

Analysis of
Human Traffic
on the
Lichen Diversity
on
Slide Mountain

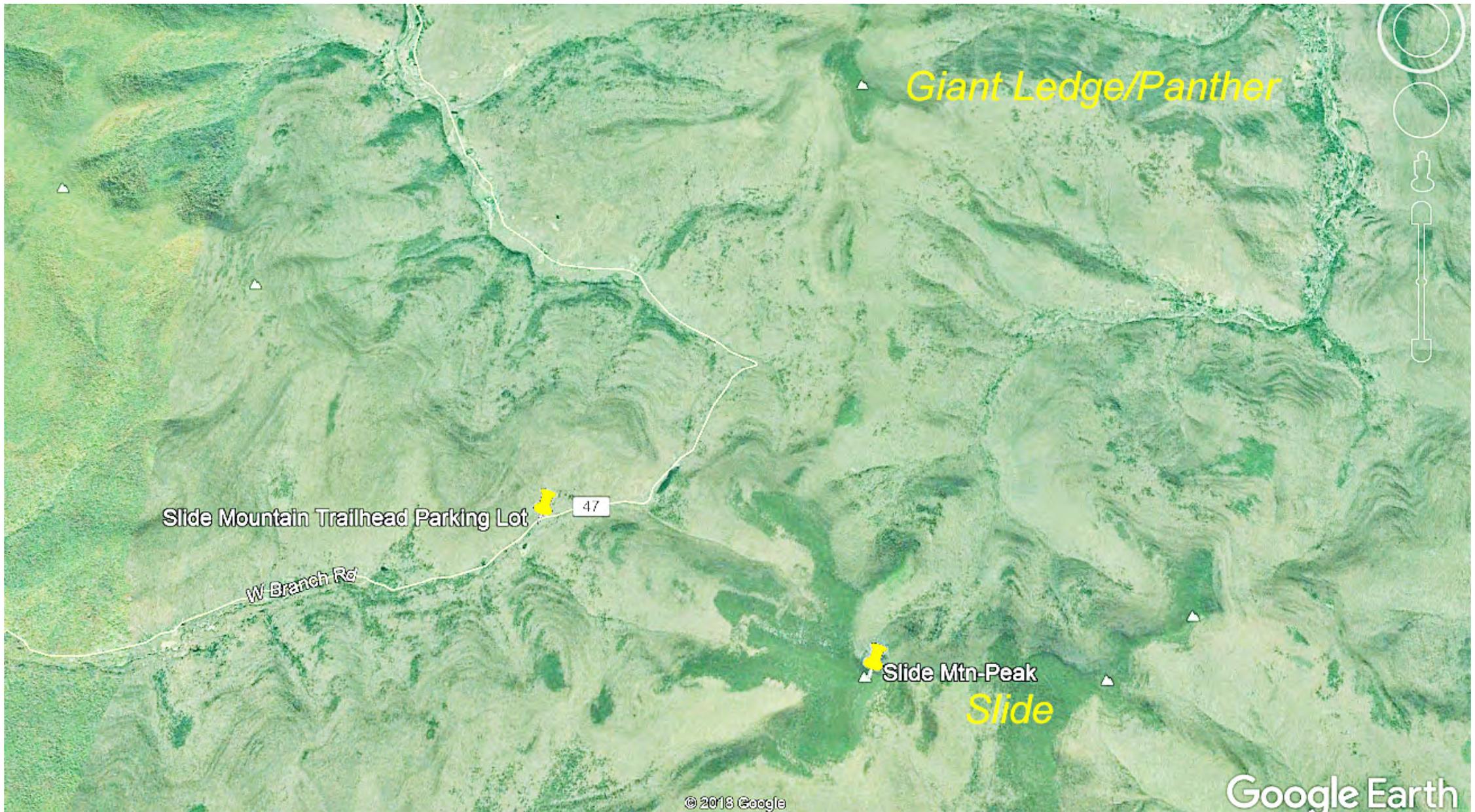
A
Long
Long Time
Ago in a Place
Not to Far Away
the Glaciers Covered
Most of Slide Mountain

- The Laurentide Ice Sheet retreated around 11,700 years ago, stripping clean all of the surface it encountered.
- Scientists believe that at 4179 feet, the **eroded plateau** we call Slide Mountain was an exception, a glacial island or **Nunatak** and the upper forest cap was slightly above the height of the last glacier.
- Surface rocks at the summit are sharp cornered, and show few if any directional striations caused by glaciers as seen on most other surface rocks at lower elevation throughout the Catskill Mountains.

