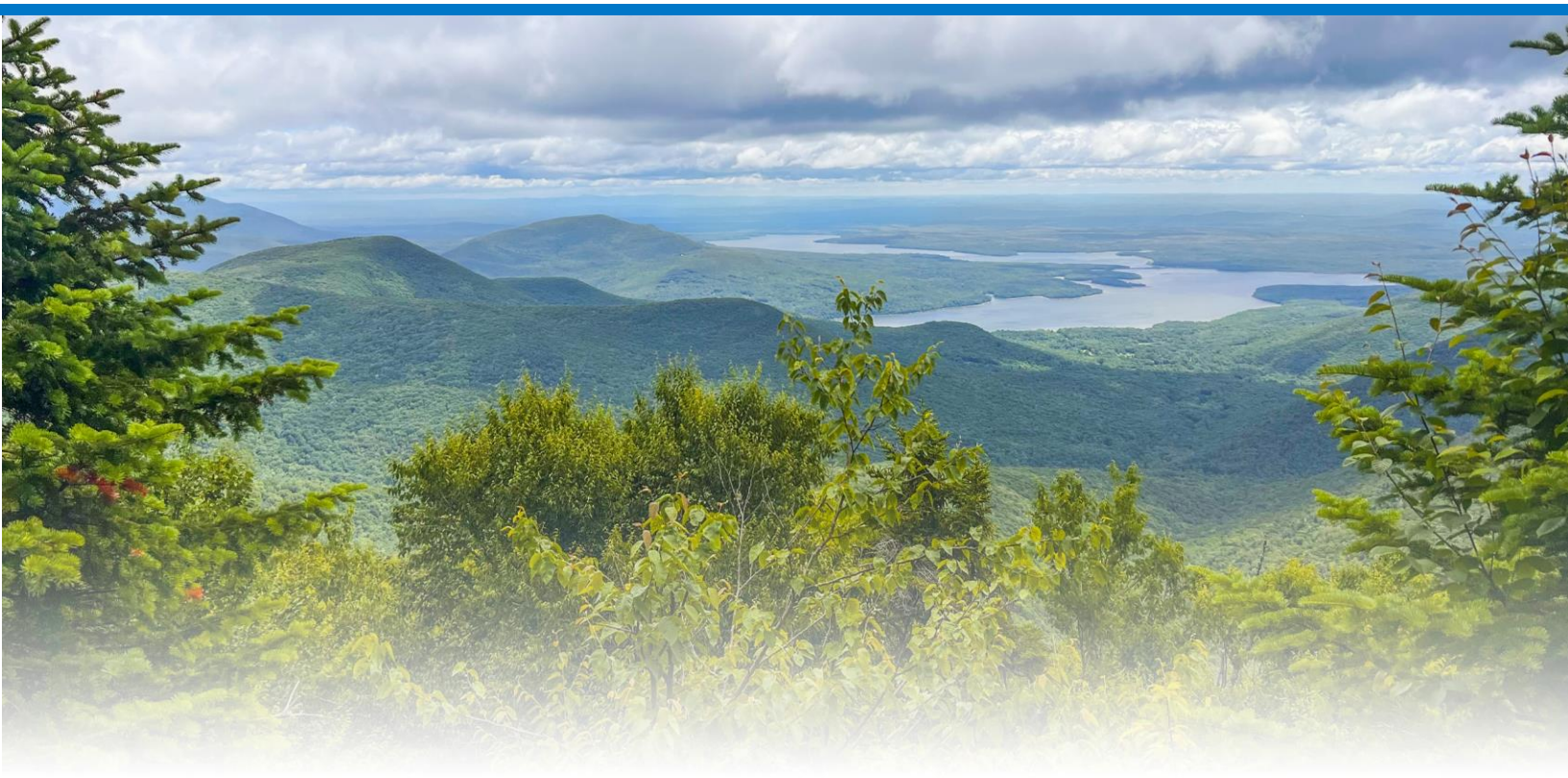
NEW YORK STATE | Department of Environmental Conservation

FORMERLY TRAILLESS CATSKILL HIGH PEAKS

Draft Visitor Use Management Plan



NYS DEC, DIVISION OF LANDS AND FORESTS

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www.dec.ny.gov **July 2025**

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“The unifying theme of this classification system is that the protection and preservation of natural resources of the Catskill Forest Preserve will be paramount. Human use and enjoyment of these lands should be permitted and encouraged, so long as the resources in their physical and biological context and their social or psychological aspects are not degraded beyond a limit of acceptable change.”

from page 11, Catskill Park State Land Master Plan

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Contents

Executive Summary

The New York State Department of Environmental Conservation (DEC) developed this draft Visitor Use Management (VUM) Plan pursuant to, and consistent with, relevant provisions of the New York State Constitution, Environmental Conservation Law (ECL) and its implementing regulations, Executive Law, the Catskill Park State Land Master Plan (CPSLMP), the Strategic Plan for State Forest Management (SPSFM), DEC policies and procedures and the State Environmental Quality Review Act (SEQRA).

The purpose of this draft VUM plan is to protect state owned lands within the study area classified as Forest Preserve as directed by Article XIV of the New York State Constitution consistent with the CPSLMP, and to manage the Bearpen Mountain State Forest as directed by the SPSFM. The study area includes sixteen Catskill Mountains over 3,500 feet in elevation where no marked or maintained official DEC trails are present. The lands within the study area contain varied topography, including steep terrain and mountain summits, which continue to attract increasing numbers of hikers seeking remote, backcountry outdoor recreation experiences. Due to significant public use of the lands within the study area, an unsustainable number of visitor-created informal trails have developed over time. These unauthorized trails have impacts on the unique resource and the high elevation spruce-fir forest habitat. Monitoring efforts indicate that substantial increases in visitation to these areas is leading to the rapid expansion of informal trail networks. The rapid expansion of such networks is resulting in diminished social, experiential, and ecological conditions.

DEC began conducting natural resource assessments in the study area in 2019. Since that time, DEC staff documented over 83 miles of informal trails leading to the formerly trailless peaks. The impacts associated with the informal trails are occurring across multiple planning units. The unfettered expansion and use of these informal trails is unsustainable and will result in long-term and potentially irreversible damage to natural resources, sensitive species, and unique habitats. Given the urgency of this issue and the increasing severity of natural resource impacts occurring at this time, it is not practical to prepare individual Unit Management Plans (UMPs) and amendments for each of the six management units within the study area. In lieu of preparing individual UMPs, this VUM plan is consistent with the CPSLMP (page 33) and will serve as a mechanism to address the adverse impacts associated with informal, visitor-created trails across multiple planning units within the Catskill Park.

The purpose of the Formerly Trailless Catskill Peaks VUM plan is to identify and implement management actions that will safeguard the natural resources while also offering visitors excellent experiential opportunities to use and enjoy the park safely, sustainably, and responsibly. This VUM plan’s objectives are to:

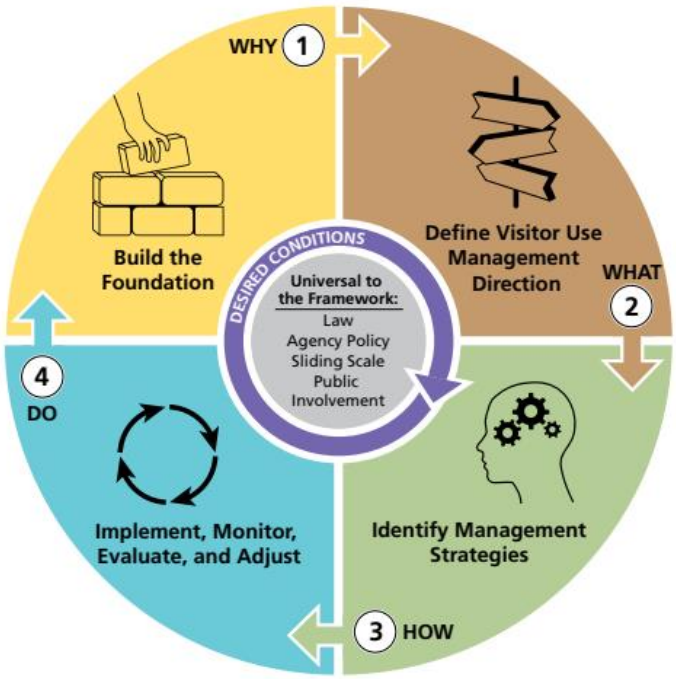
- Address visitor-created impacts to natural resources resulting from informal trails.
- Quantify the level of forest fragmentation that has occurred due to informal trails.
- Establish desired condition statements that communicate a clear vision for the future condition for the lands covered by this plan.
- Delineate management zones that reflect differences in landscape characteristics, visitor related impacts and ecological sensitivity.
- Identify indicator(s) and thresholds that are responsive to change as a function of visitor use management actions.
- Compare and document the differences between existing and desired conditions.
- Identify visitor use management strategies and actions to achieve desired conditions.
- Develop a monitoring strategy that is both administratively and financially feasible for long term monitoring.

This VUM plan provides direction for achieving the best possible physical, biological, and social conditions that align with long-term stewardship and management objectives. The plan also provides a long-term, adaptive framework for managers to use when implementing the plan to ensure quality visitor use experiences and protection of natural resources.

Organization of the Plan

This VUM plan is organized into six sections. The content of each section is briefly summarized below. This plan was developed consistent with the guidance outlined by the Interagency Visitor Use Management Council (IVUMC) https://visitorusemanagement.nps.gov/.

Figure 1. Overview of the planning process for the Visitor Use Management Framework



I. Introduction

The purpose and need for this project are outlined in Section I along with information on the Federal Inter-Agency Visitor Use Management Council's (IVUMC) VUM framework and important terms related to this planning process. The applicable law and agency policies that direct the management of lands within the study area are introduced and described along with the management mandates for the different land classifications. Section I also explains how this VUM plan addresses multiple recommendations from the 2022 Catskill Advisory Group (CAG) Report.[1] The CAG report was developed by the advisory group and provides recommendations to DEC on how to balance critical issues associated with increased public use in the Catskill Park to protect the area's natural resources for future generations.

Section I includes an analysis of monthly and annual canister sign-in data to provide context as to how visitation to these peaks has changed over time. A detailed summary

[1] 2022 Catskill Advisory Group Report: https://extapps.dec.ny.gov/docs/lands_forests_pdf/cagfinalreport.pdf

of the public involvement and engagement strategy, including survey-based insights from visitor experience surveys administered in 2022 and 2023[2] are included. These survey results provide DEC with critical information about visitor support or opposition to potential management actions and other important visitor insights. Lastly, Section I introduces new messaging strategies intended to encourage people to recreate responsibly in the study area.

II. Building the Foundation

Section II addresses Element I of the VUM framework: Build the Foundation. Section II articulates the opportunities and challenges related to visitor use that need to be addressed on the formerly trailless peaks. The section begins with an explanation of the impacts created by informal trails and is followed by a summary of the field reports and findings collected during monitoring in 2019 and 2021. The informal trail assessment method used to document the natural resource conditions on informal trails over the course of this project is also included and described. Section II provides an overview of the 2022 New York Natural Heritage Program (NYNHP) report "Effects of Informal Trail Use on Natural Communities in the Catskill Park" and introduces key ecological considerations within the project area. In 1999, several of the formerly trailless peaks were dedicated as "Bird Conservation Areas" because they are "diverse species concentration sites" for montane birds. This section describes how informal trails and increased visitation are affecting montane birds along with first and old growth forests. The bird species and ecological communities that exist on the formerly trailless peaks are considered globally significant and ecologically unique natural resource values. Information on several neotropical, ground-nesting bird species is provided along with a description of the monitoring program that was designed to track the distribution and abundance of those bird species in the study area. The data collected during monitoring is used to formulate data-driven and scientifically based management recommendations for these species.

III. Visitor Use Management Direction

Defining a clear direction for managing visitor use prevents incremental or uncoordinated change, provides a clear link for future management actions, and articulates and communicates a positive vision for the future. Section III addresses Element II of the VUM framework: Define Visitor Use Management Direction. A core objective for the lands within the study area is to sustain opportunities for visitation while reducing the overall extent and severity of visitor related impacts to natural resources resulting from informal trails.

[2] Responses to public comments on the project and complete visitor experience survey responses from the 2022 and 2023 surveys can be found in Appendix B, and C

Section III includes the desired condition statements for visitor experiences and natural resource conditions in the study area. Desired condition statements differ from management actions in that they focus on what to achieve in the future, rather than how to achieve an outcome at the present time. The desired condition statements for these lands were developed using input from multiple stakeholder perspectives, DEC staff and the public. The desired condition statements developed for this plan are organized by management zone. The purpose of management zone delineation is to allow land managers to customize the intensity of the management response based on the level of vulnerability of certain natural resources and the intensity of visitor related impacts. Indicators and thresholds are introduced and described in Section III. Lastly, recreational activities that align with the basic guidelines applicable to the Forest Preserve and State Forest land classifications are listed along with those recreational activities that are out of alignment with the stated purpose of each land classification.

IV. Management Strategies & Actions

Section IV addresses Element 3 of the VUM framework: Identify Management Strategies. Element 3 aims to provide an answer to the following question: how will visitor use be managed to reach or maintain desired conditions? Section IV compares and documents the differences between existing and desired conditions on the formerly trailless peaks and identifies visitor use management actions that are necessary to achieve the desired conditions for the lands within the study area. The proposed management actions outlined in this section were developed by consulting the New York Natural Heritage Program (NYNHP) biological inventory findings, STRAVA heat maps depicting visitation patterns, and ortho-imagery of high elevation spruce-fir forest occurrences. These data sources were used to develop management actions and strategies intended to influence visitor use patterns on the formerly trailless peaks to achieve desired conditions.

V. Implementation, Monitoring and Adaptive Management

An effective monitoring strategy is critical to the implementation of the VUM framework as it provides essential information to land managers. Section V addresses Element 4 of the VUM framework: Implement, Monitor, Evaluate and Adjust. Routine monitoring is critical to determining whether management actions taken to protect natural resources are effective or if they need to be modified or adjusted. Well-planned monitoring strategies are operationally feasible, financially viable over an extended period, and use data collection protocols that are easily replicable. Section V describes the monitoring program elements that will support the implementation of this VUM plan. Section V also outlines a road map for measuring the effectiveness of the management actions into the future.

VI. Appendix

The appendix contains the complete responses to the 2022 and 2023 Visitor Experience Survey Results as well as Leave No Trace Principles information, NYNHP Classification definitions, informal trail condition class maps from the 2022 field work, complete descriptive statistics tables developed during the forest fragmentation analysis, mapping methodology information and the VUM sliding scale of analysis table. In addition, this appendix also includes the public comment responsiveness document created to address comments that were received between July of 2022 and September 2024 as well as the informal trail assessment protocols and condition class information.

A. What the Plan Does Not Do

The proposed management actions identified in this plan are confined to the state-owned Forest Preserve lands within the study area within the Catskill Park Blue Line and additional lands within the Bearpen Mountain State Forest, located just outside of the Catskill Park Blue Line boundary. Activities on adjacent State lands or private property outside of the study area boundary are beyond the scope of this document but may be discussed as they relate to uses and impacts within the study area. In addition, this draft VUM plan cannot amend Article XIV, Section 1 of the New York State Constitution or conflict with any statutory mandates or existing DEC policies. All management proposals and actions contained within this draft plan must conform to the guidelines and criteria set forth in the CPSLMP and the SPSFM.

B. State Environmental Quality Review Act

The State Environmental Quality Review Act of 1975 (SEQRA) requires that all agencies determine whether the actions they undertake may have significant impact on the environment. Any development within the units identified within the study area and presented in this draft VUM plan must take into consideration environmental factors to ensure that such development does not have a significant negative impact on the environment. The overall intent of this draft VUM plan is to identify mitigating measures to avoid or minimize significant adverse impacts to the natural resources of the State lands within the study area. Any reconstruction or development within the confines of the study area will take environmental factors into account to ensure that such development does not degrade the resource. The recommendations presented in this draft VUM plan are subject to the requirements of SEQRA. All proposed management activities, including alternatives, will be reviewed and assessed in accordance with SEQRA.

SEQRA requires the consideration of environmental factors early in the planning stages of any proposed action(s) that are undertaken, funded, or approved by a local, regional, or State agency. A Long Environmental Assessment Form (LEAF) is used to identify

and analyze relevant areas of environmental concern based upon the management actions proposed in the Forest Preserve portion of this draft VUM plan.

The Strategic Plan for State Forest Management (SPSFM) serves as the Generic Environmental Impact Statement (GEIS) regarding management activity on Bearpen Mountain State Forest. The SPSFM establishes SEQRA analysis thresholds for each category of management activity. Furthermore, the SPSFM establishes the environmental impact thresholds that if exceeded would trigger future SEQRA reviews of proposed management activities requiring a more detailed or site-specific assessment of potential impacts. None of the management activities proposed in this VUM plan exceed specific thresholds established in the SPSFM. Therefore, additional SEQRA review is not required for the Bearpen Mountain State Forest portion of this plan.

Recognizing the SEQRA provisions within the SPSFM, SEQRA review for this VUM plan as a single “action” has been initiated with the preparation of the LEAF. Upon review of the information contained in the LEAF, DEC has determined that there will not be any significant impacts on the environment resulting from implementation of this draft plan and therefore, a Negative Declaration has been prepared. If public comments suggest that significant changes to this draft plan are necessary, the determination of potential environmental impacts will be re-evaluated.

1. No-Action Alternative

The “no-action” alternative of not developing a VUM plan is not an option. DEC staff have confirmed that there are extensive, visitor-created informal trails on every formerly trailless Catskill peak over 3,500’. Although these peaks do not contain any officially designated trails, the presence of the extensive networks of visitor created informal trails has resulted in significant impacts to these formerly trailless areas. Based on the extent of current impacts of the informal trails, these peaks can no longer be considered trailless and require management intervention. Over the past six years, DEC staff have documented a rapid rate of change in the distribution and condition of the informal trail networks on the formerly trailless peaks. Monitoring results indicate that the visitation occurring in the formerly trailless areas is occurring at unsustainable levels that will lead to long-term damage without management interventions.

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I. Introduction

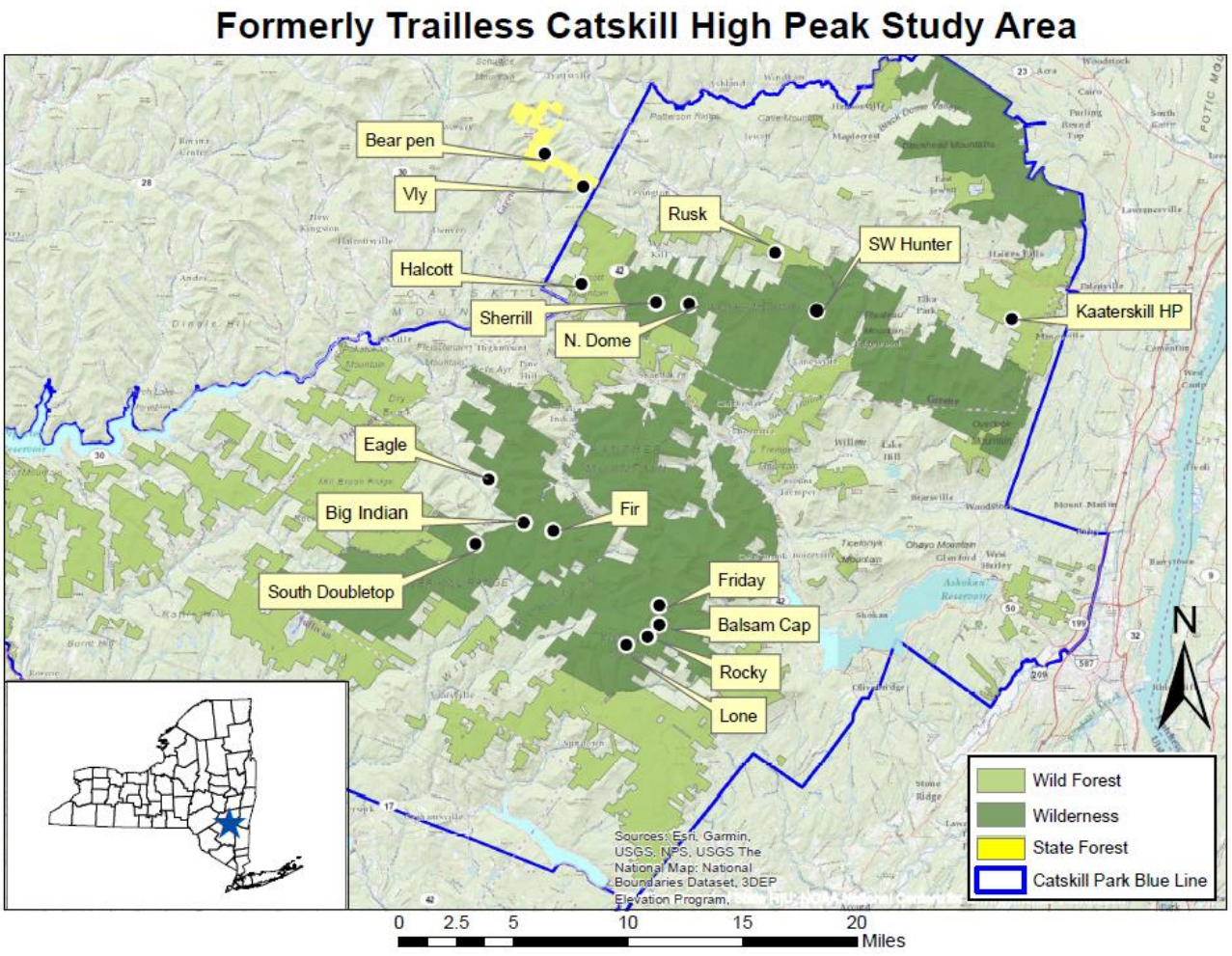


Figure 2. Formerly Trailless Catskill High Peak Study Area

A. Purpose and Need

The Catskill Park encompasses an area of 705,500 acres of public and private lands in the southeast portion of New York State within the counties of Ulster, Sullivan, Green and Delaware. The boundaries of the Catskill Park are defined by the Catskill Park Blue Line. The land within the Blue Line is 41% State under the jurisdiction of DEC Catskill Forest Preserve, 53% privately owned, and 6% NYC-owned under the jurisdiction of the NYC Department of Environmental Protection. Within the Catskill Forest Preserve there are 98 mountain peaks that are over 3,000' feet in elevation. In addition, there are 35 peaks above 3,500' located on land classified as wilderness, wild forest, state forest and

private land. Two peaks, Doubletop and Graham, are on private land and were officially closed to the public in January 2021. A unifying theme of the CPSLMP and individual UMPs is the goal of striking a balance between resource protection and recreational use of the Catskill Forest Preserve. Visitation to the trailless peaks has been increasing yearly, with over 77,607 people signing in at canisters from 2020 to 2024. Increased visitation has negatively impacted both the natural resources and the bushwack hiking experience sought by many.

Consistent with CPSLMP management directives, DEC managed 18 of the peaks over 3,500' as trailless areas, meaning that DEC never constructed, marked, or maintained trails on these peaks. Of the 18[3] trailless peaks over 3,500' ft, 16 peaks are located on lands owned by the State and managed by DEC. Of the 16 peaks on public land, 11 are in wilderness, 3 are in wild forest and 2 are on state forest lands outside of the Catskill Park Blue Line boundary.[4]

Peaks located within the study area.

Peak Name	Elevation	Land Classification
1.South Doubletop	3,852'	Big Indian Wilderness
2.SW Hunter	3,740'	Hunter-West Kill Wilderness
3.Lone	3,721'	Slide Mountain Wilderness
4.Big Indian	3,700'	Big Indian Wilderness
5.Friday	3,694'	Slide Mountain Wilderness
6.Rusk	3,680'	Rusk Mountain Wild Forest
7.Kaaterskill High Peak	3,655'	Kaaterskill Wild Forest
8.Balsam Cap	3,623'	Slide Mountain Wilderness
9.Fir	3,620'	Big Indian Wilderness
10. Sherrill	3,550'	Hunter West Kill Wilderness
11.North Dome	3,610'	Hunter-West Kill Wilderness
12.Eagle	3,600'	Big Indian Wilderness
13.Bearpen	3,600'	Reforestation Area, Bearpen State Forest Unit
14.Halcott	3,537'	Halcott Mountain Wild Forest
15.Vly	3,529'	Reforestation Area, Bearpen State Forest
16. Rocky	3,508'	Slide Mountain Wilderness

[3] There are 16 trailless peaks on state land and 2 peaks over 3,500 on private land that were closed to public access.

[4] Currently, the DEC is closely monitoring impacts to peaks under 3,500' that are still trailless in nature and these peaks will be subject to a future analysis.

While new technology, particularly hiking apps, has helped make outdoor recreation more accessible for a broader segment of the population, these technological developments have also created new challenges for public land managers. One such challenge is that hiking apps do not always distinguish between formal trails and informal un-approved trails. Failure to provide information distinguishing formal and informal trails, can result in visitors unwittingly navigating to dangerous or environmentally sensitive areas. At the same time, hiking challenges that require aspiring hikers to visit the trailless areas have grown exponentially. These combined factors significantly increase the number of hikers annually accessing the trailless areas. This increase in foot traffic has resulted in notable damage to the natural resources and vegetation. Monitoring results show that recreational impacts in high elevation ecosystems are increasing. This is particularly problematic because summit ecosystems are ecologically sensitive, slow to recover, and contain isolated islands of infrequently occurring biodiversity (Monz, 2010).

1. Canister Sign-in Information

Fourteen[5] of the formerly trailless peak summits have canisters intended to collect visitor data. These small orange canisters are affixed to trees and contain a notepad for hikers to sign to document their visitation. The visits recorded in the canister notebooks serve as the foundation for estimating visitation to the trailless areas. Since 2009, volunteers from the Catskill 3500 Club have annually collected the canister sign-in data and provided such data to DEC through a Volunteer Stewardship Agreement (VSA). The canister sign-in data has been key to recognizing the pattern of significantly increasing visitation to the formerly trailless peaks.

Example of a canister on formerly trailless peak

[5] South Doubletop does not have a canister.

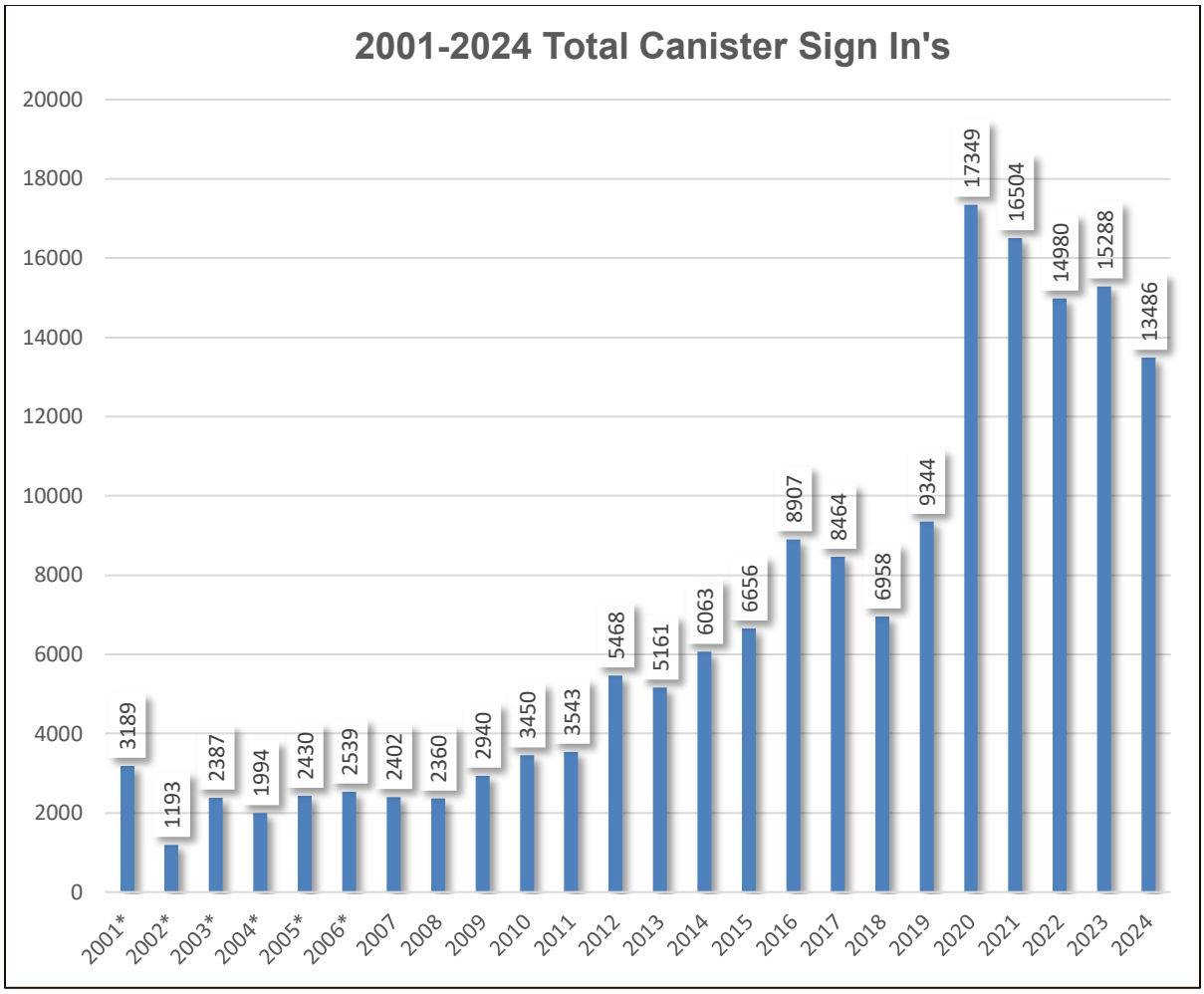


*Figure 3. *Canister data is incomplete from 2001-2006 when canister books were lost or stolen.*

Canister sign-in data since the start of the Covid-19 pandemic reveals some surprising trends in monthly visitation. May was the month with the highest sign-in rates in 2022 and 2023. This trend is concerning because several ground-nesting montane bird species are particularly vulnerable during May when begin to breed and nest. The highest number of recorded canister sign-ins occurred in October of 2020, with 2,040 signatures recorded, while April 2020 revealed the lowest recorded visitation since the start of the Covid-19 pandemic.

- 163,055 people signed in at canisters between 2001-2024.
- From 2020-2024, a total of 77,607 people signed in at the canisters, meaning that 47% of total canister sign-ins from 2001-2024 have occurred in the last 4 years.

- 2024 canister sign-in data indicated that there was a decrease in sign-ins between 2023 (15,288) and 2024 (13,486). There was an 11% decrease in sign-ins between 2023 (15,288) and 2024 (13,486).
- In 2023, 1,343 people signed in at the canister at Kaaterskill High Peak, making it the peak with the highest number of sign-ins.
- In 2024, 1,176 people signed in at the canister at Kaaterskill High Peak, making it the peak with the highest number of sign-ins for the second year in a row.
- More than half of the peaks showed increased sign-in rates between 2022 and 2023 (9 out of 14).
- All of the peaks showed decreased sign-ins between 2023 and 2024.
- The peaks that showed the largest increases in sign-in rates between 2022 and 2023 were Balsam Cap (13%), Friday (12%) and Eagle (13%).
- The peaks that showed the largest decreases in sign-in rates between 2023 and 2024 were Balsam Cap (-15.5%), Friday (-16.9%) and North Dome (-15.4%).

