found wherever limestone is present.

11. Brian Head

The mountain on the horizon is named Brian Head. Although Brian Head is not a volcano, the prominent cliffs at the top of the peak are composed of volcanic rock. This rock was formed during numerous, violent, volcanic explosions about 28 million years ago. You will get a close look at this rock ahead at Station 24.

Can you see trees on Brian Head peak? The mountain's summit is an alpine habitat, an area where conditions are too severe for trees to grow. The forest you walk through now is a sub-alpine area. Subalpine means "below the alpine." The most common trees here are sub-alpine fir and Engelmann spruce. You will learn to identify these trees at Station 20.

12. Nature's Tools

Nature, a patient artist, has taken millions of years to sculpt and paint the scenery at Cedar Breaks. The freezing and thawing of water breaks up the rock, pounding rain and wind blown grit sand off the sharp edges, and water and wind carry away bits of rock. Although these forces work daily, their progress is slow. Cedar Breaks is eroding at a rate of about 12 centimeters per year (2 inches per 5 years). Very little change occurs in a human lifetime.

Calcite, the mineral that makes up limestone, is colorless. Color in the rocks comes from minerals that are present in small amounts.

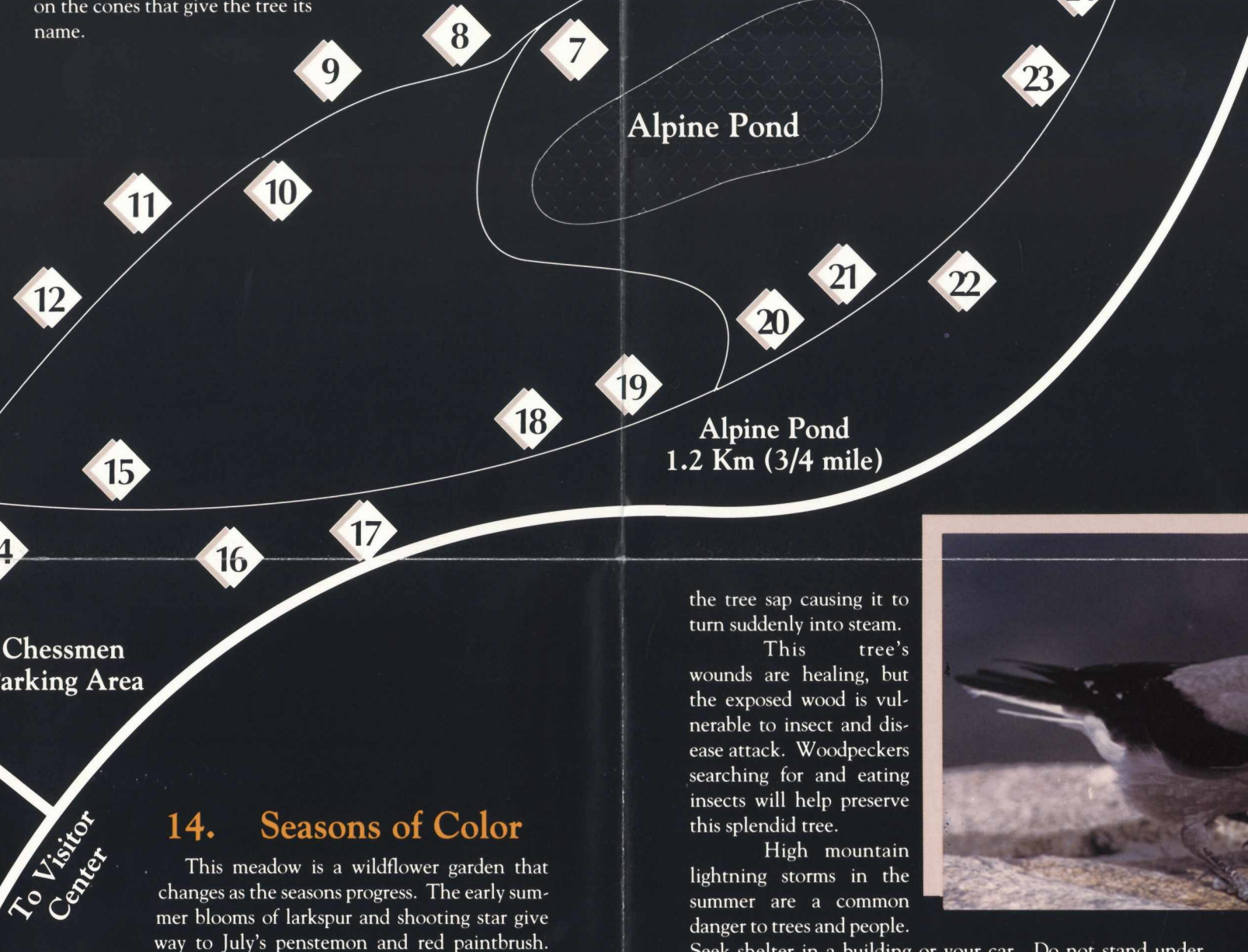
Iron oxide, the chemical forming rust, contributes most of the colors here. Various forms of iron oxide create reds, yellows and oranges. Purple tints are caused by manganese oxide. See Cedar Breaks after a rain storm when the colors are brilliant.

