Point Assessment Trail Monitoring

Efficacy of using *Survey123* to conduct point assessments of informal trails in the Catskills

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An example of soil erosion caused by off trail foot traffic

Introduction

Global Positioning Systems (GPS) and smartphones have become more popular for backcountry navigation in the past decade as technology becomes better and more people participate in outdoor recreation. In the Catskill Mountains in New York, there has been a substantial increase in hikers using fitness-tracking smartphone applications to navigate in the backcountry. These apps record the user's activity while they hike, and then allow the user to post that activity so that other app users can follow their route. Certain social media apps like *Instagram* allow users to "tag" their location in posts so that followers can see where they have been. The proliferation of social media in outdoor spaces has contributed to an explosion of recreation at previously secluded spots as people see pictures or routes online and follow the picture tags or GPS route to the location (Wood et al, 2020). *Strava* is a fitness tracking and GPS smartphone application that creates heat maps of all the existing routes of a certain activity to show where concentrations of activity are highest and lowest (Figure 1). These heat maps are useful for app users who want to know where popular hiking routes are, but they can be useful to land managers who want to find areas of high activity.

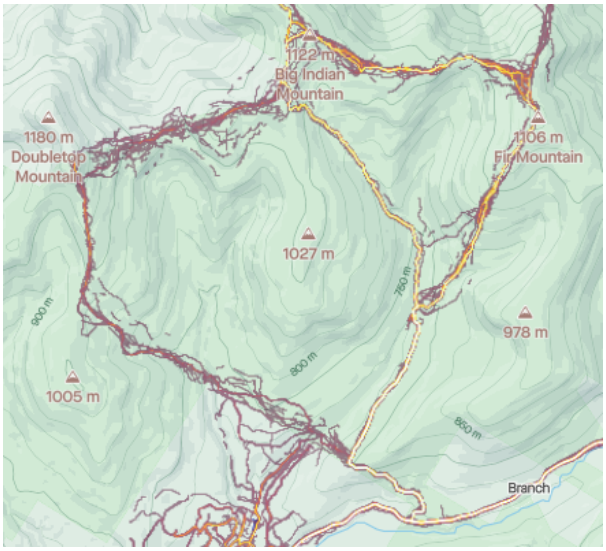


Figure 1: Strava heat map of Big Indian Wilderness in the Catskill Park

The Catskills have seen a substantial increase in recreation in the past ten to fifteen years, much of which consists of hikers on mountains over 3500'. There are 35 mountains over 3500' in the Catskills whose peaks are on public land, and thirteen of those peaks have no official trails

to the top. There are canisters at the tops of these peaks that contain registers for hikers to sign to record visitation. Canister sign-ins at the thirteen trail-less high peaks increased 57% between 2019 and 2020, and increased 400% between 2009 and 2020, showing an overall increasing trend that accelerated during the pandemic (New York DEC, 2021).

Strava data have the potential to be used as a remote monitoring system, in which land managers in the Catskills can find areas of high visitation by looking at large geographic areas and time spans on *Strava* to find patterns of use and create interventions to mitigate potential overuse. This is important because many of these trailless peaks are difficult to reach and have multiple informal trails leading to them, making ground truthing time consuming. *Strava* heat maps can be used to pinpoint high-use informal trails so that a land manager can develop a precise plan to locate informal trails.

In 2019, the New York State Department of Environmental Conservation (DEC) initiated a baseline data collection effort on Catskill trail-less high peaks to determine the location and intensity of off-trail hiker traffic. The DEC used *Strava* heat maps to find areas of high off-trail activity and ground truthing to confirm their existence and severity. *Strava* heat map data were collected in 2020 and 2021 for the trail-less areas, and DEC staff observed an alarming expansion of the informal trail networks and significant increases in visitation to these areas during the beginning of the COVID-19 pandemic. In May 2022, ground monitoring was conducted on thirteen trail-less peaks in the Catskills, using routes found on *Strava* heat maps.

The monitoring effort in 2019 classified sections of informal trails (ITs) by a three-class system that categorized the impact on soils and fauna by the amount of soil exposed and organic matter disturbed along the center of the tread. The monitoring effort was refined and adjusted in 2022 using a more detailed five-class system and point assessments using *Survey123*, an *ArcGIS*

application that allows users to create and geolocate surveys. The point assessment system allowed the DEC to include measurements such as trail grade, trail slope alignment, and trail width in the data. These impact indicator categories are key in deciding the overall sustainability, ecologic impact, and erosion potential of the trail.

Goals and Objectives

The research objective for 2022 was to continue the monitoring effort started in 2019 to evaluate the patterns of use that occurred during the pandemic. The monitoring effort consists of using *Strava* heat maps to locate areas of high use and conduct condition class and point assessment surveys on *Survey123* to evaluate trail erosion and sustainability. The areas that were monitored in 2019 were monitored again, in addition to new areas that showed a significant increase in visitation on *Strava* heat maps. Point assessment surveys will decide whether *Strava* and other novel data sources are accurate at showing the impact of IT's and can supply data and information that will inform future management decisions and interventions.

Methods

The *Strava* heatmap was crucial to deciding what route to hike and where to concentrate monitoring efforts. *Strava* represents user routes on the heatmap even when they go off trail, so the heatmap was used to establish where people were hiking on trail-less peaks. The impact of off-trail hiking was measured with three key indicators: trail width, trail slope, and Trail Slope Alignment (TSA). The trail width is how wide the trail is at a given point assessment, measured in inches, and the trail slope is the steepness of the trail, measured with a clinometer. The TSA is the alignment of the trail to the fall line of the slope, measured by the angle between the fall line

of the slope and the prevailing direction of the trail at the survey point, using a compass (Marion, 2020).

Class 1	Trail distinguishable; slight loss of vegetation cover and/or minimal disturbance of organic litter.
Class 2	Trail obvious; vegetation cover lost and/or organic litter pulverized in primary use areas.
Class 3	Vegetation cover lost and/or organic litter pulverized within the center of the tread, bare soil exposed.
Class 4	Nearly complete or total loss of vegetation cover and organic litter within the tread, bare soil exposed.
Class 5	Soil erosion obvious, as indicated by exposed roots and rocks and/or gullying.

Figure 2: Five-Class system for determining trail degradation developed by J. Wimpey and J. Marion (Wimpey et al, 2010)

When hiking the route, we divide the route into segments classified by the level of degradation observed. The classification system is a modification of Dr. James Wimpey and Dr. Jeffrey Marion's five-class system (Figure 2), with the addition of a class zero for when no trail is observed along a *Strava* route and an Old Road classification for when the trail follows an old road. In addition to the classification system, we employed the point assessment system on *Survey123* in which we conducted a quick survey of the trail's sustainability based on the width, slope, and TSA.

Point assessments are critical for data on the specific attributes that determine the sustainability of a trail, the grade, the width, and TSA. Studies show that a trail closely aligned with the fall line of a hill is more difficult to drain and more prone to soil loss, widening, and degradation. In addition, trails that have steeper grades, especially those above a ten percent

grade, are likely to suffer the same difficulties, and wider trails have proportionally more impact than narrow trails would (Marion, 2020). Using the TSA, trail grade, and trail width gives researchers an exact analysis of how much impact a trail will have on the surrounding environment and how durable the trail is to erosion.

To conduct trail monitoring, we followed *Strava* heat maps using the *Strava* app on a smartphone to find and stay on informal trails, the same way a typical *Strava* user would. As we hiked, we used a Garmin GPS to record our route and to place waypoints that denoted the classification of the trail going forward. To conduct point assessments, we used *Survey123* on a tablet, stopping every quarter mile to conduct point assessments when we were on a significant herd path of Class 1 or higher. The survey connected to that point collected data on the trail width, the trail slope, the TSA, the trail classification, and a picture of the trail (See Appendix A for full document on inputting data into *Survey123*, and Appendix B for maps of point assessments for each area visited).

Data collected while trail monitoring was input into *ArcGIS* to create maps of informal trail networks on Catskill high peaks. The condition class maps show the routes of informal trails as they were classified while monitoring (Figure 3), and the point assessment maps show each point assessment taken along with the data collected at that point (Figure 4). In addition, the most popular routes up these peaks on the hiking app *AllTrails* as defined by number of reviews were downloaded as a .gpx file and overlaid onto *Strava* heat maps to show the correlation between *Alltrails* and *Strava* use (Figure 5).

