Natural Heritage Hikes

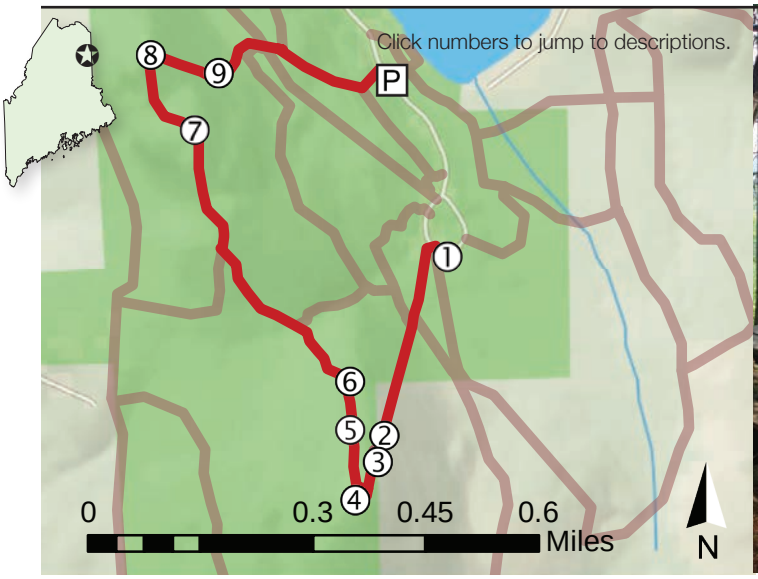
# Aroostook State Park: Quaggy Joe

South Peak Trail, North-South Peak Ridge Trail, North Peak Trail - 3 miles, moderate

*In its nearly 400-million-year lifespan, the rock that makes up Quaggy Joe has witnessed everything from surrounding volcanic activity to the Pork and Beans War, a near-violent controversy that almost ended with Aroostook County as part of Canada. After a brief period as a boundary commission lookout site, local communities rallied in support of Quaggy Joe's conservation. The early 1900s campaign to create Maine's first state park was promoted through booster club meetings and movie screenings, and ultimately led to several generous land donations. When enough funds were raised, ski trails were widened, a toboggan slide was built, and beaches, picnic areas, and campsites were developed. Today, a hike up Quaggy Joe is an introduction to the entwined ecology and history of Aroostook County, and a reminder of what makes this mountain so special that it inspired decades of community support.*

## Getting There

Turn off US Route 1 approximately three miles south of Presque Isle (Aroostook State Park signs mark turn off US Route 1 in both directions). Turn on to the Spragueville Road and drive 1.5 miles before taking a left turn on to State Park Road. Drive another mile to the park's main entrance. Park near the North Peak Trailhead, located about 200 yards beyond the fee collection booth on the right. Continue up the road on foot until you reach campsite number 18, where the South Peak Trail begins.



### ① Keys to the Trees *-68.004203, 46.608791*

to map

*The South Peak Trail enters a strikingly diverse forest.*

If you want to learn trees, you're on the right trail. This broad path near the trailhead boasts two species of ash, two species of maple, and two species of birch, as well as hophornbeam, quaking aspen, American beech, and balsam fir. This mix of hardwood trees and more cold-tolerant softwoods is typical of forests in northern Maine.

Scientists use dichotomous keys, or a series of paired questions, to identify plants. Use the key at the end of this narrative to identify mature trees along this section of trail. For each pair of descriptions, choose the one that best describes the tree you are trying to identify and follow the directions at the end of that description.

For wildlife, dead trees are just as valuable as live ones. Look behind the trailhead sign for a balsam fir tree that has snapped in the middle. Places where the bark has been flicked away in small flakes are evidence of black-backed woodpeckers search-

Black-backed woodpecker

ing for wood-boring beetles and ants to eat.