13. The Bristlecone

Bristlecone pine like the one in front of you grow on the barren slopes and cliff edges of the breaks. While they are adapted to this precarious habitat, you aren't. Watch your footing and avoid walking near the crumbling cliff edges.

The bristlecone will make everyone feel young! The oldest bristlecone at Cedar Breaks is at least 1650 years old. That tree was a seedling during the Roman Empire and over 1100 years old when Christopher Columbus sailed. The oldest bristlecones, found in California, have been alive for over 4600 years. These magnificent trees are only found at high elevations in the Great Basin and the Rocky Mountains.

Notice how the needles form bundles, with 5 needles to a "package" or bundle. One way to identify pine trees is to remember the saying "pines come in packages." The arrangement of the needles on the branch of the bristlecone give it a characteristic "bottle brush" appearance. Look for the long curved prickles on the cones that give the tree its name.



14. Seasons of Color

This meadow is a wildflower garden that changes as the seasons progress. The early summer blooms of larkspur and shooting star give way to July's penstemon and red paintbrush.

The summer ends in a final brilliant display of yellow, gold and purple goldenrods and asters. The park rangers at the visitor center will be glad to help you identify these plants.

If you pick a flower it will provide you only fleeting pleasure before it wilts and dies. If left to grow it will be there for others to enjoy and will eventually produce seeds to populate the meadows with its offspring.

15. Beetle Galleries

Notice the patterns on this tree trunk. When this tree was alive, bark beetles drilled into it to lay their eggs. Later, after the eggs hatched, the larvae fed within the inner bark, etching the wood as they ate. These beetles are important natural enemies of the forest, but they usually only kill old or weakened trees. Birds eating the larvae help keep such insect infestations under control. Nature has many checks and balances.

16. Pocket Gophers

Can you find any loose ridges of dirt in this meadow? In winter pocket gophers push the dirt up into the snow as they dig out their underground burrows. When the snow melts these dirt ridges are left on the ground. Although they may be considered pests in your backyard, pocket gophers are beneficial here because they till the soil.

Pocket gophers spend most of their lives underground. Their front claws are large and curved for efficient digging. As they dig through the soil, they eat plant roots. They often carry extra food along with them in their fur-lined cheek pouches or "pockets."

17. Quaking Aspen

The white-barked trees in front of you are quaking aspens. These trees get their name from the way their leaves shake in the wind. Long flattened stems cause the leaves to tremble in the slightest breeze.

Notice the spruce and fir trees growing between the aspens. Aspens need sunshine. As the aspen stand matures, it creates a condition that its own seedlings cannot tolerate - shade. Young Engelmann spruce and subalpine fir, however, thrive in shade, so they "invade" the aspen grove. Eventually, spruce and fir will be the dominant trees here.