Slide Mountain Survived the Last Glacier!

- The **Slide Mountain** summit is still an *Old-Growth Forest!*
- Slide Mountain is remote, far from most roadways and the summit above 3800 feet is rather steep. These two factors saved the forest cap from the spree of clearcutting done by humans in the last two centuries that wiped out almost all of the other old-growth forests in Southern New York. With easier access locations to cut elsewhere, they left the top of Slide alone as a remnant conifer forest of balsam fir and hemlock.
- From about 3500 feet down, almost everything was cut and only faster growing hardwoods have now recovered.

Slide Mountain summit survived 200 years of Clearcutting



Slide Mountain has a bigger ***conifer forest*** than Panther

Why is **Old Growth** Important for Lichen Diversity?

Because clear-cutting breaks lichen succession.

- *Corticolous* or tree lichens propagate from one tree to another usually by windblown *spores*, *isidia*, or *soredia*. If there are no similar trees next to a new tree, little viable lichen material will get established on the new tree.
- Conifers have acid bark and they support a specific and different variety of lichens than most deciduous trees. If all the neighboring conifers are cut, the remaining conifers have little chance of receiving viable lichen spores. If you look at some of the few scattered conifers remaining in the middle mountain hardwood forest, they are mostly devoid of lichens.

The **Slide Mountain** Hiking Trail is Old!

- Slide was the first public recreational trail in New York State supported by public funds. Chapter 356 of the Laws of 1892, awarded the Catskill Forest Commission the sum of **\$250** “for completing the public path to the summit of Slide Mountain.”
- 125 years later, Slide is still one of the most popular hiking trails in the Catskills. The NYS DEC data shows a 10 year average of 5510 hikers a year taking the challenging hike to the summit, with 6522 in 2016. Only Overlook, with 10,933 and Giant Ledge, with 10,325 had more hikers in 2016.



Slide Mountain Summit Rock Face



Close-up of this rock face shows it is completely covered with *crustose*, *foliose*, and *fruticose* lichens. This is the way open rocks should look on this mountain.



Bright orange-yellow *Candalaria vitellina* on the rock face



The upper surface of this same rock outcrop where hikers rest and enjoy the views



A close-up of this heavily trafficked upper surface shows no lichens in sight!



Just a few meters away, a rock in the field looks like it should-carpeted with lichens!



View of the main trail leading up to the viewing rocks shows nothing but loose gravel

Can this Destruction of Habitat be a Good Thing?

- The NYS DEC recommends that all hikers stay on the designated trails and avoid trampling native flora, especially in wet or muddy conditions.
- As terrible as these worn pathways appear, this is really a good thing for the lichens and native plants on the mountains of the Catskills.
- What these trails represent is a **successfully planned small sacrifice of biome** in the hopes that the remaining 99% of the mountain will remain biologically intact.