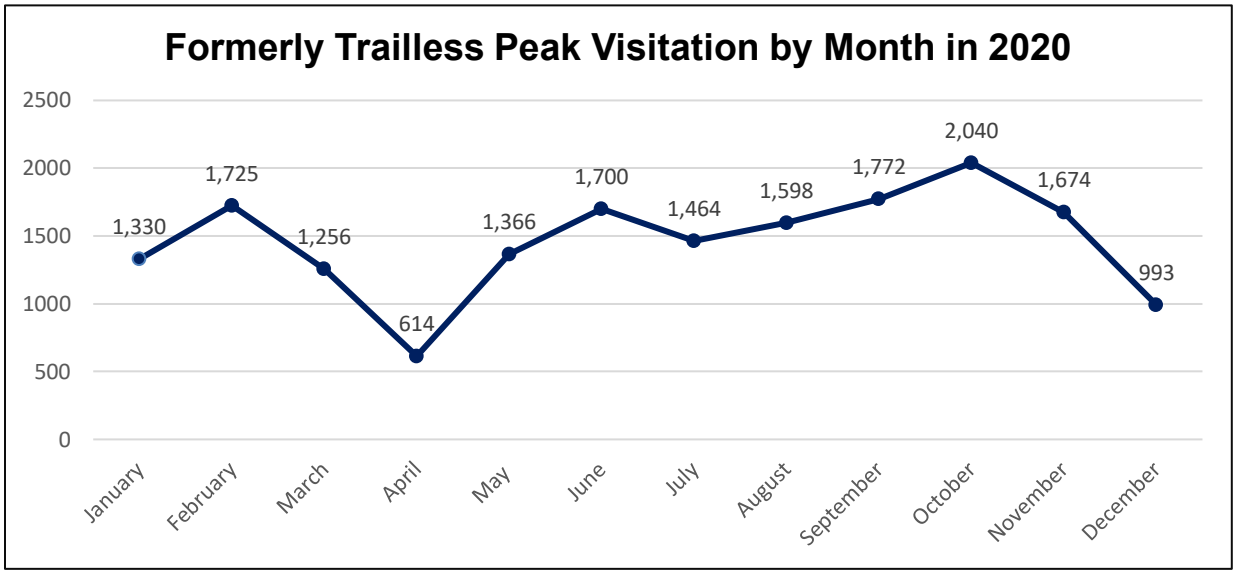


Figure 4. Visitation by Month 2020

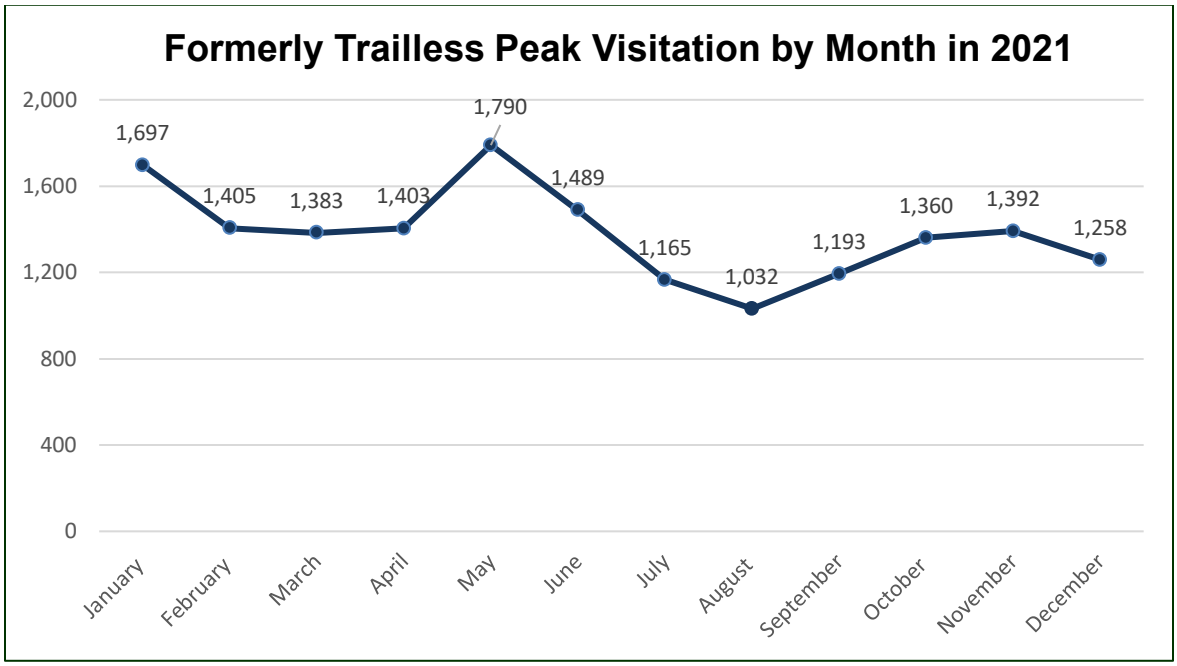


Figure 5. Visitation by Month 2021

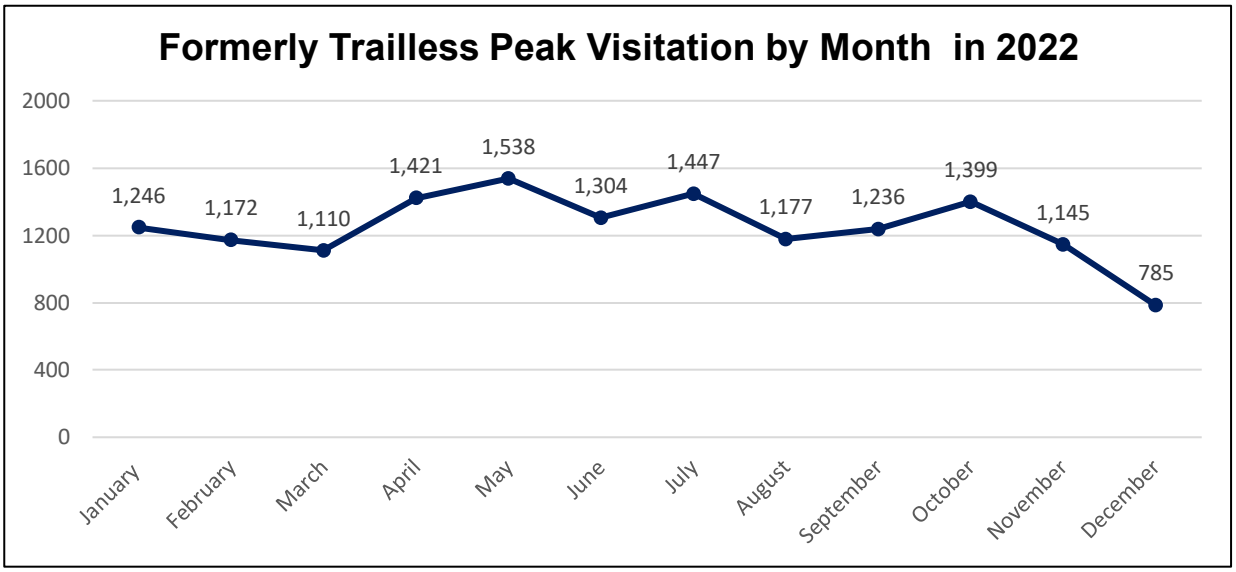


Figure 6. Visitation by Month 2022

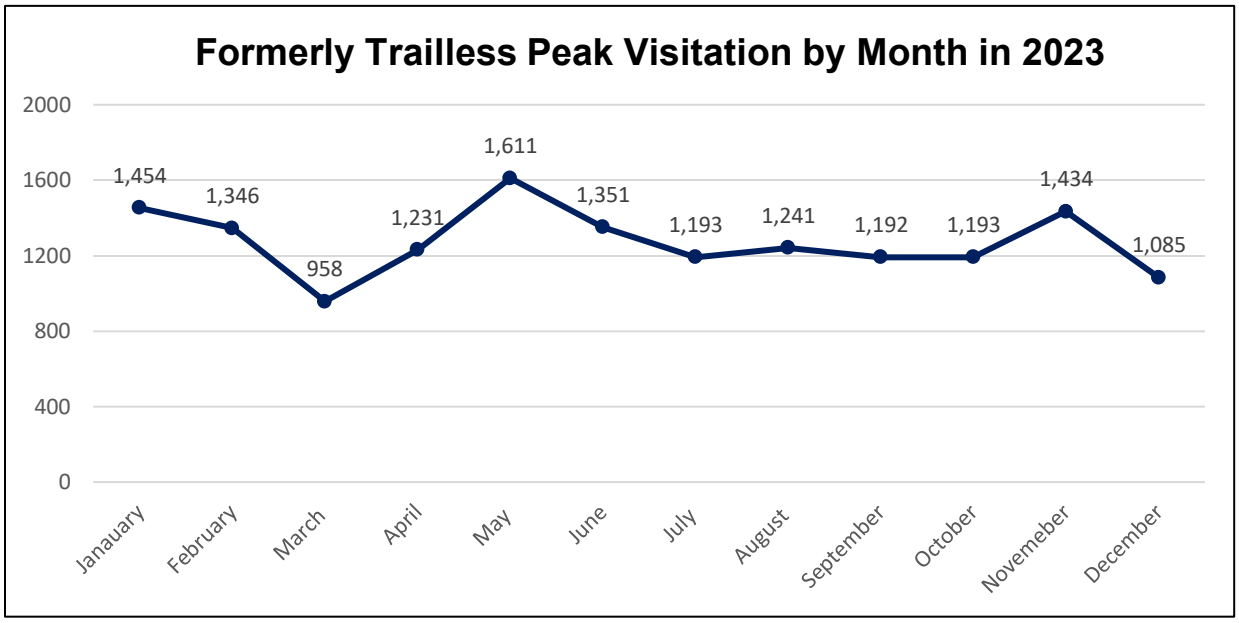


Figure 7. Visitation by Month 2023

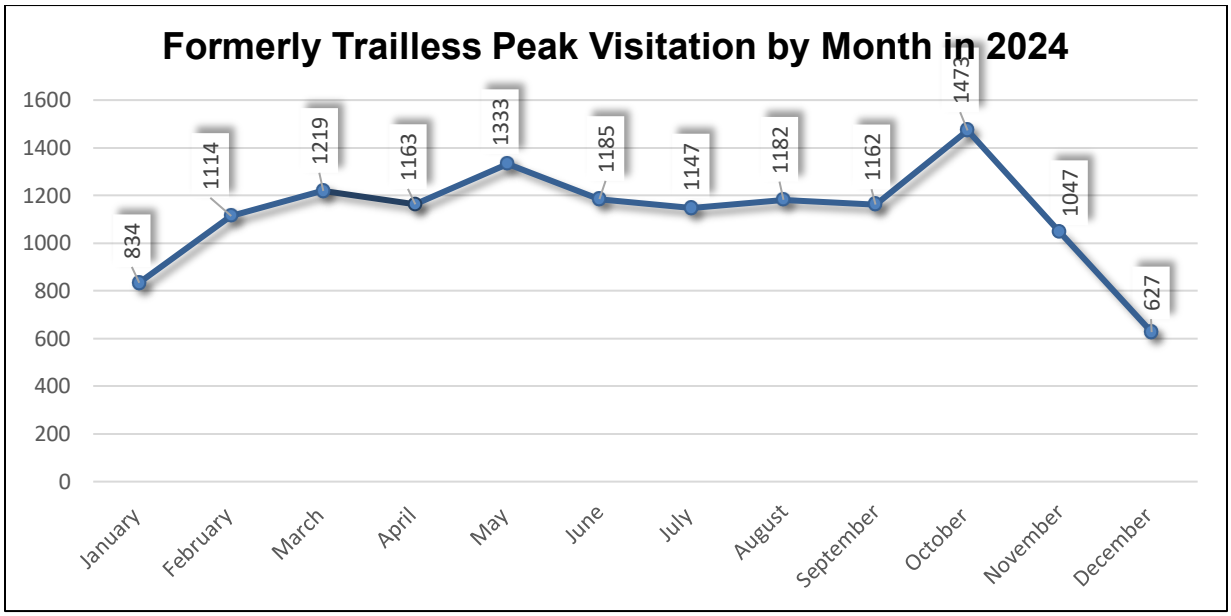
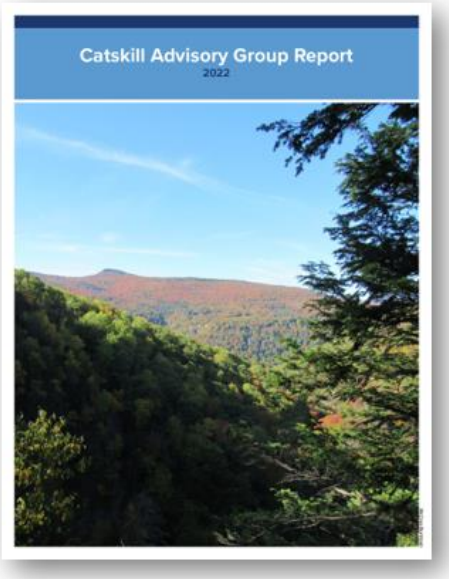


Figure 8. Visitation by Month 2024

Complete sign-in data by peak can be found in Appendix F.

2. Catskill Strategic Planning Advisory Group (CAG)



In October 2020, then DEC Commissioner Basil Seggos announced the formation of the Catskill Strategic Planning Advisory Group (CAG). The CAG was comprised of stakeholders with expertise in local government, recreation, natural resource protection, business, tourism and other priority areas. The CAG was tasked with developing a strategic framework for promoting sustainable recreation in the Catskill region with an emphasis on areas that are threatened by high use.

A prominent recommendation that emerged in the CAG Final Report was for DEC to utilize the Federal Inter-Agency Visitor Use Management Framework (IVUMF) planning process for public lands. This framework IVUMC-VUM Framework (nps.gov) was developed by a partnership of federal land management agencies and is the federal standard for public land management. The framework requires managers to clearly articulate prescriptive public land management objectives, desired resource conditions and appropriate recreational opportunities through the utilization of associated indicators and thresholds which are then used to measure the efficacy of management actions to achieve identified desired conditions and outcomes (Marion, 2024). This planning framework also focuses heavily on the experiential, social and public safety elements of visitor use. The CAG suggested that DEC should adopt the IVUMF framework as a tool for establishing long-term planning objectives, and adaptive management and monitoring strategies that can be used to inform data driven, science-based decision making on Forest Preserve lands. This VUM plan includes the following recommendations that were outlined in the final Catskill Advisory Group report:

- Adopt the Visitor Use Management Framework:

This plan incorporates the four elements of the VUM framework into the management strategy for the formerly trailless peaks and identifies desired conditions, indicator(s) and associated thresholds for the project area.

- Develop working relationships with popular smartphone app developers:

DEC entered a partnership with AllTrails utilizing their Public Lands Portal to improve messaging and manage GPS tracks that are available to the public. For additional information about this partnership see page 136.

- Build Leave No Trace™ into Unit Management Plans and the VUM process:

Leave no trace information is included in this plan (see page 74). Leave No Trace "Authority of the Resource" educational outreach approaches and messaging has also been developed specifically for this project see: https://dec.ny.gov/nature/forests-trees/forest-preserve/visitor-use-management. Appendix F contains the 7 principles of Leave No Trace.

- Ensure that group-use and recreational challenges protect resources:

As a strategy to ensure that hiking challenge participants are not having undesirable impacts on the landscape, DEC recommends that hiking challenge organizers consider requiring completion of the free Leave No Trace awareness course (available at: https://learn.lnt.org/) to ensure that all challenge participants are recreating responsibly and that they understand Leave No Trace principles and practices.

- Data collection and monitoring: Collect baseline data to understand the physical and biological conditions within the park as a basis for understanding how they change over time:

Section II of this plan provides details on the data findings and results that have been produced since 2019 as part of multi-year monitoring effort.

- Visitor experience data should be collected by qualified social scientists. Data should include research on the attitudes, perceptions and desires of park visitors and communities.

Visitor experience surveys that assessed visitors' attitudes about existing and preferred natural resource conditions in the project area were conducted in 2022 and 2023. The results of those surveys can be found online at: https://dec.ny.gov/nature/forests-trees/forest-preserve/visitor-use-management and in Appendix B.

- Natural-resource protection as a driver for decision-making:

The management actions and proposals contained in this plan were developed to address visitor created impacts to natural resource conditions. Natural resource indicators were identified and will continually be measured and monitored to ensure that the ecological integrity of the lands within the project area is not compromised by unsustainable and damaging visitation patterns.

B. VUM Planning at DEC

VUM planning employs a proactive, iterative, and adaptive process for managing visitor use on public lands. VUM uses a variety of strategies and tools to define, achieve and maintain desired resource conditions and visitor experiences. Governing laws and policies, public and stakeholder participation, and data collection and analysis are all critical elements of defining desired conditions for every VUM project. DEC utilized the VUM framework for this planning project to better understand how people visit and recreate on the formerly trailless peaks on Forest Preserve and State Forest lands, and to assess the impact of this human behavior on both the natural resources and visitor experiences.

Integral to the VUM process is the ability of DEC to work with stakeholders and the public to identify desired conditions for visitor experiences, natural resources, infrastructure, and recreational opportunities for the area. DEC developed a public involvement and engagement strategy to encourage public participation throughout the course of this project. Throughout this VUM planning process, DEC collected public and stakeholder input in order to articulate desired conditions for visitor experiences and to understand which potential management strategies might be favored or opposed. Part D more fully explains the public outreach and engagement opportunities and events associated with the early phases of this project. By proactively utilizing VUM for sensitive and/or highly visited locations, DEC intends to maximize the public's experience and appreciation of DEC-managed lands while protecting important natural resources, as mandated by Article XIV of the New York State Constitution, ECL, the CPSLMP and the SPSFM.

1. The VUM Planning Process

A VUM plan develops a collaborative vision for managing visitor use by aligning visitor use and experiences with the park's purpose and by providing direction for protecting fundamental resources and values. This type of planning process uses a variety of strategies and tools to achieve and maintain desired resource conditions and visitor experiences (IVUMF,5). Desired condition statements, indicators and thresholds are three essential concepts of any VUM plan. These concepts are introduced below with additional information on how these concepts have been customized and incorporated

into this project found in Section III, Management Strategies and Actions. VUM planning is inherently proactive and will maximize the ability of DEC to encourage access, connect visitors to the park's fundamental resources and values and to manage visitation in a manner that allows for more responsive management. In addition to identifying desired condition statements, indicators and thresholds, this draft VUM plan will:

- Assess the opportunities for and appropriateness of visitor activities.
- Analyze existing visitor use characteristics and patterns.
- Minimize impacts to resources and visitor experiences caused by visitor use.
- Promote sustainable recreational use of the study area[6].

As part of this VUM planning process, DEC offered a multitude of outreach and public comment opportunities to guide the development of this draft plan.

2. Key VUM Planning Concepts

Desired Conditions

The VUM planning process uses desired condition statements to describe the ideal state of natural resources, visitor experiences and facilities. Desired condition statements differ from current condition statements in that they describe what conditions, what outcomes and which opportunities are to be achieved and maintained in the future, not necessarily what exists today. These statements articulate the aspirations for a particular area by answering the question: "What are we trying to achieve?" Answering this question is imperative for proactive rather than reactive management. Desired condition statements can be thought of as proactive, strategic, and purposeful goals. By having a clear understanding of desired opportunities and resource conditions for a particular are or unit, current conditions can be compared to desired conditions to inform management strategies. Once the desired condition statements for an area have been established, land managers can adjust management strategies until the desired conditions are achieved. These statements are built upon the laws and policies which govern the management of each area and are used to guide management actions and foster accountability, defensibility and transparency in land management decisions (IVUMC, 2023).

Social science data, in the form of visitor experience surveys and public comment opportunities, were used to develop a more comprehensive understanding of visitor's experiential preferences, attitudes and beliefs about the desired conditions of the lands within the study area. Public comments and stakeholder feedback were used to create

[6] Information pertaining to objectives for Visitor Use Management planning is taken directly from the National Park Service Planning Catalog: Visitor Use and Experience

and inform desired conditions statements for the lands within the study area. The draft desired condition statements are described in greater detail in Section III: Visitor Use Management Direction.

Indicators

Indicators are measurable proxies that track changes in conditions associated with recreational use. Indicators provide a systematic basis to assess progress towards achieving and maintaining desired conditions. They are measurable physical, ecological, or social variables which are used to track trends in conditions resulting from visitor related impacts. Indicators allow land managers to routinely evaluate progress towards desired goals and conditions. Comparing resource conditions to management goals or indicator criteria can help determine whether recreation impacts are acceptable or unacceptable (Marion, Wimpey, 2011). Strong indicators are those that can be easily and reliably measured, are related to, and representative of desired conditions, are understandable to general audiences and are responsive to visitor use management actions. Before a monitoring program can be developed, indicators of social, physical, or biological change must be identified.

Well-designed indicators must be connected to visitor use, relevant to desired conditions, sensitive to change, reasonable, and reliable. Indicators can be either social indicators or natural resource indicators. This VUM plan identified a key natural resource indicator which will be monitored to assess the effectiveness of management actions over time. Additional indicator information is included in Section III: Visitor Use Management.

Thresholds

Thresholds identify when conditions are about to become unacceptable and accordingly serve as a “line in the sand,” informing managers and the public that corrective action must be taken to keep conditions acceptable so that progress towards desired conditions can be achieved over time. Thresholds are quantifiable conditions of indicators which represent points at which adaptive management actions are needed. In other words, thresholds are triggers designed to support proactive visitor use management actions to maintain desired conditions. Two critically important concepts for thresholds are 1) although defined as “minimally acceptable”, thresholds still represent acceptable conditions, not degraded or impaired conditions; and 2) establishing a threshold does not imply that nothing will be done prior to reaching the threshold. Management strategies should always strive to maintain conditions that are better than thresholds. Recommendations for thresholds for management zones within the study area are included in Section III: Visitor Use Management.

C. Relevant Laws, Policies & Guidance

This VUM Plan for the Formerly Trailless Catskill High Peaks was developed pursuant to, and is consistent with, relevant provisions of the New York State Constitution, the Environmental Conservation Law (ECL), the Executive Law, the Catskill State Park State Land Master Plan (CPSLMP), New York State Department of Environmental Conservation ("Department") rules and regulations, Department policies and procedures and the State Environmental Quality Review Act. The State lands that are the subject of this draft Visitor Use Management Plan are both Forest Preserve lands protected by Article XIV, Section1 of the New York State Constitution and State Forest lands under the jurisdiction of the Department consistent with the ECL. This Constitutional provision, which became effective on January 1,1885 provides in relevant part: "The lands of the state, now owned or hereafter acquired, constituting the Forest Preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed."

ECL§3-030 (1)(d) and 9-0105(1) provides the Department with jurisdiction to manage Forest Preserve lands. The Catskill Park State Land Master Plan (Master Plan) places State land within the Catskill State Park into the following classifications: Wilderness, Wild Forest, Primitive Bicycle Corridor, Intensive Use and State Administrative and sets forth management guidelines for the lands falling within each major classification. The Master Plan sets forth guidelines for such matters as: structures and improvements; the use of motorized equipment and aircraft; roads, state truck trails; flora and fauna; recreation use and overuse; boundary structures and improvements and boundary markings. Executive law §816(1) requires the Department to develop individual UMPs for each unit of land under the Department's jurisdiction which is classified in one of the five classifications set forth in the Master Plan.

Consistent with the above authority, DEC's Division of Lands and Forests has management responsibility of New York State's 3-million-acre Forest Preserve. Management of these DEC-administered lands in the Catskills is guided by the CPSLMP. The CPSLMP requires routine monitoring and assessment of impacts to natural resources lands classified as Forest Preserve. Conversely, the SPSFM requires such monitoring and assessment of lands managed as State Forests. In accordance with the CPSLMP, DEC has the obligation to protect the natural resources of the Forest Preserve, including the formerly trailless peaks within the Catskill Park Blue Line. Additionally, the SPSFM addresses at-risk species and natural communities and charges DEC with protecting and in some cases, managing known occurrences of endangered plants, wildlife, and natural communities on state forest lands. In the study area, these State Forest lands include Bearpen and Vly peaks, which are both formerly

trailless peaks within the Bearpen Mountain State Forest and located just outside of the Blue Line.

The original and intended purpose of the trailless peaks was to provide areas within the Forest Preserve that were unencumbered by built facilities which allowed for natural process to occur. Areas without man-made facilities provided visitors with the opportunity to test their navigational skills now referred to as “bushwacking”. While many bushwacking experiences still exist, bushwacking opportunities to peaks over 3,500’ have been severely impacted due to the prevalence and establishment of informal trail networks. Empirical results from visitor experience surveys and observations of natural resource conditions through routine monitoring are inconsistent with the prescriptive management objectives contained in the CPSLMP and the SPSFM.

Relevant to the harmful impacts of the rapidly expanding informal trail networks, the CPSLMP includes the following management directives:

- Consistent with the Biodiversity Act of 1993 DEC must identify, manage, and conserve plants, animals and ecological communities that are rare in New York State, and that are located on State-owned lands (see page 13, CPSLMP).

- Where public use of existing trails or facilities endangers rare plants, animals or communities, these trails or facilities will be modified, relocated, or closed (see page 24, CPSLMP).

- No new trails will be constructed to, or within one half mile (horizontal distance) of the summit of a trailless peak unless a trail is needed to eliminate resource degradation and the trail is specified in an approved unit management plan for the area (see page 33, CPSLMP).

1. Wilderness

The CPSLMP provides that the quality and character of the visitor experience in wilderness areas should offer outstanding opportunities for solitude or a primitive and unconfined type of recreation. In addition, where the degree and intensity of permitted public recreational use threatens the wilderness resource, appropriate administrative and regulatory measures will be taken to limit such use to the capacity of the resource. Consistent with this directive, Catskill Park wilderness land managers must ask themselves, “are visitors experiencing a wilderness environment where the evidence of human activity is substantially unnoticeable?” If the answer to this question is no, then management interventions are necessary to bring the current conditions of a wilderness

area into alignment with legal mandates and prescribed conditions. According to the CPSLMP, the prescribed condition for wilderness is as follows:

"…*an area where the earth and its community of life are untrammeled by man- where man himself is a visitor who does not remain*".

A wilderness area is further defined in the CPSLMP to mean:

"…*an area of State land or water having primeval character, without significant improvements or permanent human habitation, which is protected and managed to preserve, and where necessary, enhance and restore, its natural conditions and which generally appears to be affected primarily by the forces of nature, where man's work is substantially unnoticeable*".

The CPSLMP requires that in instances where resource degradation is extreme, DEC must study the possibility of temporarily closing all or portions of wilderness areas to allow rehabilitative measures to occur (see page 33, CPSLMP). Unconfined foot traffic has led to the establishment of informal trails which have scarred the wilderness landscape in many areas. As a result, opportunities to embrace solitude and primitive recreation and experience a connection to wilderness have diminished in recent years.

2. Wild Forest

As provided by the CPSLMP, the physical characteristics of wild forest lands are typically capable of withstanding higher levels of recreational use, convey less of a sense of remoteness and provide fewer outstanding opportunities for solitude. Wild forest areas should be managed to provide opportunities for a greater range of recreational activities and a higher intensity of recreational use than are afforded in wilderness areas. As in wilderness areas, the primary management guideline for wild forest areas is to preserve the physical and biological resources in a wild state. According to the CPSLMP, types and levels of use that would degrade the character of wild forest areas will not be permitted. The CPSLMP prescribed condition for wild forest areas is described as,

"…*an area of Forest Preserve land whose character as a natural plant and animal community receives the same degree of protection under Article XIV of the Constitution as in areas classified as wilderness, but which differs from wilderness in that generally, the physical characteristics of wild forest areas are capable of withstanding higher levels of recreational use; wild forest areas convey less of a sense of remoteness and provide fewer outstanding opportunities for solitude for visitors*". (Pg.38, CPSLMP)

The 2019 Visitor Use Study of the Trailless Peaks over 3,500' in the Catskills and the 2022 Addendum to the 2019 Visitor Use Study[7] suggests that the forest fragmentation caused by informal trail networks on the formerly trailless peaks in both wilderness and wild forest areas deviates from the vision and purpose of these lands as outlined above.

Additionally, the CPSLMP provides that "…*new trails on trailless peaks can only be proposed if there is serious environmental degradation in the form of multiple herd paths (also known as informal trails)".* Additional information on the recommended thresholds for these lands is provided in section III. Visitor Use Management Direction.

3. State Forest

The SPSFM outlines the stewardship responsibilities associated with natural resource protection and public recreation on state forest lands. Bearpen and Vly are two formerly trailless peaks that are located outside of the Catskill Park Blue Line in the Bearpen Mountain State Forest. Recent biological inventories of these peaks confirmed the presence of old growth forest and first growth forest. The NYNHP conducted biological inventories on Bearpen and Vly during the Fall of 2023 and confirmed that informal trails should be closely monitored to protect the habitat quality within the old growth stands found on these summits. Two of the objectives for recreation management on state forests identified in the SPSFM are to reduce the environmental impacts of hiking trails and to provide recreational facilities that are environmentally sound. The level of informal trail development on the summits of Bearpen and Vly is not as extensive or severe as it is in other peaks within the study area. However, the NYNHP recommended that these peaks should be routinely monitored to verify that the resource conditions are consistent with the management standards in the SPSFM.

D. Public Involvement & Engagement

Effective visitor use management incorporates environmental ethics and education, ultimately encouraging visitors to become stewards of the public lands on which they recreate. Public and stakeholder engagement is an essential component of the VUM planning process. Successful VUM planning efforts offer multiple opportunities for feedback and public comment which is used to form a comprehensive understanding of visitor's tolerances, perceptions, attitudes, and opinions about potential management actions.

1. Project Timeline

[7] Both studies are available online at: https://dec.ny.gov/nature/forests-trees/forest-preserve/visitor-use-management

- Winter 2018: Identified areas to target for monitoring and selected an informal trail monitoring protocol developed for the National Park Service (NPS) that was used for informal trail monitoring in Acadia and Denali National Parks.
- Summer 2019: Baseline data collection on the informal trail networks began. The primary purpose of this effort was to develop an understanding of informal trail network distribution and to assess where biological inventories by NYNHP were needed. Baseline data on the extent of recreational impact and vegetation loss surrounding the canisters was measured.
- Fall 2019: Release of the 2019 Catskill Trailless Peaks Visitor Use Study.
- Summer 2020: Collected STRAVA heat map and canister sign-in data for peaks within the study area during the COVID-19 pandemic.
- Fall 2021: Released the Addendum to the 2019 report which included 2020 STRAVA heat map information, canister sign-in data and identified priority areas for 2022 monitoring.
- Summer 2022: Conducted field work to test data collection protocols for point assessments along informal trail segments using Survey-123. Indicators of soil loss such as trail width, slope and trail slope alignment were measured at points along informal trails.
- Summer 2022: An open public comment period for the project began in June of 2022 and continues to be open today. The public can email catskillpark@dec.ny.gov to submit their comments on the project. [8]
- Fall 2022: Hosted the Informal Trails in the Catskills webinar and conducted the first Visitor Experience Survey.
- Winter/Spring 2022-2023: Developed a mapping methodology which was used to quantify landscape fragmentation resulting from informal trail development which replicated some previous work that was conducted in Yosemite National Park and Mt. Rainier (Moskal, 2011). The results of that analysis were used in the developing draft indicators and thresholds for the study area.
- Spring/Summer 2023: Began development of a draft Visitor Use Management plan that will serve as the mechanism to expedite DEC's ability to address adverse impacts to natural resources and visitor experiences before preventable, unacceptable impacts become irreversible.
- Summer 2023: Circulated a Request for Proposals (RFP) in seeking to contract with experienced educational outreach professionals to amplify the educational outreach and messaging associated with this project and to assist DEC in

[8] To date, 27 public comments have been received. These comments have been useful in informing and defining the desired conditions for the study area. The public comments and the DEC responses to those comments are contained in Appendix A.

integrating Leave No Trace Authority of the Resource messaging in educational outreach efforts.

- Fall 2023: DEC announced the New York New Jersey Trail Conference (NYNJTC) was awarded the contract. A second visitor experience survey was developed and administered in partnership with the NYNJTC in fall of 2023 which resulted in 802 people participating in the survey. The survey was presented at 10 trailheads during Indigenous Peoples weekend during October 7th –9th period. The survey was also made available on the NYNJTC website from October 7th-November 11th. The complete survey results are included in Appendix C.
- Spring 2024: Deliverable material developed through the contract with the NYNJTC was provided to DEC. Recommendations and educational material developed through that partnership have been integrated throughout this draft VUM document.
- Summer 2025: Draft VUM plan is presented to the public. A 60-day public comment period is held.

2. Visitor Experience Surveys

Information regarding public attitudes towards visitor experiences and natural resource conditions can be used to identify thresholds of acceptability or unacceptability of natural resource conditions. Throughout this VUM planning process, visitor experience surveys were used to assess attitudes about potential management options for the formerly trailless peaks. The purpose of these surveys was to examine the relationship between natural resource impacts caused by informal trails, user's perceptions of those impacts and how those perceptions affected user's recreation experience. The feedback gathered during the 2022 and 2023 surveys was used to develop key aspirational components of the desired condition statements included in Section II: Visitor Use Management Direction. Visitor experience surveys were offered in 2022 (168 people participated) and 2023 (802 people participated). A total of 970 people participated in the visitor experience surveys offered throughout the course of this planning process.