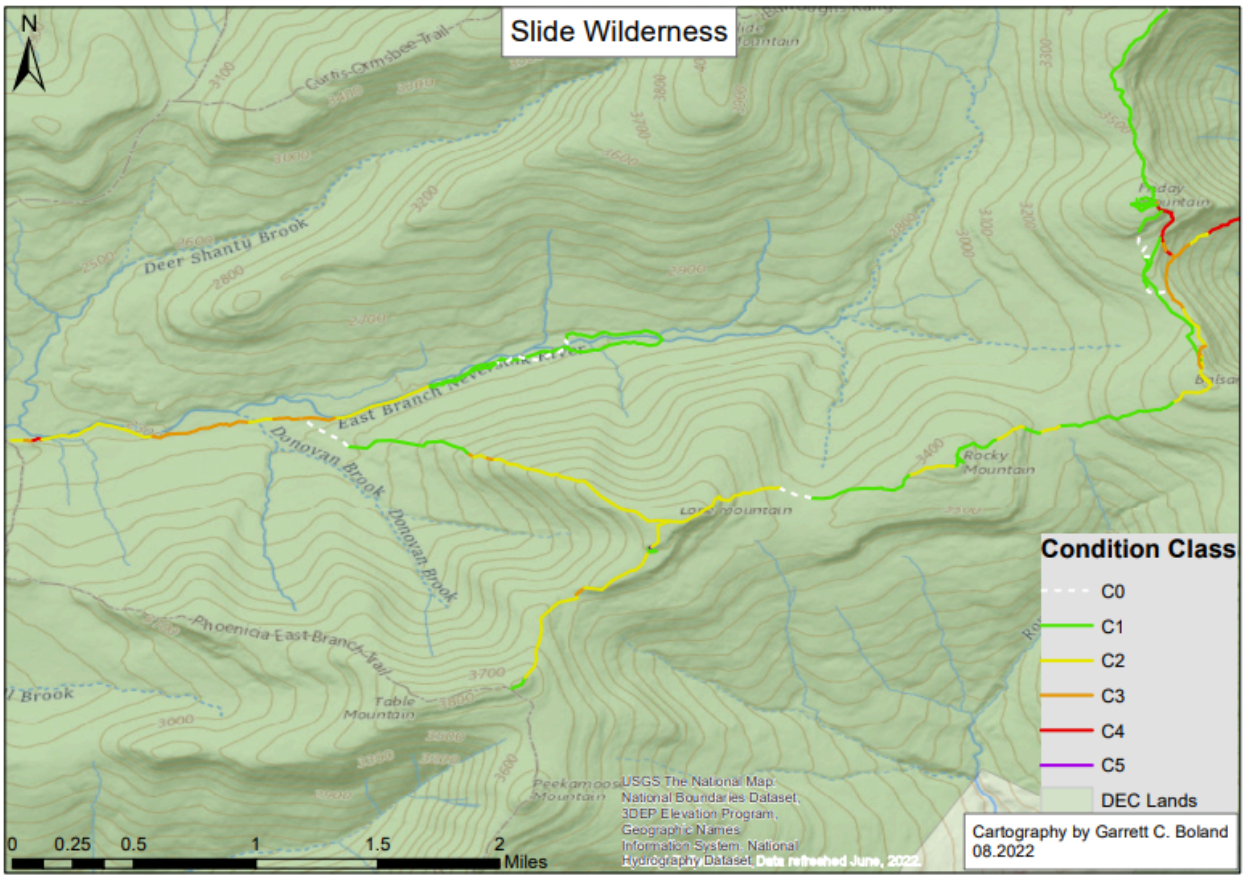


Figure 3: Condition Class map of Slide Wilderness showing herd paths going to Lone and Rocky peaks

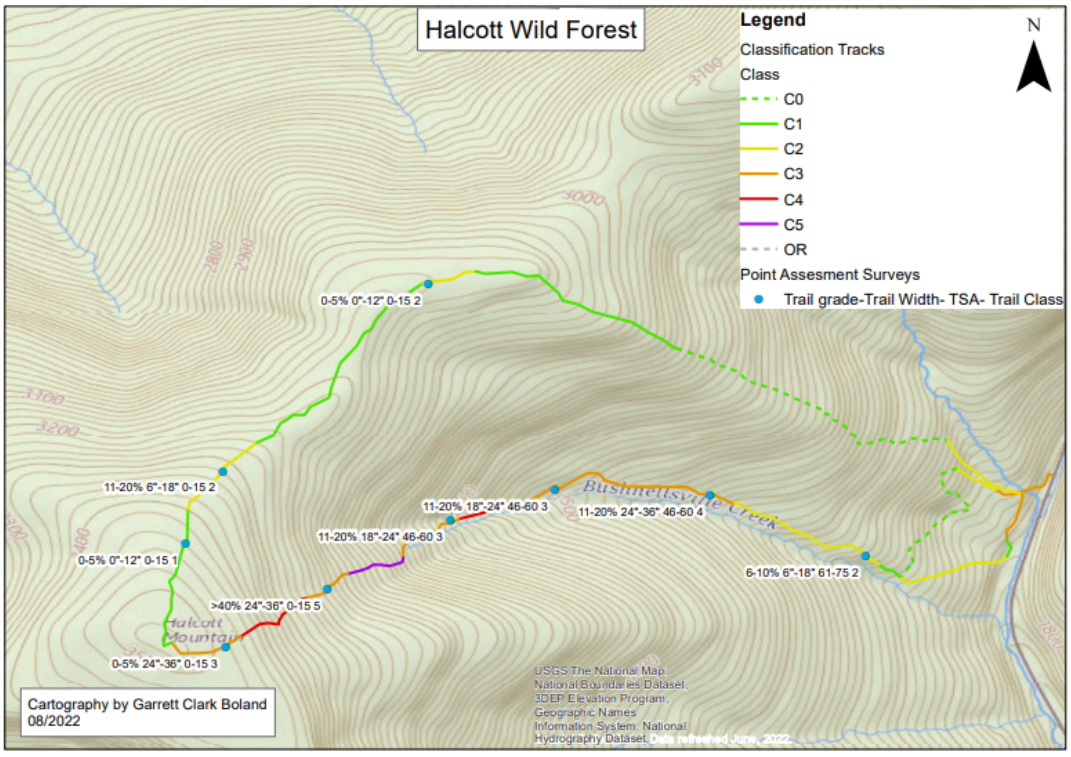


Figure 4: Point Assessment

map

Figure 5. Overlay of the *Alltrails* GPS track for Balsam Cap and Friday mountains in the Catskills overlaid on the *Strava* heatmap

Data from the point assessments were brought from *ArcGIS Online* into table format in Excel, and a series of graphs and a matrix were developed to analyze the overall sustainability of trails as defined by the TSA, trail grade, and trail width. The matrix defines trails as Good, Neutral, Poor, or Bad in terms of sustainability based on the trail grade and TSA (Figure 6).

Anything with a trail grade less than 5% was regarded as *Neutral* regardless of TSA, because trails with less than 5% grade will usually puddle water and not erode no matter the TSA. Trails between 6-10% grade but less than 30º of TSA were labeled as *Poor* because although the grade allows water to run with minor risk of erosion, the TSA prevents water from draining from the trail in most cases. Anything with a 6-10% trail grade and a TSA greater than 30º was labeled as *Good*, because the trail grade allows the trail to climb and water to run off, while the TSA of greater than 30^0 allows the water to flow off the trail and down the fall line rather than getting trapped on the tread. Trails with 11-20% grade and a TSA of over 30º were labeled *Poor*, because of the risk of erosion from the high trail grade, and those with a TSA under 30º were labeled *Bad*. Anything over 20% grade was labeled as *Bad* due to the high erosion potential regardless of TSA.

Table 6: Demonstration Trail Sustainability Matrix

Trail grade (X-axis) Trail slope Alignment in Degrees (Y-Axis)	0-5%	6-10%	11-20%	>20%
0-15º	Neutral	Poor	Bad	Bad
16-30º	Neutral	Poor	Bad	Bad
31-45º	Neutral	Good	Poor	Bad
46-60º	Neutral	Good	Poor	Bad
61-75º	Neutral	Good	Poor	Bad

Results

Figure 7: Table and chart of trail sustainability found by Point Assessment Survey.

	Big Indian	Halcott	Hunter-Westkill	Kaaterskill	Rusk	Slide	Total
Good	0.0%	11.1%	0.0%	7.1%	0.0%	7.4%	4.3%
Neutral	35.7%	33.3%	9.1%	21.4%	14.3 %	40.7%	11.7%
Poor	13.3%	33.3%	18.2%	7.1%	14.3 %	7.4%	28.7%
Bad	53.3%	22.2%	72.7%	64.3%	71.4 %	44.4%	55.3%
Total points	15	9	22	14	7	27	94

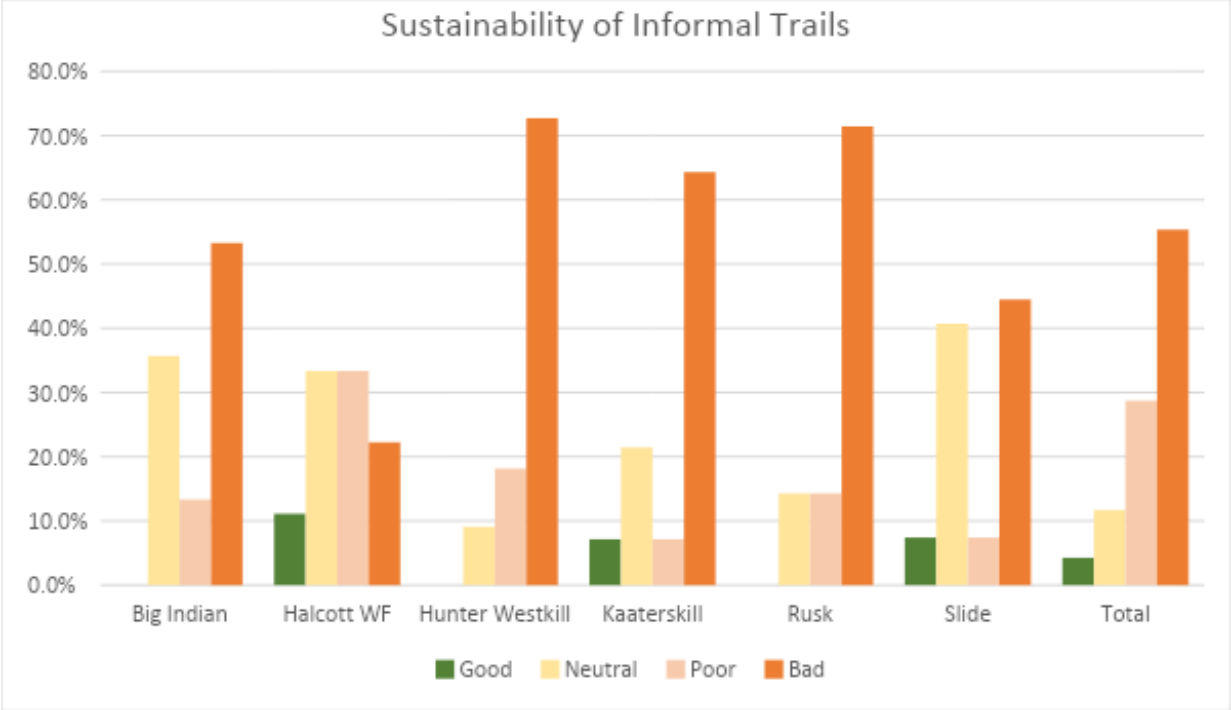


Figure 7: Table and chart of trail sustainability found by Point Assessment Survey. Columns represent the percentage of point assessments found to be *Good, Neutral, Poor,* or *Bad* in each unit surveyed

Out of 94 total point assessments taken, 84% of those showed Poor or Bad trail sustainability based on our metrics. Rusk Wild Forest and Hunter-Westkill Wilderness had the least sustainable trails with over 70% being Bad in both cases. Halcott Wild Forest had the most sustainable trails with about 56% being Poor or Bad and 44% being Neutral or Good (Figure 7).