The **Old Conifer Forest** on Slide Supports Many Lichens

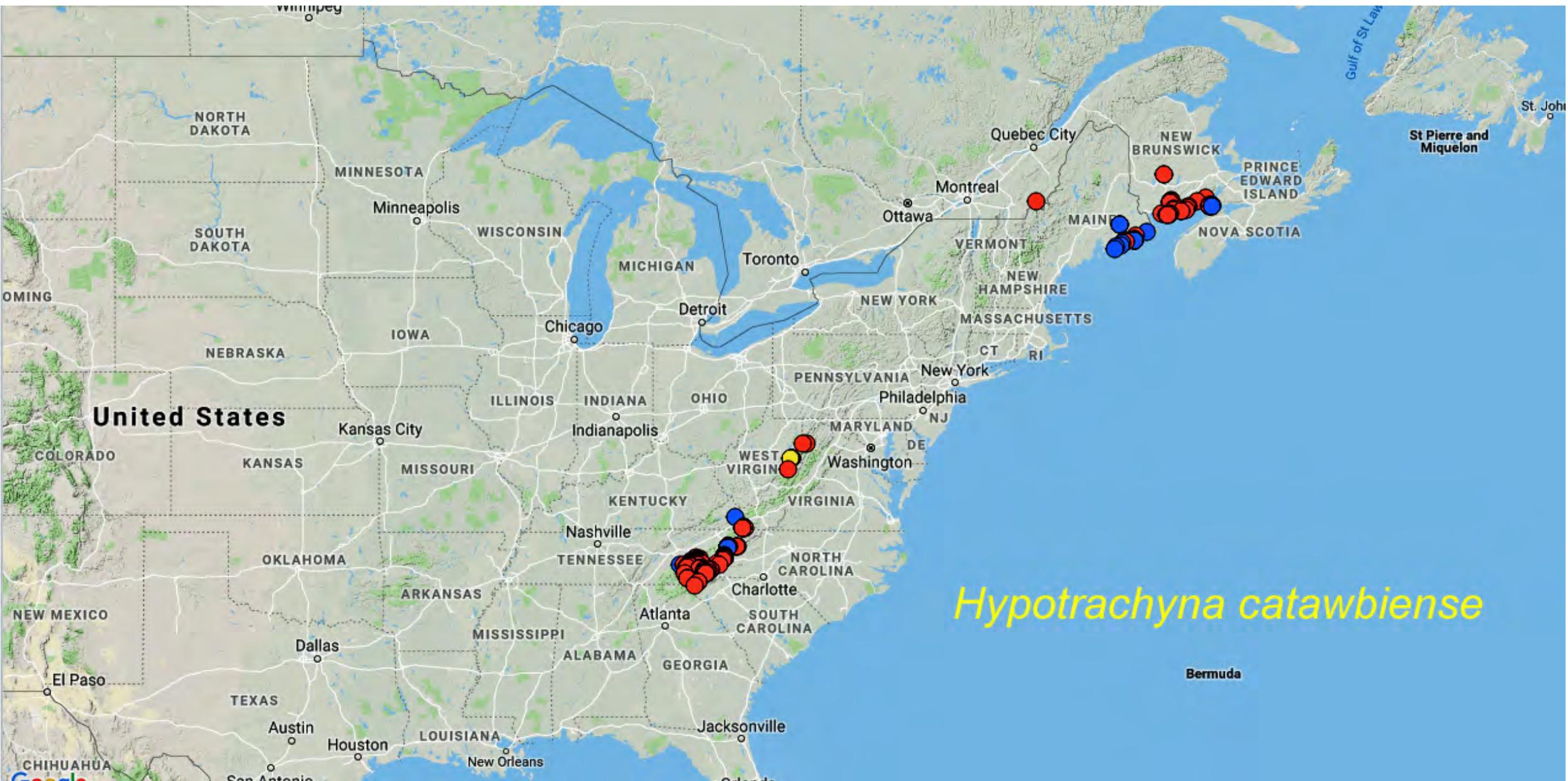
- The *Old-Growth* forests on Slide are home to many lichens that are not common elsewhere in the Catskills.
- Lichens there have had an unbroken line of succession because of the continual supply of viable lichen *spores*, *soredia*, and *isidia* from older similar trees.
- Just a few feet away from the well worn trail you will find numerous trees covered with lichens, some extremely rare for New York.



View of the conifer forest at the summit near viewing rocks



In this Conifer Forest is *Hypotrachyna catawbiense* - a very rare lichen.



Hypotrachyna catawbiense is an old growth lichen with only a few locations to call home



A few meters further down from the trail on the left is this small meadow



In this grassy field we still find numerous *fruticose* lichens like *Cladonia cristatella*



If you lift the lower branches of the border trees, you find even more *Cladonia Lichens*



Brightly colored *Vulpicida pinastri* on some rocks in the meadow



When conifers die, dozens of hidden *Usnea filipendula* lichens show up.