The visitor experience surveys and research activities conducted over the course of this project relied heavily on STRAVA heat map images. These heat maps illustrate visitation patterns and visitor volumes on the formerly trailless peaks. For purposes of this study, STRAVA is a smartphone fitness app that records and aggregates user data to create heat maps which depict corridors of activity and the intensity of that activity. These heat maps, and the intensity of the activity that they represent, have been instrumental in understanding the visitation patterns on the formerly trailless peaks. STRAVA heat map images of informal trail networks and photographs of informal trail conditions on the mountains were included in the 2022 survey. Respondents were asked to rate the images and photographs and were given a set of options which

ranged from unacceptable, to very acceptable. The complete Visitor Use survey and responses is provided in Appendix B.

- The 2022 Visitor Experience Survey results suggest that visitors prefer minimal resource impact, fewer interactions with people and low intensity management. However, when faced with tradeoffs, respondents were inclined to accept more intensive management to help ensure that sustainable recreational and natural resource protection goals were achieved. Survey results also provided insight into the demographic composition of visitors: The overwhelming majority of participants self-identified as White (88%), with Hispanic/Latinx and Asian each accounting for 3% and other categories accounting for less than 1%.

- When asked their gender identity (Question 20), 63% of participants identified as a Man and 31% identified as a Woman, with 2% identifying as X (inclusive of, but not limited to gender categories such as Non-Binary, Intersex, Genderfluid and Genderqueer).

In 2023, the New York New Jersey Trail Conference (NYNJTC) was awarded an Education and Outreach Planning contract from DEC, funded by the Environmental Protection Fund. As part of the contract, the NYNJTC administered a second Visitor Experience Survey to expand on the 2022 survey and to obtain a larger sample size of participants. During Indigenous Peoples weekend, in October of 2023, in-person trailhead surveys were conducted at 10 trailheads that offer access to the formerly trailless peaks. The 2023 visitor experience survey was also made available on the NYNJTC's website from October 6th through November 11th. A total of 802 submissions were recorded during the 39-day period the survey was open, including 106 submissions obtained through the in-person surveying.

The survey asked participants about their level of support for certain interim management actions, methods for trip planning and preparation, and if they encountered dogs on a formerly trailless peak hike. The results were as follows:

- 71% of survey participants supported the designation of a formal trail using the existing informal trails. 20% of respondents indicated that they were neutral on this question and 9% opposed.

- 64% of survey respondents supported the closure of informal trails and construction of a new, sustainably aligned trail to the summit. 22% of respondents indicated that they were neutral on this question and 14% opposed.

- 83% of survey respondents indicated that they supported posting additional educational signage that includes information on threatened and/or vulnerable

species and Leave No Trace information. 14% of survey respondents indicated that they were neutral on this question and 3% opposed.

- When asked about support or opposition for implementation of seasonal closures or a permitting system to limit users to the area during times when species are vulnerable (i.e., during breeding, nesting seasons), 39% of survey respondents indicated that they opposed seasonal closures or a permit system, 25% indicated that they were neutral and 36% indicated that they would support seasonal closures or a permit system.

- 68% of survey participants ranked the extent of the informal trail network on Rocky Mountain in the Slide Mountain Wilderness as “Very Unacceptable”.

- 77% of survey participants support construction of sustainably designed trails to trailless peak summits to prevent impacts to natural resources.

- 60% of survey participants used a smartphone app to plan and prepare to hike a trailless peak.

- 54% of survey participants reported that they encountered dogs on trailless peak summits.

The complete 2022 and 2023 surveys and responses are provided in Appendix B and C respectively.

3. Stakeholder Engagement

DEC conducted robust civic engagement during the planning process to provide an opportunity for the public to learn about and contribute to the planning process throughout the project. In 2022, DEC partnered with several stakeholder groups to host a free public webinar titled “Informal Trails in the Catskills.” (October 19, 2022: https://www.catskillmountainkeeper.org/informal_trails_webinar)

This webinar highlighted project and provided opportunity for public comment on the project. Webinar presenters included DEC staff, New York Natural Heritage staff and United States Geological Survey (USGS) Recreation Ecologist, Dr. Jeffrey Marion, a leading expert in informal trail management. The webinar discusses conditions and

monitoring results of informal trail networks, ecological and vegetative structure of the summits and species occurrences in the Catskills as well as informal trail impacts and potential informal trail management solutions. In addition to the webinar, Trailless Peak Project Presentations occurred on the following dates to spread awareness of the project and the results from the monitoring effort:

- January 2020: Results from the 2019 monitoring effort of the Trailless Peaks were presented to the Forest Preserve Advisory Committee (FPAC) Albany, NY DEC Central Office.
- February 2020: Results from the 2019 monitoring effort were presented to the Catskill Park Advisory Committee (CPAC) Arkville, NY.
- January 2022: Results from the 2021, 2022 STRAVA heat map analysis during the COVID-19 Pandemic were presented to CPAC.
- February 2022: Overview of the monitoring effort from 2019-2022 was presented virtually to the CAG.
- March 2024: NYNJTC and DEC presented new education and outreach resources for the project area to stakeholders at CPAC quarterly meeting.

4. Indian Nations and the Catskills

The lands and waters of the Catskill region provide not only vital resources for Native people that live(d) here- but these lands are also an inseparable component of their identity. State owned lands in the Catskills region are among the few remaining places that offer access to resources that are essential to sustain indigenous peoples cultural and spiritual practices. DEC acknowledges the indigenous right to use the natural resources found on Forest Preserve, as their tradition and heritage requires provided that the use is consistent with State laws and regulations that pertain to Forest Preserve management.

Forests in the Catskills contain a wide variety of habitat. This variety supports an array of plant life, of which many species, both common and scarce, are utilized by Indigenous peoples as food and medicine. Indigenous peoples maintain extensive ecological knowledge systems, sometimes referred to as Traditional Ecological Knowledge (TEK). TEK refers to the body of knowledge, practice, and belief concerning the relationship of living beings to one another and to the physical environment, which is held by people in societies with a long history of direct dependence on local resources (Berkes, 1993). TEK is part of the cultures it comes from. Like Western science, TEK is based on systematic observations of nature. Both knowledge traditions have predictive power, and in both traditions, observations are interpreted in a cultural context. TEK has value not only for its wealth of information, but also for the cultural framework of respect, reciprocity, and responsibility in which it is embedded (Kimmerer, 1998, Pierotti and

Wildcat, 2000). Scientific approaches for sustainability solutions have been effective in certain arenas, but it has become clear that science alone is limited in its ability to address problems that include human values. Citizens of Indian Nations continue to employ TEK in their hunting, trapping, fishing, and foraging activities. Maintaining and preserving the TEK associated with these activities, is central to a Native Tribal way of life. Helping the Tribes gain access to all the necessary data (GIS and otherwise) will support the preservation of TEK and will be a continued goal of DEC.

The lower forested slopes of the Catskills were hunting grounds and homelands of several major Indian Nations: the Haudenosaunee ("People of the Longhouse") to the west, the Mohicans to the east, and the Wabanakis and Hurons to the north (Hagan, 2013).[9] In his book on the Catskills, Alf Evers describes the Indian Nation assemblages and the places that they were associated with. According to Evers,

> *On the pioneering voyage of exploration aboard the Half Moon, Henry Hudson encountered a division of the Esopus or the Mahican Indians. To the northwest and well hidden by the Catskills were groups who spoke very different language from the Algonkian of the Esopus Indians- theirs was an Iroquois dialect. To the north of the Esopus Indians lived the speakers of the Algonkian dialect different from that of the Esopus people – they were called the Mahicans. On the western and southwestern borders of the mountains, still another Algonkian speaking group was thinly settled on favorable spots in the Delaware valley from the Minnisink Valley – northward to present day Arkville and Margaretville.*[10]

The sunny, south facing slopes in the Catskills were rich with nut bearing trees and attracted various species of game animals particularly during the fall. Indigenous people actively managed the landscape using frequent burning to promote growth of food sources and consequently, the region was never a "pristine wilderness" as it was actively managed by indigenous people for centuries prior to becoming Forest Preserve land. The Catskill mountains initially served as a significant barrier between groups of Indians with different languages and customs and later between hostile white settlers.

Indian Nation Consultation and the Unit Management Planning Process

Stewardship of the environment is a mission that aligns strongly with how Native Tribal members see their position within the natural world. DEC has and will continue to partner with the Native Tribes in ways that can highlight and tap into their long,

[9] Review of the NYC Watershed Protection Program, 2020. National Academies of Sciences, Engineering and Medicine. Washington DC, National Academies Press

[10] Evers, Alf. 1972 "The Catskills from Wilderness to Woodstock". Doubleday & Company, Inc. pg. 10.

successful track record in conservation. Commissioner Policy 42: Contact, Cooperation and Consultation with Indian Nations describes how the Department interacts with Indian Nation representatives on natural resources, cultural resources, and hunting, fishing, and gathering. Department staff consult with appropriate Indian Nation representatives on a government-to-government basis regarding matters affecting Indian Nation interests during the Unit Management Planning process.

Consultation and coordination with tribal nations and other interested parties will be conducted to identify issues and/or concerns related to natural and cultural resources. Affiliated tribes who were sent invitations to consult on the draft VUM included the following: Delaware Nation, the Stockbridge Munsee Band of the Mohican Nation, Wisconsin, the St. Regis Mohawk Tribe, and the Haudenosaunee Environmental Task Force.

5. Press and Social Media

Outreach through online and digital methods has the potential to reach visitors at multiple points including the planning, on-site and post-trip reflection stages. Messaging that can reach a visitor during the initial planning stage may have the greatest potential to influence behavior. Educating visitors early in their trip planning process should be a primary focus of any messaging. Messaging at the trailhead or on-trail is important, but information such as informal trail closures, undesirable conditions on informal trails or times of year when resources are sensitive or vulnerable, may not be as effectively communicated at these on-site locations. Many hikers routinely utilize various social media platforms to plan their outings, arrange group hikes and share experiences, advice and opinions with others. Messaging disseminated through social media has great potential to reach visitors during the crucial trip preparation phase. DEC will strive to coordinate with other stakeholders to disseminate social media messaging pertaining to new developments on the formerly trailless peaks. Coordination can expand the reach of the messaging, which in turn, can potentially influence changes in behavior.

A press release and a web page were developed to announce the effort in June 2022. The project webpage (Visitor Use Management Plan for Formerly Trailless Catskill High Peaks - NYS Dept. of Environmental Conservation) provides background on the study, tips to reduce hiking impacts in the study area and announces opportunities for public comment.[11] Public notifications and announcements on the Catskill Trailless Peaks VUM planning process were made by the DEC on Instagram and Facebook posts on:

- June 28th, 2022- Catskill Leave No Trace Principles

[11] The public comment period on this draft plan will be open for 30 days following a public meeting. Comments on the information contained in this draft VUM plan can be sent to: catskillpark@dec.ny.gov.

- July14th, 2022 - Bicknell's Thrush and LNT Principles
- August 16th, 2022 - Mountaintop Plant Communities
- September 1st, 2022 - Catskill High Peaks and Labor Day
- September 13th, 2022 - High Peaks Fire Prevention
- September 20th, 2022 - High Peaks Fire Prevention and Fire Towers
- October 4th, 2022 - Campfire safety and leaf peeping
- October 12th, 2022 - Informal Trails Zoom webinar announcement
- October 19th, 2022 - Catskill Informal Trail webinar hosted by Catskill Mountainkeeper
- November 21st, 2022 - Catskill Webinar and visitor experience survey reminder.
- June 8th, 2025- Ground Nesting Montane Birds

6. Educational Messaging

Providing education to visitors about the formerly trailless peaks once they have reached the starting point in the Catskills, or while they are navigating on or off formal or informal trails, is important. Any new onsite messaging should focus on guiding visitors toward desired behaviors for accessing these peaks, such as educating them about responsible recreational behavior though sensitive habitats. Many of the existing access points to the formerly trailless peaks do not have kiosks where information can be displayed and encountered prior to visitors beginning their hike. This draft plan proposes that informational kiosks will be installed in locations where there is currently no information display. The proposed informational kiosk locations are described in section IV.

Research shows that proscriptive language (i.e., what we should not do) and Leave No Trace guidelines should be used on trailhead signage and at key intersections along informal trail networks. The efficacy of signage types and styles to deter people from traveling off trail on mountain summits was tested in Acadia National Park by a team of recreation ecologists. Study results showed that the most effective technique in preventing deprecative, off trail behavior was to use a combination of signage and physical barriers (Marion, Park, 2022). DEC created signage that will be available at access points to the formerly trailless peaks intended to inform visitors about the fragility of natural resources and to provide suggestions for low impact recreational behavior. The language and design of the signage is based on that tested in Acadia National Park.

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II. Building the Foundation

This section relates to Element 1 of the visitor use management framework: Build the Foundation. Specifically, this section reviews the area's purpose, applicable laws, agency policy and management direction. The purpose of the plan is to provide high-quality opportunities for visitors to safely use, experience and enjoy the lands within the study area and to develop strategies to protect natural and cultural resources. To accomplish this, data collection and analysis is key to understanding how to prioritize project needs and resources for the purpose of sustainably managing so that these lands and experiences into the future. The findings and data included in this section are key to developing visitor use management strategies that will enhance resource resilience, thereby allowing future generations the opportunity to continue to enjoy these lands. The information contained in this section builds the foundation for defining future desired conditions of natural resources as well as visitor experiences on the formerly trailless peaks.

A. Impacts from Informal Trails

When visitors are not confined to formal trail corridors, visitor- created informal trails can develop. The term "impact" is used to denote any undesirable visitor-related change in resource condition. Informal trails can have many negative impacts on the landscape including altered hydrology, forest fragmentation, increased soil compaction and erosion. Such informal trails can also lead to the development of wet and unsustainably aligned foot trails. Additionally, informal trail resource impacts can include but are not limited to:

- Loss of protective layers of vegetative cover and organic litter through trampling.
- Alteration of the appearance and composition of trailside vegetation through reduction of existing vegetation height, which can result in favorable conditions for trampling resistant species.
- Loss of trees and shrubs resulting in increased sunlight exposure which can further alter naturally occurring conditions by favoring shade tolerant species.
- Transportation of non-native species (by visitors) along informal trails that can outcompete native vegetation.
- Disturbance to rare and threatened species and damage to sensitive plant communities particularly in environments with slow recovery rates such as mountain summits.

Typically, informal trails will follow shortest distance between two points (straight up a hillside) rather than along contours on gentler gradients. The characteristics of informal trails can result in unsustainable trail alignments that can degrade quickly, are difficult to use or manage and require a substantially greater maintenance effort. Unless informal trails are extensively hardened, tread degradation is likely to be severe and unacceptable. (Marion and Leung, 2004). From a visitor experience perspective, informal rails create a visually scarred landscape particularly above the tree line. (Marion et al 2006)

Informal trail leading to the summit of North Dome in the Hunter-Westkill Wilderness.

In contrast, sustainably built trails are deliberately designed, constructed, and managed to accommodate a specific type and expected amount of use. These types of trails utilize low grades and side hill alignments and rocky substrates (Marion, 2017). Sustainability is enhanced on trails that have grades between 3-10% with rolling side-hill alignments that are closer to contour lines rather than steep fall lines and are located on landform grades >10% so that steep side slopes permanently compel the spatial concentration of foot traffic to a narrow tread that is more easily drained. These characteristics make sustainably designed trails hydrologically invisible, easy to maintain and enjoyed by a wide range of people with varying physical abilities. (Marion, Wimpey 2017).

When informal trail networks become incised on the landscape, the total amount of undisturbed habitat in an area is dramatically reduced (Ballantyne et al, 2014, Leung, 2011). In the Catskills, formerly contiguous areas of vegetation have become separated by areas of bare, compacted soils due to the establishment and use of informal trails, resulting in extensive forest fragmentation. In addition, these poorly located dense networks of informal trails increased opportunities for nest predation and created new pathways for invasive species introductions into high elevation spruce-fir forest habitats. Within the study area, the damage associated with informal trails occurs in two topographic types: steep slopes and summits. On steep slopes, the use of vertically aligned informal trails, leads directly to the loss of vegetation. Once the vegetation is lost, the exposed soil is susceptible to erosion and incision of the trail tread and in severe cases, soils can be completely lost, leading to exposed bedrock. On the formerly trailless peak summits, multiple informal trails that lead to canisters have fragmented the summit forest cover. The most severe impacts from these types of trail networks are

concentrated in the mountain spruce-fir or mountain fir communities over 3,500''. These informal trails converge at the summit canisters where areas as large as 1,200 meters have been found devoid of vegetation with exposed mineral soil, rocks, and tree roots.

Currently, the spatial extent of informal trail networks within the study area have altered the "untrammeled" appearance of the wilderness landscape within the Catskill Park. There is a growing concern that the quality of the visitor experience and biological integrity of park resources will be compromised if management actions are not taken to prevent additional proliferation of these trail networks.

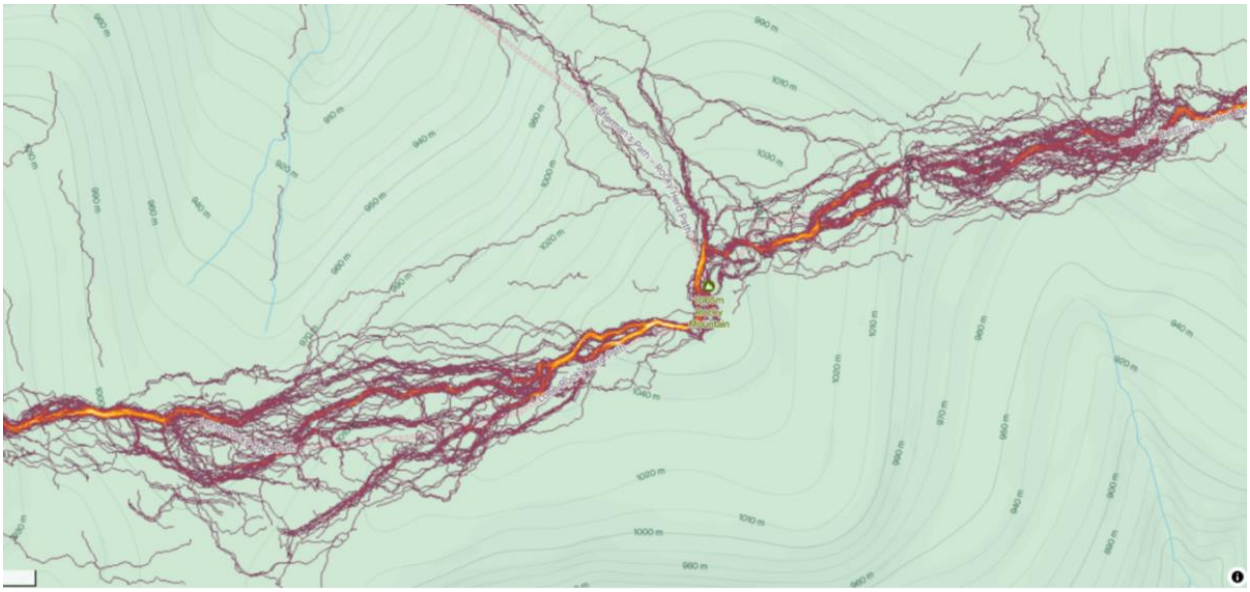


Figure 9. STRAVA heat map of the informal trail network on Rocky Mountain summit, Slide Mountain Wilderness. Note: STRAVA heat maps only reflect the activity of visitors that are using the STRAVA app. Results from a 2024 DEC study have shown that these heat maps only reflect 9%-16% of actual hiking activity on the formerly trailless peaks.

B. Field Reports and Findings

1. 2019 Visitor Use Study

By the end of 2018, DEC received several anecdotal reports, indicating that visitor created informal trails were emerging on the trailless peaks in the Catskills. At the time, DEC land managers lacked information about the volumes and patterns of visitor use on the trailless peaks above 3,500', as well as the spatial extent and lineal distribution of those unofficial trail networks. At that time, data collection within the study area was administratively prohibitive and practicably impossible due to the large size of the study area (124,814 acres) and the labor-intensive, traditional trail survey methods.

Informal trails are often short and braided in complex patterns which makes them difficult to assess due to their discontinuous and duplicative layouts (Marion, 2011). The challenges associated with identifying the locations of informal trails over a very large study area prompted DEC to use a novel approach. Before beginning any traditional field work in 2019, DEC staff used crowdsourced data[12] from publicly availably platforms, i.e. STRAVA and AllTrails, to perform a desktop analysis of 17 trailless peaks to assess and map the locations of the unofficial trail networks. This straightforward desktop analysis enabled DEC staff to efficiently and effectively locate these previously undocumented informal trail networks. The availability of crowdsourced data from smartphone hiking apps has been helpful in removing many of the obstacles associated with traditional field- based inventory work.

The primary objective of the 2019 field work was to confirm if there was a correlation between STRAVA heat maps, AllTrails GPS tracks, and informal trail occurrences on the ground. DEC staff observed and confirmed a direct correlation between the GPS track information provided by AllTrails and the informal trail locations indicated on the STRAVA heatmaps. This information has served as a benchmark by which DEC continues to strategically monitor changes to the visitation patterns and document new informal trail networks as they develop on the landscape. A second objective of the 2019 field work was to field test the data collection methods associated with informal trail monitoring protocols developed for the National Park Service (NPS) and to use that protocol to assess and document the trampling-related impacts to vegetation and soils along the existing informal trails. A third objective was to collect baseline data on recreation-related impacts to vegetation and soils on the summits of the formerly trailless peaks. The complete 2019 monitoring results can be found at: https://extapps.dec.ny.gov/docs/lands_forests_pdf/traillessreport2019.pdf

The 2019 study documented the effects of recreational visitation on informal trails using a condition class (CC) assessment, which is an informal trail monitoring protocol. The condition class assessment protocol was developed to document conditions on informal trail networks in Denali and Acadia National Parks for the NPS. A condition class assessment is a highly efficient survey method that can provide an easily understood summary of the general informal trail tread conditions. The purpose of this type of assessment is to document the progression of natural resource degradation by assigning a condition class rating based on the level of degradation of the informal trail tread. The beginning and end points of a segment along an informal trail are recorded and assigned the appropriate condition class rating. When the condition of the natural resource changes, the corresponding condition class changes and a new point is taken to signal the change in natural resource condition. Condition class assessments are a

[12] Crowdsourced data is a collection of data from a large group of people that can be used for a variety of purposes, including improving products and services, research, and transportation operations.

commonly used method to characterize and track changing site conditions (Figure 4). Condition class assessments are useful in identifying areas where heavy visitor use is causing informal trail tread conditions to deteriorate to unacceptable levels and informing where informal trail re-alignments may be required. Initially, in 2019, the informal trail networks within the study area were evaluated using a 0-3-class condition class assessment and over 39 miles of Catskill informal trails were categorized and classified by DEC staff.

Figure 10: 2019 Informal Trail Condition Classes

Class 0: Trail barely distinguishable or discontinuous; no to minimal disturbance of ground vegetation and or/ organic litter. Ground vegetation rooted within the treads is irregularly trampled.

Class 1: Trail distinguishable and continuous; some loss of tread vegetation cover (0-25%) and/or minimal disturbance of organic litter. Vegetation is trampled down and compressed. Soil exposure is similar or slightly more than surrounding areas. The trail is lightly impacted compared to surrounding areas.

Class 2: Vegetation cover is 25- 75% lost, and/or organic litter is pulverized within the center tread. There is some bare soil. The area is moderately impacted when compared to surrounding areas.

Vegetation and organic litter cover 75- 100% lost. The tread surface is predominately exposed soil with some pulverized organic litter. This area is heavily impacted when compared to surrounding areas.

The results of the 2019 condition class assessments were as follows:

	Class 0	Class 1	Class 2	Class 3	Total
Balsam Cap and Friday	0.96	0.97	1.81	0.89	3.67
Bearpen and Vly	0	0.52	1.07	2.2	3.79
Big Indian and Fir	0.99	0.59	0.71	1.26	2.56
Doubletop	0	1.03	0.98	0.31	2.32
Eagle	0	0	0.16	0	0.16
Graham	0	0	0.13	1.85	1.98
Halcott	1.73	0.89	1.61	0.1	2.6
Kaaterskill High peak	0	0.29	1.14	1.06	2.49
Lone and Rocky	1.67	2.61	2.4	0	5.01
North Dome and Sherrill	0.41	3.01	1.98	0	4.99
Rusk	0	0.8	0.73	0.48	2.01
SW Hunter	0	0.17	0.73	0	0.9
Total length (mi)*	**5.76**	**10.88**	**13.45**	**8.15**	**32.48**

*Class 0 mileage is not included in the total mileage figures because class 0 indicates that no informal trail was detected

Informal trail condition class assessments will continue to be a monitoring tool that complements the more quantitative analysis methods described in Section V: Implementation, Monitoring and Adaptive Management. This information will be used to develop natural resource maps which can be used to identify informal trail locations that may require additional analysis and realignment to prevent adverse impacts to natural resources. The complete findings and condition class maps from the 2019 report are available online at:
https://extapps.dec.ny.gov/docs/lands_forests_pdf/traillessreport2019.pdf

2. 2021 Addendum to the 2019 Visitor Use Study

During the height of the COVID-19 pandemic in 2020 and 2021, DEC staff continued to build upon the remote desktop analysis that began in 2019. Using STRAVA heat maps, this analysis revealed that a sharp rise recreational activity and expansion of informal trail networks in 2020 on all the formerly trailless peaks. There were number of noteworthy factors that influenced the amounts of visitor use between 2019-2022:

- Public lands experienced unprecedented levels of visitation while people took to the outdoors in record numbers during the Covid-19 pandemic.

- Record levels of new informal trails became established between 2020 and 2021. STRAVA heat map information collected in 2020, 2021 and 2022 indicated that most of the informal trails included in the monitoring effort in 2019 were rapidly transitioning into more entrenched and incised informal trails due to the significant increases in visitation.
- In January of 2021, the private landowner of Graham and Doubletop mountains made closed those mountains to public use.
- South Doubletop in the Big Indian Wilderness and Roundtop in the Kaaterskill Wild Forest were added to the list of required hikes to provide alternative hiking destinations for hikers that wanted to climb the 35 peaks in the Catskills as part of certain hiking challenges. As a result, heavy visitation to South Doubletop and Roundtop started in the beginning of 2021 and has led to the development of extensive informal trail networks in previously undisturbed areas.

3. 2022 Data Collection

Monitoring priorities for the 2022 field season were established using 2020 and 2021 STRAVA heatmaps to identify locations where new recreational use was occurring. Condition class assessments continued over the course of the 2022 field season. In 2022, the condition class assessment rating system was expanded to include a 0 to 5 class condition class assessment to capture a greater range of variability in informal trail tread conditions and to reflect changes in natural resource conditions more accurately and concisely (Marion, Wimpey, Carr, 2013)[13].

[13] (Marion, Wimpey, Carr, 2013). Long Term Monitoring Methods for Assessing Visitor Impacts to Mountain Summits. Final Report to the National Park Service, U.S. Department of the Interior. The report is available online at: https://www.academia.edu/19895833/LONG_TERM_MONITORING_METHODS_FOR_ASSESSING_VISITOR_IMPACTS_TO_MOUNTAIN_SUMMITS

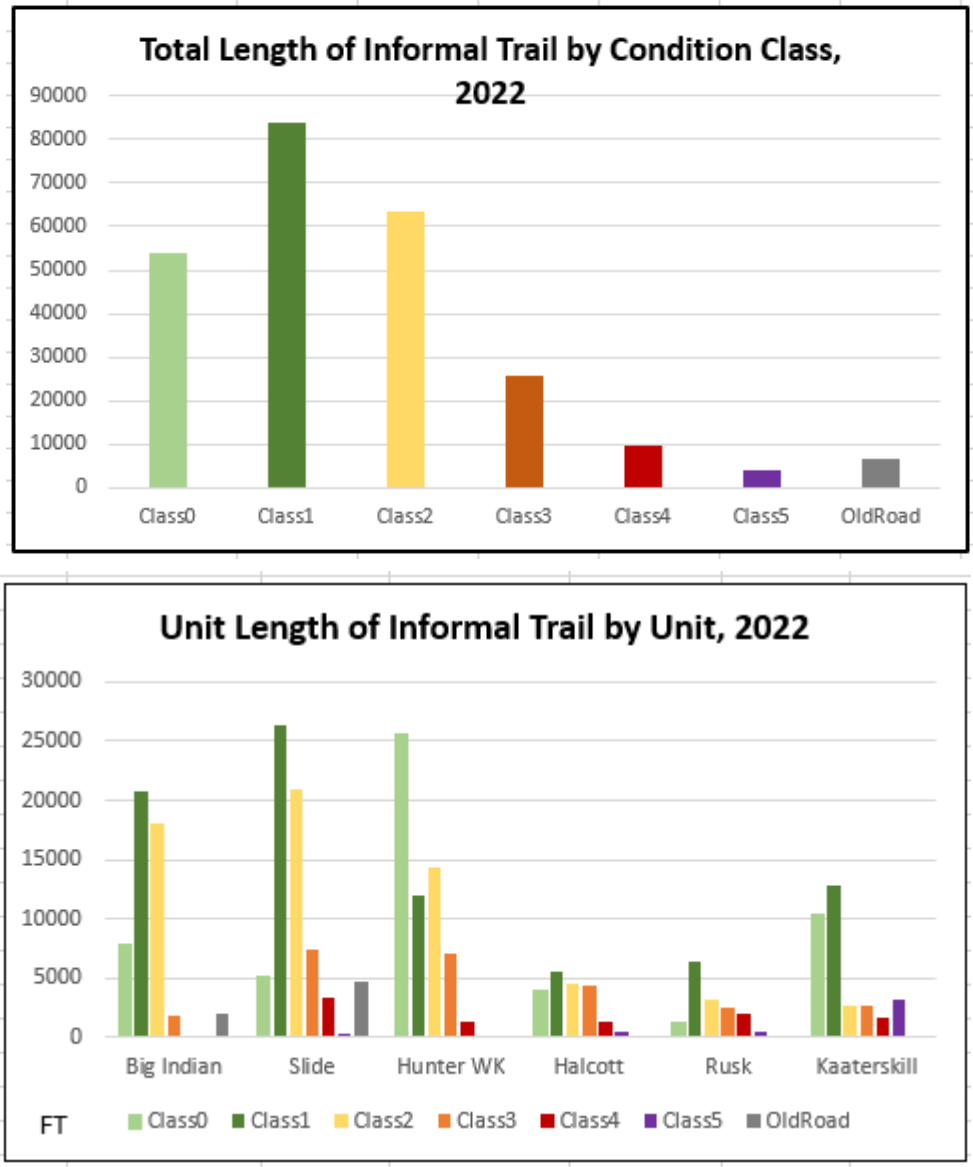
Figure 11. Illustration of the various condition and associated condition classes of informal trails in the Catskills. The condition class ratings reflect increasing levels of natural resource impacts (i.e.,0-absence of trail- 5 severely eroded, high levels of soil loss and absence of vegetation).

In 2022, informal trails were surveyed to capture data in new locations where informal trails had developed. The results were as follows:

Informal Trail Class (ft)	**Big Indian Wilderness**	**Slide Mtn Wilderness**	**Hunter WK Wilderness**	**Halcott WF**	**Rusk Mtn. WF**	**Kaaterskill Mtn WF**	**Miles**
Class0	7,851	5,153	25,576	3,854	1,213	10,277	10.21
Class1	20,767	26,323	11,886	5,532	6,401	12,788	15.85
Class2	18,019	20,993	14,396	4,438	3,171	2,555	12.04
Class3	1,826	7,393	6,967	4,289	2,393	2,701	4.84
Class4	126	3,374	1,276	1,219	1,967	1,676	1.82
Class5	0	229	0	462	387	3,121	0.79
Old Road	1,991	4,617	0	0	0	0	1.25
Total	50,580	68,082	60,101	19,794	15,531	33,118	45.55* miles of informal trails

*Old road mileage not included in the final figure.

Figure 12,13. Results of informal trail condition class assessments in 2022:



The monitoring effort was expanded in 2022 and had three main objectives, condition class and point assessments, data collection, and detailed reporting. Condition class assessments are more fully described above, and a point assessment is a trail survey method that can be used to measure trail conditions at a discreet point along a trail corridor. Finding the trail sustainability indicators that could be realistically and practically measured in the field was the first step in this process. In trail sustainability assessments, previous research used soil loss indicators like trail width, trail slope and trail slope alignment (TSA) which are measured to assess the sustainability of informal trails. These indicators were selected for the pilot point assessment collection effort in 2022.