The condition class assessment stands for the degradation of the informal trail based on soil erosion, trail width, and organic matter damage such as crushed plant life and exposed roots. The worst trail degradation happens at Class 3 and above, when there begins to be significant root exposure and trails can be two feet wide or more. Only about 16% of the trails were classified as Class 3 or above with 42% being classified as Class 2 or above (Figure 8).

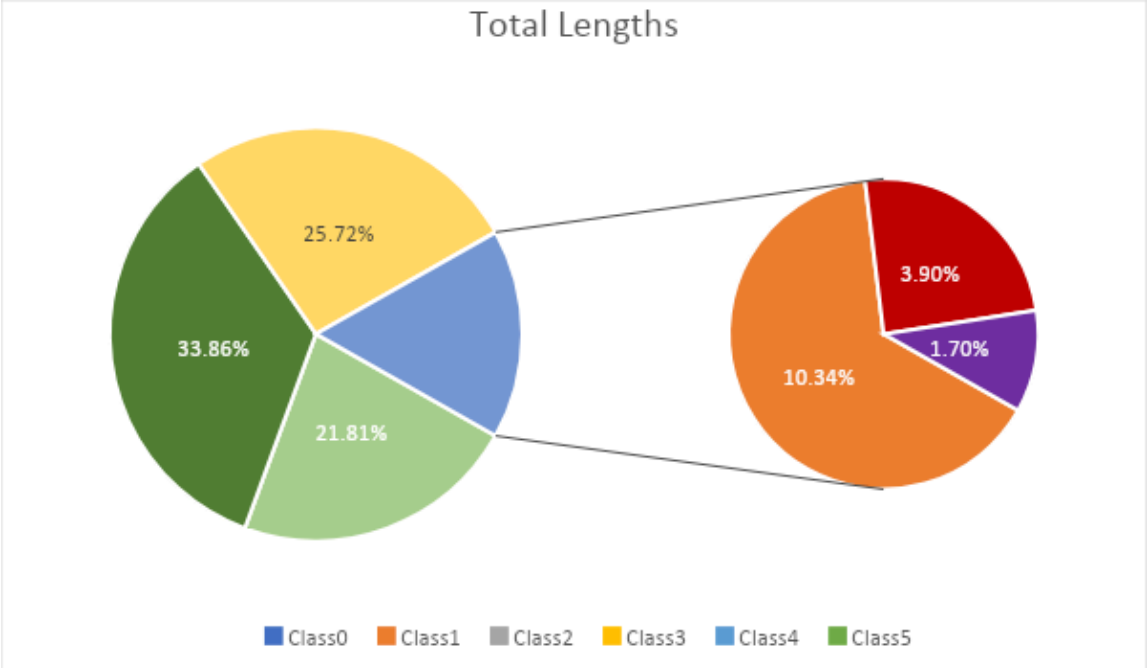


Figure 8: Total lengths of each condition class shown as percentage of total miles surveyed.

Discussion

There were minor issues in our data collection methods and challenges in collecting data over the course of the monitoring program. At first, in our point assessments, we had four categories for Trail Slope Alignment (TSA) based on Marion's (2017) study, but we found that it did not provide enough specificity on the TSA angle and that most of our trails fell into the first category of 0-22^{o} TSA. We created a six-category system that simply divided 90^{0} into six even categories (0-15^{o}, 16-30^{o}, etc.). Our six-category system, while it offered better specificity, did not capture the 22^{o} threshold that Marion found to be key in determining trail sustainability. Marion based his system on his findings of how TSA affected soil erosion and found that a trail with a TSA below 22^{0} was highly susceptible to soil erosion, and so included that threshold in his TSA categories (Marion, 2017). Our first two categories were 0-15^{0} and 16-30^{0}, and so were not able to represent this threshold. In the future, it may be better to go back to the four-category system to represent that threshold.

The point assessment and condition class data collection were successful in mapping the extent of IT networks on Catskill peaks, as well as the characteristics that make these trails unsustainable. Trail width, trail slope, and TSA were found to be unsuitable for modern trail building standards in 84% of point assessment surveys over all TSA's surveyed, indicating a dire need for management intervention. The methods of evaluation, adapted from previous studies (Marion, 2017, Lawson, 2021), proved to be successful and created a baseline evaluation procedure that can be used for future data collection.

The information collected since 2019 shows that there has been an increase in the number of informal trails that have been developed. Even when the trails themselves are not particularly incised or damaging, the braided nature of the trails can disturb large areas of sensitive vegetation at the peaks (Barros et al, 2017). In addition, the routes the trails take are generally fall line trails, which is typical of informal trails and unsustainable for long-term use. Using *Strava* heatmaps and *Alltrails* routes to find the ITs, and then using the point assessment and condition class systems to monitor and quantify the extent of the ITs, was successful in showing the growth of IT networks on trail-less high peaks since 2019.

The impact of rapidly proliferating ITs on rare flora and fauna is not well known, but due to the sensitive ecology of organisms that exist above 3500', there could be significant negative consequences if visitation continues to rise (Barros et al, 2017). There were several encounters with ruffed grouse mothers and their chicks during monitoring, as well as a sighting of a Bicknell's thrush, which is on the NY Endangered Species list. An area near South Doubletop has historic instances of Jacob's Ladder and other rare plants, which could be at risk of getting trampled if people begin visiting that area more frequently (New York Natural Heritage Program, 2022). Negative interactions between visitors and at-risk organisms like these will increase as

visitation to trailless peaks increases, creating a management issue that will need additional monitoring. Survey point assessments are a crucial part of the continued monitoring effort. If the DEC decides to create an official trail out of the informal trail route, then point assessments will be able to show which sections of the informal trail will be most sustainable and which sections should be rerouted or brushed in to discourage use.

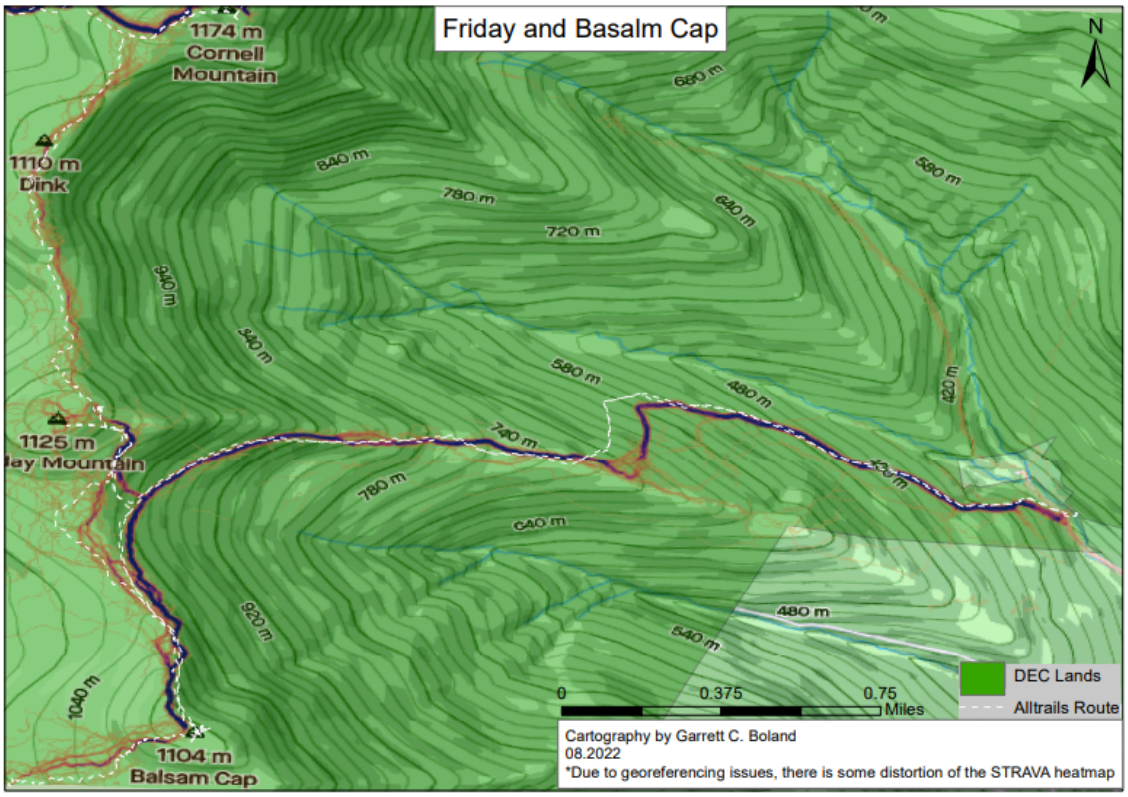
In future monitoring, there should be a method by which researchers are alerted every quarter mile to take a point assessment, as one of our struggles was keeping track of how far we walked by constantly checking a GPS device separate from the *Strava* map on the phone and the tablet. The point assessment dataset is also limited by how few points there are on shorter or less used informal paths, which do not give a complete picture of the trail. By taking point assessments more often, such as every .2 miles, there will be more points by which to create an exact assessment of trail sustainability.

Conclusion

The 2022 monitoring effort has found an extensive system of ITs across all the officially trail-less high peaks in the Catskills. This shows that using *Strava*, and potentially other novel data sources, can help land managers find and track informal trail development. The condition class and point assessment monitoring systems were accurate in showing the location and intensity of use that *Strava* heat maps showed, and we were able to quantify the data quickly and accurately using these systems. The point assessment system introduced in 2022 can show how ITs are inherently unsustainable due to their alignment and grade, which can be important in future management decisions concerning the creation of any future official trails along these routes.

The monitoring effort and the canister sign-in data has shown that there has been a significant increase in visitation to trail-less peaks over the past 5-10 years (New York DEC, 2021). The longevity of the trend indicates that regardless of short-term dips, the large visitation numbers seen in the Catskills are here to stay. Using 21st-century technology like smartphone apps to deal with a 21st-century problem is promising, but there is still much research that needs to be done to create a monitoring program that can be repeatable across New York. Working partnerships with app companies like *Strava* could be the next step for the DEC to access the data it needs to build the program and inform future monitoring decisions.