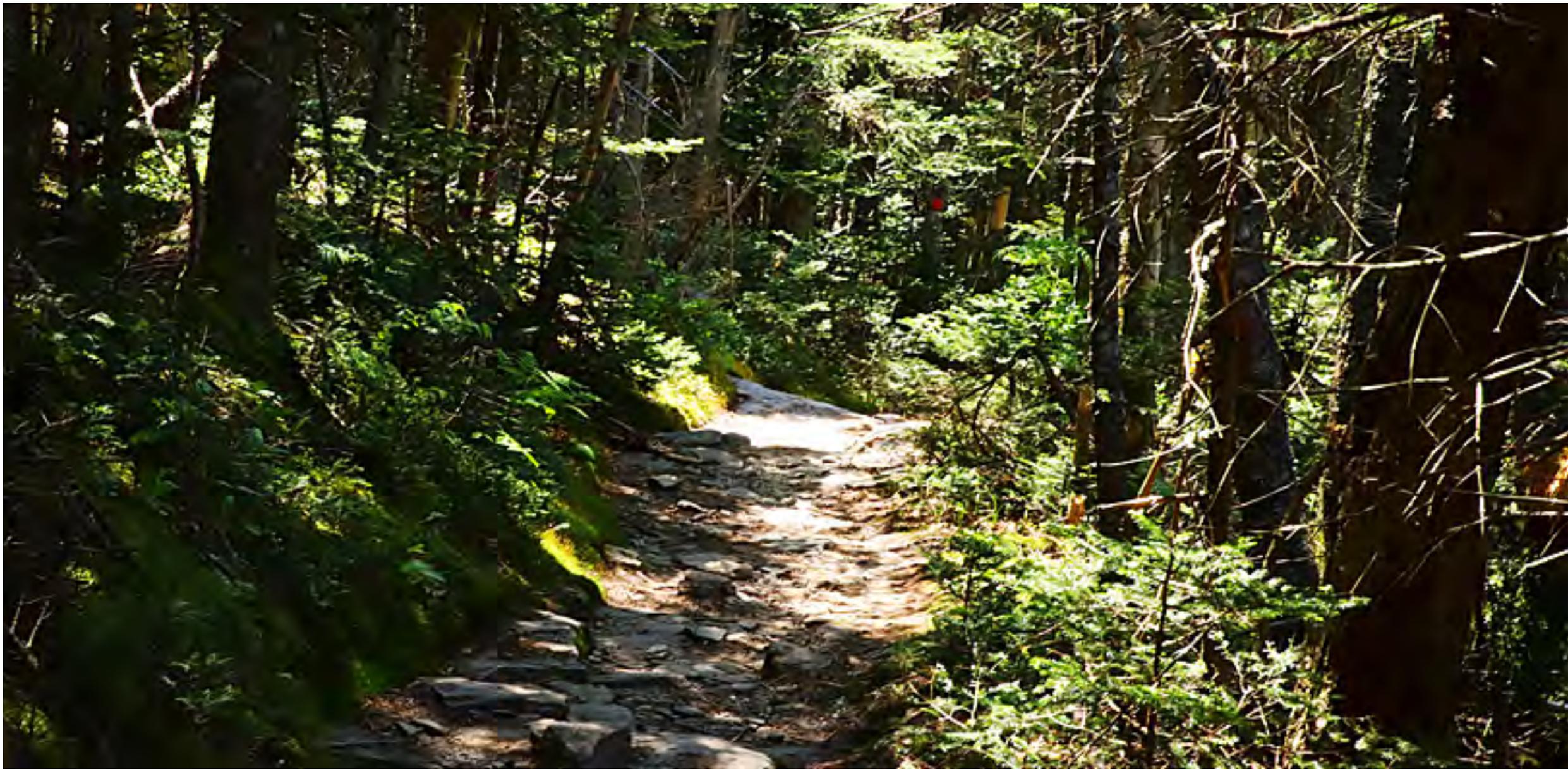
Even snow does not stop the hikers...here in early spring, the only snow left was packed by hiker feet in the trails



Over the last 125 years, all of the trail has been stripped of vegetation



But, on a tree next to this trail is *Flavopunctelia flaventior* - normally 2" it's 12" wide.