18. Lightning Tree

The large Engelmann spruce in front of you was hit by lightning in 1986, causing a thick strip of bark to peel off. Lightning may set trees on fire or make them explode by heating

the tree sap causing it to turn suddenly into steam.

This tree's wounds are healing, but the exposed wood is vulnerable to insect and disease attack. Woodpeckers searching for and eating insects will help preserve this splendid tree.

High mountain lightning storms in the summer are a common danger to trees and people. Seek shelter in a building or your car. Do not stand under trees or on exposed viewpoints during a thunderstorm.

19. Tread Lightly

National Parks and Monuments protect plants, animals, rocks and everything else that can be found within their boundaries. Carving initials onto trees, such as the quaking aspen in front of you, or even such seemingly harmless activities as picking a flower or collecting a rock, diminishes the park experience for visitors yet to come. Several hundred thousand people visit Cedar Breaks each year to view the natural beauty here. Tread lightly and preserve this park for all to enjoy.

20. Fir or Spruce?

The two most common trees in this forest are sub-alpine fir and Engelmann spruce.

The tree behind the numbered post is an Engelmann spruce. On the other side of the trail is a subalpine fir. Notice the differences in the bark of the two trees. Now examine the needles and cones of each tree. The following characteristics will help you identify each tree:

Subalpine fir:

Fir needles are flat and flexible. Fir cones stand erect and fall apart while they are still on the tree (you won't find them on the ground).

Engelmann spruce:

Spruce needles are sharp and square. Spruce cones hang downward and fall apart while they are on the ground.

Can you remember the distinct features of pine tree needles? Check Station 13 for a description.

21. Alpine Pond Overlook

Sit and relax. Take several deep breaths and enjoy the aromas of the forest. Listen. One of the many pleasures of a forest is its sounds. What do you hear? The wind? A bird song? A scolding squirrel? These sounds are clues to what happens daily at Cedar Breaks.

Plants and animals live together in communities, just as people do. The community you have before you is always changing: rocks are being broken down; one plant is being replaced by another; animals eat the plants... What was this place like 6 months ago? 600 years ago? What is in store for the future?

22. Porcupine Tree

Notice the teeth marks covering the small tree in front of you. A porcupine ate all the bark off this tree, killing it. Porcupines are large rodents. During the winter, when food is buried beneath the snow, they mainly feed on tree bark. The porcupine cannot digest bark any better than you can. However, its intestinal tract contains tiny one-celled animals which can digest bark, enabling the porcupine to get nourishment from the wood. Porcupines usually do not kill trees. The trees they do kill become homes for a variety of birds, insects and small mammals.

23. Limber Pine

Can you tell the difference between spruce, fir and pine trees? This tree, the limber pine, is closely related to the bristlecone pine

found at Station 13. The scientific name for this tree is flexilis because the branches are very limber or flexible, an important adaptation to prevent breakage from deep snow.

Limber pines share a special relationship with a high mountain bird, the Clark's nutcracker. Nutcrackers love limber pine seeds and bury them to feed

on throughout the year. Although the birds find most of their seed caches, they never find them all. The forgotten pine seeds then grow. Most limber pine trees have been planted by Clark's nutcrackers.

24. Rhyolitic Tuff

The rock in front of you is volcanic. It is the same kind of rock found on Brian Head peak, visible from Station 11. It is also the same type of rock found in several areas of southwestern Utah. The rock is classified by geologists as a rhyolitic tuff, a rock formed during very explosive volcanic eruptions.

You can see layering in the larger boulders. Each layer represents a separate eruption that covered everything around with hot ash, dust, and small bits of rock and molten lava. Can you imagine what this area might have looked like when these eruptions occurred?

25. The High Life

You will soon reach the Alpine Pond parking area. Before you do, stop and look at the forest around you and consider the patterns of nature you have seen. You are one of the most important parts of this pattern. Man's wise use of the land is a critical factor affecting all life.

Please be sure to stop at the visitor center. Park rangers are there to answer your questions.