The second objective of the 2022 field work was to test data collection procedures and create a survey that could be integrated into Survey123 to standardize and manage the data collected in the field as part of a long-term monitoring program. Survey123 software was used by field staff to collect the key soil loss indicator measurements. A third objective was to prepare a report that detailed the data collection protocols and to provide recommendations to improve the efficacy of data collection during future monitoring efforts. The Survey123 informal trail point assessment survey is provided in Appendix K and provides details on the type of data that was, and will be, collected along the informal trails during future monitoring efforts.

Unfortunately, the utility of the point assessment data collected in 2022 was limited due to two factors: point assessments were taken at random rather than fixed intervals, and the sampling intensity was not statistically significant enough to draw definitive conclusions about the degree of sustainability of the informal trails that were surveyed. Therefore, it is premature to draw conclusions about the overall sustainability of the informal trail networks based on the results from the 2022 field work. However, the methods of evaluation that were developed and applied during this effort were successfully field tested. As a result, these methods will be valuable to future monitoring efforts. Learning from the mistakes of 2022, in the future, point assessments will be taken at a higher frequency and at fixed intervals to establish a more accurate and statistically defensible assessment of trail sustainability.

The complete results from the 2022 field work can be found at: FEMC - File Info - Point Assessment Trail Monitoring (uvm.edu). Nine maps were created showing the location of each of the 94 Point Assessment Surveys taken, as well as the data collected by the surveys at each point. These maps are available in Appendix F. Appendix E contains the condition class maps that were generated using data collected during the 2022 field season.

4. 2022 NYNHP Report

It was discovered in 2019 that some of the peaks within the study area had outdated or insufficient biological inventory data. As a result, DEC contracted the New York Natural Heritage Program (NYNHP) to update, and in certain situations, finish the biological inventories of the study area's lands and summits. The results from the field work conducted by NYNHP staff were contained in the final report "Effects of Informal Trail Use on Natural Communities in the Catskill Park", which provides a complete analysis of the current condition of natural communities and a comprehensive evaluation of the impacts of visitation on natural resources. On summits with montane community occurrences, sustained hiking/visitation and multiple informal trails have had a lasting impact that has quickly degraded the forest cover's health and habitat quality.

The NYNHP report includes management recommendations to DEC for the individual peaks within the study area. The recommendations and the biological inventory information and analysis from that report are directly integrated into this plan in Section IV, Management Actions and Strategies.

During the biological inventory fieldwork, NYNHP encountered a new, high elevation forest type below the mountain spruce or spruce-fir cover and has described it as a narrow strip of deciduous forest dominated by stunted birch (*Betula spp.)* and black cherry (*Prunus serotina)* with an herbaceous layer that is characterized by poor ecological resources both in quantity and diversity. According to NYNHP, this natural community is currently categorized as Beech-Maple Mesic Forest but given its structure and composition, may represent a new natural community (NYNHP, 2022). NYNHP will continue to evaluate the possibility of elevating this community type to a new, uncommon, and potentially rare natural community in the classification schematic.

Field work conducted by NYNHP staff determined that the overall effect of informal trails on the condition of the beech-maple mesic natural community matrix may be considered negligible. However, staff found the ecological conditions immediately surrounding the informal trails to be quite poor with periodic invasive species detections. NYNHP reported that sustained hiking/visitation and duplicative informal trails have had a lasting impact that has quickly degraded the forest cover's health and habitat quality on summits with montane community occurrences. The complete 2022 NYNHP report can be found at: https://www.dec.ny.gov/docs/lands_forests_pdf/nynhpcatskill.pdf

C. Unique Resource Values within the Study Area

1. Ecological Communities

Summit ecosystems are often unique and sensitive, harboring isolated "islands" of biodiversity with rare, specialized montane flora and fauna that are adapted to survive in rocky, infertile substrates with extremely short growing seasons and harsh climates. (Emanuelsson 1985; Grabherr 1985). The ecological community occurring on or surrounding the formerly trailless peaks above 3,500'' is typically comprised of small areas of high elevation montane spruce-fir forest or boreal forest. While boreal forests are cold-weather forests found at either high elevation or far North and South latitudes, montane forests are those on mountain slopes just below the elevation where trees are unable to grow. The extent of these forests in the study area landscape is relatively small when compared to the greater landscape of the Northeast. These communities are typically much smaller than the matrix forests (40-2,000 acres) located within Catskill Park and given their small size and the significant increase in recreational use of the summits, these montane spruce-fir forest communities are among the most

threatened ecological communities within the formerly trailless peaks study area. Monitoring results have shown that the spatial distribution of the informal trail networks throughout and across the montane spruce forest community has resulted in significant forest fragmentation.

Monitoring recreational impacts in high elevation ecosystems can be particularly problematic for several reasons. Assessing the conditions of informal trails and sites is particularly important on mountain summit ecosystems because of their limited spatial extent, fragility, and potential for permanent and irreversible vegetation and substrate loss Impacts on mountain summits are long-lasting because vegetation and soils cannot recover quickly from trampling. Mitigation actions, which are frequently limited to hardening and rehabilitation of trails and sites, are logistically difficult and expensive at summit locations. Since 2019, the goal of the DEC and NYNHP's monitoring effort has been to record the effects of recreational activities on the ecological conditions of the natural communities affected by the development of informal trails.

2. New York State Bird Conservation Area Program

The New York State Bird Conservation Area Program was enacted into law in 1997 (ECL § 11-2001). The program was designed to safeguard and enhance bird populations and their habitats on selected states and waters (CPSLMP, 2008). This law also established a Bird Conservation Area (BCA) Program Advisory Committee (§ ECL 11-2003) composed of representatives from numerous conservation agencies and organizations. The committee was charged to assist State agencies on the designation, management, educational research and utilization of the sites identified as part of the BCA program. In June of 1999, New York State designated several Catskill peaks over 3,500" feet containing dense montane coniferous forests as the Catskill High Peaks Bird Conservation Area (BCA). The Catskill High Peaks BCA includes peaks over 3,500" in the Windham-Blackhead Range Wilderness, Rusk Mountain Wild Forest, Indian Head Wilderness, Slide Mountain Wilderness, and the Hunter-West kill Wilderness.

Vision Statement of the Bird Conservation Area Program*: Continue to maintain the wild character of the area, while facilitating recreational opportunities in a manner consistent with conservation of the distinctive assemblage of species nesting in the Catskill High Peaks. Promote further research at the site, particularly on Bicknell's Thrush*. - Catskill Park State Land Master Plan, pg. 98

The CPSLMP outlines several objectives for this program which include:[14]

- Identify habitat management activities needed to maintain the site as a BCA.

[14] Appendix H: Catskill High Peaks Bird Conservation Area Management Guidance Summary

- There has been little research on what effect normal use of hiking trails will have on nesting activities of montane birds (in particular, Bicknell's Thrush). Further study or research would help to assess impacts of recreational activities on nesting montane species. The need for protective measures will be discussed and incorporated into the appropriate Unit Management Plans for the Forest Preserve areas that contain the Catskill High Peaks.
- Identify seasonal sensitivities; adjust routine operations, accordingly.
- Identify state activities or operations which may pose a threat to the habitat types; recommend alternatives to existing and future operations which may pose threats to those habitats.
- Identify any existing or potential impacts; recommend new management strategies to address those impacts.
- Determine education and outreach needs, recommend strategies and materials.
- Identify research needs; prioritize and recommend specific projects or studies.

Three criteria were referenced in establishing a Catskill High Peak as an important bird area. The peak must contain the following:

a) a diverse species concentration site,
b) an individual species concentration site, and
c) a species at risk site (ECL 11-2001 [3][f], [g], and [h]).

The vision for the Catskill High Peaks BCA was to maintain the wild character of the area while facilitating recreational opportunities in a manner consistent with the conservation of the distinctive assemblage of bird species nesting in the Catskill High Peaks (CPSLM, page 23). The locations of the BCA in the Catskill can be viewed at: Catskill High Peaks Bird Conservation Area Map (ny.gov). There is a direct correlation between the locations of the BCA's and the locations of highly duplicative informal trails. The Governor's office disbanded the Bird Conservation Areas Advisory Committee, which evaluates potential BCAs and recommends them for adoption, during the 2008-9 recession and never authorized it to be reconvened. It has essentially been dormant since.

3. Mountain Birdwatch Program in the Catskills

Habitat loss on overwintering grounds, climate change and the corresponding projected changes in precipitation patterns, growing season dynamics, and plant community composition as well as high levels of recreational pressure is creating challenging conditions for montane birds' species in the northeast. As the climate warms, encroachment of northern hardwoods on high-elevation fir and spruce could eventually

reduce the extent of suitable habitat for many range restricted montane birds that require spruce-fir forest and mountain fir forest habitat for their continued reproductive success. Such vegetation shifts have the potential to indirectly increase competition between montane birds and lower elevation bird species as the latter move upslope (Takacs et al 2023). In the Catskills, high elevation communities exist in isolated pockets of suitable habitat and birds will have little opportunity to move elsewhere, making these species particularly vulnerable to stressors.

Mountain Birdwatch (MBW), is a citizen science program run by Vermont Center for Eco studies that has been tracking populations of montane bird species in the high elevation forests of the northeastern United States since 2000. MBW volunteers focus on monitoring 10 species of montane birds, which are rarely detected during traditional roadside bird monitoring schemes, such as the USGS North American Breeding Bird Survey (BBS), due to their higher elevation habitat requirements. Nine of the ten species monitored by MBW occur in the Catskills. MBW data captures presence, absence, numbers of individuals and distances, which in turn can be used to calculate bird species occupancy and abundance. Typically, MBW monitoring occurred at on fixed points along high elevation formal trails in the Catskills. Until recently, monitoring data had not been collected within the vicinity of, or along informal trails in areas with prime spruce-fir forest habitat.

According to the 2023 State of Mountain Birds report[15], there have been precipitous declines in the species abundance across the Catskills. Across the entire Mountain Birdwatch region, which ranges from the Catskills to Katahdin, ME, seven species (Yellow-Bellied Flycatcher, Winter Wren, Bicknell's Thrush, Swanson's Thrush, Hermit Thrush, Blackpoll Warbler, and White Throated Sparrow) have experienced average declines of approximately 40% since 2020 (Hill, J.M 2024). The fastest declining montane bird species monitored by the MBW in the Northeast is the White-Throated Sparrow. As of 2023, the greatest declines in that species' abundance throughout the Northeast were documented to be in the Catskills (Hill, 2023).

In 2023, SUNY New Paltz, NYSDEC, the Vermont Center for Ecostudies, and the Cary Institute for Ecosystem studies partnered to expand the MBW monitoring effort to better understand the relationship between off-trail hiking and bird species densities and abundance in the montane spruce-fir forests in the Catskills. Data was captured along sample points along established formal trails on Big Slide, Hunter and Plateau (trails that experience high visitation in the summer months) and along informal trails on Southwest Hunter, Balsam Cap, Dink, Friday and Rusk (informal trails that experience

[15] Hill, J.M. The State of Mountain Birds Report: 2023.Vermont Center for Ecostudies, White River Junction, VT. https://mountainbirds.vtecostudies.org/wp-content/uploads/2023/12/State-of-the-Mountain-Birds-Report-2023-v2.pdf

regular visitation). During the 2023 monitoring effort, sample points were located along and along informal trails on Little Slide, the south shoulder of Slide, the North shoulder of Sugarloaf, Rusk, West Hunter and Southwest Hunter (informal trails that have low levels of visitation) between 3300-4200 feet (Takacs et al. 2023).17 of the 28 species detected at point counts during the 2023 monitoring effort consisted of neo-tropical migrants. These bird species migrate to, and overwinter in Central America, South America and the Caribbean and travel long distances to breed and nest in the high elevation spruce-fir forests of the Catskills between 3,300 and 4,200 feet in elevation [16].

4. Montane Birds of the Catskills

During the 2023 monitoring study, birds were surveyed in 72 locations on 10 different mountains in the pre-dawn hours of the day. Field technicians collected data on the vegetative structure and community composition of the peaks they monitored. A total of 27 species and nearly 1,000 individuals were encountered during the 2023 field survey. Results of the monitoring showed that the highest rate of detection for focal species occurred in low visitation areas. The high visitation, informally trailed areas and the high visitation formally trailed areas had significantly less detections in comparison. According to the 2023 report, one of the strongest predictors for species richness was tree diameter at breast height (DBH). Data suggested that sampling locations with smaller trees had greater species abundance and richness, which is consistent with the conditions encountered at higher elevation forests that includes stunted fir trees. Across peaks containing informal trails, focal species abundance and richness was greater in areas with less human visitors (Takacs et al. 2023). Preliminary study results showed that the total number of birds detected decreased as the condition class of the informal trail increased.

[16] Neotropical migrants that were detected in 2023 between 3,300 and 4,200 feet include Hermit Thrush, Winter Wren, Yellow-bellied Flycatcher, Mourning Warbler, Bicknell's Thrush, Blackpoll Warbler, Swainson's Thrush, Magnolia Warbler, Black and White Warbler, Black Throated Green Warbler, Black-Throated Blue Warbler, Purple Finch, Red-Breasted Nuthatch, Golden-crowned Kinglet, Blackburninan Warbler, Red Crossbill and Yellow-rumped Warbler.

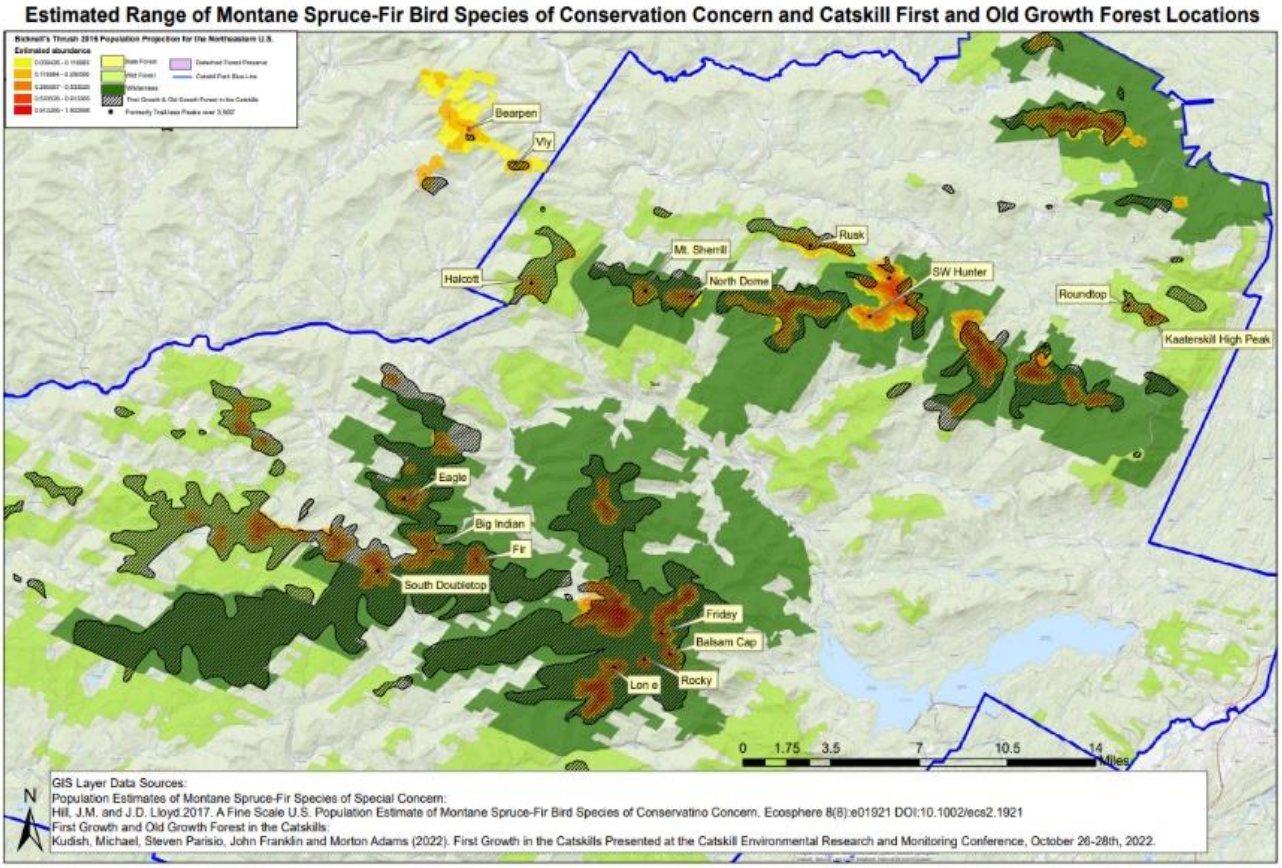


Figure 14. Spruce fir, Old Growth Forest, and Estimated Range of Spruce-Fir Forest dependent bird species

Recreational impacts to montane bird species can include direct effects such as disturbance, harassment, damage to habitat (i.e., damage to tree branches or understory during bushwack hiking), and habitat fragmentation. Indirect effects of recreation may also include, modification of bird behavior, temporal or spatial displacement from food or water, or nest abandonment. Hikers who choose to hike off trail (bushwack) can inadvertently disturb or harm species that nest on or near the ground. Visitors that are bushwack hiking can break off the lower branches of woody plants and trample short vegetation, thereby reducing understory density and reduce the quality of available habitat. The quality of available nesting opportunities for these species is being impacted by the effects of this hiking behavior. Additional monitoring will be necessary to assess species resiliency and their ability to respond to increased human activity in the higher elevation montane communities.

Previous research conducted in Eastern North America evaluated the recreational disturbance associated with trails in protected areas. This research found that birds that nest or forage on the ground responded negatively to recreationists at a greater

distance than birds nesting or foraging higher in the canopy, suggesting that these species are more sensitive to recreation related impacts. (Ford, 2020) Breeding conditions and activities such as nest establishment and rearing young, are particularly sensitive times for wildlife when typically, they need access to more or higher quality resources. There is consensus among researchers that many fauna are more prone to negative impacts associated with recreation during breeding season (Naughton, 2021).

Several montane bird species found in the Catskills nest in the dense and scrubby spruce-fir forests that occur in small pockets at high elevations. Range restricted, neotropical ground nesting songbirds like the Bicknell's thrush are of particular concern as their average nest height is about five feet off the ground (Rimmer, McFarland). There are several montane species that occur within the study area that nest between roughly 0 and 5' feet off the ground including:[17]

- **Bicknell's Thrush** (*Catharus bicknelli)* is one of the rarest songbirds in North America, where it breeds only in the montane forests of mountaintops in the NE US and far Eastern Canada. It nests in dense stands of short- or stunted balsam fir at high elevations, usually close to the tree trunk. These birds build their nests an average of five feet above the ground, preferring the thick vegetation of regenerating forest edges or gaps. A neotropical migrant, this thrush spends the winter in the Dominican Republic/Haiti and a few other Carribean islands. There are two separate breeding populations of Bicknell's Thrushes in New York State- one in the Catskills and the other in the Adirondacks where the birds breed only in the montane spruce-fir forests above 3,500' feet. The Catskills are the southernmost portion of its global breeding range. Because of its steep decline and limited range, the Bicknell's Thrush has been classified as a Vulnerable Species globally by the International Union for the Conservation of Nature (IUCN) Red List of Species for 2020. Mountain Birdwatch data for the Catskills region shows a 60% decline in detections of this species since 2020 (Hill, J.M 2024).

- **The Yellow-bellied Flycatcher** (*Empidonax flaviventris*) is a little-studied and reclusive bird of the boreal forest. It builds its nest in thick sphagnum moss on the ground or just above it. It may also do so in low, protected areas, for example, among the overturned roots of fallen trees. The nests are usually very hard to find, well hidden inside mosses with a narrow entrance. Often spending less than 70 days on its breeding grounds in North America, this species has one of the shortest stays of any neotropical bird. Its wintering grounds are in southeast Mexico and Central America, where it spends most of the year. It's

[17] Source for species information: Cornell Lab: All About Birds https: www.allaboutbirds.org/

breeding range extends across much of Canada and dips down into the NE US, with the Catskills near the lower limit of its breeding range. While the global population appears stable, it is experiencing a 55% decline in the Catskills.

- **The Blackpoll Warbler** *(Setophaga striata*) is a tiny member of the wood-warbler family that is notable for its high-pitched songs, long migrations, and its high densities in the boreal forests of the North. It builds its nests in spruce and fir trees, usually close to the tree trunk at elevations between 0.5 and 3.0 feet. An extreme long-distance neotropical migrant, this warbler spends the winter in the northern regions of South America before flying up to 5,000 miles to breed in the boreal forests of Canada and on mountaintops in the Northeastern US. Globally, it is listed as IUCN near-threatened, because of declines in the US portion of its range. It has declined by 60% in the Catskills since 2020.

- **The Hermit Thrush** (*Catharus guttatus*) is a shy forest thrush with an ethereal flute-like song. Eastern Hermit Thrushes nest on the ground or occasionally in low shrubs, often under ferns or small herbaceous plants or logs with deep leaf litter. It is the only forest thrush in North America to overwinter in the Southern areas of the US by switching its diet from arthropods to waxy berries. It migrates to breed in the Northern forests of Canada and the mountains of both the Eastern and Western US. It's large range and short migration may explain how this thrush has avoided the global population declines of many other Catharus thrushes (It is listed as a species of Least Concern), but it is rapidly declining in the Catskills (60% since 2020).

- **The White-throated Sparrow** (*Zoonotrichia albicollis*) is a large ground-foraging sparrow with a slow, clear-whistled song. It builds its nest on or near the ground, usually in level forest openings with a thick ground cover where they prefer dense areas of regenerating conifers such as balsam fir. This sparrow rarely builds its nests off the ground, usually in low trees, brush piles, or shrubs. The White-Throated Sparrow is the species that MBW is tracking that is declining at the steepest rate as of 2023, with the Catskills experiencing the sharpest declines in species abundance in all the Northeast (80%), perhaps because the Catskills are near the Southern limit of their breeding range. However, it is a short-distance migratory species, wintering in the mid-and Southern US and West Coast, and breeding in the Northern NE US and Canada. The NE US is one of the few places where this species exists year-round, although individuals likely are migrating to and from this area. Over its global range, this species is listed a species of least concern.

- **The Winter Wren** (Troglodytes hiemalis) is a tiny, round, brown bird with a long complex and tinkling-sounding song that is commonly heard in deep forest ravines and mountainsides. It nests in naturally occurring cavities near the gound (below 6 feet), such as cracks in rocks, old woodpecker cavities, rotting stumps, and holes in streambanks and is an old-growth forest specialist, preferring interior forest locations with dense evergreens and plentiful snags and brush piles. This species is a short distance migrant wintering in the Southern US and breeding in Eastern Canada and the northern NorthEast of the US. They can be found year-round at high elevations in Pennsylvania and New York, but individuals likely migrate. They are a species of Least Concern globally but are declining in the Catskills (50% since 2020).

- **The Swainson's Thrush** (*Catharus ustulatus*) is a secretive thrush of the Northern boreal forests with a flute-like song. Swainson's Thrushes build nests low in vegetation (many between 2-4 m), often in Balsam fir or spruce saplings in the East. This species is a neotropical migrant, wintering in Northern South America and Central America and breeding across the boreal forests of Canada through Alaska with some breeding along the West Coast, in the Mountains of the West, and the mountains of the Northeastern US. Although they are not yet listed as a species of conservation concern, they are being considered for listing as vulnerable in several states due to population declines, and Mountain Birdwatch data shows a steady decline in the Catskills (18%), although not as steep as for the other thrush species.

- **The Black-capped Chickadee** (*Poecile atricopilla*) is a common, year-round resident of forests across the continent that is hardy enough to survive year-round in the montane forests of the Catskills High Peaks. It is a cavity nester, modifying natural cavities or those made previously by woodpeckers. Due to its large range and habitat flexibility, it is a species of least concern, and the only montane focal species monitored by Mountain Birdwatch that is increasing in the Catskills (60% increase since 2020).

White-throated Sparrow *Zonotrichia albicollis* WTSP	Black-capped Chickadee *Poecile atricopilla* BCCH	American Goldfinch *Spinus tristis* AMGO	Hairy Woodpecker *Leuconotopicus villosus* HAWO
Hermit Thrush** *Catharus guttatus* HETH	Bicknell's Thrush** *Catharus bicknelli* BITH	Blue Jay *Cyanocitta cristata* BLJA	Red-breasted Nuthatch** *Sitta canadensis* RBNU
Winter Wren** *Troglodytes troglodytes* WIWR	Blackpoll Warbler** *Setophaga striata* BLPW	American Robin *Turdus migratorius* AMRO	Golden-crowned Kinglet** *Regulus satrapa* GCKI
Yellow-bellied Flycatcher** *Empidonax flaviventris* YBFL	Swainson's Thrush** *Catharus ustulatus* SWTH	Black-throated Green Warbler** *Setophaga virens* BTNW	Blackburnian Warbler** *Setophaga fusca* BLBW
Dark-eyed Junco *Junco hyemalis* DEJU	Magnolia Warbler** *Setophaga magnolia* MAWA	Black-throated Blue Warbler** *Setophaga caerulescens* BTBW	Red Crossbill** *Loxia curvirostra* RECR
Mourning Warbler** *Geothlypis philadelphia* MOWA	Black-and-White Warbler** *Mniotilta varia* BWWA	Purple Finch** *Haemorhous purpureus* PUFI	Yellow-rumped Warbler** *Setophaga coronata* YRWA

0-5 ft
5-15 ft
15-25 ft
25-60+ ft

*Figure 15. Source: Takacs, D., Belinsky, K. Hart. S, Hill, J. "Impact of Human Visitation on Montane Breeding Bird Populations in the Catskill High Peaks. (2023) Cary Institute for Ecosystem Studies. Common Names, Latin Names, and 4-letter alpha codes of species that were detected at least twice by fellows during 2023 summer point counts in the Catskills. The black box indicates the focal species, and the color scale represents average nesting height from the ground (varies significantly- information gathered from allaboutbirds.org) ** Indicates neo tropical migrant.*

5. Montane Bird Monitoring

Weather conditions throughout the course of the 2023 monitoring effort were less than optimal. The 2023 summer season was very wet, and field technicians faced challenging conditions due to excessive smoke from wildfires in Canada. The singing behavior of birds can be heavily impacted by these factors and therefore data collection should continue for several years before definitive conclusions can be made from the monitoring results. However, one of the key findings from the 2023 study and monitoring effort was that the placement and type of trail (formal vs informal) had less of an impact on bird species than the level of visitation pressure. (Takacs, et al. 2023). Preliminary findings indicate that species abundance, richness and detections increased in areas with fewer human visitors. A preliminary management recommendation from the study suggests that the designation of a formal trail in areas of high visitation would protect

vulnerable bird species by reducing the area of the landscape that is impacted by human visitation. The "Human Visitation Impacts on Montane Breeding Birds in the Catskills High Peaks" study[18] concludes that hiking trails adversely affect all birds. Bird abundance and diversity was lowest on official trails,[19] intermediate on unofficial trails with high hiker use and highest at the control sites which were unofficial trails with low to no hiker use.

A potential management action that could be taken would be to formally designate trails on the formerly trailless peaks. Such action may increase the levels of visitation to these summits and surrounding areas, but the tradeoff is that the extent of trail-free habitat would be maximized by consolidating foot traffic to a single corridor. Recreation ecology research has shown that forest patch area and areas of trail-free habitat positively influence the density of ground-nesting birds observed in study sites. (Thompson, 2015). More research is needed to understand whether bird populations are negatively affected by current and future levels of human recreation, both on and off trail on mountain summits in the Catskill High Peaks. It is anticipated that survey work will continue

The breeding and nesting season in the Catskill High Peaks for montane birds' spans between late April and late June. During that time, unleashed dogs may kill or injure adults and chicks, destroy eggs and nests, displace birds from critical habitat. Such activities result in shifts in breeding or foraging behaviors (Jorgensen and Brown, 2014). High numbers of unleashed dogs on mountain summits within the study area could potentially result in increased mortality of some threatened bird species like the Bicknell Thrush. DEC is charged with protecting rare and threatened species. If the populations that are precipitously declining become critically imperiled, regulatory changes may be required. Hikers can protect vulnerable and threatened wildlife (particularly during mating and nesting season between April and July) by leaving dogs at home or keeping dogs on leashes during hikes especially in summit areas over 3,500'.

For VUM decision making, a key influential factor is understanding how recreational access, and the level of conservation use may affect wildlife conservation objectives (Marion, 2019). Given the substantial reductions in species abundance documented since 2010 by MBW, further development of scientific knowledge and best management practices for montane birds is needed to conserve their native populations In addition, visitor experience surveys indicate that there is a lack of awareness of visitor created impacts to these montane bird species. As a result, a sustained and robust education effort is necessary promote responsible recreation on mountain summits within the

[18] This study is available at: https://dec.ny.gov/nature/forests-trees/forest-preserve/visitor-use-management

study area, particularly during mating and nesting seasons of the montane birds in the Catskills.

6. Montane Forests

Along with montane birds, the Catskills High Peaks are home to another rare resource: montane forests, i.e., the spruce-fir forest cover upon which many montane birds depend. Montane birds rely on high elevation forest communities found on isolated peaks in the Catskills. These forest communities represent unique habitats that warrant special protection. The impact of climate change on natural processes and high elevation forests are a growing concern within the study area. Impacts include increased frequency of severe weather events, dwindling high elevation spruce-fir forest habitat, changes in phenology, and longer growing seasons.

Montane forests in the Catskills are home to rare and vulnerable species that depend on old or mature tree stands at high elevations. The unique structural and vegetative composition of montane forests allows them to provide opportunities for specialized species and rare community relationships. Changing climate is reducing the extent of the spruce-fir forest biome as lower elevation communities respond to increasingly favorable conditions at higher elevations. One of the key goals of this visitor use management planning process is to identify strategies that will help to manage visitation to trailless peaks and reduce fragmentation of these montane forests caused by the proliferation of informal trails.

Dr. Michael Kudish, a forest historian of the Catskills, has mapped the known extent of first growth forests in the Catskills. According to Dr. Kudish, a forest is considered first growth if “human beings have not been in the forest making changes.” It can be any forest type at any elevation if it has not been altered by people. Dr. Kudish estimates that there are at least 110 square miles of first growth forest in the Catskills today (Kudish, 2000). The montane forests found on the Catskills High Peaks are primarily first growth forests. Given their location at high elevations, these forests haven’t been logged, barked, burnt, or altered by humans in any way. First growth forests are not the same as old growth forests. Ecologists usually describe old growth forests as stands that include widely mixed-aged trees, irregular canopy openings due to tree falls, standing dead trees or snags, pit-and-mound topography created by long-dead windblown trees, multi-layered canopies, late successional or shade tolerant species, and minimal disturbance. In old growth forests, trees die of old age or other natural causes and simply fall over. Much of the area Dr. Kudish delineated as first growth in the Catskills would also be old-growth forest. The first growth forests of the Catskill High Peaks, while old, have a slightly different history from old growth forests. First growth montane forests are distinguished from old growth forests because the former are dominated by stunted spruce-fir communities (instead of having complex canopy

structures), have shallow soils (instead of deep organic soil layers), do not contain an extensive above-ground woody debris layer, and individual trees in these first growth montane forests do not get very old (i.e., rarely live past 100 years) due to the harsh summit weather conditions and exposure to extreme weather events.

Several species of mosses and lichens are used as old growth indicators, as they are slow growing and almost exclusively found on old growth trees in pristine forest environments. Lichen and moss research is continuing to evolve in the Catskills, with several new species identified within the past few years. These discoveries may be indicative of (rich and probably not yet fully understood) species diversity that can be found on old growth trees in the Catskills. Species indicative of old growth include Shingle Moss (*Neckera pennata),* Wall Scalewort (*Porella platphylloidea*), Lungwort (*Lobaria pulmonaria*), Tree Skirt Moss (*Anomodon attenuates*), Shaggy Fringe Lichen (*Anatychia palmulata*), Ghost Antler (*Pseudevernia cladonia),* Smooth Lungwort (*Ricasolia quercizans*) and Powder-headed tube lichen (*Hypogymnia tubulosa*). To reiterate, most of the epiphytes listed are found on maples and other lower elevation tree species, not in montane forests on summits.