*Where the wide path peels away to the left, follow the narrow trail straight uphill.*

Slope of rhyolitic tuff

## ② Joe of the Volcanoes? *-68.006225, 46.604165*

to map

*At 0.3 miles, the trail ascends a slope of loose rubble at the base of an exposed bedrock outcrop.*

Pick up a rock and examine it. Is it light or dark colored? Are there any visible crystals within it? Rhyolitic tuff, the bedrock of Quaggy Joe, is a light-colored, fine-grained rock of volcanic origin. Because Quaggy Joe is formed of volcanic rock, it is a common misconception that this mountain is an extinct volcano. Instead, Quaggy Joe's bedrock began as volcanic ash that erupted violently from nearby volcanoes and settled on the ground.

The surface of the earth is broken up into massive plates, many the size of continents, which float on the earth's liquid mantle. When two enormous slabs of rock (tectonic plates) bump into one another, they crumple, forming mountains. In many cases, one plate is wedged beneath the other and begins to melt into the mantle. Here, it sheds water and other chemicals that reduce the melting point of rock, inducing volcanic activity above. When they erupt, certain types of volcanoes blanket thousands of square miles in ash. For example, ash from the violent eruption of Mount St. Helens in 1980 can be found around the globe!

Having avoided much of the mountain building turmoil experienced hundreds of millions of years ago by other parts of the state, Aroostook County does not have many large mountains. However, it didn't dodge the ash spewed into the atmosphere by the volcanoes associated with their formation. Over millions of years, the fallen ash was buried and compressed into the rhyolitic tuff that you are standing on.

## ③ Living on the Edge

to map

*At the top of the cobble slope, the trail switches back across a face of exposed rock.*

When a landslide or other disturbance clears an area of plants and soil, all that remains is an exposed face of rock, like this east-facing outcrop. Often, lichens acting as pioneer species are the first organisms to colonize bare rock, helping to create a more hospitable environment for the eventual arrival of other species.

Magnified paper birch seed
Image by Steve Hurst, hosted by the USDA-NRCS PLANTS Database

Lichens are complex plantlike organisms made up of an alga and a fungus growing in a mutually beneficial (symbiotic) association. This unusual combination of life forms allows lichens to grow in harsh, often drought-prone environments by going dormant when they are dessicated. Here, gray lichens cover the rock like paint. In attaching to and living on this rock, this organism is catalyzing the weathering process, slowly leading to the formation of soil. In crevices where soil has begun to accumulate, mosses grow on top of the lichen. These mosses provide a moist nursery for the seeds of larger plants, even trees, like paper birch and balsam fir.

Paper birch seeds are small and light, like confetti, which allows them to travel great distances to find sunny patches of moss or bare soil in which to germinate. To travel

On the ledges, paper birch and balsam fir grow atop mosses

light, these tiny seeds compromise by not packing stored nutrients. Without nutrients stored in the seed, a germinating plant cannot survive long enough for its roots to penetrate thick leaf litter and find soil. These paper birch seedlings have found ideal places to germinate in these patches of damp moss.

Paper birches are better suited for sunny sites than balsam firs, which grow on these ledges among the paper birch. The fir is best adapted to grow in the shade of another tree; here, it grows beneath the young birch.

*The trail ascends gently through a tunnel of young balsam fir. When you reach the tower at the top, find the trail to the viewing platform on the right.*

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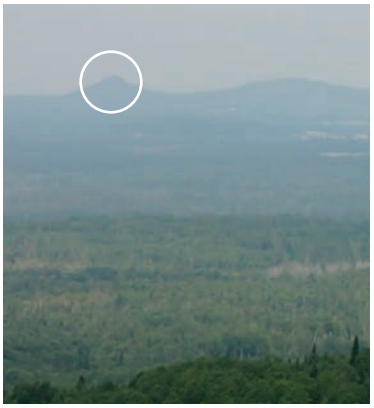
### ④ Haystack Mountain *-68.006467, 46.603167*

to map

*The south summit of Quaggy Joe offers an excellent view west across Aroostook County.*



Haystack Mountain, as visible from summit of Quaggy Joe

From this vantage point, the landscape below can tell you quite a bit about the distribution of the underlying bedrock. Farm fields in this region are often positioned above calcium-rich sedimentary rocks, while wooded areas are perched atop younger volcanic rock.

