



# Natural Heritage Hikes

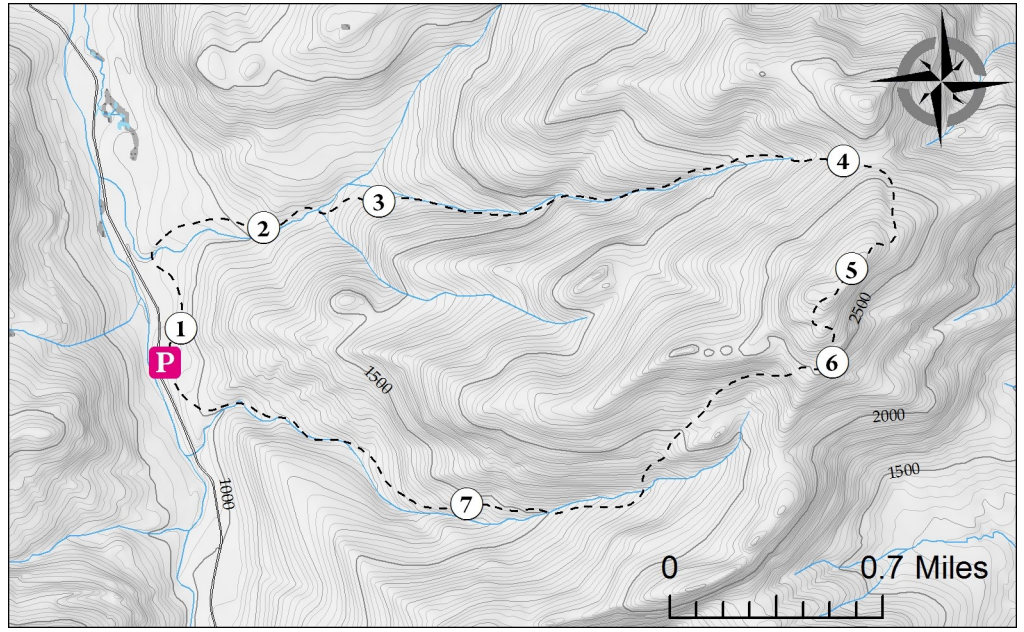
## Caribou Mountain

Caribou and Mud Brook Trail Loop— 6.2 miles, Advanced

*Rt. 113 through Evan’s Notch, cut by the Civilian Conservation Corp in the 1930s, travels up the Cold River drainage to the shoulder of Speckled Mountain, and down along Evans Brook and the Wild River. Doing so, it crosses the divide between two of the largest watersheds in Western Maine— the Saco and Androscoggin Rivers. The terrain and forest as they now exist have the feel of a place untouched by the modern world. Passing under the canopy of stately trees, it is difficult to imagine the bustle of timbermen, locomotives and saws that fed the mills along the Wild River in the now vanished town of Hastings. Though the signs are now nearly invisible, the story of the Caribou-Speckled Mountain region is one of forest loss and recovery.*

### Getting There

Parking for the Caribou Mountain trail is on the east side of Route. 113.



① **Trailhead** -70.97544, 44.33592



The White Mountain National Forest looks very different today than at its peak of industry.

As today, abundant 19th century timber resources in Evan’s Notch included Eastern hemlock, red spruce and northern hardwoods such as American beech, sugar maple and yellow birch. At the end of the 1800s the demand for hemlock bark, the preferred source of tannins for curing leather, was at its height. Red spruce trees were cut for lumber and hardwoods were more selectively cut and sent to wood turning mills. The town of Hastings had its own wood alcohol and saw mill, and exported the various timber products to Gilead by rail. By 1900 nearly all the accessible old-growth trees were harvested from the valley and the buildup of logging slash was considerable. Many of the streams were choked with silt from soil erosion. In 1903, major wildfires swept through much of the White Mountains National Forest, including Evan’s Notch, burning much of the remaining standing timber. Lum-

## Naturalist's Notes



Since their extirpation, there have been two failed attempts to re-introduce woodland caribou in Maine— once in 1963 and once in 1986. With both efforts, woodland caribou were captured in Newfoundland and released in Baxter state park. Both attempts failed due to a variety of factors including low release numbers, brain worms contracted from deer, lack of mature forest habitat required by Caribou and predation from bear and coyotes.