7. Invasive Species

Increased visitation to the study area has resulted in the proliferation of informal trail networks that has increased forest fragmentation and created new pathways for the spread of invasive species. While many non-native species do not have adverse effects on the areas in which they are introduced, some become invasive in their new ranges by disrupting ecosystem function, reducing biodiversity, and degrading natural areas. Invasive species have been identified as one of the greatest threats to biodiversity. Invasive species can damage native habitats by altering hydrology, fire frequency, soil fertility and other ecosystem processes. The accidental introduction and dispersal of non-native invasive flora by hikers is a serious concern for land managers. Invasive species compete with native plants and animals for space, nutrients, and water. They can damage forests, limit food for wildlife, take over fields and wetlands, dominate waterways and even cause human health problems. Soils, seeds, and plant parts carried on shoes, bikes, pets, and gear can spread invasive plants and animals to new places. Non-native species can alter how a system can cycle nutrients and energy, change food web structure and dynamics and causes declines or loss of native biotic species and assemblages leading to reduced native biological diversity. When a non-native insect or disease is introduced from another country, the natural controls in its native range are often lacking in its new “home,” causing epidemic population levels and rampant infestations. Invasive species threaten the natural processes in state lands as they can outcompete native species, particularly considering climate change. Invasive

species create monocultures in once diverse habitats and substantially alter the natural wildland fire regime.

Preventing invasive species introduction is the preferred strategy and the first line of defense. Prevention measures are usually the most cost-effective means to eliminate the environmental and economic impacts caused by an invasive species. One of the most concerning new invasive species in the region is *Amynthas app* and *Metaphire spp,* commonly known as jumping worms. The jumping worm adversely impacts forest soils and consumes the forest duff layer, which is a critical component that provides habitat for native plants and wildlife. The worms make the soil gravellier in structure, more prone to erosion and less favorable to important soil microorganisms such as fungi and bacteria. Jumping worm cocoons are very small and are easily transported but can be removed with mud on boots. DEC will continue to work with regional partners and stakeholders to spread awareness about how to prevent invasive species transport and introductions and will actively monitor for and document and new detections.

III. Visitor Use Management Direction

This section relates to Element 2 of the VUM framework: Visitor Use Management Direction. Specifically, this section defines desired conditions for the project area, identifies an indicator and associated thresholds and defines appropriate visitor activities, facilities and services. As noted earlier in this document, a well-defined VUM vision protects against gradual or haphazard change, communicates a clear future vision, and gives an explicit link to future management actions. Utilizing the process of identifying and managing visitor usage patterns and volumes, supports the development of strategies that will result in sustainable management and protection of resources while providing visitors with a variety of high-quality recreational experiences. Maximizing the amount of trail-free habitat and landscape connectivity on Wilderness, Wild Forest, and State Forest lands and creating ecological conditions that support native wildlife habitat and biodiversity are important objectives of this planning process and management effort. Through this document, DEC aims to provide visitors experiences that are consistent with the management guidelines for State Forest, Wilderness, and Wild Forest land classifications as stated in the SPSFM and the CPSLMP.

A key objective of this section is to define what natural resource and experiential conditions DEC seeks to achieve and how those conditions will be tracked over time. The first part of this section introduces conceptual management “zones” for the formerly trailless peaks and includes information on how these management zones were defined and delineated. The desired condition statements that define future natural resource conditions and type of visitor experiences have been customized for each management zone. These management zones have been drawn to account for variations in the types of forests that exist at different elevations, as well as variations in visitor use intensities and recreational impacts.

A fragmentation analysis was utilized to identify indicators and thresholds for the formerly trailless peaks and the analysis process is described in detail in this section. Aligning with the Interagency Visitor Use Management Council (IVUMC) best practices to support VUM Element 2, this section provides a description of the appropriate and inappropriate recreational activities and facilities that are suitable and compliant with the management standards for each land classification covered by this plan. The types of recreational activities that are inconsistent with the area’s intended uses and that are having unsustainable effects on natural resources are described later in this section.

A. Desired Conditions by Zone

Desired conditions may vary across a landscape depending on resource types and the types of desired visitor experiences. Zoning allows land managers to evaluate each area for specific needs and opportunities while considering integrated resources and visitor use connections among all areas. (IVUMC, 2023). Many of the VUM plans developed by federal agencies divide the landscape into management “zones” which reflect the differences between natural resource occurrences and visitation patterns between different areas. A customized desired condition statement is included for each of the management zones described in this section. While developing desired conditions for different zones makes implementation slightly more complicated, the advantage is that managers can strategically allocate resources based on the management requirements of the natural resource occurrences in each zone.

The reality is that not all areas within a particular land unit or mountain summit have the same ecological sensitivity. Certain areas require more protection than others; not all areas have the same attractiveness, and visitors are not all seeking the same types of recreational opportunities. The key is to identify a zoning scheme that recognizes the desired diversity across the landscape while avoiding zoning that is more complex than can be realistically managed for on the ground (IVUMF, 31). For the purpose of this project, zone delineation was informed by administrative boundaries, visitor use patterns, habitat irreplaceability, and ecological vulnerability. The zone boundaries and features that have been selected for this project are described on the following pages.

1. Management Zone Delineation[20]

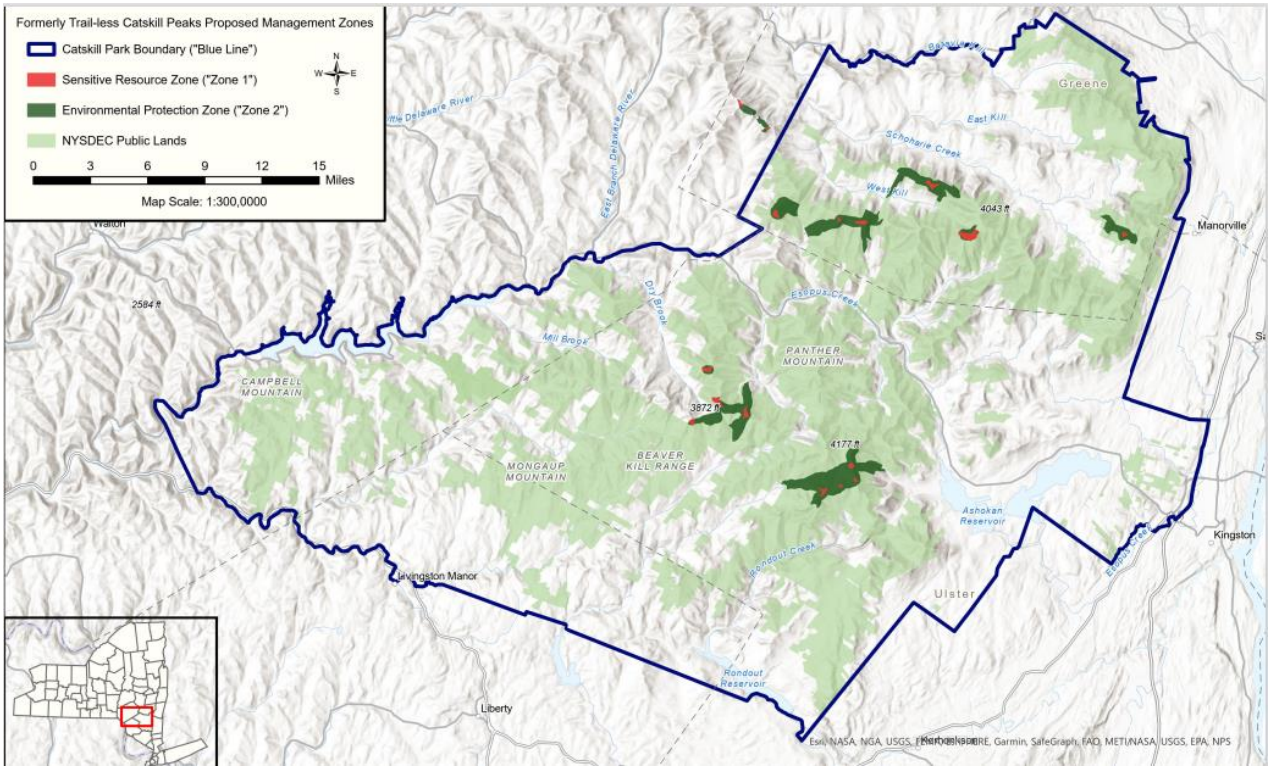


Figure 16. Proposed Management Zone boundaries for the formerly trailless high peaks

In the trailless peak areas, visitation varies greatly and is loosely concentrated below 3,500' feet in elevation. In areas over 3,500' feet, informal trails start to consolidate and duplicate significantly. This is likely because as visitors approach the summit, the overall land area decreases and the amount of terrain restrictions such as steep slopes, rock outcrops, and cliffs increase. The monitoring effort and resource allocation related to each zone will be continuously evaluated as data is gathered to identify any areas that may require additional resource allocation and analysis.

Zone 1: The Sensitive Resource Zone Delineation and Desired Conditions

The "Sensitive Resource Zone" or Zone 1, includes the formerly trailless peak summit areas at, or above 3,500' feet. Zone 1 was delineated at the 3,500' foot line for two

reasons. First, it aligns with the administrative boundary at 3,500' where regulations begin to limit certain recreational activities. Many visitors are aware that elevations above 3,500' have different regulations than lands below 3,500'. Second, this elevational boundary roughly aligns with recorded occurrences of montane Spruce-Fir Forest habitat affirmed by observational comparisons between high-resolution color-infrared orthoimagery (Orthoimagery | GIS (ny.gov) and GIS data provided by the New York Natural Heritage Program. Finally, compared to lands at lower elevations, the occurrence of informal trail networks increases significantly above 3,500' and will likely require a more intensive management response.

In the high elevation montane spruce-fir areas, the effects of informal trail networks on the environment have been found to be more severe (Henschell, 2022). The 3,500' contour line on 14 of the 16 formerly trailless peaks was used to objectively determine the boundary for Zone 1 with two exceptions: Halcott and Rocky Mountains. Halcott Mountain (~3,537 feet) and Rocky Mountain (~3,508 feet) contain very little summit area above 3,500' feet and therefore the Zone 1 boundary on these summits was extended to 3,400' feet to capture the summit conditions more accurately on those peaks.

The upper elevation spruce-fir forests found on many of the formerly trailless peak mountain summits provide breeding and nesting habitat for neo-tropical, ground nesting (nesting location between 0' and 5' off the ground) montane bird species. Zone 1 comprises regions where the current recreational pressure on these summits could potentially cause long-term, irreversible harm to natural resources, including numerous montane bird species.

Zone 1: Sensitive Resource Zone Desired Condition Statement

Natural Resources- Habitat in the Sensitive Resource Zone is free from extensive forest fragmentation caused by visitor created informal trails and retains the conditions required to support native habitat, wildlife, and biodiversity. Visitor related impacts to natural resources are barely detectable and opportunities for solitude are abundant. Changing ecological patterns due to climate change, including variations to wildlife hibernation periods, migration patterns, and/or lengthened growing seasons are considerations in management decisions. Native plants thrive away from areas used by people and competition with invasive species is minimized. Visitors understand the importance of staying on the trail.

Visitor Experiences- Visitors have opportunities for primitive recreation such as backpacking; adventure; self-discovery; and self-directed learning. Opportunities for independence, closeness to nature, tranquility, and the application of outdoor skills are moderate to high. The probability of encountering other visitors is low.

Visitors have the appropriate knowledge, skills, and attitudes to care for the environment. They have an opportunity to develop a deep understanding and appreciation for the unique ecosystems that exist on the formerly trailless peaks.

Facilities & Infrastructure- Trails that have been approved by DEC are sustainably built on slopes that support proper drainage and do not contribute to erosion.

Zone 2: The Environmental Protection Zone: Delineation and Desired Conditions

The "Environmental Protection Zone," or Zone 2, is defined as the area below 3,500' within a 500-meter buffer that was established around the existing informal trail networks. Because there is not an administrative boundary below 3,500' to objectively delineate a management Zone, a different process was used to define the boundary for Zone 2. This process included digitizing and buffering the informal trails under 3,500' using a 500-meter setback to define the" Zone of Influence" (ZOI)[21] on 14 peaks [22] In Zone 2, there are instances where two mountain areas had to be combined because the informal trail network below 3,500' between them was interconnected (North Dome, Sherrill, Rocky, Lone, Balsam Cap and Friday) which is reflected in graphs and charts on the following pages. Trails can influence and impact wildlife behavior and there are several ways in which different wildlife species can respond to recreational activity within the ZOI. Recreational activity on trails can lead to intrusion induced behaviors, such as nest abandonment or increased alertness which can reduce foraging efficiency and attentiveness to young.

The predominant forest habitats in Zone 2 are composed of hemlock forests, northern hardwood, spruce-northern hardwood, and beech-maple mesic forests. These forests are more resilient to the effects of informal trail usage and are less sensitive to recreation related impacts (Henschell, 2022).

Zone 2: Environmental Protection Zone Desired Condition Statements

Natural Resources - Connectivity and quality of wildlife habitat are preserved by promoting foot travel along a single, clearly marked trail corridor. Wildlife populations thrive and conflicts are avoided so that animals and visitors are not

[21] ZOI is the effect of human disturbance from development, trails, or other activity, projected over space onto ecological processes (Ford, 2020). The ZOI is determined by generalized flight initiation distance and alert distance of a species. The secondary zone of influence can extend up to 500 meters from a recreational trail and therefore the informal trail networks were buffered by 500 meters to establish the Zone 2 boundary. (Naughton, 2021)

[22] On Halcott and Rocky, Zone 2 was defined by buffering informal trails under 3,400'.

harmed. Changing ecological patterns due to climate change, including wildlife hibernation and migration, or lengthened growing seasons are accommodated and accounted for in land management decisions. Native plants thrive away from areas used by people and where competition with invasive species is minimized.

Visitor Experiences - Visitors experience a sense of adventure along a lightly marked, sustainably aligned, side hill trail. The area provides frequent opportunities for solitude with a low to moderate number of visitors. Visitors have opportunities for primitive recreation such as backpacking with some solitude; adventure; self-discovery; and self-directed learning.

Facilities & Infrastructure - Trails approved by DEC are lightly marked, sustainably aligned, and have side hill alignments. Trails in Zone 2 are designed and managed to accommodate the type, amount, and seasons of visitor use with minimal soil loss, widening, and muddiness. In remote Wilderness, Wild Forest and State Forest areas intended to provide outstanding opportunities for self-reliance and discovery, the landscape will be relatively free of man-made features, including informal trails.

B. Zone 1 and 2: Indicators and Thresholds

The natural resource indicator and thresholds that were chosen for this project are connected to visitor use, sensitive to change and can reasonably and reliably be used to measure change in natural resources conditions over time. [23] DEC staff determined that the appropriate natural resource indicator for the formerly trailless peaks for both management zones is a measure forest fragmentation caused by informal trails. An easy and effective way to objectively quantify habitat subdivision is to count the number of forested “patches" that are made by trails. The natural resource indicator chosen for this project was the “Number of Patches” in a management zone, which directly reflects the degree of forest fragmentation brought on by the existence of informal trails.

A forested “patch” is defined as a contiguous forest area bordered and bounded by (in)formal trails. Forested habitat gets more fragmented (i.e., broken up into separate patches) as the number of habitat patches rises. The number of patches is an indicator that provides a fundamental description of habitat subdivision resulting from the current visitor use patterns in the formerly trailless areas. Federal land management agencies

[23] There are two main types of indicators: Social Indicators (Examples include people per view (PPV), vehicles at one time (VAOT) or Intergroup Encounters); and Natural Resource Indicators (Examples: number of informal trails, degree of fragmentation of unit area, soil loss).

have employed this trail metric (Number of Patches) as a measure of visitor-caused impacts to quantify landscape fragmentation brought about by visitor-created informal trails in Acadia and Mount Rainier National Parks (Kim and Daigle 2011; Leung et al. 2011 b; Monz).To operationalize the use of this natural resource indicator for this VUM project, DEC staff digitized existing informal trails and conducted a fragmentation analysis to quantify the number of patches in Zone 1 and Zone 2.

Figure 17. An illustration of single forest "patch". There is a discreet, contiguous patch of forested habitat that is bounded and bordered by (in)formal trails.

C. Forest Fragmentation Analysis to Inform the Natural Resource Indicator

To quantify landscape fragmentation, multiple data sources were aggregated to map the network of informal trails across the peaks. High use routes represented by white, yellow, and orange tracks on the STRAVA Global Heatmap were digitized and converted to shapefiles in ArcGIS Pro. 34 user-generated routes from AllTrails were downloaded and converted to shapefiles in Arc GIS Pro. GPS Tracks of informal trails on the formerly trailless peaks were collected by DEC employees during the 2019 and 2022 field seasons and converted into shapefiles in ArcGIS Pro. These field tracks did not comprehensively capture the full extent of the informal trail networks but provided, supplementary, ground-truthed references for the digitally acquired data. The Zone 1 Sensitive Resource Zone map was created by downloading the NYS contours layer and using the trace tool to draw a polygon around the 3,500’ contour line. The Zone 2 “Environmental Protection Zone” was created in ArcPro by using a 500-meter buffer around the informal trail network.

A second analysis modeled the potential reduction in the current patch number and informal trail density that would occur from marking a “preferred” hiking route. Since AllTrails is the most widely used hiking app among visitors and it correlates directly to the most heavily used informal trails, the "preferred route" as described in the descriptive statistic charts matches the GPS tracks promoted by AllTrails. Using crowdsourced hiking routes, digitalized STRAVA heatmap data, and GPS tracks from field work, the informal trail network density was measured in ArcGIS Pro for both management zones. Complete maps and tables with statistics were produced and are included in Appendix I.

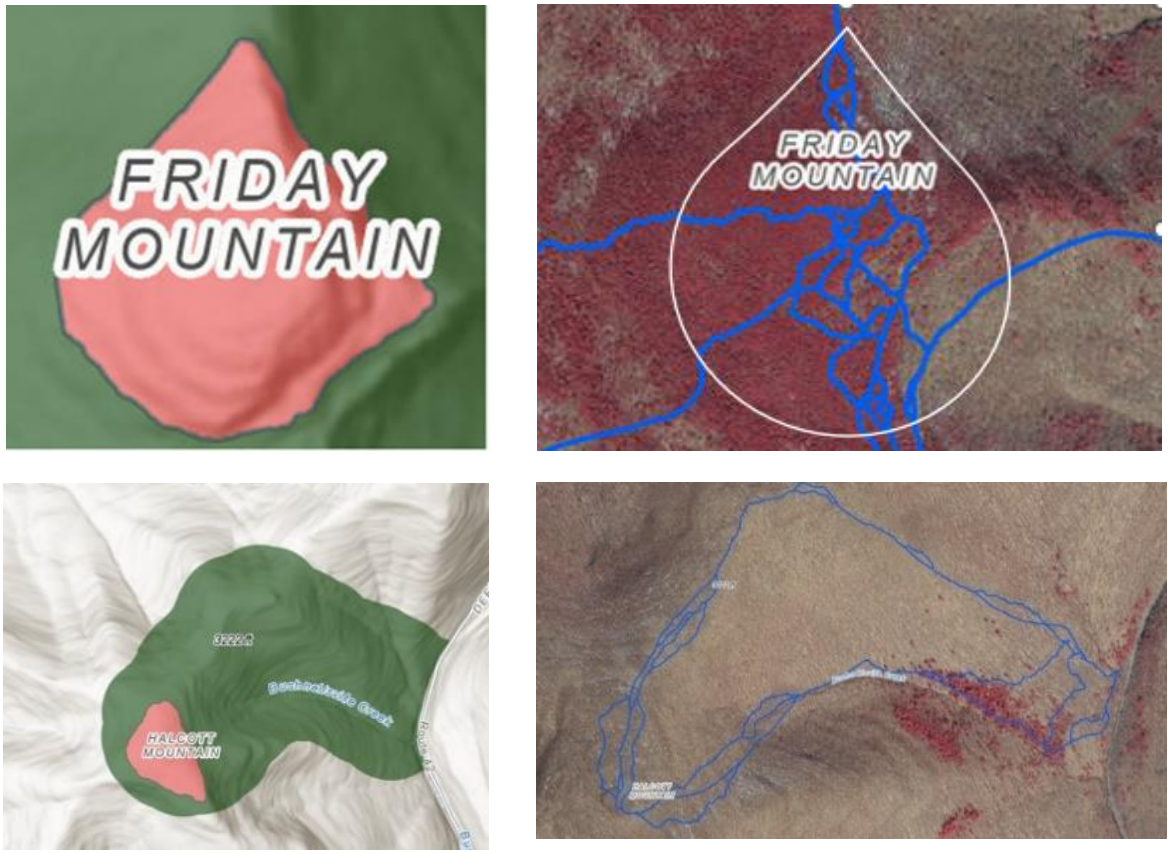


Figure 18. Fragmentation analysis illustrations for Zone 1 (Top left, top right) and Zone 2 (lower left, lower right). Blue lines are the digitized informal trails. Patches were quantified for each zone following informal trail digitization.

D. Establishing a Management Standard to Achieve Desired Conditions

"What is the appropriate model of landscape structure and connectivity that we should be managing towards?" That was the question that land managers had to ask at the start of this VUM planning process. A certain amount of landscape fragmentation is produced by official DEC trails and this fragmentation is exacerbated by informal trails. According to other informal trail fragmentation analyses, official trails should be used as a reference point for determining what constitutes "acceptable" levels of fragmentation (Moskal, 22). To bring current conditions into alignment with desired conditions, it was imperative to define a management standard for landscape connectivity to determine what constitutes a reasonable and acceptable number of "patches" on the landscape in Zones 1 and 2. A "management standard" acts a general parameter for managing a system, while a threshold refers to a specific measurable deviation from the standard,

beyond which visitor impacts to a natural area would be considered unacceptable, triggering management actions to protect the resource. Essentially, the management standard sets the overall framework for managing visitor use, while the threshold defines the critical point where interventions are needed to maintain desired conditions.

A forest fragmentation analysis was performed on Slide, Cornell and Wittenburg[24] (SCW) in the Slide Mountain Wilderness before the same analysis was done on the formerly trailless peaks. The purpose of this preliminary analysis was to determine what constitutes an acceptable degree of forest fragmentation in a managed, formal trail system. The selection of Slide Mountain, Cornell Mountain and Wittenburg Mountains was based on their high popularity with hikers, the presence of a well-established formal trail, lack of visitor deviation from that formal trail and the proximity of those mountains to four of the formerly trailless peaks.

The Slide-Cornell-Wittenburg formal trail network was selected as the management "standard" for landscape connectivity because STRAVA heat map data indicates that visitors consistently travel along the marked trail corridor and do not stray from that trail which minimizes the degree of forest fragmentation that occurs along that managed formal trail system.

Figure 19. An example of very good landscape connectivity along formal trail network on the summit of slide mountain wilderness that experiences very high visitor volumes. Notice that the

[24] The Slide, Cornell, Wittenberg Range is commonly referred to as the Burroughs Range.

hiker activity is confined to a single corridor (indicated in yellow) and that the lands adjacent to the formal trail are undisturbed and there is minimal forest fragmentation.

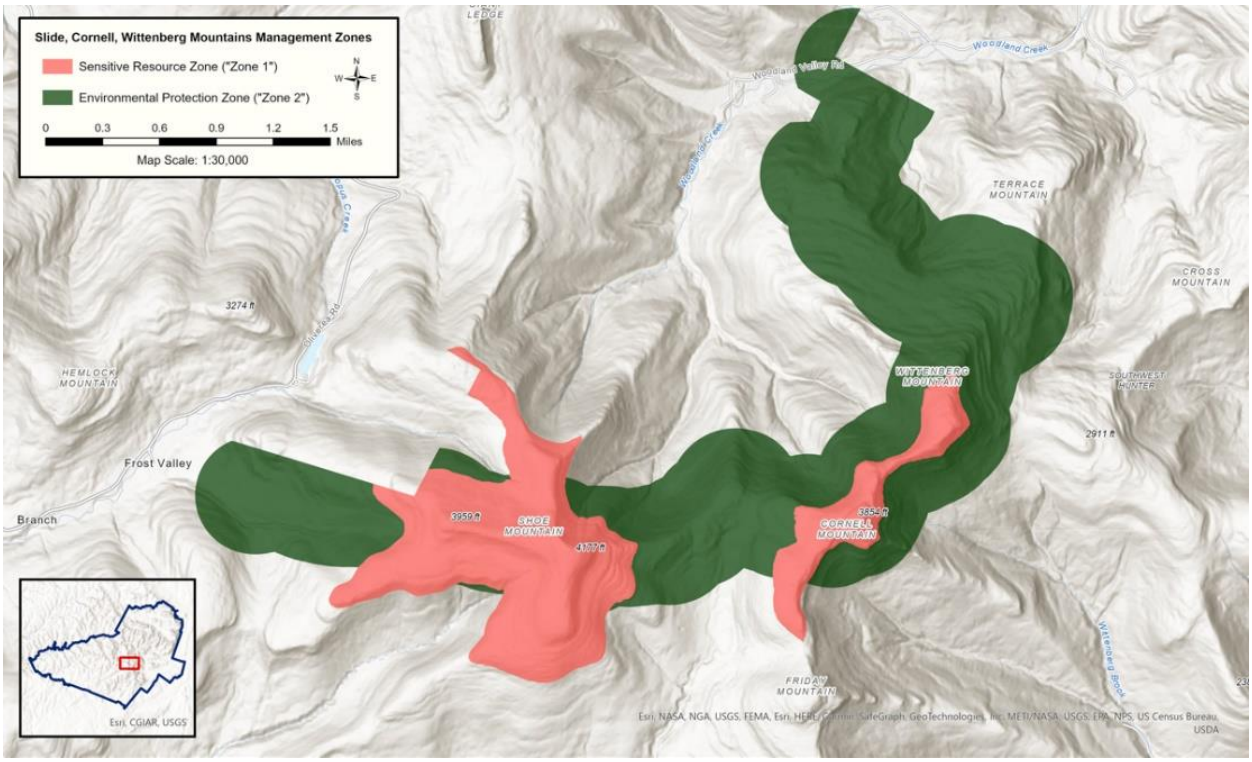


Figure 20. Management Zone 1 and Zone 2 delineation for the Burroughs range in Slide Mountain Wilderness. Lands above 3,500' in the "Sensitive Resource Zone" (Zone 1) are illustrated in pink. Land within the Environmental Protection Zone (Zone 2) are illustrated in green. Private lands above 3,500' are excluded from the analysis.

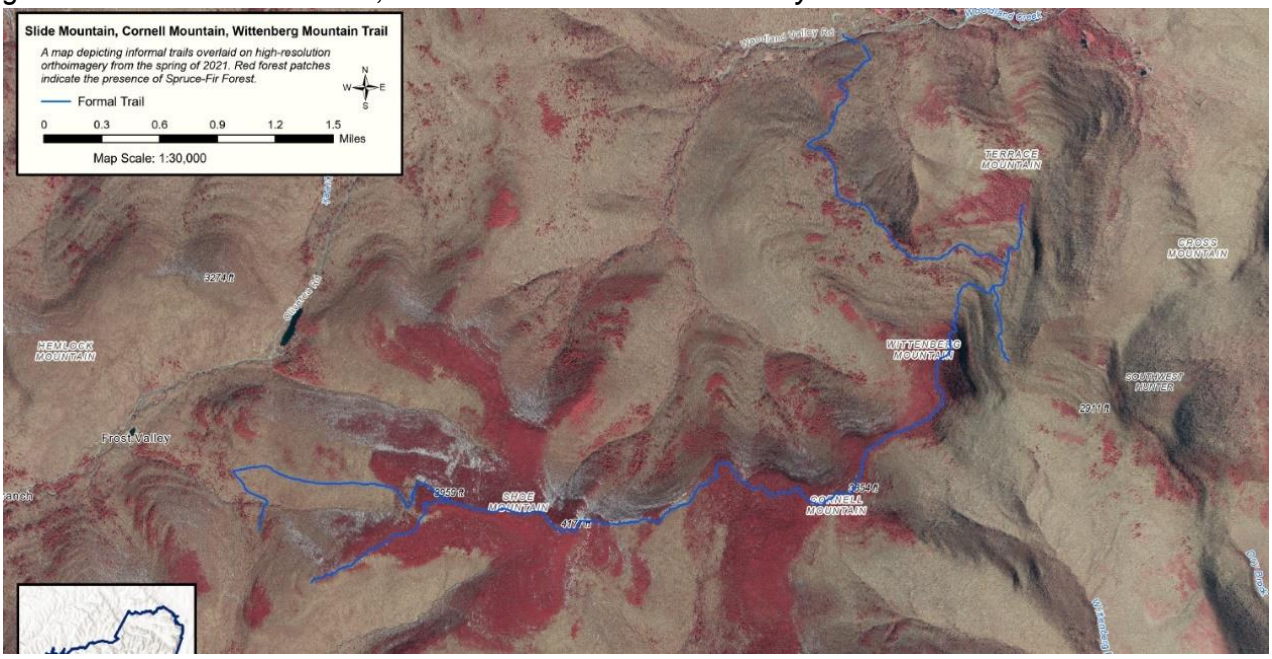


Figure 21. The Blue line represents the digitized formal trail corridor that was utilized for the fragmentation analysis applied to the Burroughs Range in the Slide Mountain Wilderness.

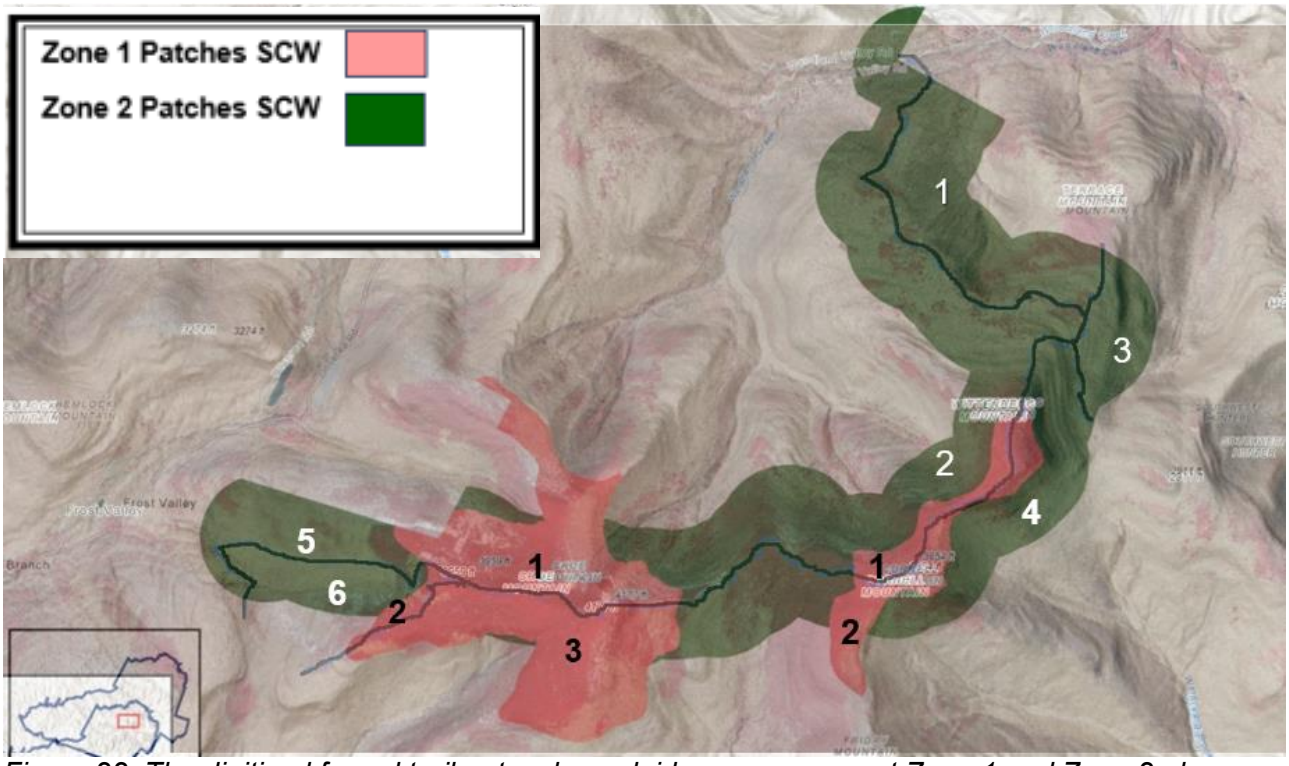


Figure 22. The digitized formal trail network overlaid on management Zone 1 and Zone 2 along the Slide- Cornell- Wittenberg Trail in the Slide Mountain Wilderness. Zone 1 patches are numbered in black. Zone 2 patches are numbered in white. Note: Slide Mountain has 3 patches in Zone 1. Cornell and Wittenberg have 2 patches in zone 1. There are 6 total patches in zone 2 along the Slide-Cornell-Wittenberg trail in the Slide Mountain Wilderness.