Look northwest along the horizon to find a pointy, cone-shaped peak very different from the rounded tops of neighboring mountains. Like Quaggy Joe, the rock of Haystack Mountain began as volcanic emissions. If you were to climb Haystack Mountain (a short 0.7-mile round trip), you would find rhyolite exposed at the summit.

Haystack Mountain is located in the middle of a massive, 5-mile-long upward fold in the geology (anticline) that runs north-south, also encompassing the next mountain to the north, Pyle Mountain. Millions of years of abrasive wind, snow, ice, and scouring glaciers have worn down the top of the fold, revealing the older, tougher rocks below. Because it is so tough, the rhyolite on the summit of Haystack Mountain has persisted as the younger rock around it eroded away, giving the mountain its unique, pointy shape.

*Follow the North-South Peak Ridge Trail toward North Peak.*

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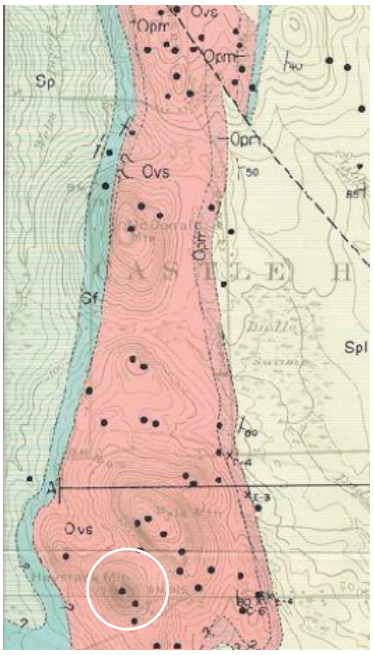
### ⑤ Beech Bark Disease: The Destructive Duo

to map

*Where the trail first levels below the south summit at approximately 0.5 miles, look for beech bark disease.*




Haystack Mountain, located in the middle of an exposure of Ordivcian rock (pink)
Image courtesy of the Maine Geological Survey

American beech is usually recognizable by its smooth, light-gray bark and very regularly toothed oval-shaped leaves. The bark keeps the tree from overheating by reflecting sunlight, discourages other organisms from growing on it, and most impressively, allows light to pass through so that the tree can photosynthesize. Where the trail first levels between the two summits, there are beech trees with bark that is cracked and pock-marked. These diseased trees are harder to recognize as beech.

A scale insect and fungus collectively cause beech bark disease, which is wide spread in Maine and the rest of New England. Despite its benefits, the beech's thin bark offers no defense against the beech scale, a tiny insect introduced from Europe in the

Beech bark disease

late 1800s. And still worse, while burrowing into the bark to feed, the insect infects the tree with a destructive fungus. The tree tries to isolate the fungus in ugly cankers, but fails. These openings in the bark make the beech tree more susceptible to infestation from insects, and subsequently woodpeckers. Too many holes and disruptions in the bark prevent the movement of life-supporting nutrients and the tree gradually weakens and dies. The decline of beech affects many species, like bears, that depend on beechnuts for survival.

### ⑥ Mountain Murder Mystery *-68.007221, 46.605871*

to map

*At 0.6 miles, the trail slices through a clearing filled with fallen trees.*

Pause among the fallen aspen and birch in this clearing; this is a good place to do some detective work.

With the direction that they've fallen, dead trees can, almost literally, point to the cause of their death. Groups of trees that point east, on average, indicate a thunderstorm microburst. Groups of trees that point southwest are likely the work of a northeaster or, depending on the specifics, a hurricane. Here, the culprit has left its calling card; these trees point southwest.

When a hurricane travels over a landscape, the winds it generates move in a counterclockwise direction around the storm. With the storm to the east, Quaggy Joe is blasted by winds that blow southwest. Trees tumble in response to these winds, their tops pointing southwest. Hurricane Arthur, the first Atlantic hurricane of the 2014 hurricane season, was responsible for the deaths of these trees.