Here we see breaks of sunlight in the older and darker section of the conifer forest

Even Man-made Forest Breaks Help Lichens to Prosper

- As bad as this trail surface is for *saxicolous* or rock lichens, **the opening it creates in the forest is a huge benefit for *corticolous-tree* and *terricolous-ground* lichens.** Although there is a distinct but small set of “shadow lichens” that prefer shade, most lichens thrive best on the sunny, or lighted side of the tree. Any meadow or forest opening greatly increases light penetration and lichens prosper on all sides of the opening, even if it is man-made.
- You will usually find more lichens within the first 10 feet of the open trail than in the next 50 feet of darker forest. The deeper you go in the forest you find less light penetration, less moisture, and often fewer lichens.



Sunlit trees along the open trail are often covered with lichens



View of the rocky trail below 3500 feet-mostly new growth hardwoods.

The Slide Mountain Trail is Often Rough and Rocky

- Many sections of the Slide Mountain hiking trail are little more than **Man-Made Dry Creek Beds** and they are devoid of almost all vegetation or lichens.
- Only a few intrepid crustose lichens remain on the upper or more vertical surfaces of the largest rocks that most humans try to avoid in the walking path.
- This section of the path is really tough on hikers, but because most hikers follow the NYS DEC recommendations, you will find still many fragile lichens just a few feet away from the path.



Fragile *Cladonia squamosa* covering rocks within 6 feet of the path



View of the highest DEC approved campsite at about 3500 feet

DEC Regulations Help Protect the Upper Forests

- At about 3500 feet, this campsite is the last DEC approved camping location on the trail before the summit. From here, there is still almost a mile of trail ahead before reaching the viewing rocks at the summit of Slide Mountain.
- In the 1970's, the NYS DEC enacted regulations that prohibit camping and fires above 3500 feet on the mountains. These new regulations were intended to protect the mountain biome in many ways.
 1. The upper forests are more fragile, often with irreplaceable flora and fauna endemic to the upper sections of the mountains.
 2. The remote locations are also far more difficult to reach if emergencies should occur. Firefighting and emergency activity are often delayed considerably in the upper reaches of the mountain and may be ineffective at best.



Mid-mountain forests are young with numerous small hardwood trees



Delicate *Cladonia furcata* is common here and will cover many rocks just off the path

Some Scattered Old Trees Remain at Lower Elevations

- Even in clear-cut areas, there are a few scattered very-old trees. In the mid-mountain areas that were mostly clear-cut, there are occasional very large maple, cherry and birch trees.
- Some of these old trees show sizable lichen populations, but only in the upper canopies where they get sufficient sunlight.
- You only get to see these lichens if you are lucky to come across a wind-blown tree or canopy branch laying on the ground.



Fallen trees allow access to lichens normally not visible from the ground



A lower elevations, most rocks are rounded by glacial action, remain exposed and often are populated by lichens.



The Slide Mountain Trailhead Parking Lot

Strange mix of trees remain by the road

- Even at the lowest elevation of about 2480 feet near the Trailhead Parking Lot, you can still find a few really old trees. There are some very old maples and birches right next to the Trailhead Parking Lot. They may have been left because they were too close to the road to cut safely?
- The lone conifer tree remaining in the Parking Lot mix is almost free of lichens. It no longer has a source for conifer lichens after all other close conifers were cut.

- On one very old maple tree, we found rare *Lobaria quercizans*. This lichen is classified as an old growth indicator.
- Known as Smooth Lungwort, this rare lichen is one of 11 species of concern in the North Woods area above Lake Superior. This is the only place I have seen it in NY.
- **NOTE:** There is currently no official list in NY of endangered lichens.



- On this same tree, we also found ***Lobaria pulmonaria***, a large *foliose* lichen that is only found in unpolluted old-growth forests.
- ***Lobaria pulmonaria*** is also classified as an old-growth indicator species and is very sensitive to air pollution, especially to Sulphur Dioxide above 10 parts per billion.
- Where did we find these two rare old growth lichens?





The Slide Mountain Trailhead Parking Lot

- Another astonishing find is this lichen, *Anaptychia palmulata*, also an old growth indicator lichen. It was found in numerous places on the large, old yellow birch, sitting right next to the DEC Parking Lot toilet!
- I found this lichen only twice on Slide Mountain. Here next to the DEC toilet and also on a large old maple tree in the center of the 3500 ft camping area seen earlier.
- This lichen appears to prefer sunlit areas, even if created and temporarily occupied by humans.