Acknowledgments



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into a cutting-edge yearly monitoring program. I can't thank her enough for giving me this wonderful opportunity! Thanks for a great summer!

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Appendix A

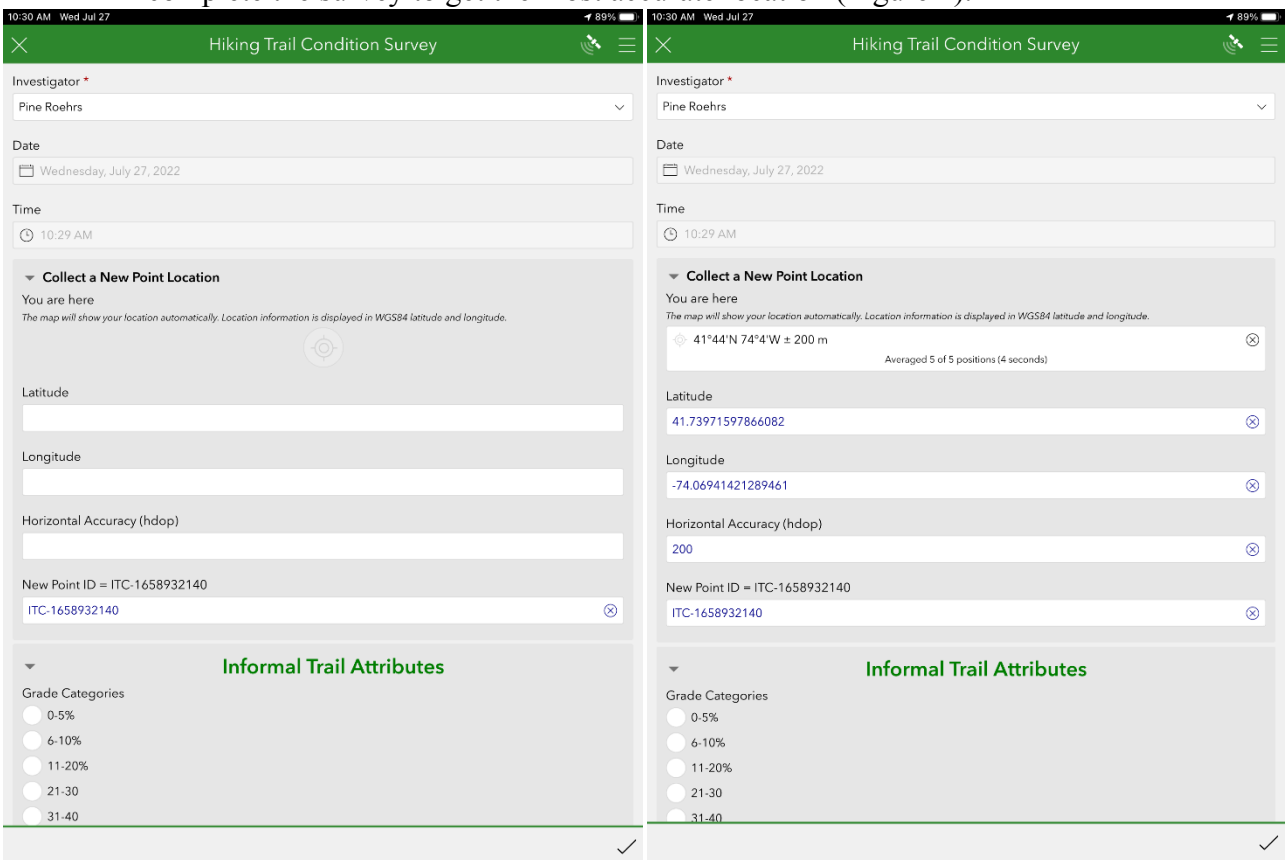
This appendix is the Survey123 Guidance Document created to guide the researchers and other New York DEC employees who may use Survey123 for similar purposes.

Trail monitoring method with Survey123

What follows are the methods used to conduct point assessments on informal trails in the Catskills in 2022 using Survey123. The methods used should be able to be duplicated on any DEC iPad with Survey123.

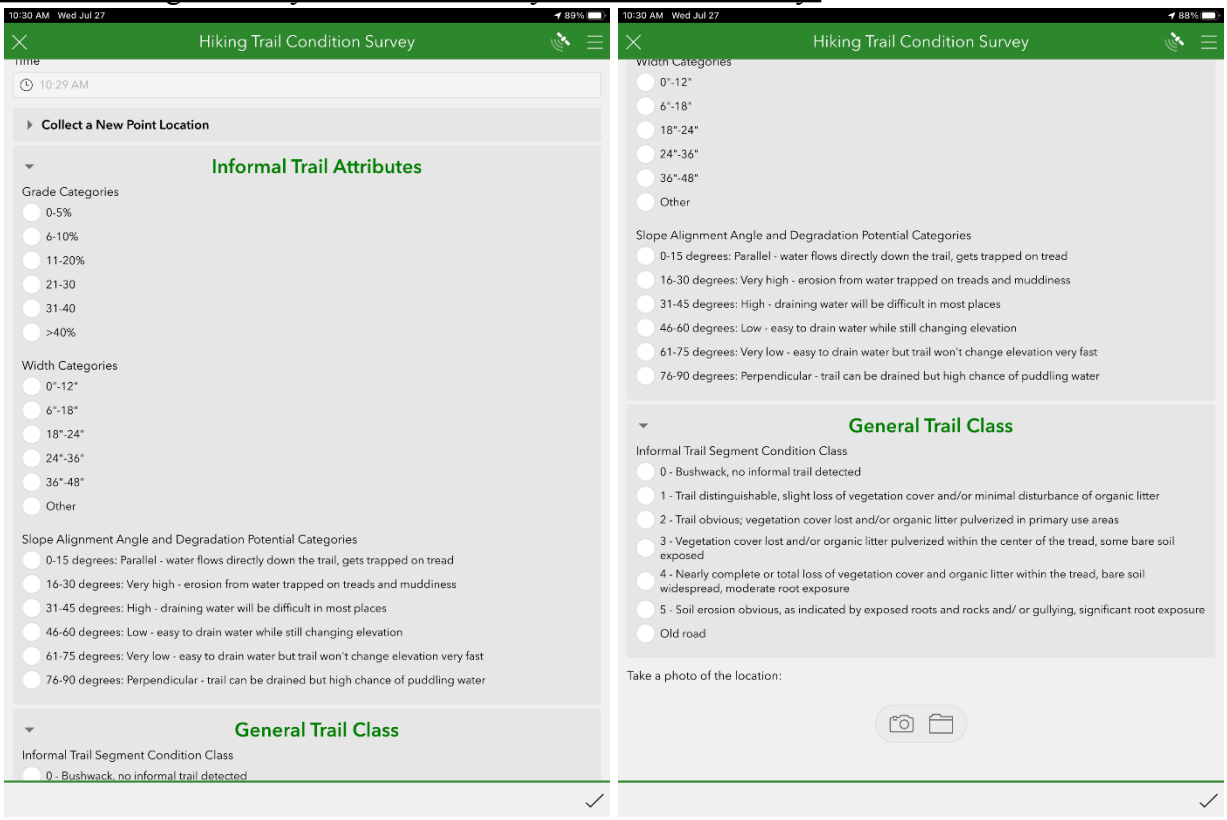
Tools: iPad, a large Ziplock bag and/or a stylus. It is useful to keep the iPad in a large clear bag to keep it dry when it's raining. Stick your hands into the bag to operate it rather than taking the iPad out of the bag. A stylus can also be used.

1) **Starting Survey123**
   - Unlock the iPad and open Survey123, then log in if not already using your DEC login credentials. This is done by selecting "enterprise" and entering in "nysdec", then using your DEC email and password. You should see your surveys on the opening page. Choose the one you would like to do, and then hit the "Collect" button at the bottom of the page.
   - Note: This document does not provide information on creating surveys, it is assumed the survey is already created.
2) **Conducting the survey:**
   - When you open the survey, you will see a drop-down menu at the top with a list of investigators; choose yourself.
   - The next drop down menu will allow you to collect coordinates; click the crosshairs on the far left to collect initial coordinates. The iPad will search for satellites for a moment and the crosshairs will pulse while it does (Figure 1). They will stop pulsing and display the coordinates when it has found them. Once the coordinates have been collected, click and hold the crosshairs until they begin pulsing again and collect more coordinates. Survey123 will average out all the coordinates it collects while you complete the survey to get the most accurate location (Figure 2).



- Note; sometimes the iPad won't be able to find enough satellites to get coordinates. Click the crosshairs to stop collecting, then hold the iPad as high as you can and click the crosshairs to try collecting again.

The following is what you will see when you collect the survey:



Condition Class Assessment for Informal Trails

Soil Loss Indicators

Informal Trail Grade Categories % (Multiple choice)

0-5%
6-10%
11-20%
>20%

Informal Trail Width (Multiple choice)*:

0"-12"
6'-18"
18"-24"
24"-36"
36"-48"
Other

**Forest Service Trail Fundamentals and Trail Management Objectives: Trail Design Parameters pg 49*

Informal Trail Slope Alignment* (multiple choice)

0-15 degrees	Parallel: water flows directly down tread, gets trapped on tread
16-30 degrees	Very high: muddiness and erosion from water trapped on tread
31-45 degrees	High: draining water difficult in most places
46-60 degrees	Low: easy to drain water while still changing elevation
61-75 degrees	Very Low: Easy to drain water but trail won't change elevation very fast
76-90 degrees	Perpendicular: trail can be drained but high chance of puddling

* Direct ascent trails with TSA values lower than 22 percent are particularly prone to soil loss due to the difficulty of draining water from incised treads- both slopes are often higher than the tread surface. Also see Note at end of document.