Large eastern hemlock are common throughout the White Mountain National Forest. The holes in this tree have been made by a yellow bellied sapsucker— sapsuckers drill these 'sap wells' and return to feed on both the sap and insects that are caught in sap wells.

bering operations were discontinued soon afterwards and by 1918, lands had been acquired by the United States Forest Service for the White Mountain National Forest, in part as a result of the [public response to poor land stewardship](#). Only subtle evidence of this history is still found on Caribou Mountain, named such because it was the location of the last known caribou in the region, which was [shot in 1854](#). One will observe historic logging roads, old stumps, and the still open summit, its thin soils having eroded away following past fire events.

'Forest succession' is a term used when describing the development of a forest following a disturbance, such as a wind storm, fire, logging, or clearing and subsequent agricultural abandonment. In Maine's forests 'forest succession' describes the transition from initial colonization of light-dependent, short lived species, such as aspens or birches, to the dominance of mature, shade tolerant species such as spruce or sugar maples. Young forests are usually called 'early-successional,' and mature forests may be called 'mid' or 'late-successional.' Many plant and animal species only occur in forests in certain successional stages. While pre-settlement forests contained a heterogeneous mix of early and late-successional forest patches, present day forests are much more even-aged. This story of forest recovery is playing out on Caribou Mountain. Trees over 100 years old now dominate the canopy in most places; while not old-growth, large areas of forest are maturing and are increasingly gaining late-successional stature. These provide more habitat for species that prefer old forest such as American marten and the black-throated blue warbler.

Land use history is not the only factor influencing forest structure and composition on Caribou Mountain. The change in elevation from ~900 ft at the base to 2840 ft at the summit presents a broad array of climatic conditions mirroring a latitudinal range, at its extremes, from the southern Appalachians to central Quebec. As we ascend the Caribou Trail, and descend along the Mud Brook trail, we will stop along the way to examine how the influences of landform, human history and climate collide to create the forests that occur today.

### ② Hemlock Forest -70.969341, 44.34180

*Cool, dark woods ideal for fungi.*

Eastern hemlock, identified by its short, flat needles and furrowed bark, has a natural range from the Appalachian Mountains in Georgia to New Brunswick and southern Quebec. At the heart of its range (including Maine), it can dominate the forest canopy along cool, moist valley bottoms and sloping lakesides and similar environments at low to mid elevations. Hemlock needle litter is high in tannins, making the understory soils highly acidic and unfavorable to



Hemlock reishi is a wood decaying fungus that grows on dead hemlock snags and logs. Reishi is a bitter tasting fungi that is sometimes prepared in teas for medicinal uses.



White matsutake is an edible mushroom that is often found associated with Eastern Hemlock. A word of caution: do not collect wild mushrooms for the table without adequate identification skills.

other plant species. Additionally, hemlock trees have a dense canopy which deeply shades the understory, limiting other species from becoming established. These factors lead to the open park-like environment typical in mature hemlock stands and lead some to call these areas ‘hemlock deserts’. While hemlock forests tend to have low plant diversity, they support a variety of fungi including hemlock reishi (*Ganoderma tsugae*), a shelf mushroom with medicinal properties; matsutake (*Tricholoma magniverlare*) and black trumpets (*Craterellus sp.*), both desirable edibles; and the deadly destroying angel (*Amanita bisporigera*). A word of caution: one should only collect wild mushrooms for the table when they have enough experience to correctly identify them.

Hemlock forest provides important wintering habitat for deer, which are in decline in many areas of northern Maine. In addition to limiting sunlight, the dense canopy of hemlocks can capture a large percentage of the season’s snowfall. While deer can tolerate a moderate amount of snow, deep snow with multiple ice crust layers can greatly hinder mobility of deer and may make them more vulnerable to predators and exposure. Thus, deer will often yard in mature hemlock stands in the winter where the snowpack is generally less deep and where they may maintain a network of open trails.

Since the collapse of the hemlock tannin industry in the early 1900s, caused in part by the development of synthetic processes for tanning leather, the market for hemlock trees has been very weak. Hemlock lumber is highly prone to cracking or ‘checking’ and has only limited contemporary uses which include timber frames and railroad ties. As a result, most remnant hemlock forests have been allowed to mature. Recently, the invasive hemlock wooly adelgid, introduced from East Asia in the 1950s, has been threatening stands of hemlock in Maine. Once believed to be restricted to southern Maine by cold winters, this pest has now infected trees all along the coast. As the climate continues to warm, hemlock stands in interior sections of Maine may become vulnerable as well.