The Slide Mountain Trailhead Parking Lot

Conclusion: History has been kind to **Slide Mountain**

- The upper conifer forest on Slide Mountain **was not** stripped bare by the last glacier
- The upper conifer forest on Slide Mountain **was not** stripped bare by clear-cutting.
- Both of these conditions have allowed the native biome to prosper in the upper forest for thousands of years. There should be lots of lichens on Slide Mountain.

The Lichen Diversity on Slide Mountain Remains Strong

- A study of lichens done in 2009 by Lichenologists Richard Harris and Dr. James Lendemer, both of the NY Botanical Gardens in the Bronx, found 81 lichens on Slide Mountain.
- Their expert eyes found **51 crustose** lichens and **30 macro-lichens**. On our more recent hikes we have found 72 lichens confirmed lichens so far, but only 31 of those found on the NYBG list!
- **We did not locate 50 lichens** they found, mostly crustose, but **we found 41 additional lichens** they did not find, mostly from the far summit, an area they may not have reached.

The Numbers Speak for Themselves

- So far both groups have found **122 different lichens** on Slide Mountain in the last decade. We still have another **64 samples** working their way through the lab identification process.
- When completed, it is possible we may have a total of **150-160 different lichens** on just a 3-mile section of trail!
- Considering there are officially 869 lichens found in all of New York, 150 lichens in one small section is quite a lot.

Samples of Slide Mountain Lichens are Rare

- We recently sent 58 identified samples collected on Slide Mountain to Lorinda Leonardi, curator at the New York State Museum in Albany. Some of these lichens represent the first samples from Slide Mountain ever received by the museum.
- 2 samples we just sent, *Hypotrachyna catawbiense* shown earlier, and *Bryoria nadvornikiana* represent the first sample of these species from anywhere in NY State to be deposited in the NY State Herbaria files. The sample of *Punctelia appalachensis* represents only the second such sample in the State Museum.

How Well is it Working?

- To see if the “Keep on the Path Program” is working, you need only take a few steps off the path to see prime woods at your feet.
- In all the time I spent on the mountain, I don't recall seeing anyone off the main path.
- I did find this obvious well used campsite up on the Slide summit where camping should be prohibited, but most areas are fine.



Can **Slide Mountain** survive the next 100 years?

- We have found that the **Lichen Diversity on Slide Mountain is very high**. The unique combination of historical forces greatly enhance the selection of lichens.
- I think the signs remain good for Slide. Based on observations so far, the forests on Slide Mountain, despite well over 125 years of heavy human traffic, appear to remain pretty much intact.
- As long as future hikers and campers continue to honor the “**Hike in the Path**” and “**Camp in Approved lower elevation locations only**” directives, I think Slide can remain a place where both humans and the natural element can co-exist.

Lichen Sample Collection Made Possible

by

NYS DEC TRP Permit # 11096

John Franklin & Hal Hahn

Big Trouble in Little *Giant Ledge*

- There is something seriously wrong on Giant Ledge where many, lichens are dying.
- Something is causing trees full of lichens and lichens on rocks to turn pink and brown and wither away.
- It may be camp fire smoke, or mosquito repellents like Thermacell or other DEET spray?



What ever is causing the problem, it is widespread near the summit of Giant Ledge. It is happening to all 3 kinds of lichens; *foliose*, *crustose*, and *fruticose*.



It is happening on all 3 substrates; trees, rocks and ground



Camping is Permitted Here

- The most obvious difference in the deteriorating conditions seen here on the upper surfaces of Giant Ledge and on the near-by Slide Mountain summit is that **camping is allowed there**, and not on the Slide summit.
- It is tempting to simplify the cause because the damage is mostly contained to an area around the frequent camping locations on the upper flat surface of Giant Ledge. Additional research must be taken to develop an accurate account of the loss of lichen viability.
- On the surface it certainly appears that the restrictions to camping in remote locations are indeed an **effective and necessary tool** for protection of the natural environment.....

THE
END