- Method for finding TSA:

1. Align compass north arrow parallel to hill slope, so that the compass is pointing up the fall line
2. Turn compass bezel until 0 degrees on bezel is in line with trail; the angle between 0 and the north arrow is the TSA

Marion, J- The Influence of Trail Layout on Appalachian Trail soil loss, widening and muddiness: Implications for Sustainable trail design and management. Journal of Environmental Management 2019

General Trail Class*

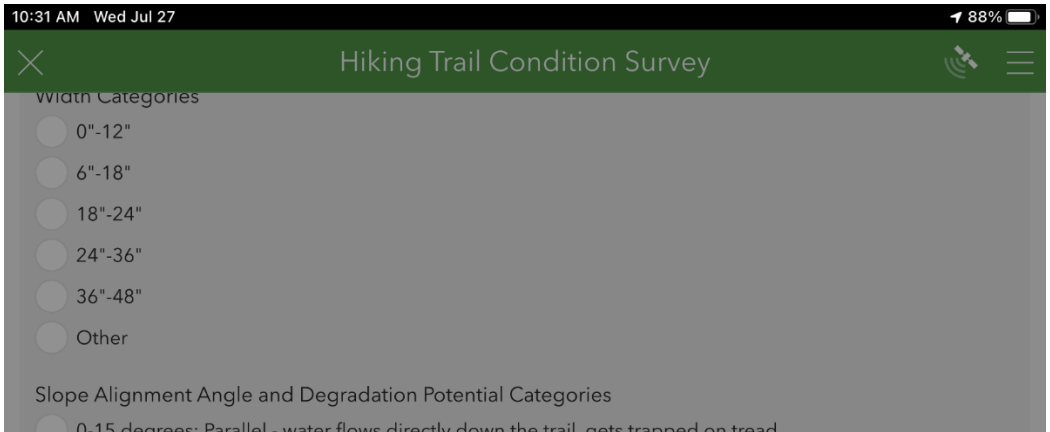
Informal trail segment condition class

0- Bushwack. No informal trail detected
1- Trail Distinguishable, slight loss of vegetation cover or disturbance of organic litter
2- Trail Obvious, vegetation cover lost and/or organic litter pulverized in primary use areas
3- Vegetation cover lost and/or organic matter pulverized continuously through center of tread, some bare soil exposed
4- Nearly complete or total loss of vegetation cover and organic litter within the tread, bare soil widespread, moderate root exposure
5- Soil erosion obvious, as indicated by exposed roots and rocks and/or gullying, significant root exposure

Old road- trail follows old road

*The 5-class method is different than the 3 class method used in 2019. A class 3 (2019) is between a class 2 and 3 in 2022, and a class 2 (2019) is more like a class 1.5 (2022)

3. Finishing and saving the survey



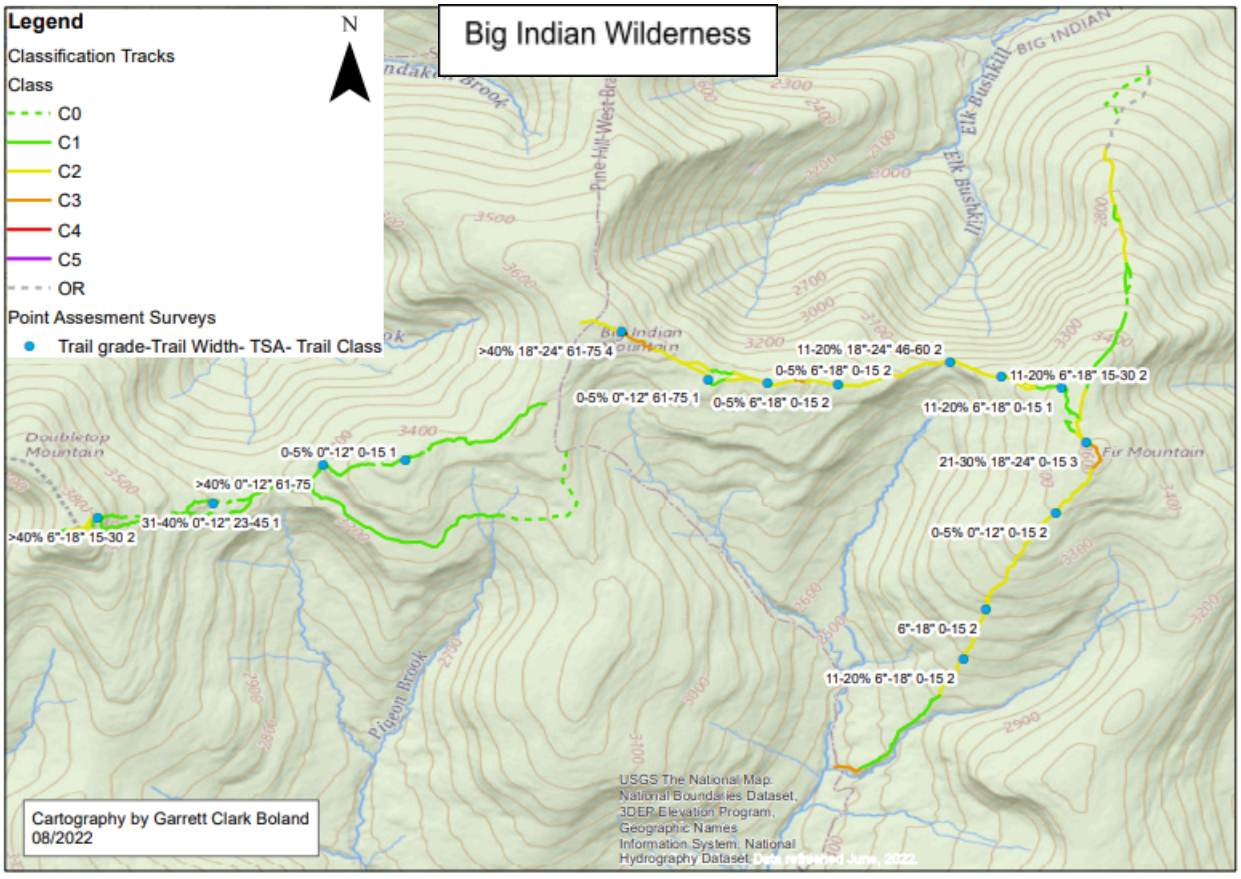
- Save the survey to the outbox when completed. All completed surveys will be stored in the Outbox in Survey123 on the iPad.
- When you have access to wifi, you can send the surveys to ArcGIS Online by going to the Outbox and following the prompts to log into AGOL so that the surveys can be sent to your AGOL account.
- From your AGOL account back on your desktop, go to “My Groups” and find your survey. From here, you can download a shapefile or File Geodatabase of the surveys for use in ArcMap

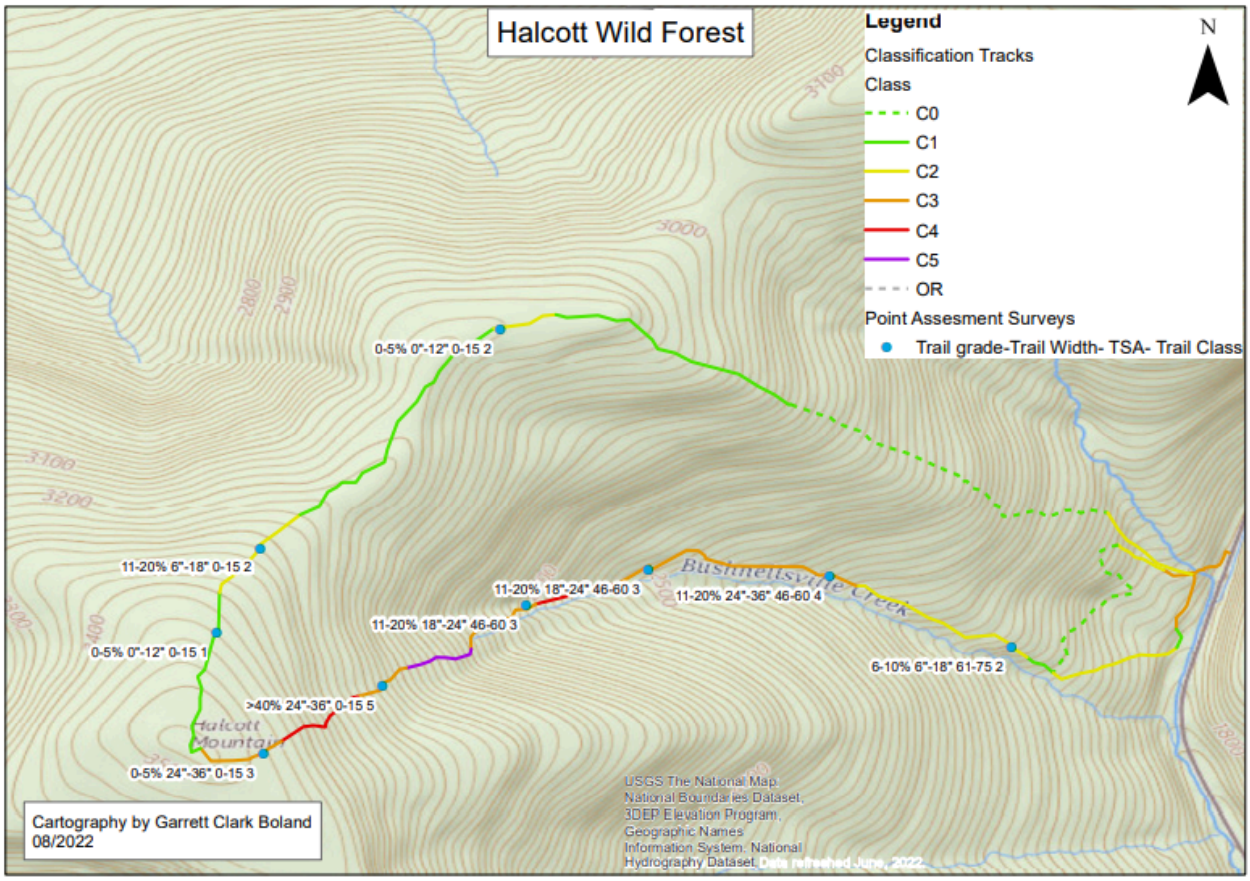
Notes

- The TSA values we originally used were directly from Marion (2020), which divided the TSA values into four categories from 0 to 90. This is because Marion found that direct ascent trails with a TSA lower than 22 degrees were especially inclined to erode and were hard to drain under any circumstance. By dividing the values into 6 categories, we do not take into account that 22 degree threshold Marion found. We divided the values into 6 because so many informal trails just went straight up the fall line, and we weren’t getting any real specificity of TSA angles because most of them were under 22 degrees. By dividing into 6 categories, we could capture TSA angles from 0-15 and 16-30, which provides a bit more detail, but again does not take into account the 22-degree threshold.