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### ③ Legacy trees and Northern Hardwoods –70.9618, 44.34321

*Large, coarse woody material provides habitat diversity in mature forests.*

To the west of the trail are two large trees, a sugar maple and yellow birch, which exceed 30 inches in diameter. These are likely well over 150 years old, and are some of the few remaining ‘legacy’ trees left after intensive logging deforested the slopes of the White Mountain National Forest. Heading uphill, these trees mark the transition to northern hardwoods forest, a forest type typically characterized by sugar maple, American beech and yellow birch trees. Northern hardwoods thrive in areas of deep, moderately well drained soils developed from glacial ‘till.’ ‘Till’ is a term that describes the



Large coarse woody material provides important habitat for a variety of species.



Some land snail species benefit from calcium rich sugar maple logs.



Trees in late successional forest will have a variety of age and size classes.

heterogeneous mixture of fine and coarse grained sediments (even boulders) that are deposited during the melting of glaciers, and which are not washed or sorted by interaction with streams or other water bodies.

Pressure to harvest hardwoods in Maine was not as great during the era when rivers were the primary means of transporting logs to mills and markets. Unlike softwoods, hardwood logs quickly become waterlogged and sink when left in a body of water. To run hardwood logs down the rivers, loggers would raft hardwood logs together with softwood logs. Because the demand for hardwoods was less at this time, they were harvested more selectively, especially in mountainous terrain. The demand for hardwoods only increased after World War II (and after the White Mountain National Forest was established), when increased mechanization of the logging process made harvest of hardwoods more economical. Many ‘legacy’ northern hardwood trees can be found along the upper slopes of Caribou Mountain.

Here, northern hardwood forests exhibit many ‘late successional’ characteristics, including mixed size and age classes of trees in the forest canopy, large ‘snags’ or standing dead trees, and large diameter logs decaying on the forest floor. These features add species and structural diversity to a forest, providing habitat for cavity nesters, including woodpeckers, owls, nuthatches, brown creepers, and invertebrates. Large sugar maple logs on the forest floor make calcium more available to land snails, and [snail density and diversity](#) are positively associated with decaying sugar maple logs. Given the prior land-use history, it is clear that the hardwood forests of Caribou Mountain are not old-growth; they have been and continue to be influenced by human activities. However, many of the ecosystem functions that characterize old growth forest can be found here.

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#### ④ **Beech bark disease** -70.93102, 44.34565

*A major disease changes the ecology of an important tree species*

In the col between Caribou and Gammon Mountain, the forest canopy consists almost exclusively of American beech trees. American beech’s closest relative in North America is the American chestnut, once one of the most common trees in the northeast. Chestnut blight, a non-native fungal disease, swept across American chestnut’s range nearly eliminating the species from the region altogether. Now, American beech may face a similar, though more prolonged, fate.

Beech-bark disease was introduced in Nova Scotia in the early 1900s, and is caused by an association between a non-native scale insect and two fungal tree diseases (*Neonectria faginata* and *N. ditissima*). The scale insect creates



This mature beech is beginning to show signs of beech bark disease on its upper trunk.



Caribou Mountain's summit is not a true alpine summit, but a mid elevation mix of exposed bedrock, spruce-fir woodland and heath shrubs.

small lesions in healthy trees, incidentally inoculating them with spores of the fungal tree diseases. These fungal diseases eventually kill the tree. Beech, once identified for its smooth grey bark, can now be identified by the many bark disease related boils and lesions that pockmark the bark's surface. Though mature trees are able to resist an infection for many years, they eventually succumb. Once the upper part of an American beech dies, the tree utilizes the reserves in its roots to grow many new shoots. These sprouts will often out-compete other vegetation, and because these sprouts are already infected with the disease, it is unlikely they will become mature enough to flower and fruit. Eventually, American beech will likely become a less common component of northern hardwoods forests.

Here, this stand of beech seems relatively healthy. While beech bark disease is certainly impacting these trees, the elevation and absence of timber harvesting may allow these trees to persist and bear fruit—an important food source for wildlife including black bears and other fauna—for many years.