The results of the fragmentation analysis for Slide, Cornell and Wittenburg confirmed that high use, formally trailed peaks, have significantly less fragmentation than informally trailed peaks. Subsequently, a management standard for landscape connectivity was established using data from the Burroughs range fragmentation analysis which resulted in the following outcomes:

- In Zone 1, Slide Mountain had 3 patches and Cornell and Wittenberg each had 2 patches, indicating high levels of landscape connectivity.

- There was a total of 6 patches in Zone 2 on Slide, Cornell and Wittenburg Mountains, indicating excellent landscape connectivity for those mountains in Zone 2.

Peak(s) Zone 1	Total Area (Acres)	Current # of Patches	Trail Length (Miles)	*Trail Area (Acres)	Trail Density (m/ha)
Slide Mountain	732.29	3.00	1.48	0.51	5.66
Cornell and Wittenberg	201.50	2.00	2.58	0.29	11.83

Peak(s) Zone 2	Total Area (Acres)	Current # of Patches	Trail Length (Miles)	*Trail Area (Acres)	Trail Density (m/ha)
Slide, Cornell, & Wittenberg	2,148.25	6.00	6.13	1.22	4.59

The management standards for landscape connectivity for the formerly trailless peaks that have been established based on this analysis are as follows:

- Zone 1 will have no more than 3 patches above 3,500'.
- Zone 2 will have no more than 6 patches under 3,500'.

Zone 1 Indicator: Number of Patches Created by Informal Trails

A spatial analysis designed for quantifying landscape structure has been used to determine the number of "patches" that are present within the Zone 1, Sensitive Resource Zone. This indicator assesses the degree of forest fragmentation that has occurred at high elevation Catskill summits in Zone 1 due to the existence of extensive informal trail networks. Since recovery rates in alpine and sub-alpine environments are very slow, it is especially important to prevent further informal trail development in Zone 1.

Zone 1 Threshold

To meet the management standard for landscape connectivity, sites monitored in Zone 1 should have no more than 3 patches above 3,500' in elevation[25]. Summits containing 3 or less distinct patches of habitat will meet the management standard for landscape connectivity.

Zone 1: Fragmentation Analysis and Current Number of Patches on Formerly Trailless Peaks

Peak	Total Area (Acres) Zone 1	Current # of Patches Zone 1
Bearpen Mountain	36.65	2

[25] Halcott and Rocky will have no more than 3 patches above 3,400' in elevation.

Vly Mountain	16.39	1
Big Indian Mountain	130.67	5
South Doubletop	47.48	6
Eagle Mountain	76.18	2
Fir Mountain	74.92	11
Halcott Mountain	60.66	8
Mount Sherrill	23.19	7
North Dome	70.43	13
Southwest Hunter	230.15	2
Kaaterskill High Peak	37.25	10
Rusk Mountain	87.42	14
Balsam Cap	24.39	8
Friday Mountain	45.62	14
Lone Mountain	61.8	15
Rocky Mountain	18.94	21
Total	1,042.14	
Zone 1 Threshold: There will be no more than 3 patches in the Zone 1: Sensitive Resource Zone		

The results from the fragmentation analysis in Zone 1 show that the existing number of patches in Zone 1 exceeds the threshold established for that management zone on:

- Big Indian
- South Doubletop
- Fir Mountain
- Halcott
- Mt. Sherrill
- North Dome
- Kaaterskill High Peak
- Rusk Mountain
- Balsam Cap
- Friday Mountain
- Lone Mountain
- Rocky Mountain

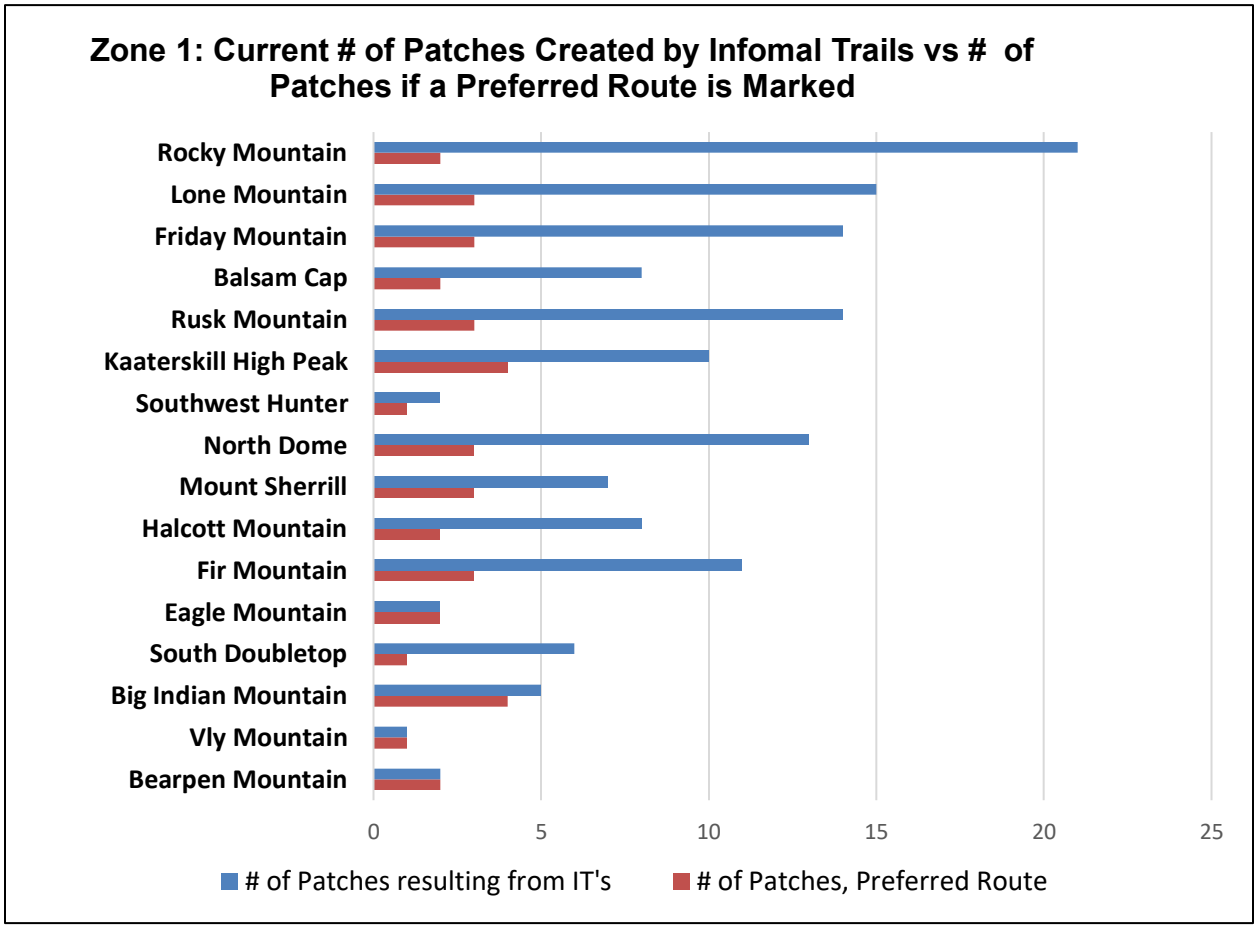


Figure 23. This graph illustrates the effect that marking a preferred route would have on patch numbers in Zone 1 above 3,500''. Management interventions will be required to bring natural resource conditions in Zone 1 back into alignment with the management standard which requires that Zone 1 areas have less than 3 distinct patches over 3,500' (3,400' for Rocky and Halcott). Resources should be dedicated to the Catskill peaks with highest levels of fragmentation and the greatest potential for fragmentation reduction.

Zone 2 Indicator: Number of Patches Created by Informal Trails

The same spatial analysis used to quantify landscape structure in Zone 1 was used to determine the number of "patches" that are present within the Zone 2, Environmental Protection Zone. This indicator assesses the degree of forest fragmentation occurring below 3,500'' in elevation.

Zone 2: Threshold

To meet the management standard for landscape connectivity established above, sites monitored in Zone 2 should have no more than 6 patches under 3,500' in elevation. (* For Halcott and Rocky, there will be no more than 6 patches below 3,400').

Fragmentation Analysis and Current Number of Patches on the Formerly Trailless Peaks in Zone 2

Peak	Total Area (Acres) Zone 2	Current # of Patches Zone 2
Bearpen Mountain	181.65	4
Vly Mountain	140.65	4
Big Indian Mountain and Fir	1,284.9	16
South Doubletop	472.39	8
Eagle Mountain	80.01	3
Halcott Mountain	715.68	19
Mount Sherrill and North Dome	1743.6	51
Southwest Hunter	130.86	3
Kaaterskill High Peak	709.95	11
Rusk Mountain	1,350.97	16
Lone, Rocky Balsam Cap and Friday	3,309.91	98
Zone 2 Threshold: There will be no more than 6 patches under 3,500' in elevation for 14 peaks. There will be no more than 6 patches under 3,400' for Rocky and Halcott.		

The results from the fragmentation analysis in Zone 2 show that the existing number of patches in Zone 2 exceeds the threshold established for that management zone on:

- Big Indian and Fir
- South Doubletop
- Halcott
- North Dome and Mt. Sherrill
- Kaaterskill High Peak
- Rusk Mountain
- Balsam Cap, Friday Mountain, Lone Mountain, and Rocky Mountain

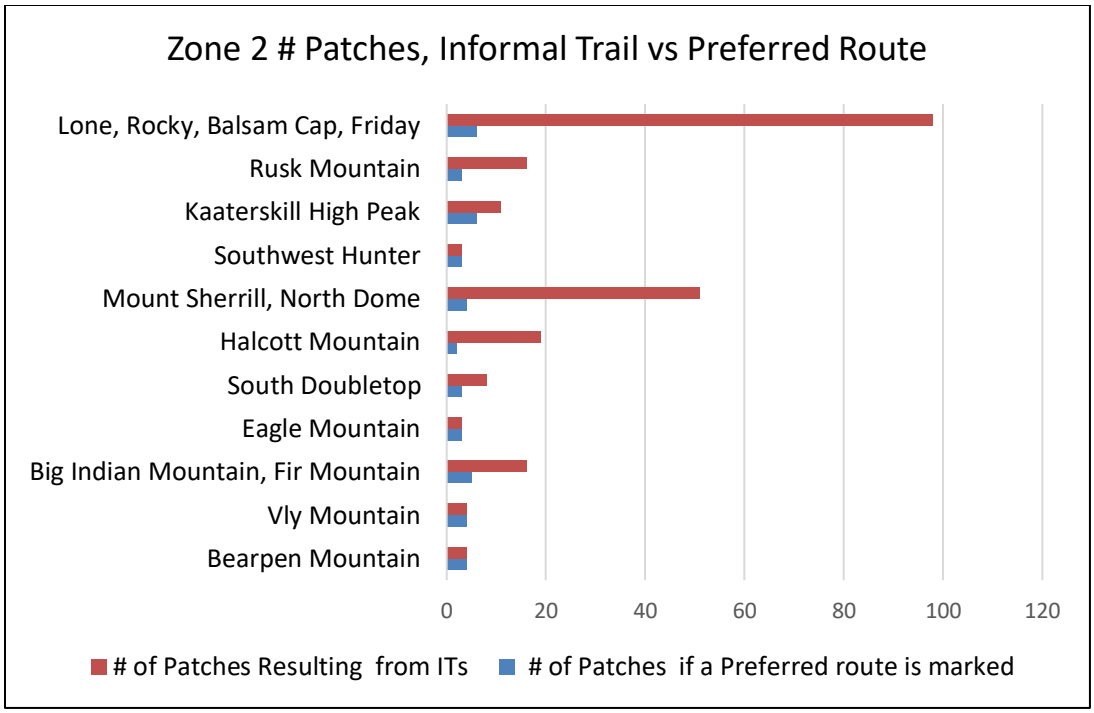


Figure 24. This graph illustrates the effect that marking a preferred route would have on patch numbers in Zone 2 below 3,500''. Management interventions will be required to bring natural resource conditions in Zone 2 back into alignment with the management standard which requires that Zone 2 have no more than 6 distinct patches under 3,500'.

E. Appropriate Activities and Facilities

This section lists acceptable visitor activities and facilities based on the land classification assigned to a specific area and explains what facilities and activities are consistent with the land classifications intended use. The term "appropriate" is defined and used differently by different agencies, sometimes with legal implications. Identifying appropriate facilities and recreational activities is regarded by the IVUMFC as best practice. Understanding how a particular activity or facility is in line with, or out of line with, an area's desired conditions is crucial when identifying visitor activities, facilities, and services to help achieve desired conditions. For instance, a visitor using conventional navigational aids such as a map and compass that goes on a bushwack hike in a Wilderness Area without trails is participating in an activity that is suitable for the intended goal and desired experience for that land classification. In contrast, motorized activity that is appropriate on Bearpen Mountain State Forest, is a prohibited activity in the Hunter-Westkill Wilderness. The following table provides examples of the types of activities that are acceptable in each land classification that align with the areas intended purpose as described in the CPSLMP and the SPSFM.

Table 8. Activities and facilities that are considered appropriate and in alignment with the various land classifications.

Land Classification	Conforming Activities	Facilities
Wilderness lands within the study area including lands in Big Indian, Slide Mountain and Hunter West-Kill Wilderness areas	Any Wilderness-dependent, non-motorized activity, including but not limited to: • Backpacking • Birding • Camping in designated campsites • Day hiking • Dispersed camping • Fishing • Horseback riding • Hunting • Ice climbing • Nature study • Photography • Rock climbing • Skiing • Swimming • Trapping	• Barriers/gates • Bridges • Lean-tos • Informational and directional signage • Interior ranger stations/outposts • Kiosks with trail registers and signage • Pit privies • Primitive tent sites • Trail network(s)
Wild Forest Lands within the study area including lands within Kaaterskill, Rusk Mtn and Halcott Wild Forests	• Backpacking • Camping in designated campsites • Day hiking • Dispersed camping • Fishing • Horseback riding • Hunting • Ice climbing • Mountain biking • Picnicking • Skiing • Snowmobiling on designated trails • Trapping	• Primitive campsites • Informational and directional signage • Kiosks with trail registers and signage • Parking areas • Trail network(s)
State Forest Lands within the study area in Bearpen Mountain State Forest	• Backpacking • Camping in designated campsites • Day hiking • Dispersed camping • Fishing • Horseback riding • Hunting • Ice climbing • Mountain biking • Picnicking • Skiing	• Primitive campsites • Informational and directional signage • Kiosks with trail registers and signage • Parking areas • Trail network, including recreation trails, trails for

Land Classification	Conforming Activities	Facilities
	• Snowmobiling • Trapping • Forest management activities • Motorized access for persons with mobility impairments (by permit only)	forest management activities, and mobility impaired access trails

The Catskill Park State Land Master Plan stipulates that the peaks should remain trailless unless a trail is needed to address resource degradation. The Strategic Plan for State Forest Management did not address the topic of trailless areas. Nevertheless, monitoring results beginning in 2019 have revealed that peaks higher than 3,500' that were designated as trailless areas now all have redundant informal trail networks. As a result, the opportunity for bushwack hiking experiences has been significantly diminished.

The study area's unofficial trail networks have developed due to two main factors: the growing popularity of hiking challenges in the Catskills as well as the use of hiking apps on smartphones by visitors.

According to the 802 people that responded to the 2023 Visitor Experience Survey:

- 54% of survey participants indicated that they have participated in or are currently participating in a Catskill hiking challenge.
- Of those 54% that have participated in a hiking challenge, 88% specified that they participated in the Catskill 3500 Club hiking challenge, 11% specified that they have participated in the 420 Grid challenge and 10% noted that they have participated in other grid/seasonal challenge participation.

Examples of Catskill Hiking Challenges and the associated requirements[26]

Hiking Challenge	Requirements	Affiliation
3500 Peak Challenge	Hiker climbs 33 peaks over 3,500'' as well as 4 in the winter.	Catskill 3500 Club
3500 Peak Challenge	Hiker climbs 35 peaks (inc. S. Doubletop and Roundtop).	Catskill Mountain Club
Single Season 35R	Hiker climbs 35 peaks over 3500' in a single season.	Hikers Anonymous

[26] This list is not intended to be exhaustive and does not include hiking challenges that are not affiliated with a particular club such as "The Devil in a Day, Manitous Revenge, Burroughs Range, Escarpment Trail etc. Hiking challenges in the Catskill's are rapidly developing and new challenges can appear on a monthly or seasonally.

Hiking Challenge	Requirements	Affiliation
Single Season 35R FOUR in a Row	Available to hikers who have completed 4 consecutive Catskill Single Season 35R.	Hikers Anonymous
Catskill High Peaks 4 Seasons	Hiker has climbed each of the 35 Catskill peaks in each of the 4 seasons	Hikers Anonymous and Catskill Mountain Club
Catskill 420 Grid	Hiker has climbed each of the 35 Catskill Peaks in each of the 12 months. Hikers make 420 ascents to complete the grid.	Hikers Anonymous and Catskill Mountain Club
Catskill 840 Grid	Hikers repeat 420 grid a second time.	Hiker Anonymous
Catskill 1260 Grid	Hikers repeat 420 grid a third time.	Hiker Anonymous
Ultra 35R- Single Season	Hiker completes a full round of the Catskill 35 in seven or fewer hiking days within a single season.	Hikers Anonymous
Ultra 35R- Round in Month	Hiker required to complete 35 peaks within a month.	Hikers Anonymous
The Six	Hikers required to climb Friday, Balsam Cap, Rocky, Lone, Table and Peekamoose in a single day.	Hikers Anonymous
The Ocho	Hikers required to climb Cornell, Wittenburg, Friday, Balsam Cap, Rocky, Lone, Table and Peekamoose.	Hikers Anonymous
The Nine	Hikers climb Slide, Cornell, Wittenberg, Friday, Balsam Cap, Rocky, Lone table & Peekamoose. Results available on fastest time page.	Hikers Anonymous
Moonhaw Four	Hikers required to climb Cornell, Wittenberg, Friday and Balsam Cap and encourages hikers to cross over Dink Mountain.	Hikers Anonymous
Denning Four	Hikers required to hike Rocky, Lone, Table and Peekamoose.	Hikers Anonymous
Catskill Combinatorial	Encourages hikers to hike a combination of peaks instead of single peak.	Hikers Anonymous
Rolling 420 Milestone	String together 12 consecutive Round in a Month milestones to complete the Rolling 420.	Hikers Anonymous

Hiking Challenge	Requirements	Affiliation
Catskill Adventure Challenge	Hikers required to hike Onteora Lake, Vernooy Falls, Catskill visitor center, Diamond Notch Falls, Plattekill Falls, Trout Pond and Alder Lake	Catskill Center

Hiking clubs play an important role in the Catskills in a variety of ways and their large and engaged membership provides a great opportunity for disseminating messaging about the formerly trailless peaks. Hiking challenges are developed and advertised by an individual or organization and require participants to complete specific hiking goals. These hiking challenges are created and promoted by a person or group and require that participants reach predetermined hiking objectives. The Catskill 3500 Club, Catskill Mountain Club, Hikers Anonymous and the Catskill Center are the primary groups that manage or sponsor hiking challenges which require hikers to summit trailless peaks over 3,500'. In recent years, hiking challenges have increasingly become a motivation for participation in hiking. Often, the sponsoring individual or organization will provide those who complete the challenge with benefits such as a patch, the inclusion of their name on a list of finishers or club membership eligibility.

Figure 25. Examples of patches associated with Catskill Hiking Challenges that are endorsed by several Catskill Hiking Clubs.

Hiking clubs are vital to the Catskills in many ways. Their sizable and active membership offers a fantastic platform for spreading awareness about stewardship opportunities, responsible recreational practices and information about the unique resources found in the Catskills. However, in recent years the number of hiking challenges has grown substantially, and hiking club challenges a major factor in the study area's increased traffic, especially since the COVID-19 pandemic in 2020. These hiking challenges promote outdoor recreation, which can benefit people both physically and mentally by spending time being in nature and can also build a sense of community and accomplishment. At the same time, these challenges have also led to the "gamification" of hiking, where finishing the task may be more important than other goals or principles like respecting the environment, being a good steward, and protecting natural resources. (Boland, 2022, Takacs, 2023).

The high participation rates in challenges that require multiple summit attempts from a single person are a major contributing factor to the unsustainable recreational impacts on the formerly trailless peaks. The Grid 420 challenge calls for a single hiker to reach 35 summits every month of the year, for a total of 420 treks made by a single individual. The cumulative impact of these types of challenges on natural resources is significant. From 1980-2025, Hikers Anonymous, a hiking club, has kept track of Grid-420 finishers. According to their website, 81 people have finished the Grid-420 challenge which implies that those 81 people have made 2,835 separate visits to mountain summits above 3,500’ to complete that challenge. It is not required that the climbs be finished in

a single year or a series of years and there is no time restriction. The Grid 420 has evolved into an entirely new set of hiking challenges which include:

- Catskill Grid 840 (single hiker summits each of the required 35 peaks twice in the same month)
- Catskill Grid 1,260 (single hiker summits each of the required 35 peaks three times a month)
- Catskill Grid 1,680 (single hiker summits each of the required peaks 35 peaks four times a month)
- Catskill Grid 2,100 (single hiker summits each of the required 35 peaks five times a month)
- Catskill Grid 2520 (single hiker summits each of the required 35 peaks five times a month)
- Catskill Grid 3360 (single hiker summits each of the required 35 peaks six times month)
- Catskill Grid 3780 (single hiker summits each of the required 35 peaks seven times a month)
- Catskill Grid 4200 (single hiker summits each of the required 35 peaks seven times a month)

On peaks with formal trails, the impact from this level of use is confined to a marked trail corridor and the recreational impact to the landscape is minimized by the existence of a single, maintained route to the summit. However, on the formerly trailless peaks, the impacts from these challenges are dispersed across the landscape because of the lack of formal trail infrastructure. The requirements of the grid challenges lead to an unacceptable cumulative recreational impacts by a single individual in areas with sensitive habitat and vulnerable species Ultimately, these “Grid” hiking challenges are encouraging recreational pursuits at odds with DEC's statutory obligation or sustainable natural resource management.

Monitoring efforts have indicated that these types of challenges are having undesirable, unsustainable and preventable impacts on wildlife, especially at the higher elevations in rare and sensitive habitats over 3,500’. These types of hiking challenges do not align with the management objectives for the formerly trailless peaks.

F. Visitor Education Strategies to Reduce Natural Resource Impacts

Strategies for managing visitor use, both direct and indirect, can affect visitor behavior. Closures. timed entry, and reservation systems are two examples of direct visitor use

management techniques. Modifying visitor use and behavior without directly regulating visitors' choices can be accomplished through indirect visitor use management strategies. These indirect VUM strategies can include improved and easily accessible trip planning information, physical design solutions, and education and information programs. DEC acknowledges that there is a current window of opportunity to promote ecological literacy and responsible recreation for both first-time and repeat Forest Preserve and State Forest visitors through comprehensive visitor education. To promote and encourage responsible recreation without direct regulation, DEC is currently working with Catskill stakeholder groups to incorporate the “Leave No Trace: Authority of the Resource” messaging into future outreach materials. The CAG recommends the following, in part, for training educators and volunteers that:

> *Those providing education, doing business, or guiding trips within the Catskill Park should be trained on the principles of Leave No Trace. Entities operating under a Volunteer Stewardship Agreement (VSA) should be trained in Leave No Trace. Specific DEC staff, including forest rangers, should be trained in Leave No Trace and the Authority of the Resource Technique, which are proven methods of effectively interacting with park visitors about stewardship (CAG,2022).*

Leave No Trace’s Authority of the Resource educational approach is a tried-and-true strategy for modifying visitor behavior by prioritizing environmental education over regulation. To create and share knowledge about the special qualities of the natural resources on the formerly trailless peaks, DEC collaborated with the NYNJTC in 2023 to produce education and outreach materials for visitors. Deliverables from the partnership is included new materials that DEC employees, seasonal stewards, forest rangers, and leaders of hiking clubs can use to educate visitors to recreate responsibly on the formerly trailless peaks. You can find information and educational resources at: https://dec.ny.gov/nature/forests-trees/forest-preserve/visitor-use-management

Hikers that plan to recreate in the study area can take the following steps to reduce their potential impact on the environment:

1. Follow the 7 Leave No Trace (LNT) Principles and complete the free Leave No Trace Training available at https://lnt.org/get-involved/training-courses/
2. Avoid hiking in these areas after heavy rains or during mud season between March to late May.
3. Travel on existing informal trails to avoid impacting untrampled vegetation.
4. Avoid hiking in these areas from May through June when ground nesting birds are breeding and nesting.
5. Leash your dog or leave them at home to protect wildlife- especially ground nesting birds during the months of May and June.

6. Practice responsible use of social media: do not post GPS tracks to smartphone hiking apps or to Open Street Map, especially if you are recreating in a wilderness or wild forest area that does not have a formal trail network.
7. Watch the "Authority of the Resource" training video for the formerly trailless high peaks and familiarize yourself with this technique. The video is available at: https://vimeo.com/899606079/cab4129978
8. DEC encourages all visitors to learn traditional navigation methods and embrace a wilderness experience that is devoid of technological aids.

Leave No Trace has also outlined best practices for use of social media when recreating in the outdoors. LNT social media guidance is as follows[27]:

- **Tag Thoughtfully:** avoid tagging (or geotagging) specific locations. Instead tag a general location such as a state or region if any at all. While tagging can seem innocent, it can also lead to significant impacts to places.
- **Be mindful of what your images portray**: give though to what your images may encourage others to do. Images that demonstrate LNT practices and stewardship, as well as following legal regulations, can lead others to copy those actions. Consider the platform you have and the people you reach when posting and commenting about the outdoors.
- **Give back to the places you love**: invest your own sweat and equity into the outdoor spaces and places you care about.
- **Encourage and Inspire Leave No Trace in social media posts**- given the millions of social media users in the world, social media has incredible potential to educate outdoor enthusiasts -from first timers to seasoned adventurers- about responsible outdoor recreation.

The Department will continue to work with partners and stewards to provide the information on responsible recreational practices that are informed by the latest science, data, and best management practices. It is highly recommended that stakeholders such as hiking clubs and hiking challenge organizers, include information about Leave No Trace (LNT) on their websites and actively promote the program as part of their marketing and public outreach initiatives. Additionally, DEC advises everyone visiting the Catskills to complete the Leave No Trace Awareness Course at Learn Leave No Trace (lnt.org). Participants receive a certificate upon completion, which hiking clubs could require for a hiker to receive credit for completion of a hiking challenge. Providing this information to challenge participant at the beginning of any Catskill hiking challenge

[27] Information from: https://lnt.org/social-media-guidance/

can promote responsible outdoor behavior and reduce unfavorable and avoidable impacts to natural resources.

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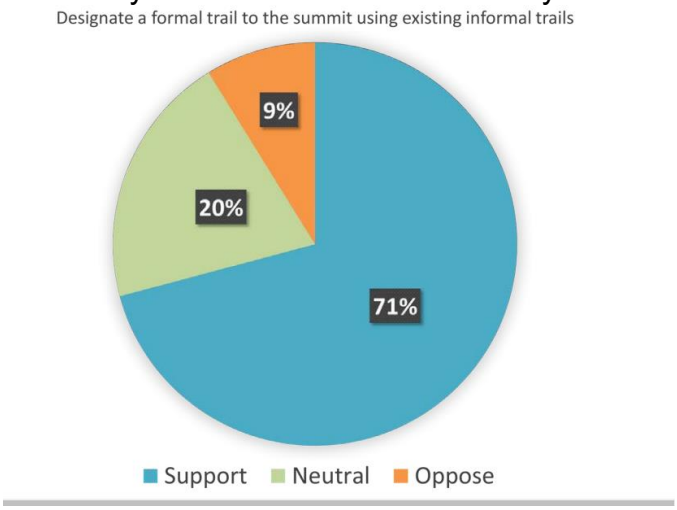
IV. Management Strategies and Actions

This section relates to Element 3 of the VUM framework: Management Actions and Strategies. Specifically, this section compares and documents differences between existing and desired conditions and identifies visitor use management strategies and actions to achieve desired conditions. Section III identifies management proposals as they relate to natural resources, visitor experiences and DEC facilities for the lands covered by this plan. The proposed management actions are consistent with the Strategic Plan for State Forest Management and the Catskill Park State Land Master Plan (CPSLMP). The management actions are based on field monitoring results, public comments and surveys, DEC staff input and Indigenous Nations consultation. The management strategies identified in this section represent the range of actions that DEC may take to meet the desired conditions for Zone 1 and Zone 2 for the individual peaks within the project area. The management strategies and actions outlined in this section are designed to increase landscape connectivity, support biological functions and ecosystem health, prevent invasive species introductions, provide a visitor experience consistent with the objectives of Article XIV and the CPSLMP and promote visitor education and inclusion. Monitoring data gathered by DEC staff informed these management strategies and actions which are designed to pro-actively prevent, rather than react to, additional impacts to natural resources resulting from increased visitation. When the conditions of an area do not meet the management standard or are found to be in low ecological condition, management interventions will be implemented to bring the area back into alignment with the landscape connectivity management standards and desired conditions.

The findings of the 2024 Visitor Experience Survey indicated that 71% of survey respondents support formal designation of an informal trail as an inter-rim management tactic to reduce forest fragmentation. DEC's initial management approach for the formerly trailless speaks is to implement a visitor containment strategy which will reduce the overall impact on the landscape and concentrate foot traffic into a single corridor. Where necessary and appropriate, a preferred route will be



identified and marked, and trail sustainability assessments will be conducted. Where feasible, unsustainable sections of trails will be rehabilitated or relocated to a more sustainable alignment. Undesirable and duplicative informal trails will be routinely brushed in using dead and downed woody debris. Permanent closure of undesirable informal trails will require a sustained management effort. DEC will work with stakeholder and partners to announce new volunteer opportunities to assist with maintaining informal trail closures.

A. Slide Mountain Wilderness

1. 1998 Slide Wilderness Trailless Peaks UMP Guidance

UMP Public Use and Management Objectives (5)

“Ensure that the trailless areas, especially summits above 3,500’’ feet in elevation remain trailless.”

2. NYNHP Findings and Recommendations

Balsam Cap

On the approach to Balsam Cap at approximately 3,200’ in elevation there is a fork in the informal trail; the south fork follows the base of the cliffs, ascends to the saddle between Balsam Cap and Friday Mountain and follows a second ridge to the summit of Balsam Cap. The north fork ascends through the cliffs to Friday Mountain. Along the north-south ridge, the informal trail passes through Mountain Spruce-Fir Forest. The area near the summit canister is small compared to other summits; there is a nearby (0.1 mile) rocky outcrop with a view to the west which probably minimizes damage to the summit community. Informal trail routes cross several significant natural communities, including Mountain Fir (S2), Mountain Spruce-Fir (S2S3), and Spruce Northern Hardwood Forests (S3S4).

Friday

Unlike the informal trail to Balsam Cap, the fork above 3200’ towards Friday Mountain has areas of extensive erosion and root damage. After the informal trail turns north, it passes through Mountain-Spruce-Fir Forest. Some of the worst damage includes exposed and broken tree roots as well as a trampled area with the stumps of several cut saplings at the summit canister.