Appendix B

Appendix B contains maps of all survey points taken on *Survey123* during the 2022 field monitoring season as well as the classified routes. In the legend, OR stands for the Old Road Classification




Halcott Wild Forest
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
0-5% 0"-12" 0-15 2
11-20% 6"-18" 0-15 2
0-5% 0"-12" 0-15 1
11-20% 18"-24" 46-60 3
11-20% 18"-24" 46-60 3
11-20% 24"-36" 46-60 4
6-10% 6"-18" 61-75 2
>40% 24"-36" 0-15 5
0-5% 24"-36" 0-15 3
Bushnellsville Creek
Cartography by Garrett Clark Boland
08/2022
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Information System, National
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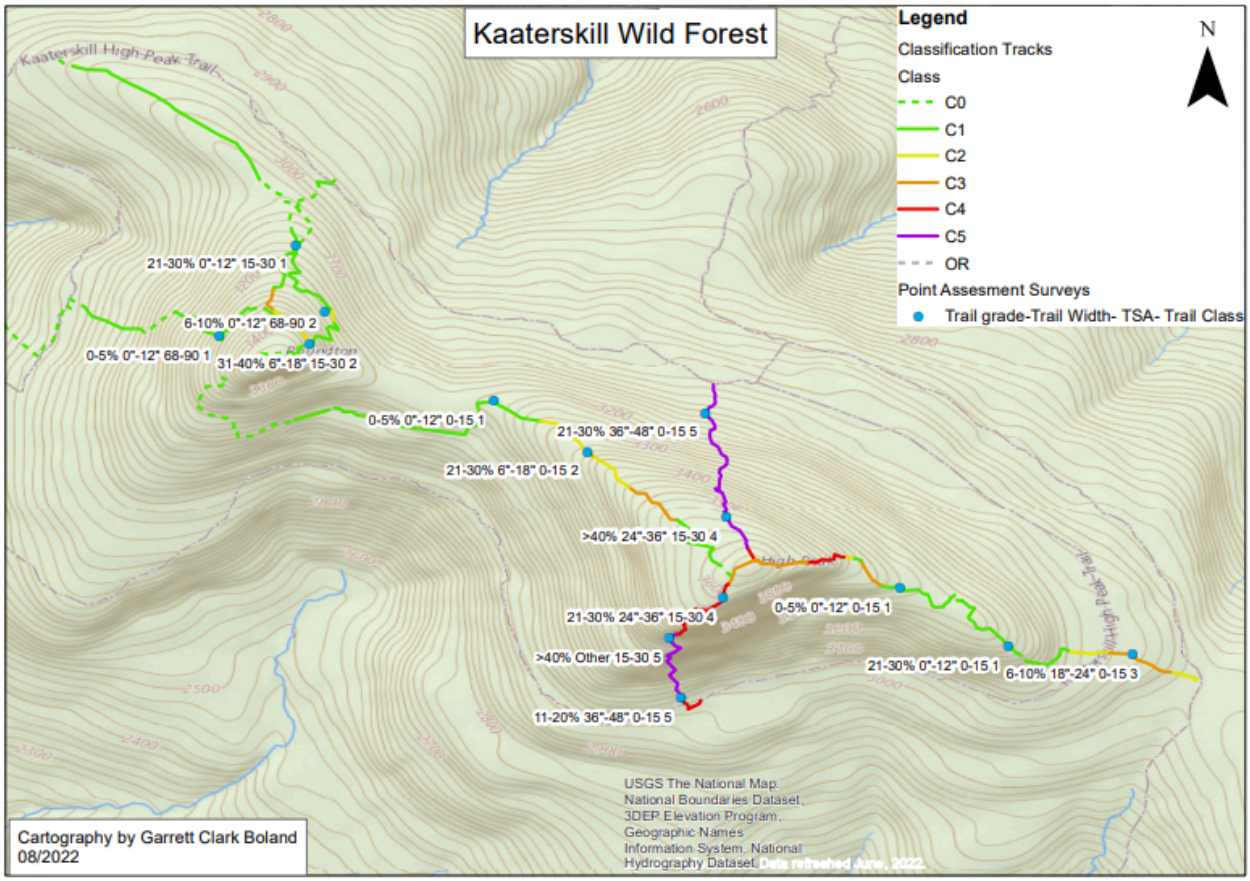
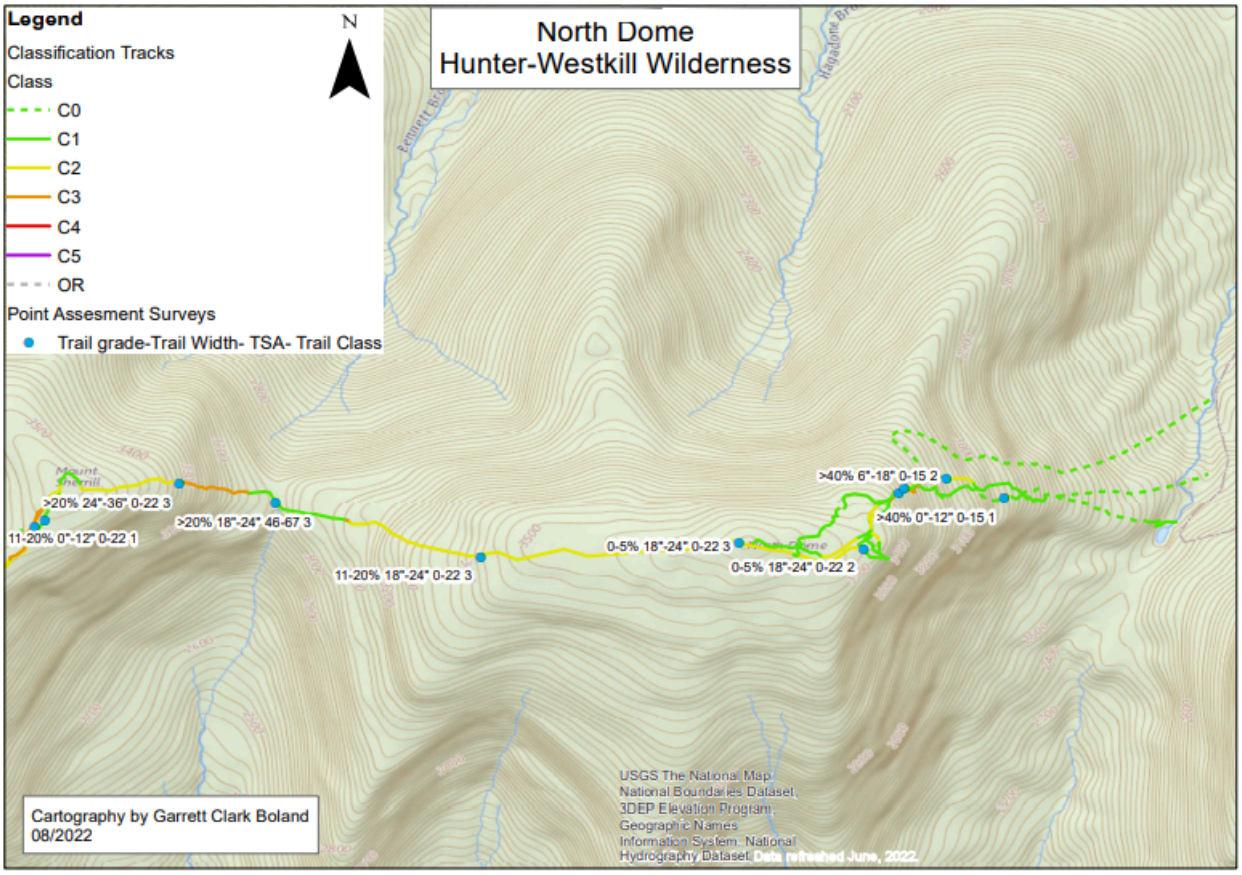
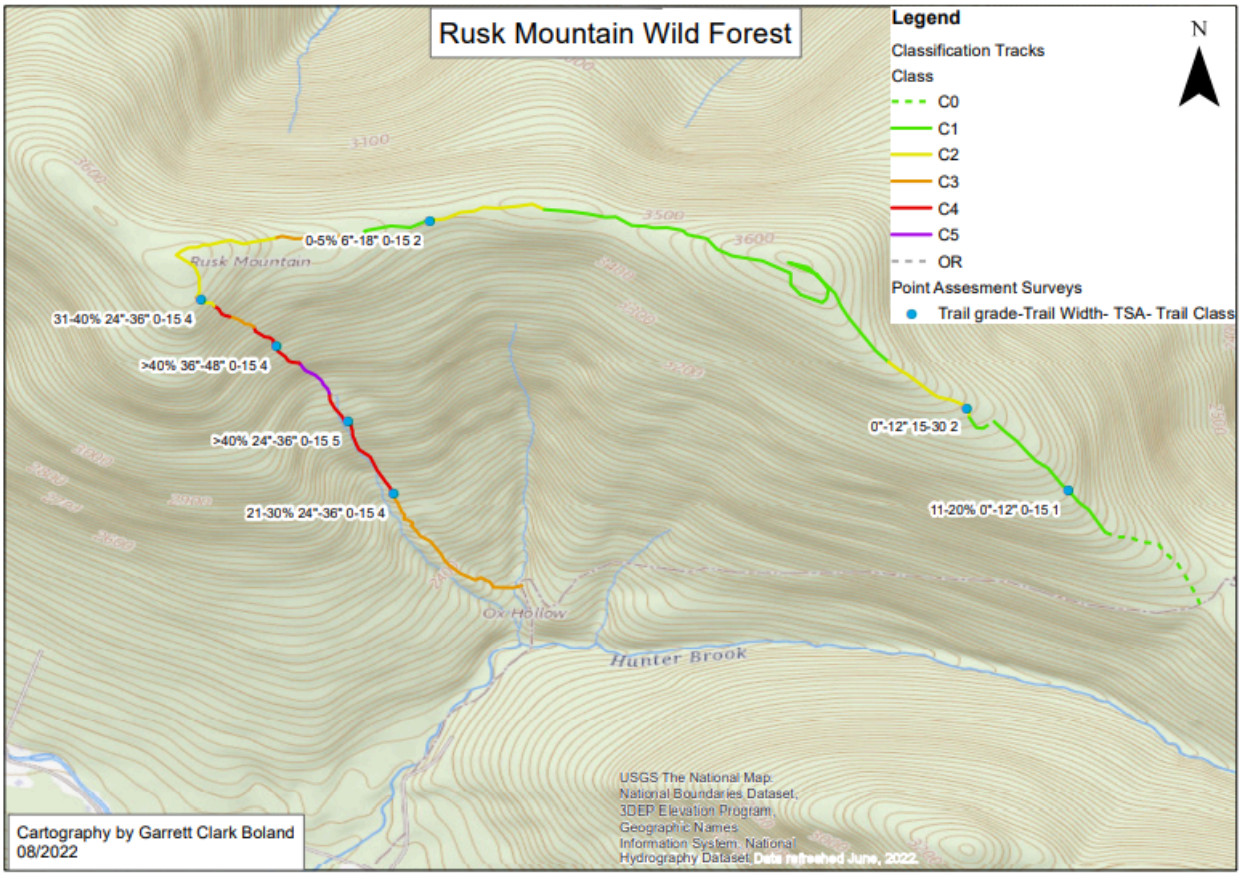