⑤ **Summit** -70.93032, 44.34052

*Disturbance events and climate stressors lead to poor growing conditions for many plant species.*

The exposed bedrock summit may have existed prior to the White Mountain's logging era, but it was likely opened up further by the fire of 1903. Poor soil development and harsh weather conditions make it difficult for trees to establish here. Many of the scattered spruce and fir that do occur are battered by the weather, with most of the living branches growing on the protected leeward side of the tree. This asymmetrical appearance has led to these trees being described as 'flag trees.'

Low stature shrub species, insulated by the winter snowpack and tolerant of harsh climate and weather conditions, thrive. These include generalist species that can be found in a wide variety of habitats, such as sheep laurel (*Kalmia angustifolia*), lowbush blueberry (*Vaccinium angustifolium*) and Labrador tea (*Rhododendron groenlandicum*). Species that exclusively specialize on summit balds and outcrops can also be found. These include mountain cranberry (*Vaccinium vitis-idaea*), black crowberry (*Empetrum nigrum*), three-toothed-cinquefoil (*Sibbaldiopsis tridentata*), and alpine bilberry (*Vaccinium uliginosum*).

⑥ **Spruce and Roche Moutonnée** -70.93143, 44.33605

*A landscape of scoured bedrock and plucked cliffs.*



Spruce and fir are highly tolerant of poor soils and can germinate in narrow rock crevices.

The impacts and deposits of the Laurentide ice sheet, a massive glacier centered on Hudson Bay and extending to New Jersey, are some of the most important predictors of ecology and landform in New England. At its peak over 18,000 years ago, this ice sheet was roughly a mile thick in Maine as it slowly progressed in a southeasterly direction. The steep southeastern slopes of Caribou Mountain exhibit one of the most common glacial landforms in mountain terrain called a ‘roche moutonnée’ by geologists. Roche moutonnée are asymmetrical bedrock features consisting of scoured bedrock on the up-glacier side, and plucked steep cliffs on the leeward side. The concept for how these features form should be intuitive for woodworkers; sometimes when tooling wood against the grain, or at the end of a board, the wood fibers are not supported by an adjacent mass of wood and will ‘tear out.’ Similarly, enormous force put upon sloped bedrock, along with the expansion ice in rock fissures, will cause fractures along the down-glacier side. On the leeward mountain slopes, these areas are not held in place by adjacent land masses and chunks of rock are broken off.

The debris fields left behind following the melting of the glaciers, often steep and full of talus, are inhospitable locations for many species. Red spruce, however, which can germinate in narrow rock crevices and which is tolerant of a variety of weather and soil conditions, is able to thrive here. Identified by its short, prickly needles, red spruce has a sub-boreal distribution and is Maine’s most common spruce. Red spruce occurs in mountain environments across the Appalachians, but northern New England, New Brunswick and the Canadian maritimes are the heart of its range where it also occurs in many low elevation settings. The southern slopes of Caribou Mountain are dominated by red spruce and contain mosses and understory plants that prefer the cool microclimate conditions provided by an evergreen canopy. These include three-lobed bazzania liverwort (*Bazzania trilobata*), wood sorrel (*Oxalis montana*), and mountain woodfern (*Dryopteris campyloptera*).



Mud Brook, not looking especially muddy.

⑦ **Ash trees and deep soils** -70.95546, 44.32893

*Rich soils lead to rapid tree growth.*

In contrast with the thin soils of the spruce-dominated forest above, it is appropriate that deep, fine grained, till-derived soils should be found along a stream named ‘Mud Brook.’

Here, we find a number of large white ash trees. White ash—an uncommon tree species of northern hardwood forests— can usually be found in areas



with enriched, fine grained soils. White ash is a fast growing tree, and this stand is not much older than 100 years. Both below and above this ash dominated forest, large sugar maple and yellow birch from the same era have grown since this valley was last logged. It is a testament to the resiliency of Maine's forests that the old road bed adjacent to the trail here is the only obvious evidence of the White Mountain National Forest's logging era.

Soils along Mud Brook are deep and fine grained. Tree species such as white ash and American basswood thrive in these rich soils.

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*Natural Heritage Hikes is a project of the [Maine Natural Areas Program](#) in partnership with the [Maine Trail Finder website](#). For more Natural Heritage Hikes, please visit [www.mainetrailfinder.com](http://www.mainetrailfinder.com).*

*Map sources: Maine office of GIS, Esri*