Rocky

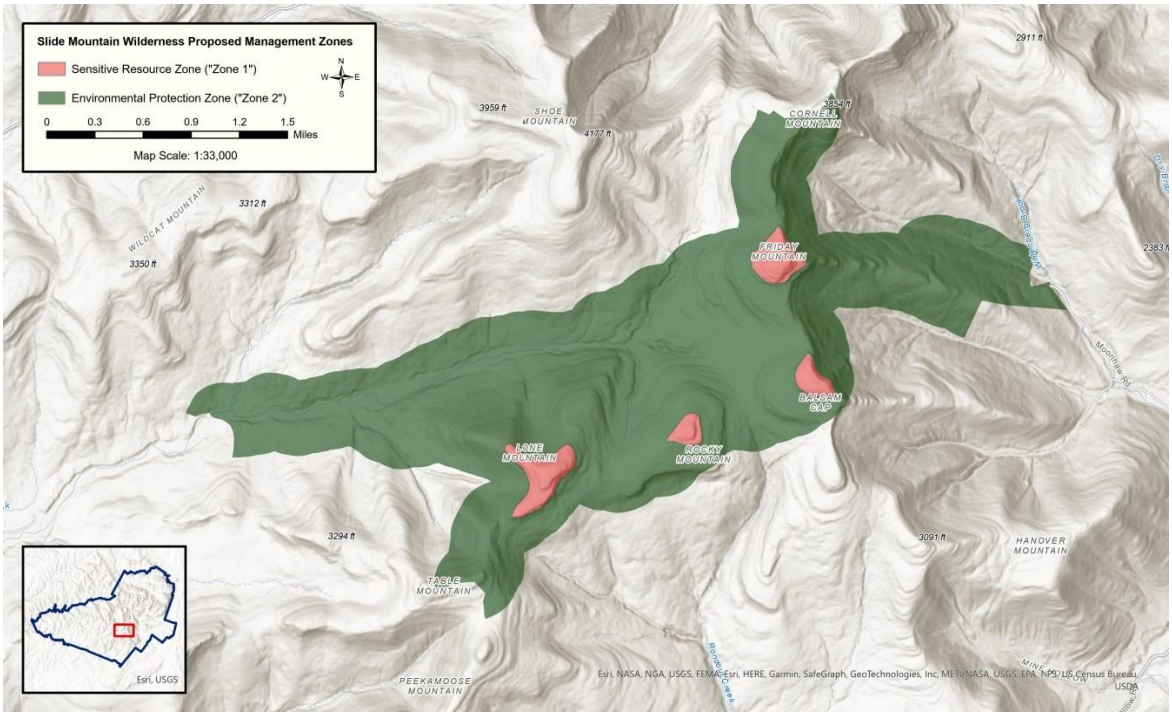
A well-defined informal trail is present as it leaves Lone’s summit, descends into the col and ascends Rocky. Some local areas quickly become a maze of crisscrossing informal

trails of limited or moderate impact as they weave upslope to Rocky. Where the informal trail follows a dominant path, the impact level increases within the informal trail tread but not beyond except for flatter areas with taller conifer dominated canopies. Above 3300' the informal trail becomes more defined with moderate impact generally limited to the tread until the gently sloping areas surrounding the summit. In the final 200m approaching and including the summit, informal trails proliferated with one exiting the summit to the northeast becoming the pronounced informal trail with moderate to high impacts within the trail tread. Extensive trampled areas adjoining the summit and access to the viewpoints are having significant local impacts to the Mountain Spruce-Fir Forest. Rocky would benefit from the establishment of a formal trail to protect the summit and the col from further impacts from increasing visitation.

Lone

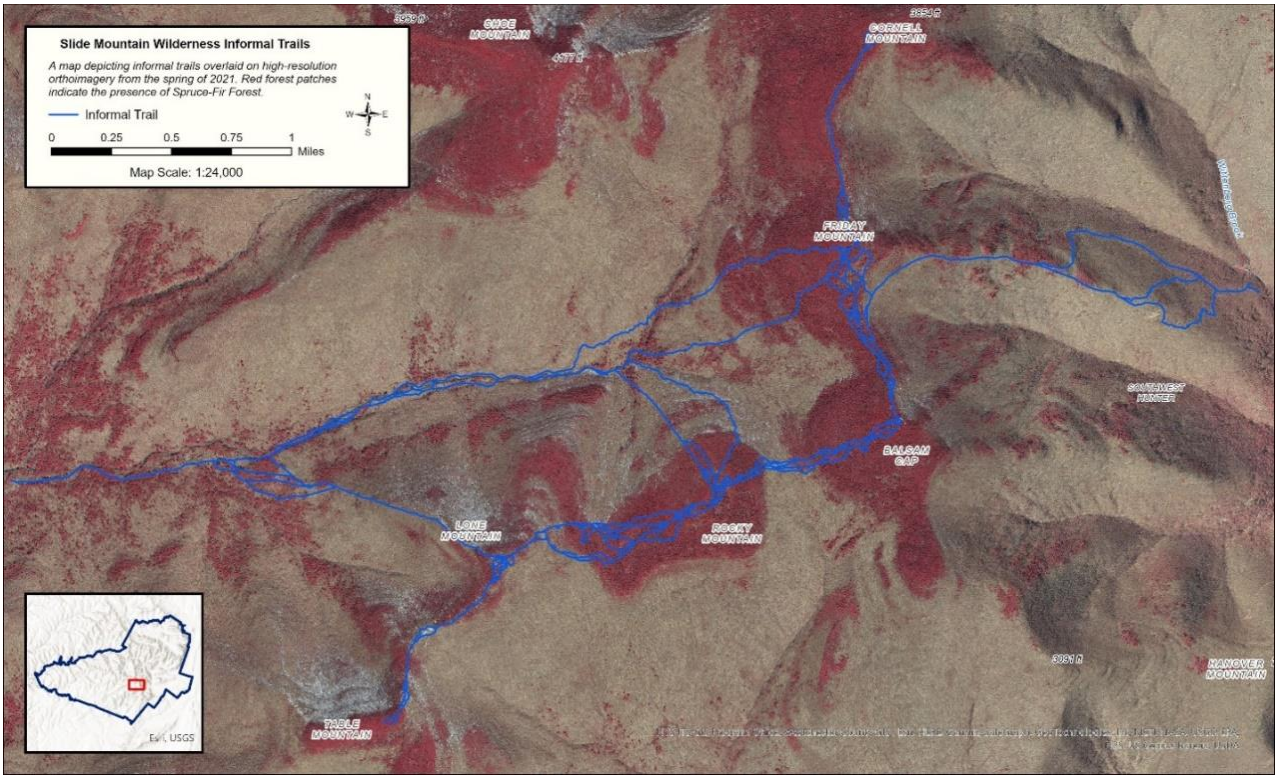
NYNHP collected data in several locations along the ridgeline to update the Beech-Maple Mesic Forest occurrence. The surveyed area remains in very good to excellent condition with regard to impacts from the informal trails.

3. Slide Mountain Wilderness Maps

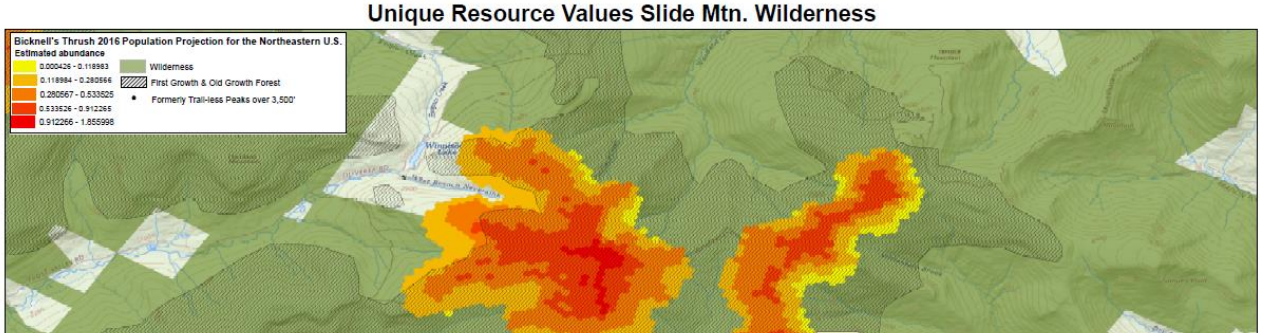


Slide Mountain Wilderness Zone 1 and Zone 2 *Note: The Zone 1 boundary for Rocky is delineated at 3,400' because of the lower elevation of this mountain.

IV. Management Strategies and Actions



Unique Resource Values Slide Mtn. Wilderness



4. Current Statistics

The proposed threshold for the Zone 1 indicator is that there will be no more than 3 patches above 3,500' in elevation for Lone, Friday and Balsam Cap and no more than 3 patches above 3,400' for Rocky.

Zone 1 Indicator: Current Number of Patches

Peak	Total Area Zone 1 (Acres)	Current Number of Patches Zone 1	Current Informal Trails Length Zone 1 (Miles)
Balsam Cap	24.39	8	0.68
Friday	45.62	14	1.52
Lone	61.8	15	1.48
Rocky[28]	18.94	21	1.06
Total	150.75	58	3.05

Zone 1 Threshold Analysis

Peak	Threshold for Indicator 1 Zone 1 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity Zone 1	Management Action Required
Balsam Cap	Y	High	N	Y
Friday	Y	High	N	Y

[28] Zone 1 on Rocky begins at 3,400'

Lone	Y	High	N	Y
Rocky	Y	High	N	Y

The fragmentation analysis results show that the threshold for Zone 1 on Balsam Cap, Friday, Lone and Rocky have been exceeded and that immediate action is required.

Desired Future Condition Zone 1 Slide Mountain Wilderness

The number of patches would meet the management standard for Zone 1 by designating a preferred route on Friday, Balsam Cap, Rocky, and Lone. The informal trail network in Zone 1 would be reduced from approximately 3.05 miles to approximately 2.16 miles by marking a preferred route.

Peak	Total Area Zone 1 (Acres)	Projected Number of Patches if a Preferred Route is Marked	Projected Trail Length in Zone 1 if a Preferred Route is Marked (Miles)
Balsam Cap	24.39	2.0	0.29
Friday Mountain	45.62	3.0	0.62
Lone Mountain	61.8	3.0	0.96
Rocky Mountain	18.94	2.0	0.29
Total	150.75	10	2.16

Zone 2 Indicator: Current Number of Patches

The threshold for the Zone 2 indicator is that there will be no more than 6 patches below 3,500’ in elevation.

Peaks	Total Area Zone 2 (Acres)	Current Number of Patches	Current Informal Trail Length (Miles)
Lone, Rocky, Balsam Cap and Friday	3,309.91	98	23.23

Zone 2 Threshold Analysis

Peak(s)	Threshold for Zone 2 Exceeded (Y/N)	Level of Management Concern	Management Action Required
Lone, Rocky, Balsam Cap, Friday	Y	High	Y

The fragmentation analysis results show that the threshold for Zone 2 on Rocky, Lone, Balsam Cap and Friday has been exceeded, requiring management action.

Desired Future Condition Zone 2 Slide Mountain Wilderness

Conditions in Zone 2 would be significantly improved by designating a preferred route on Rocky, Lone, Balsam Cap and Friday. The projected reduction in number of patches in Zone 2 on these mountains would go from 98 to 6 patches which would meet the management standard. By designating a preferred route, the informal trail network in Zone 2 would be shortened from roughly 23.23 miles to roughly 11.38 miles.

Peak	Total Area Zone 2 (Acres)	Projected Number of Patches if a Preferred Route is Marked in Zone 2	Projected Trail Length in Zone 2 if a Preferred Route is Marked (Miles)
Lone, Rocky, Balsam Cap, Friday	3,309.91	6.0	11.38

5. Proposed Management Actions

- Mark a preferred route to Friday and Balsam Cap from Moonhaw Road. This will consolidate the informal trail network to a single corridor and reduce the aggregate area of disturbance at the summits.
- Mark a preferred route between Table/Peekamoose over Lone and Rocky to Balsam Cap. This will reduce the rate of forest fragmentation that has been documented in between those summits due to the extensive and duplicative informal trail network.
- Mark a preferred route along the East Branch of the Neversink to Lone Mountain.
- Install an informational kiosk on Moonhaw Road.
- Conduct a trail sustainability analysis on preferred routes.

- Conduct an analysis to determine potential routes for relocating unsustainable trails or sections of trails.
- Develop a trail design plan including trail rehabilitation plans or relocation needs.
- Where needed, build a trail or reroute consistent with DEC CP-78 policy.

B. Big Indian Wilderness

1. 1993 Big Indian Wilderness Trailless Peaks UMP Guidance

The 1993 Big Indian Wilderness UMP does not include any specific trailless peak references or management proposals related to Big Indian, Fir, South Doubletop or Eagle.

2. NYNHP Findings and Recommendations

Big Indian, Fir, South Doubletop and Eagle peaks were surveyed in October of 2021 by the NYNHP. Those survey results concluded that informal trails have greatly fragmented and damaged the understory. According to NYNHP, Big Indian and Fir summits would greatly benefit from the establishment of one formal trail to the summit.

Eagle

The main informal trail passes through a deciduous montane forest. The informal trail is less than 200 meters long and covers relatively level terrain. The damage to the trail tread is limited to the trail tread and the area immediately surrounding the canister.

Big Indian

Big Indian was surveyed in 2021 via an out and back bushwack from the Pine Hill West Branch Trail. At the time of the survey, the lower end of the informal trail heading upslope from the Pine Hill West Branch was undetectable. Currently, the informal trail to the summit is now well defined with damage limited to the informal trail tread until you reach the relatively gently sloping area to the summit, where the informal trails proliferate, greatly fragmenting and damaging the understory. This area is moderate quality mixed forest that does not meet occurrence quality as it is recovering from past disturbances but would greatly benefit from the establishment of one formal trail to the summit. The informal trail passes through mid-age Beech Maple Mesic Forest with locally significant patches of balsam fir and red spruce saplings. This area may transition to a more mixed forest such as Mountain Spruce-Fir Forest as it recovers.

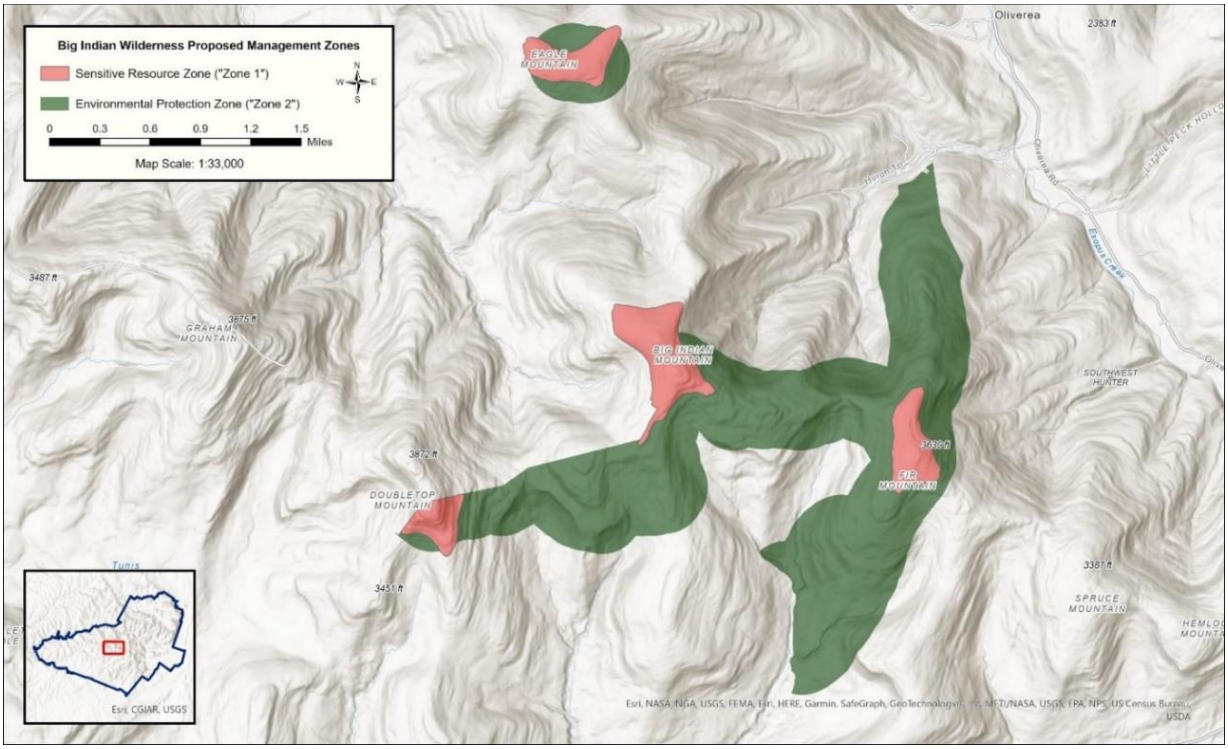
Fir

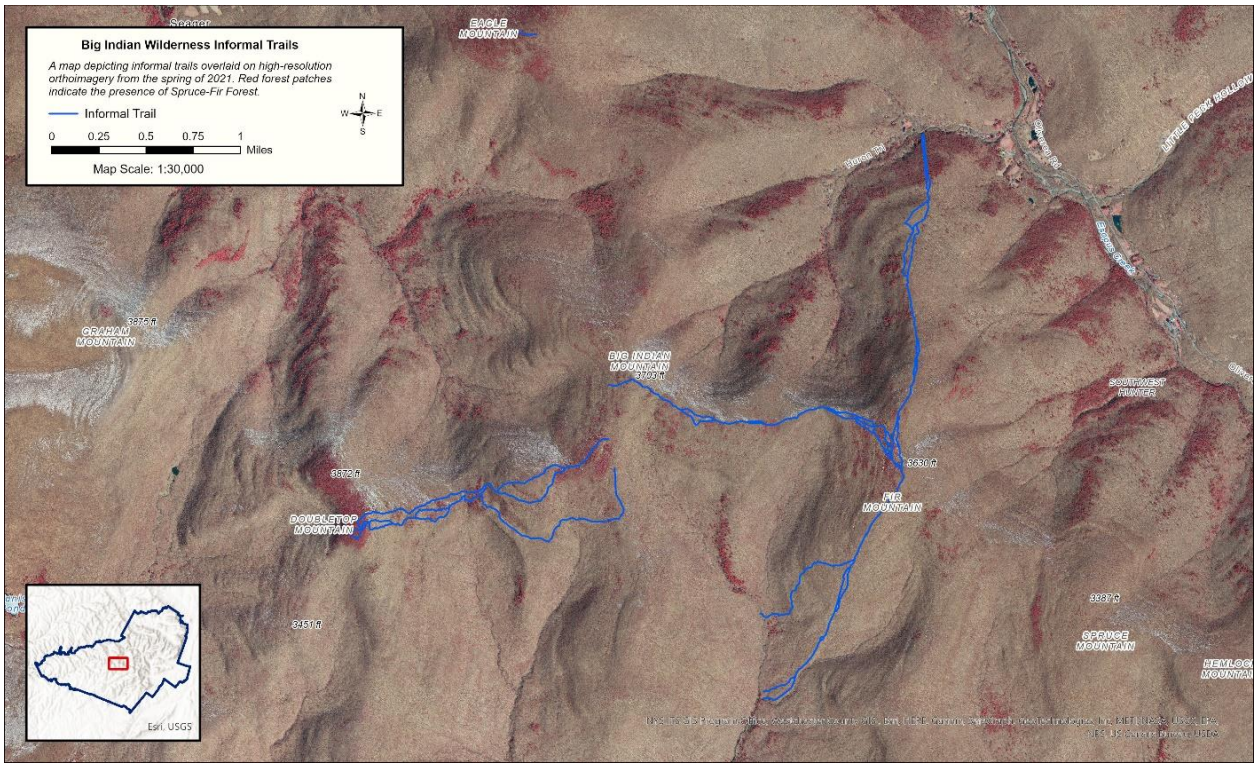
Natural resource damage has reached moderate levels in the steepest sections from Big Indian to Fir up until the gently sloping area reaching the summit where more significant impacts can be observed. The large extent of trampling has greatly fragmented and damaged the understory of the forest and area adjoining Fir's summit. The main informal trail passes through the col and up to Fir's summit through a moderate quality, mid-age, high elevation variant of Beech-Maple Mesic Forest with locally significant patches of Balsam Fir (*Abies balsamea).* According to the NYNHP, the col and the summit areas would greatly benefit from the establishment of a single formal trail.

South Doubletop

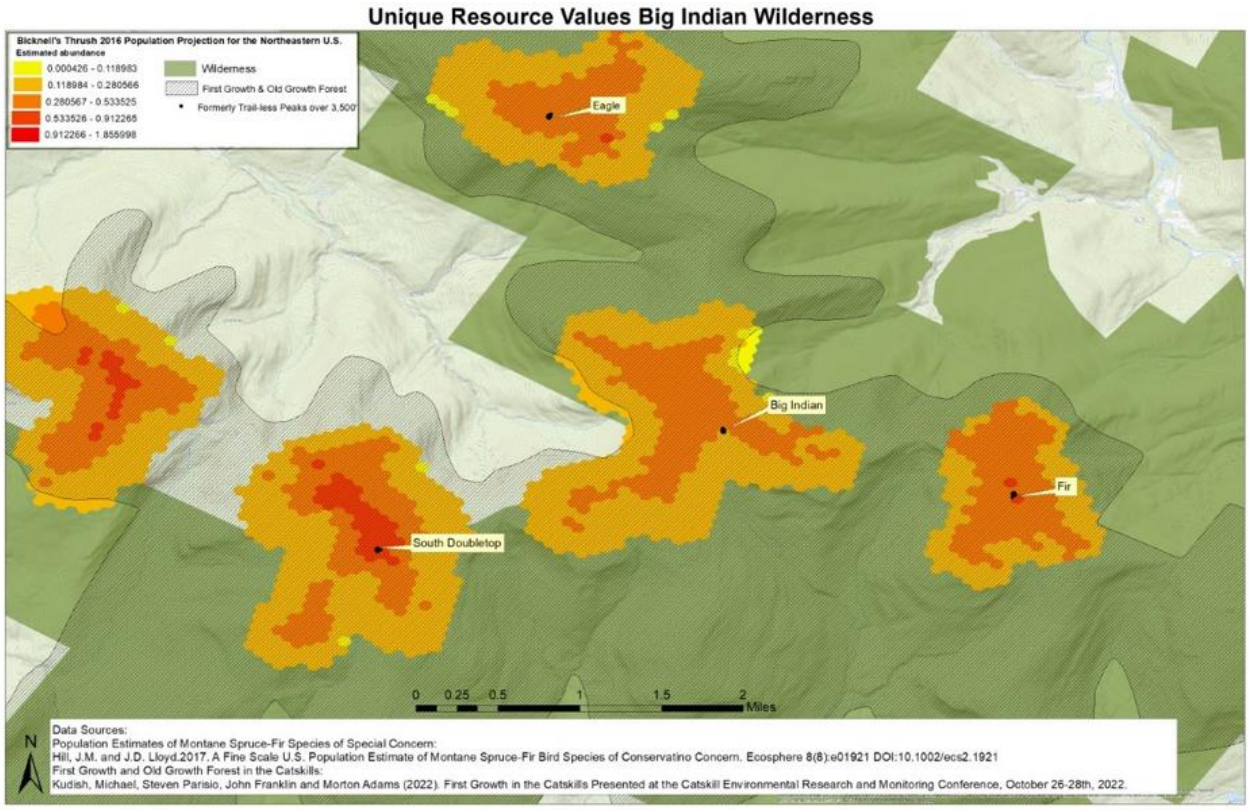
NYNHP gathered community data in a few locations to update the Beech-Maple Mesic Forest occurrence on the slopes of South Doubletop and to assess the potential statewide significance of the Mountain Fir Forest (S2) on that summit. Overall, impacts to the Beech Maple Mesic Forest were confined to the informal trail tread areas traversing the steeper bushwack sections. According to NYNHP, the Mountain Fir Forest on the summit of South Doubletop is highly impacted by trampling via a network of informal trails. The understory vegetation and moss layers have been significantly impacted in many areas. NYNHP suggested that hiking clubs should refrain from including this peak in hiking challenges until a substantial recovery of the understory is able to occur. In the Fall of 2023, DEC asked AllTrails to remove the GPS track for South Doubletop as it was leading to private land trespass on adjacent private property. DEC is monitoring what effect this change may be having on visitation patterns to this peak and evaluating whether GPS track removal is having a positive impact on informal trail development and establishment in that area.

3. Big Indian Wilderness Maps




Big Indian Wilderness Informal Trails
A map depicting informal trails overlaid on high-resolution orthoimagery from the spring of 2021. Red forest patches indicate the presence of Spruce-Fir Forest.
Informal Trail
0 0.25 0.5 0.75 1
Miles
Map Scale: 1:30,000
N
W
E
S
EAGLE MOUNTAIN
3875 ft
GRAHAM MOUNTAIN
BIG INDIAN MOUNTAIN
3772 ft
DOUBLETOP MOUNTAIN
3451 ft
3630 ft
FIR MOUNTAIN
SOUTHWEST HUNTER
3987 ft
SPRUCE MOUNTAIN
HEMLOCK MOUNTAIN
Esri, USGS


BIG INDIAN MOUNTAIN ASSOCIATION
Slide Mountain Inn
Big Indian Wilderness



4. Current Statistics

The proposed threshold for the Zone 1 indicator is that there will be no more than 3 patches in Zone 1 above 3,500' in elevation.

Zone 1 Indicator: Current Number of Patches

Peak	Total Area Zone 1 (Acres)	Current Number of Patches Zone 1	Current Informal Trail Length Zone 1 (Miles)
Big Indian	130.67	5.00	0.44
South Doubletop	47.48	6.00	0.60
Eagle	76.18	2.00	0.15
Fir Mountain	74.92	11.00	1.86
Total	329.25	24	3.05

Zone 1 Threshold Analysis

Peak	Threshold for Zone 1 Indicator Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity Zone 1	Management Action Required
Big Indian	Y	Medium	N	Y
South Doubletop	Y	Medium	N	Y
Eagle	N	Low	Y	N
Fir	Y	High	N	Y

The fragmentation analysis results show that the threshold for Zone 1 Big Indian, South Doubletop and Fir has been exceeded and management action is required. The current conditions in Zone 1 on Eagle Mountain have not been exceeded and the peak will be routinely monitored.

Desired Future Condition Zone 1 Big Indian Wilderness

Marking a preferred route on Big Indian, Fir and South Doubletop would reduce the number of patches on each summit to three or less which would bring conditions back into alignment with the management standard. The total length of the informal trail network in zone 1 on Big Indian, Fir and South Doubletop would be shortened to approximately 1.76 miles from approximately 3.05 miles by marking a preferred route.

Peak	Total Area Zone 1 (Acres)	Projected Number of Patches if a Preferred Route is Marked in Zone 1	Projected Trail Length in Zone 1 if a Preferred Route is Marked (Miles)
Big Indian	130.67	3.0	0.40
Fir	74.92	3.0	1.02
South Doubletop	47.48	1.0[29]	0.20
Eagle	76.18	2.0	0.14
Totals	328.95	9	1.76

[29] Occurrences of "1" patch happen when the length of the informal trail does not bisect the land in Zone 1. The footprint of the informal trail only extends partially into the Zone 1 boundary.

Zone 2 Indicator: Current Number of Patches

The threshold for the Zone 2 indicator is that there will be no more than 6 patches below 3,500' in elevation.

Peak(s)	Total Area Zone 2 (Acres)	Current Number of Patches Zone 2	Current Informal Trail Length (Miles)
Big Indian & Fir	1,284.90	16	6.59
South Doubletop	472.39	8	3.44
Eagle	80.01	3	0
Totals	1,837.3	27	10.03

Zone 2 Threshold Analysis

Peak(s)	Threshold for Zone 2 Indicator Exceeded (Y/N)	Level of Management Concern	Management Action Required
Big Indian & Fir	Y	High	Y
South Doubletop	Y	High	Y
Eagle	N	Low	N

The fragmentation analysis results show that the thresholds for Zone 2 on Big Indian, Fir and South Doubletop have been exceeded, requiring management action. The threshold for Zone 2 on Eagle Mountain has not been exceeded and the peak will be routinely monitored.

Desired Future Condition Zone 2 Big Indian Wilderness

By designating a preferred route on Big Indian, Fir, and South Doubletop, conditions in Zone 2 would meet the management standard by bringing the current number of patches to 6 or less. The length of informal trails in Zone 2 of the Big Indian Wilderness would be decreased from approximately 10.03 miles to approximately 4.66 miles by marking a preferred route.

Peak(s)	Total Area Zone 2 (Acres)	Projected Number of Patches if a Preferred Route is Marked in Zone 2	Projected Trail Length in Zone 2 if a Preferred Route is Marked (miles)
Big Indian, Fir	1284.9	5	3.64
South Doubletop	472.39	3	1.02
Eagle	80.01	3	0
Totals	1837.3	11	4.66

5. Proposed Management

- Mark a preferred route to Big Indian and Fir from the Pine Hill West Branch trail to consolidate the informal trail network to a single corridor and reduce the aggregate area of disturbance on the summits. Additional management strategies will be pursued to bring the conditions in Zone 2 back into alignment with the management standard.
- Mark a preferred route to the summit of South Doubletop.
- Hiker travel to the summit of Eagle will be monitored by using canister sign-in data and STRAVA heat maps. The trail to the summit will remain un-marked as hikers are traveling along a single corridor to access that summit.
- Install an informational kiosk at the Biscuit Brook parking area.
- Conduct a trail sustainability analysis on preferred routes using a combination of desktop analysis and field work.
- Conduct a desktop analysis to determine potential routes for relocating unsustainable trails or sections of trails.
- Develop a trail design plan including trail rehabilitation plans or relocation needs.
- Where needed build a trail or reroute consistent with DEC CP-78 policy.

C. Hunter West-Kill Wilderness

1. Hunter-West Kill Wilderness Trailless Peak UMP Guidance

1995 Hunter Mountain Wild Forest UMP

North Dome and Mt. Sherrill did not fall within the geographic scope of the 1995 UMP. A Hunter-West Kill Wilderness UMP has not been completed at this time. At the time the 1995 Hunter Mountain Wild Forest UMP was written, the “trailless” peaks that were owned by the State and included within the planning boundary for that unit included Rusk and South-West Hunter. The 1995 Hunter Mountain UMP does not contain any specific management proposals for South-West Hunter. North Dome and Mt. Sherrill were not owned by NYS when the 1995 UMP was written. However, the 1995 Hunter Mountain UMP does acknowledge the impact of “herd paths” on Rusk Mountain. Page 28 of the UMP states that: “*Several unofficial trails have been developed over the years to the summits of so called "trailless" peaks such as Rusk Mountain. Since these trails are usually unmarked, it increases the chances that some hikers will get disoriented and lost. In fact, DEC Forest Rangers have had to conduct searches on several occasions caused in part by unmarked trails.”* While the 1995 UMP acknowledges the existence of “herd paths”, it does not outline a specific management action to address the impacts of those “herd paths.”

2. NYNHP Findings and Recommendations

Mount Sherrill

From the Shaft Rd. parking area, the informal trail network leading to Mt. Sherrill is difficult to follow until about 2850’ in elevation, where multiple informal trails consolidate into a well-established informal trail. The informal trail ascends through Beech-Maple Mesic Forest with some smaller stands of Hemlock-Northern Hardwood Forest on north-facing slopes. Close to the summit, a very diverse old forest (potentially Mountain Spruce-Fir Forest or Spruce-Northern Hardwood Forest) was encountered which differs from the expected Mountain Fir Forest mapped in 2001. There is little damage to the natural communities found along this route, though close to the summit, the trail again branches into multiple informal trails, some of which are redundant and duplicative. The summit area close to the canister is trampled and devoid of vegetation.

The informal trail from Spruceton Rd. is much less established in comparison. It begins as an informal trail along the Westkill Creek and disappears once one ascends away from the river. Most of the route passes through Beech-Maple Mesic Forest with some extensive areas of Northern-Hardwood Forest. For most of the route, the informal trail is little more than crushed leaf litter and slightly disturbed plants, akin to a deer trail. The

informal trail becomes more visible at 3,000’ in elevation where a series of ledges limits available routes, but it is much less established than the approach from Shaft Rd.

From 3000’-3200’, the main informal trail passes through an area that was actively being foraged by bears during the survey. Black cherry (*Prunus serotina*) is the dominant canopy tree in this area, and abundant fruits covered the ground at the time of the survey. The summit area is somewhat damaged, though its natural community is likely less ecologically sensitive than the expected Mountain Fir Forest, normally found on most Catskill High Peak summits.