Black nghtshade

### ⑦ Potatoes, Tomatoes: The Nightshade Family

to map

*-68.011794, 46.611202*

*At 1.1 miles, stop at the shelter and picnic table to look east across Aroostook County.*

Take a moment to admire the picturesque farms in this agricultural landscape. Despite its small population, Maine is the tenth largest producer of potatoes in the United States, with about 90% of those potatoes grown in Aroostook County.

Along with tomatoes, tobacco, and peppers, potatoes are members of the nightshade family of plants (Solanaceae), well known among botanists for producing a diverse range of chemicals called alkaloids. In nature, alkaloids usually deter herbivores, but to humans, they can be deadly or desirable. Nicotine, an alkaloid found in high quantities in tobacco, is a stimulant drug. It can also be found in smaller amounts in potato plants and other members of this family! In the unripe berries of the introduced black nightshade plant, the alkaloid solanine is sufficiently concentrated to poison humans and livestock who eat them.

### ⑧ Maine's State Dessert *-68.013369, 46.613195*

to map

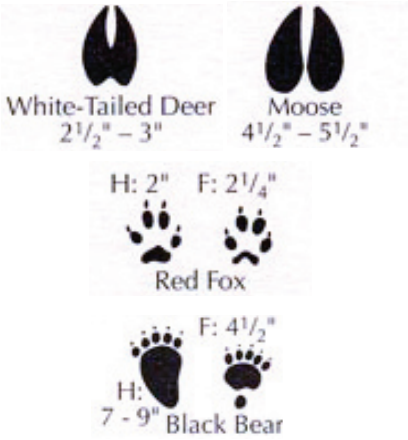
*Pause on the northern summit.*

A small spruce grove on the northern summit of Quaggy Joe is an excellent, shady place to stop for lunch and admire the view. The edges of this stand are good places to look for velvetleaf blueberry, a low-growing woody plant with tiny urn-shaped flowers

Blueberry flowers

### *Naturalist's Notes*

Many people assume that all bees are striped with yellow and black, and live in large colonies consisting of a queen and many workers. However, of approximately 20,000 species of bees worldwide, 85% of these species are solitary bees, meaning that each female lays eggs and cares for her own nest. Maine's bees come in a variety of colors, including bright metallic green, deep shades of blue, brown, and black.




F = Front, H = Hind.
Track images courtesy of the MDIFW.

and oval leaves, with both the stems and leaves covered in fine hairs.

With wild blueberries covering over 60,000 acres in Maine, it's no surprise that blueberry pie is the state dessert. While most commercially produced blueberries grow vigorously in the fields and barrens of the downeast coast, wild blueberries can be found on many acidic, low-nutrient sites throughout Maine.

Blueberry flowers are bisexual (perfect), meaning that each flower contains both male and female parts. In spring and early summer, bees (blueberry's chief pollinator) can be found crawling inside the flowers to reach the nectar. Once inside, a bee's vigorous wing vibrations knock the pollen loose from the male parts of the flower. Coated in pollen, the bee inadvertently transfers it to female parts of flowers on the next blueberry plant, pollinating the plant. Some bees, however, have managed to avoid the hassle of pollination and simply chew through the flower wall to reach the nectaries. These "robbed" flowers can be identified by holes near the base .

*Follow the North Peak Trail down toward the day-use parking area.*

## ⑨ Trail Tails

to map

*The trail crosses a boardwalk over persistent mud.*

The mud around the boardwalk is a great place to look for animal tracks. Red fox, deer, moose, and bear reside in this forest, though squirrels and chipmunks are most frequently heard and spotted. As you finish the hike, you may hear the long, rattling territorial call of the red squirrel or the high-pitched alarm calls of eastern chipmunks, two common residents of this forest type that take advantage of the beechnuts available here.

Remember that all park animals are wild, and for your safety and theirs, they should not be approached, fed, or touched.

*Continue on the North Peak Trail to reach your vehicle.* To explore and share more of Maine's extraordinary natural features, be sure to check out the other Natural Heritage Hikes covering dozens of trails from the coast to the western mountains.