Kaaterskill Wild Forest
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
Kaaterskill High Peak Trail
21-30% 0"-12" 15-30 1
6-10% 0"-12" 68-90 2
0-5% 0"-12" 68-90 1
31-40% 6"-18" 15-30 2
0-5% 0"-12" 0-15 1
21-30% 36"-48" 0-15 5
21-30% 6"-18" 0-15 2
>40% 24"-36" 15-30 4
21-30% 24"-36" 15-30 4
0-5% 0"-12" 0-15 1
>40% Other 15-30 5
21-30% 0"-12" 0-15 1
6-10% 18"-24" 0-15 3
11-20% 36"-48" 0-15 5
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset. Data refreshed June, 2022.
Cartography by Garrett Clark Boland
08/2022


Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
North Dome
Hunter-Westkill Wilderness
>20% 24"-36" 0-22 3
>20% 18"-24" 46-67 3
11-20% 0"-12" 0-22 1
11-20% 18"-24" 0-22 3
0-5% 18"-24" 0-22 3
0-5% 18"-24" 0-22 2
>40% 6"-18" 0-15 2
>40% 0"-12" 0-15 1
Cartography by Garrett Clark Boland
08/2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset, Data refreshed June, 2022


Rusk Mountain Wild Forest
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
0-5% 6"-18" 0-15 2
Rusk Mountain
31-40% 24"-36" 0-15 4
>40% 36"-48" 0-15 4
>40% 24"-36" 0-15 5
21-30% 24"-36" 0-15 4
0"-12" 15-30 2
11-20% 0"-12" 0-15 1
Ox Hollow
Hunter Brook
Cartography by Garrett Clark Boland
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USGS The National Map:
National Boundaries Dataset,
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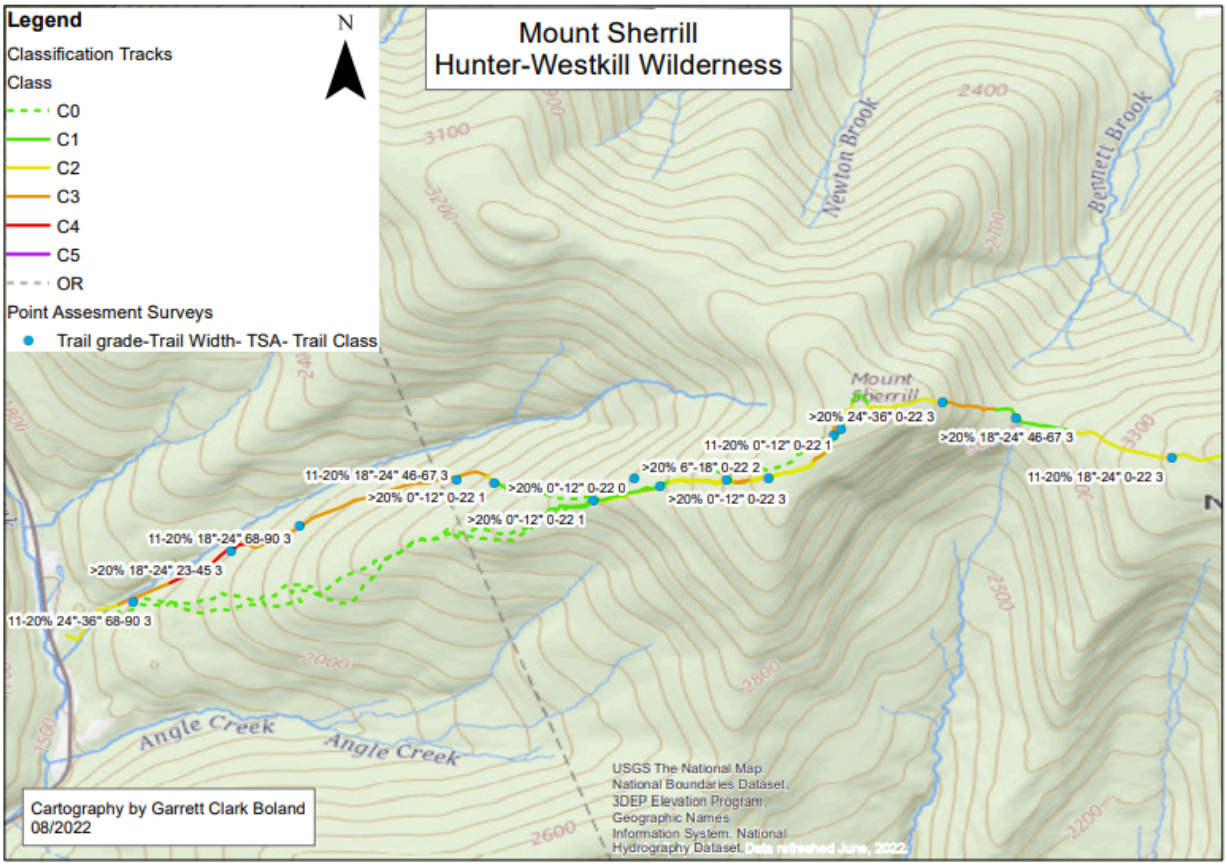
Geographic Names
Information System, National
Hydrography Dataset. Data refreshed June, 2022.


Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
Mount Sherrill
Hunter-Westkill Wilderness
Newton Brook
Bennett Brook
Mount Sherrill
>20% 24"-36" 0-22 3
>20% 18"-24" 46-67 3
11-20% 0"-12" 0-22 1
>20% 6"-18" 0-22 2
11-20% 18"-24" 0-22 3
11-20% 18"-24" 46-67 3
>20% 0"-12" 0-22 0
>20% 0"-12" 0-22 1
>20% 0"-12" 0-22 3
>20% 0"-12" 0-22 1
11-20% 18"-24" 68-90 3
>20% 18"-24" 23-45 3
11-20% 24"-36" 68-90 3
Angle Creek
Angle Creek
Cartography by Garrett Clark Boland
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USGS The National Map:
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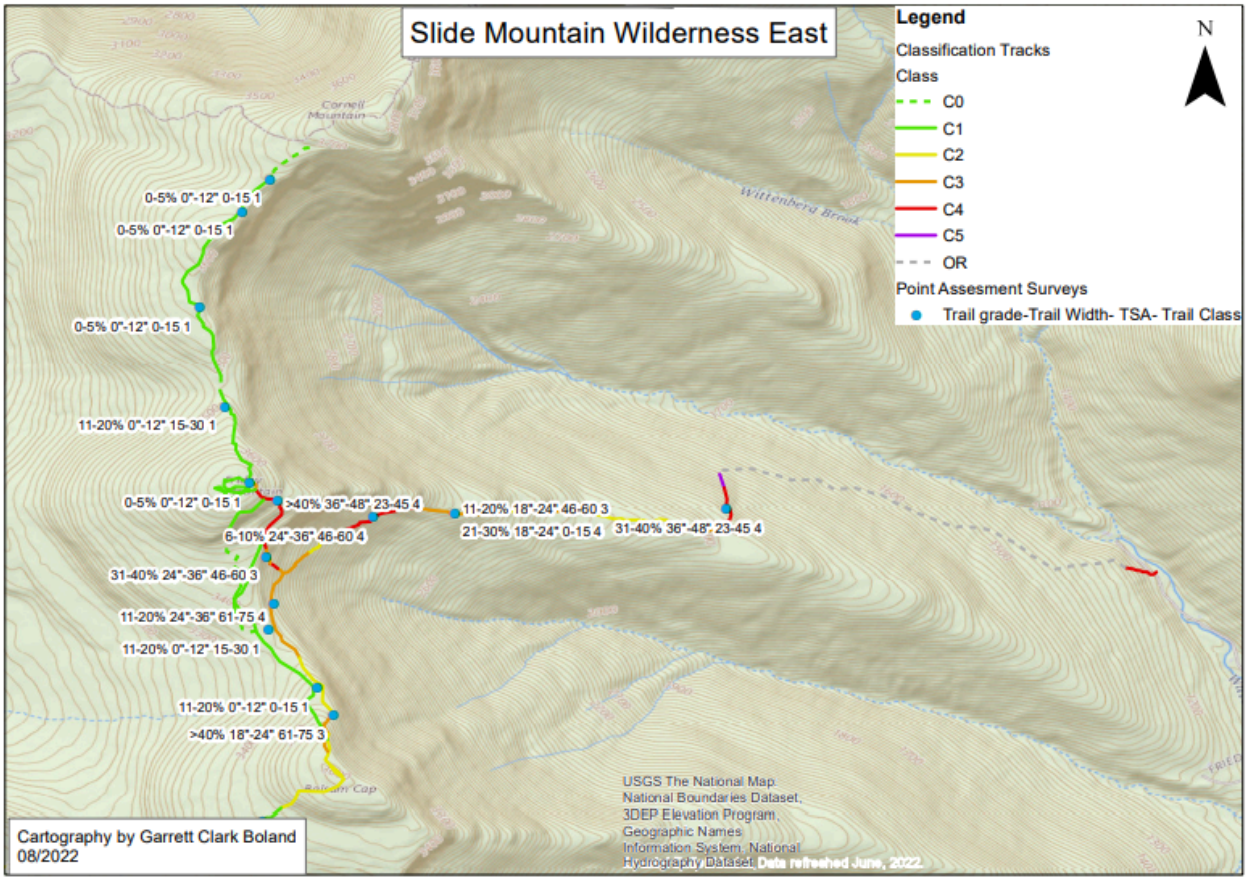
Information System, National
Hydrography Dataset, Data refreshed June, 2022


Slide Mountain Wilderness East
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
0-5% 0"-12" 0-15 1
0-5% 0"-12" 0-15 1
0-5% 0"-12" 0-15 1
11-20% 0"-12" 15-30 1
0-5% 0"-12" 0-15 1
>40% 36"-48" 23-45 4
11-20% 18"-24" 46-60 3
21-30% 18"-24" 0-15 4
31-40% 36"-48" 23-45 4
6-10% 24"-36" 46-60 4
31-40% 24"-36" 46-60 3
11-20% 24"-36" 61-75 4
11-20% 0"-12" 15-30 1
11-20% 0"-12" 0-15 1
>40% 18"-24" 61-75 3
Cornell Mountain
Wittenberg Brook
Balsam Cap
Cartography by Garrett Clark Boland
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USGS The National Map:
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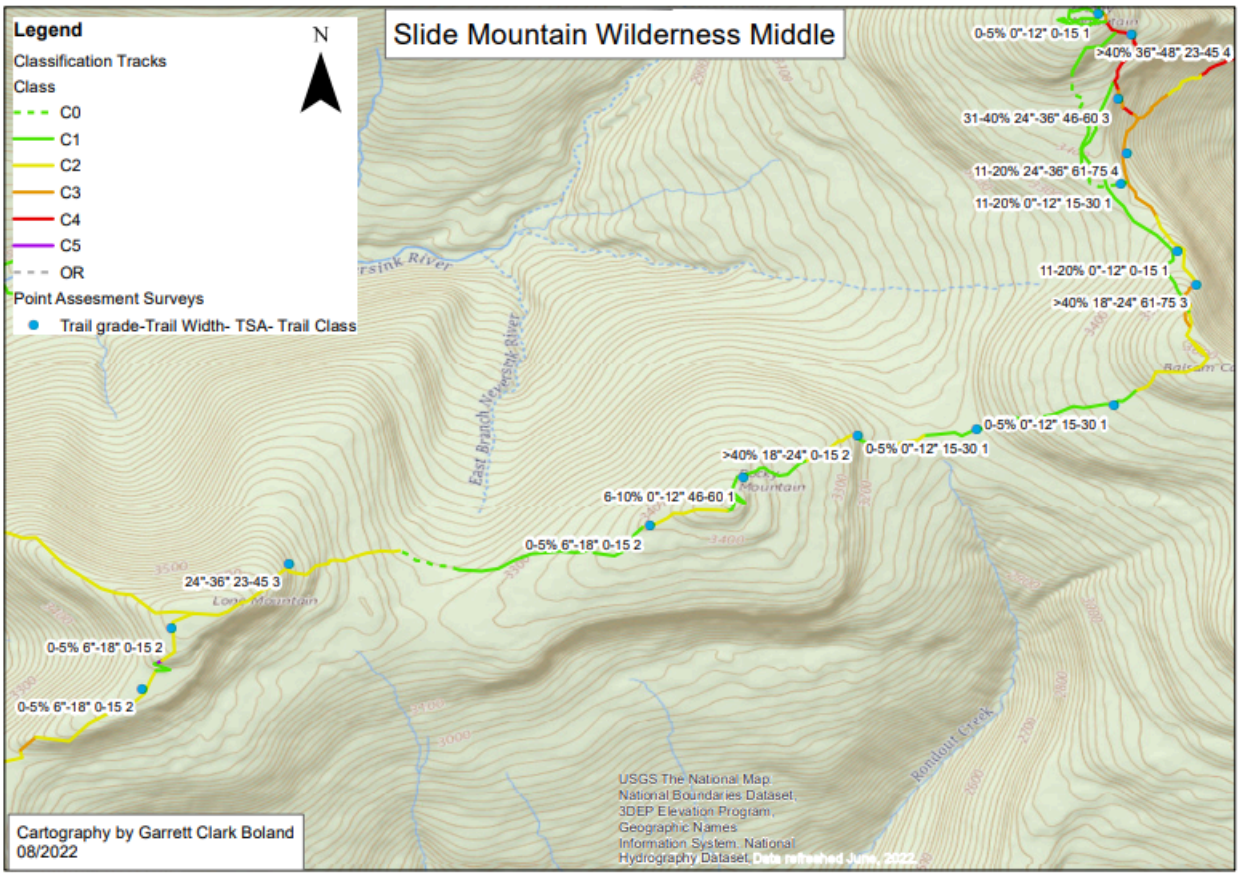
Geographic Names
Information System, National
Hydrography Dataset Data refreshed June, 2022


Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
Slide Mountain Wilderness Middle
0-5% 0"-12" 0-15 1
>40% 36"-48" 23-45 4
31-40% 24"-36" 46-60 3
11-20% 24"-36" 61-75 4
11-20% 0"-12" 15-30 1
11-20% 0"-12" 0-15 1
>40% 18"-24" 61-75 3
0-5% 0"-12" 15-30 1
0-5% 0"-12" 15-30 1
>40% 18"-24" 0-15 2
6-10% 0"-12" 46-60 1
0-5% 6"-18" 0-15 2
24"-36" 23-45 3
0-5% 6"-18" 0-15 2
0-5% 6"-18" 0-15 2
East Branch Neversink River
Lone Mountain
Slide Mountain
Rondout Creek
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset, Data refreshed June, 2022.
Cartography by Garrett Clark Boland
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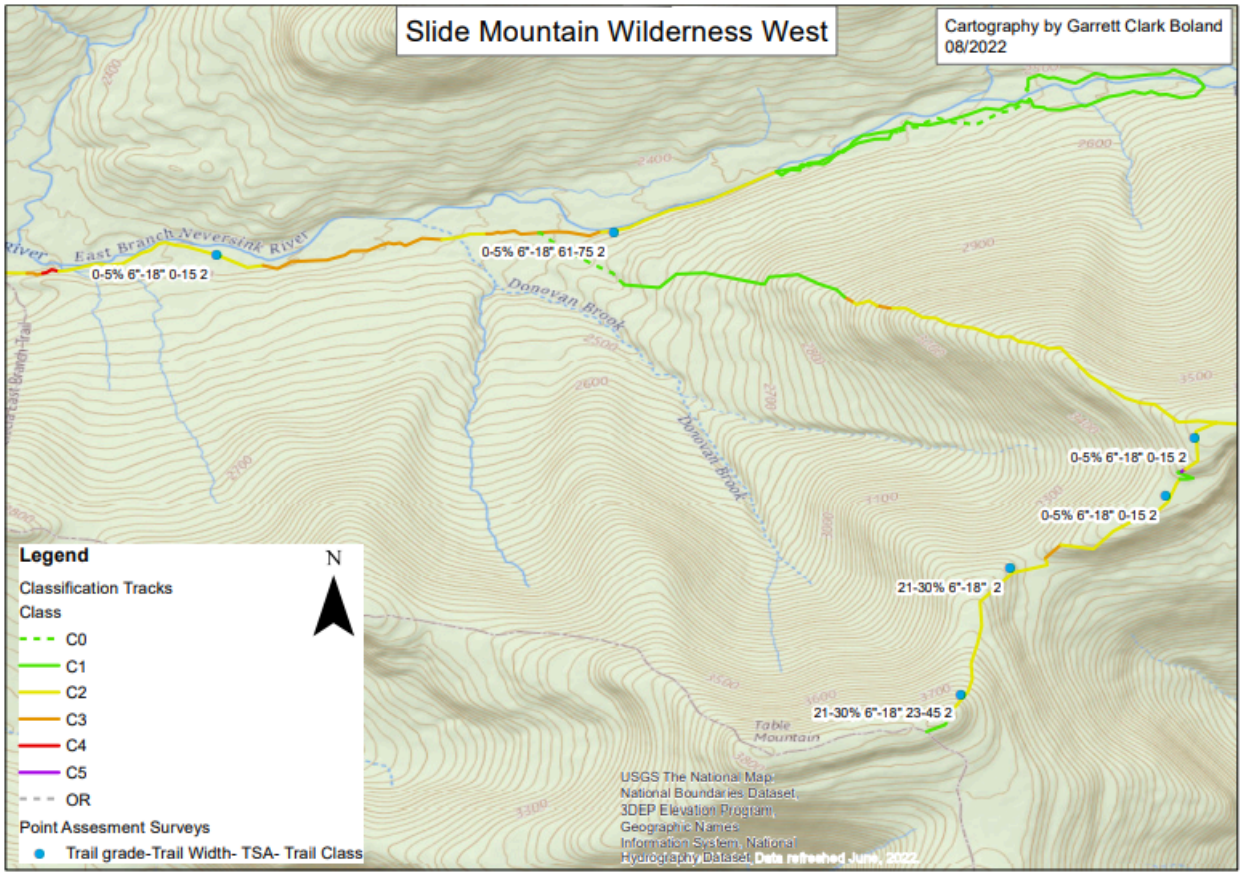
Slide Mountain Wilderness West
Cartography by Garrett Clark Boland
08/2022
East Branch Neversink River
Donovan Brook
Table Mountain
0-5% 6"-18" 0-15 2
0-5% 6"-18" 61-75 2
0-5% 6"-18" 0-15 2
0-5% 6"-18" 0-15 2
21-30% 6"-18" 2
21-30% 6"-18" 23-45 2
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset, Data refreshed June, 2022