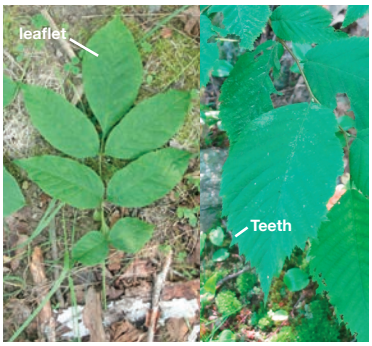
## Naturalist's Glossary

**Bedrock:** The consolidated layer of rock beneath the soil and glacial deposits.
**Mantle:** A layer found within Earth (and other terrestrial planets) between the outer crust and the core. Though it is solid, it behaves much like a liquid.
**Sedimentary rock:** Rock that is formed from the deposition and accumulation of sediments on Earth's surface and in bodies of water.
**Weathering:** The chemical or physical breakdown of rock into smaller bits.

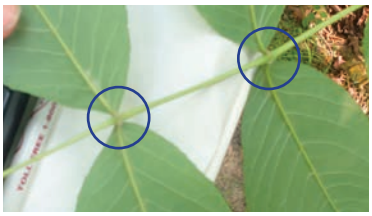
***Natural Heritage Hikes is a project of the Maine Natural Areas Program in partnership with the Maine Trail Finder website.***
***For more Natural Heritage Hikes, please visit www.mainetrailfinder.com.***
*Designed and written by Kelly Finan*

*Map sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community*

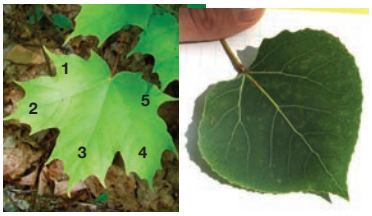
## Tree Key



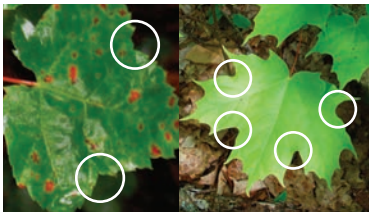

2. Ash leaf (left) is divided into many leaflets, hophornbeam leaf (right) is not



3. Black ash leaflets are stemless




4. Sugar maple leaf (left) has five lobes, aspen leaf (right) is heart-shaped.



5. Red maple leaf (left) has sinuses with sharp corners, sugar maple (right) has sinuses with rounded corners.

1. Tree is broadleaved.....go to #2
1. Tree is evergreen (needle-leaved).....go to #10

2. Leaves are divided into leaflets..... go to #3 (ashes)
2. Leaves are toothed or lobed, and not divided into leaflets.....go to #4

3. Leaflets have small stems.....white ash
3. Leaflets are sessile (without stems).....black ash

4. Leaves have five lobes; leaves are not oval-shaped.....go to #5 (maples)
4. Leaves are not lobed; leaves are oval or heart-shaped.....go to #6

5. Sinuses between lobes are rounded.....sugar maple
5. Sinuses between lobes are sharp corners.....red maple

6. Leaves are heart-shaped, upper trunk of tree is paler than base.....quaking aspen
6. Leaves are oval, upper trunk same color as lower trunk.....go to #7

7. Bark of mature tree is smooth, like elephant skin.....American beech
7. Bark of mature tree is rough and peeling in large sheets or thin strips.....go to #8

8. Bark is paper-thin, peeling off in horizontal strips.....go to #9 (birches)
8. Bark is thicker than paper and corky, peeling in vertical strips.....hophornbeam

9. Bark is glossy and peeling off in thin curls,
scratched twig smells of wintergreen.....yellow birch
9. Bark is white and peeling off in large sheets,
twigs do not smell of wintergreen.....paper birch

10. Needles emerge from branches in two opposite rows,
bark is covered in resin-filled blisters.....balsam fir
10. Needles emerge from all sides of each branch,
bark is not covered in resin-filled blisters.....red spruce

7. Smooth bark of a healthy beech tree

8. Birch bark peels horizontally (top), hophornbeam bark peels vertically (bottom)

9. Paper birch bark is dull and white (left), yellow birch bark is glossy (right)

10. Balsam fir bark has resin-filled blisters