North Dome

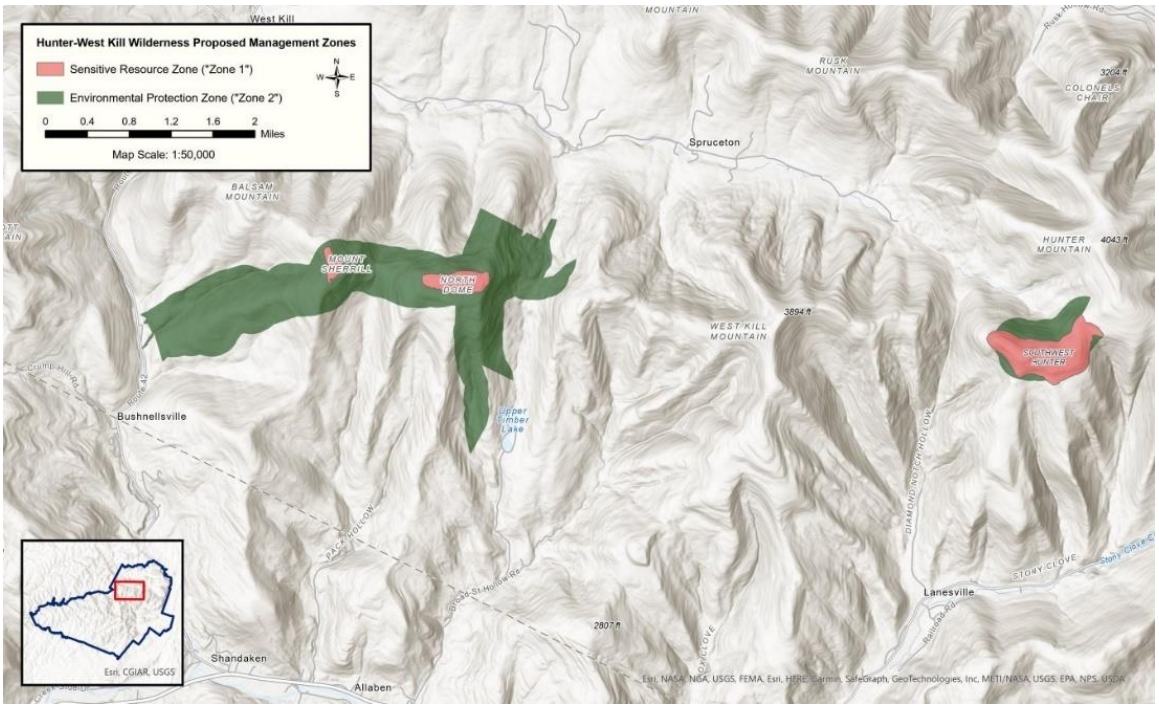
North Dome was surveyed by NYNHP from two approaches in 2022. The first approach began at the DEC parking lot at mile 2.75 along Spruceton Rd. and followed a mapped informal trail. There was occasional evidence of foot traffic- scraped moss, exposed soil, and sliding rocks observed in the steepest areas. The informal trail network followed Hagadone Brook and crossed through several conifer plantations in various stages of recovery before turning southeast and climbing a ridge that ascends to North Dome through Beech-Maple Mesic Forest. On this ridge, a clear informal trail emerged and can be followed to the summit. The summit community in that location is Mountain-Fir Forest. The informal trail crosses the summit and descends into the saddle between North Dome and Mt. Sherrill and then continues to Mt. Sherrill.

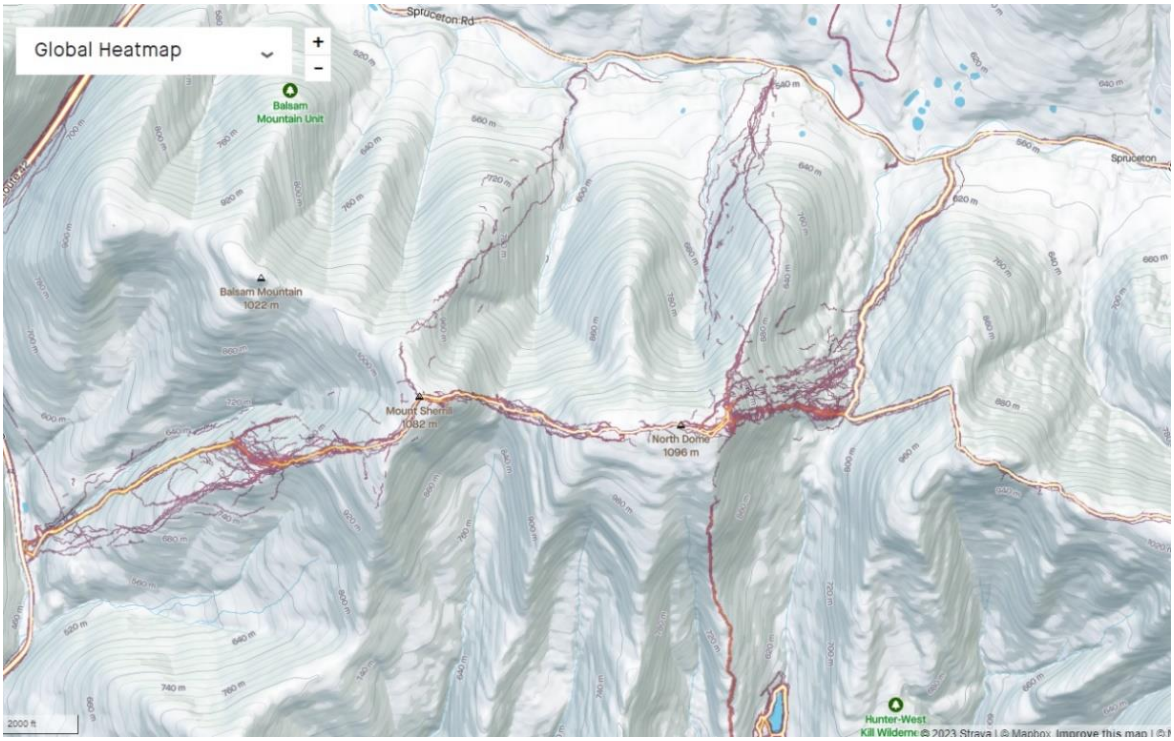
The second route follows the Devil’s Path for approximately 1.1 miles before turning west and ascending along a series of ledges to the east edge of North Dome’s summit. The existing informal trail through the Mountain Fir Forest is well-established and is probably preventing further damage to the surrounding plant communities. At the summit of North Dome, there is some erosion and trampling near the canister, but much of that area is taken up by large boulders. The greatest potential for visitor created impacts to natural resources is within the transition from Zone 2 to Zone 1, especially the ascent through the ledges.

South-West Hunter

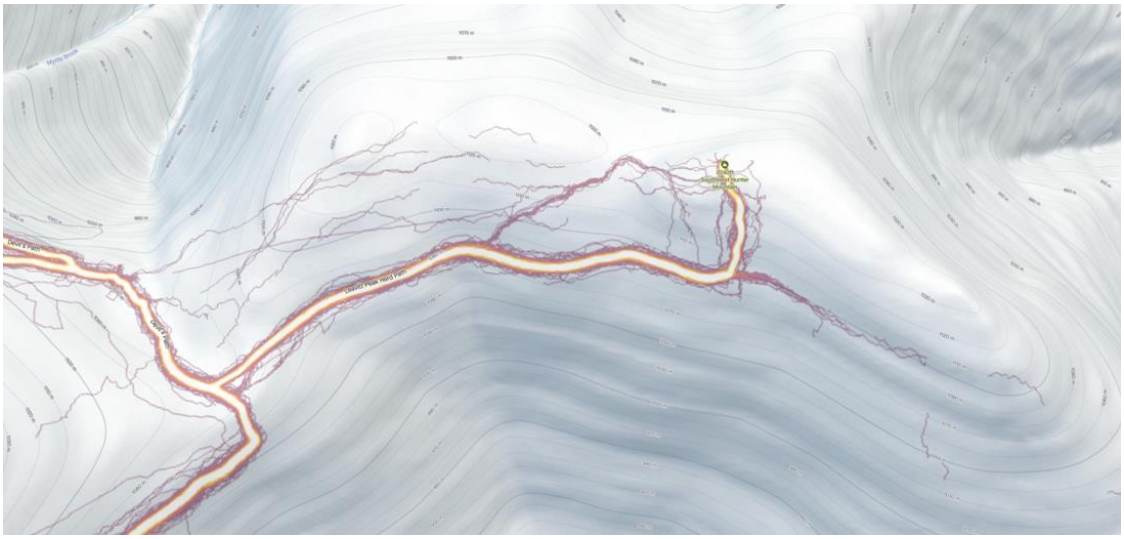
The informal trail to South-West Hunter is vertically aligned for the last 150 meters to the summit and deeply eroded. The Mountain Spruce-Fir Forest has experienced extensive trampling, leading to the loss of small trees, shrubs, and herbaceous plants within 20 meters of the canister.

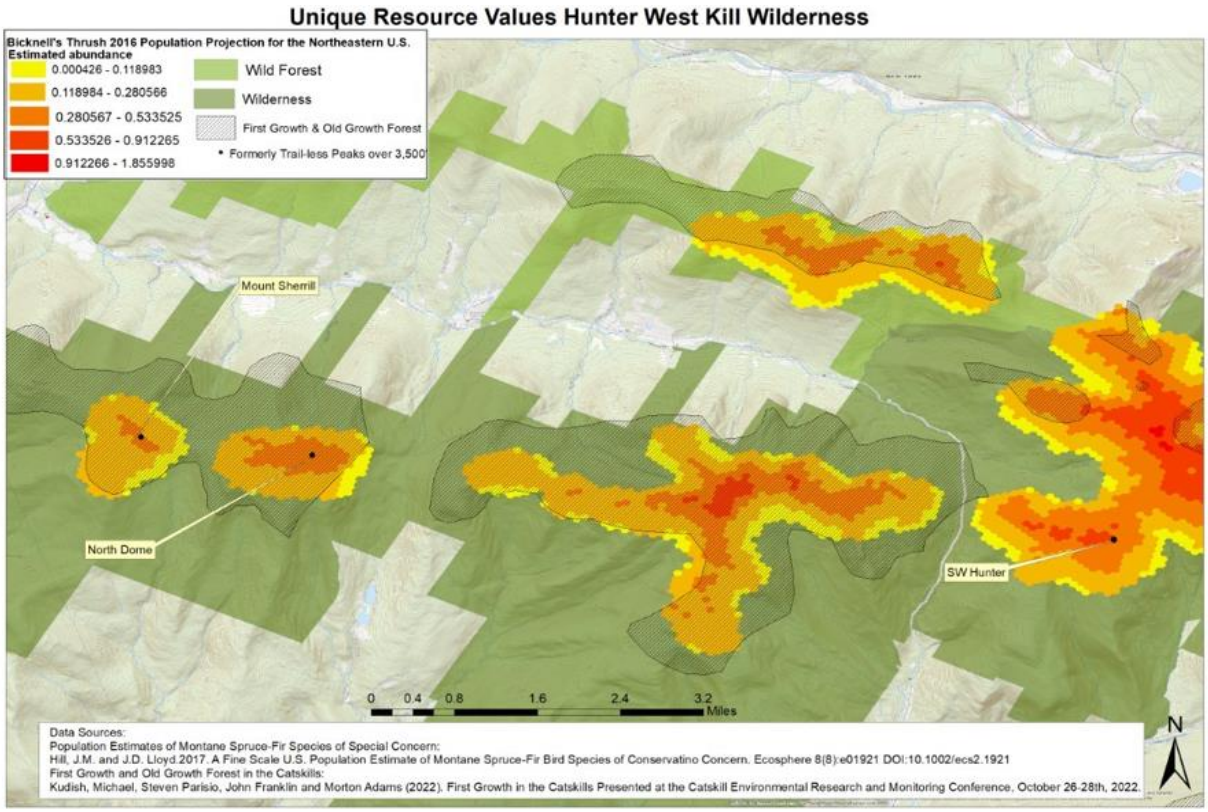
3. Hunter Westkill Wilderness Maps

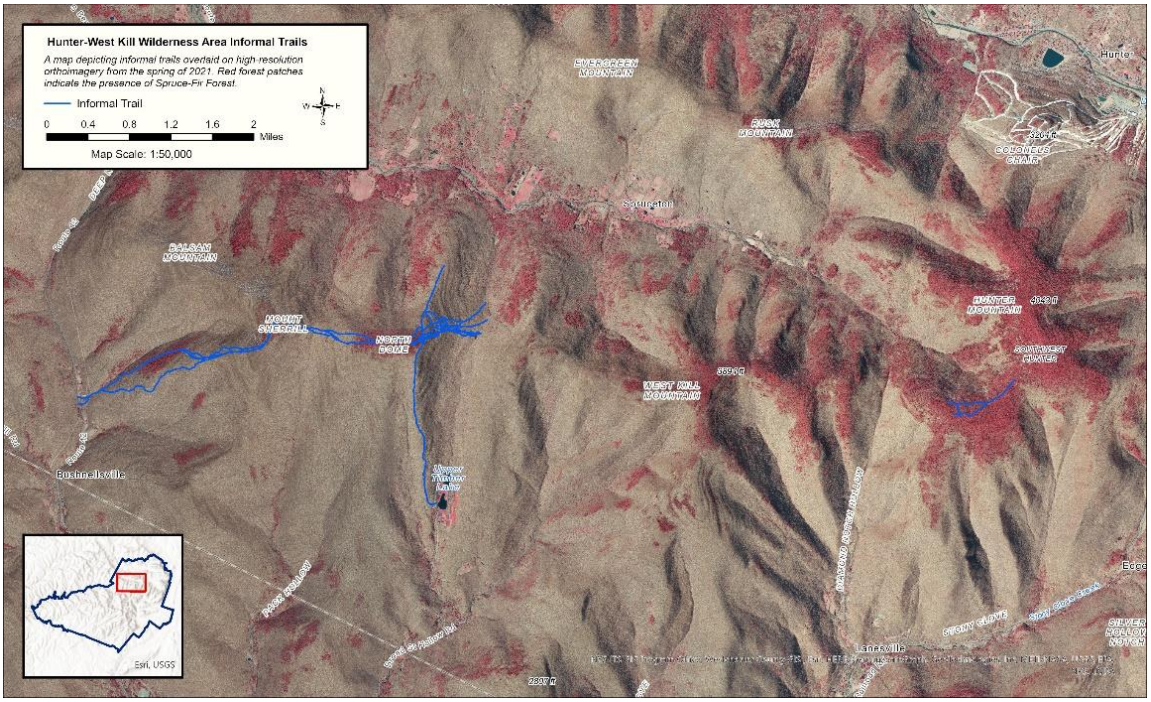

Hunter-West Kill Wilderness Proposed Management Zones
Sensitive Resource Zone ("Zone 1")
Environmental Protection Zone ("Zone 2")
0 0.4 0.8 1.2 1.6 2
Miles
Map Scale: 1:50,000
West Kill
Spruceton
RUSK MOUNTAIN
COLONELS CHAIR
3204 ft
BALSAM MOUNTAIN
MOUNT SHERRILL
NORTH DOME
HUNTER MOUNTAIN
4043 ft
3894 ft
WEST KILL MOUNTAIN
SOUTHWEST HUNTER
Bushnellsville
Upper Timber Lake
DIAMOND NOTCH HOLLOW
STONY CLOVE
Lanesville
2807 ft
Shandaken
Allaben
Esri, CGIAR, USGS
Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA


Global Heatmap
Spruceton Rd
Balsam Mountain Unit
Balsam Mountain
1022 m
Mount Sherrill
1082 m
North Dome
1096 m
Spruceton
Hunter-West Kill Wilderne
© 2023 Strava | © Mapbox Improve this map


SOUTHWEST
HUNTER







4. Current Statistics

The proposed threshold for Zone 1, Indicator 1 is that there will be no more than 3 patches above 3,500' in elevation.

Zone 1 Indicator: Current Number of Patches

Peak	Total Area Zone 1 (Acres)	Current Number of Patches Zone 1	Current Informal Trail Length Zone 1 (Miles)
Mount Sherrill	23.19	7	0.56
North Dome	70. 43	13	1.65
Southwest Hunter	230.15	2	1.27
Totals	323.77	22	3.48

Zone 1 Threshold Analysis

Peak	Threshold for Indicator 1 Zone 1 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity Zone 1	Management Action Required
Mount Sherrill	Y	High	N	Y
North Dome	Y	High	N	Y
SW Hunter	N	Low	Y	N

The fragmentation analysis results show that the thresholds for Zone 1, Indicator 1 have been exceeded on Mount Sherrill and North Dome, requiring management action. The current conditions in Zone 1 on Southwest Hunter indicate that the threshold has not been exceeded. As a result, immediate action is not required on Southwest Hunter.

Desired Future Conditions Zone 1 Hunter Westkill Wilderness

By designating a preferred route, conditions in Hunter Westkill Wilderness Zone 1 would meet the management standard by bringing the total number of patches in Zone 1 on Mount Sherrill and North Dome to 3 patches or less. There are currently 2 patches on Southwest Hunter in Zone 1 which meets the management standard. The informal trail

network in Zone 1 would be reduced from approximately 3.48 miles to approximately 2.55 miles by marking a preferred route.

Peak	Total Area Zone 1 (Acres)	Projected Number of Patches if a Preferred Route is Marked	Projected Trail Length if a Preferred Route is Marked (Miles)
Mount Sherrill	23.19	3	0.39
North Dome	70.43	3	0.84
SW Hunter	230.15	1	1.32
Totals	323.77	7	2.55

Zone 2 Indicator: Current Number of Patches

The threshold for the Zone 2 indicator is that there will be no more than 6 patches below 3,500' in elevation.

Peak(s)	Total Area Zone 2 (Acres)	Current Number of Patches Zone 2	Current IT Length (Miles) Zone 2
Mount Sherrill, North Dome	1,743.60	51	12
Southwest Hunter	130.86	3	0
Totals	1,874.46	54	12

Zone 2 Threshold Analysis

Peak(s)	Threshold for Zone 2 Exceeded (Y/N)	Level of Management Concern	Management Action Required
Mt Sherrill	Y	High	Y
North Dome	Y	High	Y
Southwest Hunter	N	Low	N

The fragmentation analysis results show that the threshold for Zone 2 have been exceeded on Mount Sherrill and North Dome, requiring management action. The threshold for Zone 2 on Southwest Hunter has not been exceeded and immediate management action is not required.

Desired Future Conditions Zone 2 Hunter Westkill Wilderness

By designating a preferred route on Mt. Sherrill and North Dome, conditions in Zone 2 in the Hunter Westkill Wilderness would meet the management standard by bringing the total number of patches in Zone 2 to 4 or less. Marking a preferred route in Zone 2 of the Hunter-West Kill Wilderness would reduce the number of existing patches caused by informal trails from approximately 51 to 4. The existing informal trail network would be reduced from 12 miles to approximately 6.41 miles.

Peak	Total Area Zone 2 (Acres)	Projected Number of patches if a Preferred Route is Marked	Projected Trail Length in Zone 2 if a Preferred Rote is Marked (Miles)
Mount Sherrill, North Dome	1743.6	4.0	6.41
SW Hunter	130.86	3.0	0.0
Totals	304.46	7.0	6.41

5. Proposed Management Actions

- Mark a preferred route from the Shaft Rd. parking area to the Devils Path to consolidate the informal trail network to a single corridor and reduce the aggregate area of disturbance on the summits. At this time, the Devils Path will not be extended to be aligned with the preferred route. Designating a preferred route is seen as an interim management strategy rather than a long-term one. The desired conditions for Zone 1 and Zone 2 must be reached before co-aligning the Devils Path with the preferred route over Mt. Sherrill can be considered.
- Install an informational kiosk at the Shaft Rd. parking area.

- Hiker visitation to the summit of Southwest Hunter will be monitored by using canister sign-in data and STRAVA heat maps. The informal trail to the summit will remain unmarked at this time.
- Conduct a trail sustainability analysis on preferred routes.
- Conduct an analysis to determine potential routes for relocating unsustainable trails or sections of trails.
- Develop a trail design plan including trail rehabilitation plans or relocation needs.
- Where needed build a trail or reroute consistent with DEC CP-78 policy.

D. Halcott Mountain Wild Forest

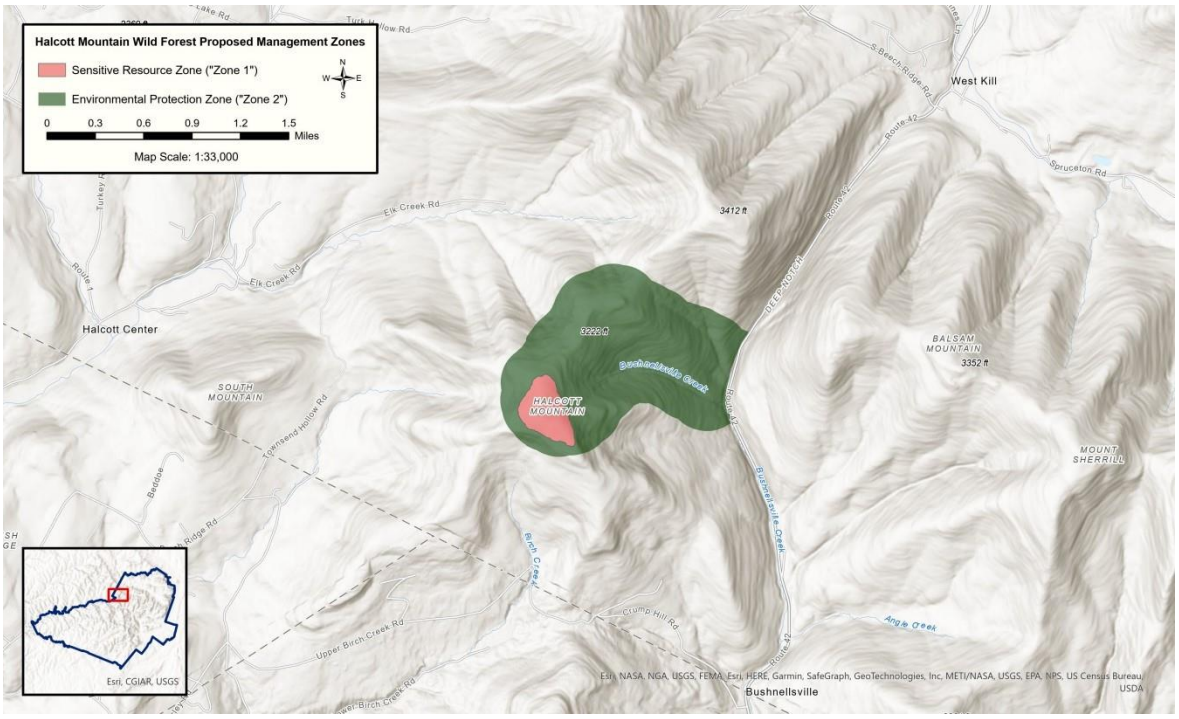
1. Unit Management Plan Guidance

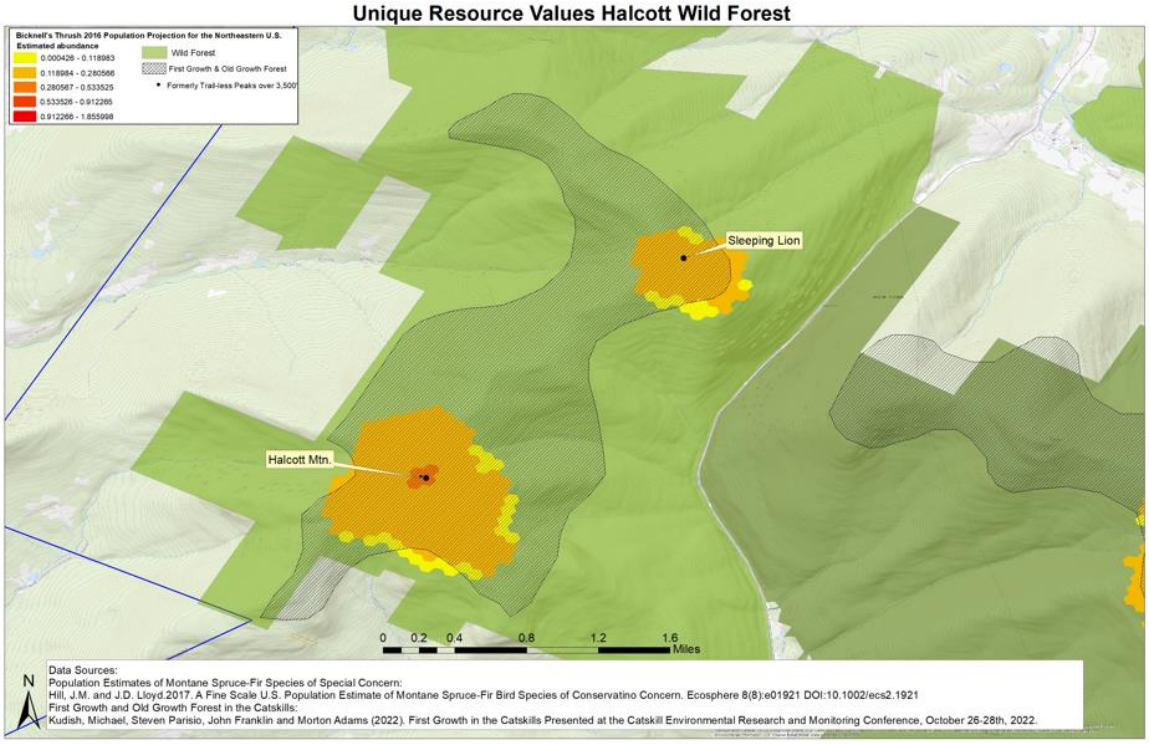
The 2001 Halcott Mountain UMP does not include specific management proposals related to maintaining the trailless character of Halcott Mountain.

2. NYNHP Findings and Recommendations

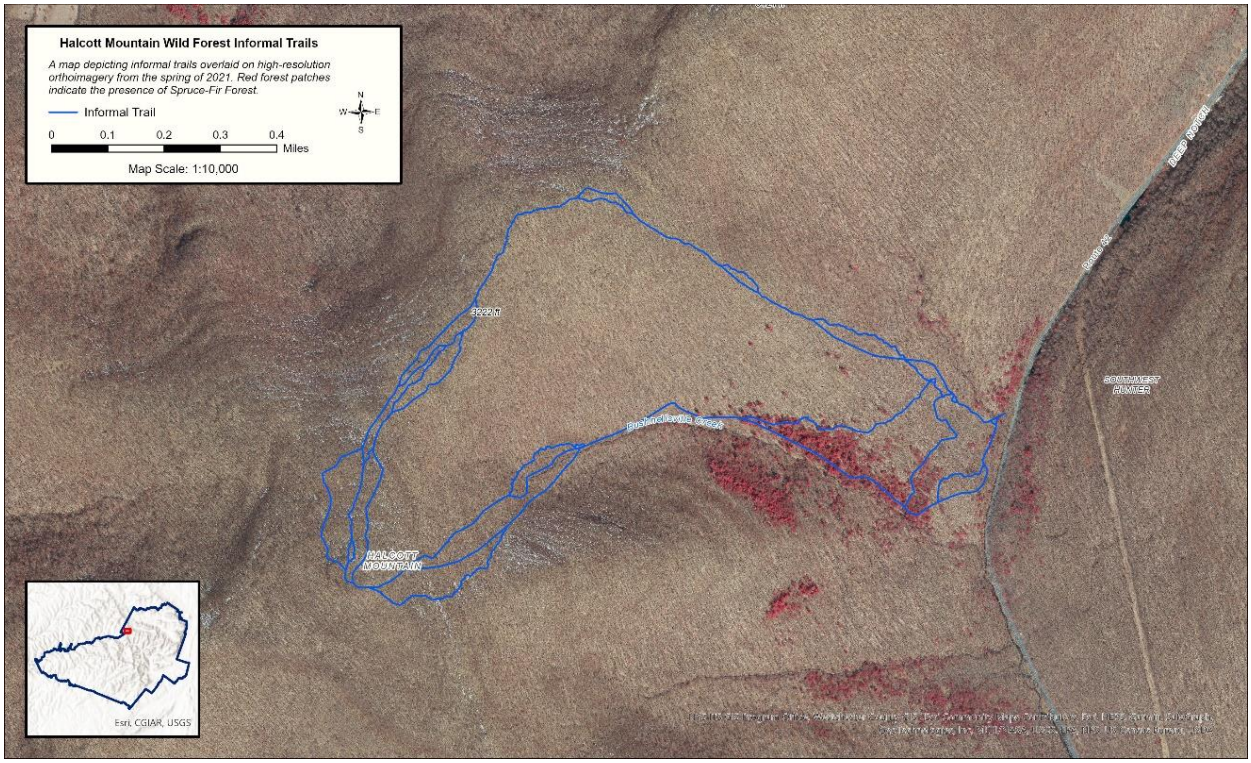
There are two main informal trails to the summit of Halcott shown on AllTrails, a northern informal trail and a southern informal trail. The northern informal trail is barely discernible in many areas between 2100’ and 3100’ in elevation. Once on the ridgetop at 3140’, the informal trail that leads to the summit of Halcott Mountain is easily found due to the trampling of Salmonberry (*Rubus sp.)* and Spinulous Wood Fern (*Dryopteris sp.).* The area around the canister of Halcott Mountain is like that on many of the formerly trailless peaks; there is an area of approximately 20 meters in diameter of trampled vegetation leading to exposed soil, rocks, and roots in the immediate vicinity of the canister. The southern informal trail is much more heavily used than the northern informal trail. The southern informal trail is generally in good condition, without areas of major erosion. However, this route does traverse some steep areas, particularly near the summit, and may eventually experience erosion with continued use.

3. Halcott Mountain Wild Forest Maps






Halcott Mountain
Wild Forest
Halcott Mountain
1074 m
Sleeping Lion
1039 m


Halcott Mountain Wild Forest Informal Trails
A map depicting informal trails overlaid on high-resolution orthoimagery from the spring of 2021. Red forest patches indicate the presence of Spruce-Fir Forest.
Informal Trail
0 0.1 0.2 0.3 0.4 Miles
Map Scale: 1:10,000
HALCOTT MOUNTAIN
Esri, CGIAR, USGS

4. Current Statistics

The proposed threshold for Zone 1 indicator 1 is that there will be no more than 3 patches above 3,400' in elevation.

Zone 1 Indicator: Current Number of Patches

Peak	Total Area Zone 1 (Acres)	Current Number of Patches Zone 1	Current Informal Trail Length Zone 1 (Miles)
Halcott Mountain	60.66	8.00	1.13

Zone 1 Threshold Analysis

Peak	Threshold for Indicator 1 Zone 1 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity Zone 1	Management Action Required
Halcott Mountain	Y	High	N	Y

The fragmentation analysis results show that the threshold for Zone 1 on Halcott Mountain has been exceeded, requiring management action.

Desired Future Conditions Zone 1 Halcott Mountain Wild Forest

Peak	Total Area Zone 1 (Acres)	Projected Number of Patches if a Preferred Route is Marked	Projected Trail Length if a Preferred Route is Marked (Miles)
Halcott Mountain	60.66	2.0	0.41

By designating a preferred route on Halcott Mountain, conditions in Zone 1 would meet the management standard by bringing the total number of patches to 2 patches. The informal trail network in Zone 1 would be reduced from 1.13 miles to 0.41 miles.

The proposed threshold for the Zone 2 indicator is that there will be no more than 6 patches below 3,400' in elevation.

Zone 2 Indicator: Current Number of Patches

Peak(s)	Total Area Zone 2 (Acres)	Current Number of Patches Zone 2	Current Informal Trail Length (Miles)	Current Informal Trail Length Zone 2 (Miles)
Halcott Mountain	715.68	19	5.78	5.78

Zone 2 Threshold Analysis

Peak	Threshold for Indicator Zone 2 Exceeded (Y/N)	Level of Management Concern	Management Action Required
Halcott Mountain	Y	High	Y

The fragmentation analysis results show that the threshold for Zone 2 on Halcott Mountain has been exceeded, requiring immediate management action.

Desired Future Conditions Zone 2 Halcott Mountain Wild Forest

Peak	Total Area Zone 2 (Acres)	Projected Number of Patches if a Preferred Route is Marked	Projected Trail Length if a Preferred Route is Marked (Miles)
Halcott Mountain	715.68	2.0	3.02

By designating a preferred route on Halcott Mountain Wild Forest, conditions in zone 2 would meet the management standard by bringing the number of patches from 19 to 2 patches and would reduce the length of informal trails from approximately 5.78 miles to approximately 3.02 miles.

5. Proposed Management Actions

- Mark a preferred route to Halcott Mountain to consolidate the informal trail network to a single corridor and reduce the aggregate area of disturbance on the summit.
- Conduct a trail sustainability analysis on preferred routes.
- Conduct an analysis to determine potential routes for relocating unsustainable trails or sections of trails.
- Develop a trail design plan including trail rehabilitation plans or relocation needs.
- Where needed build a trail or reroute consistent with DEC CP-78 policy.

E. Rusk Mountain Wild Forest

The Rusk Mountain Wild Forest was re-classified in 2008 and was formerly part of the Hunter Mountain Wild Forest. DEC manages these lands in accordance with the 1995 Hunter Mountain Wild Forest Unit Management Plan (UMP) (PDF).

1. Hunter Mountain Wild Forest Trailless Peaks UMP Guidance

Protection of Trailless Peaks- Rusk Mountain at 3600' is a trailless peak. Some individuals prefer the challenge of climbing mountains which do not have trails. If a ridge trail is constructed, it would eliminate the "trailless" character of this mountain and the others along this ridge unless a trail could be in an area which was at a lower elevation far from the summits. (Page 26, Hunter Mountain Wild Forest UMP).

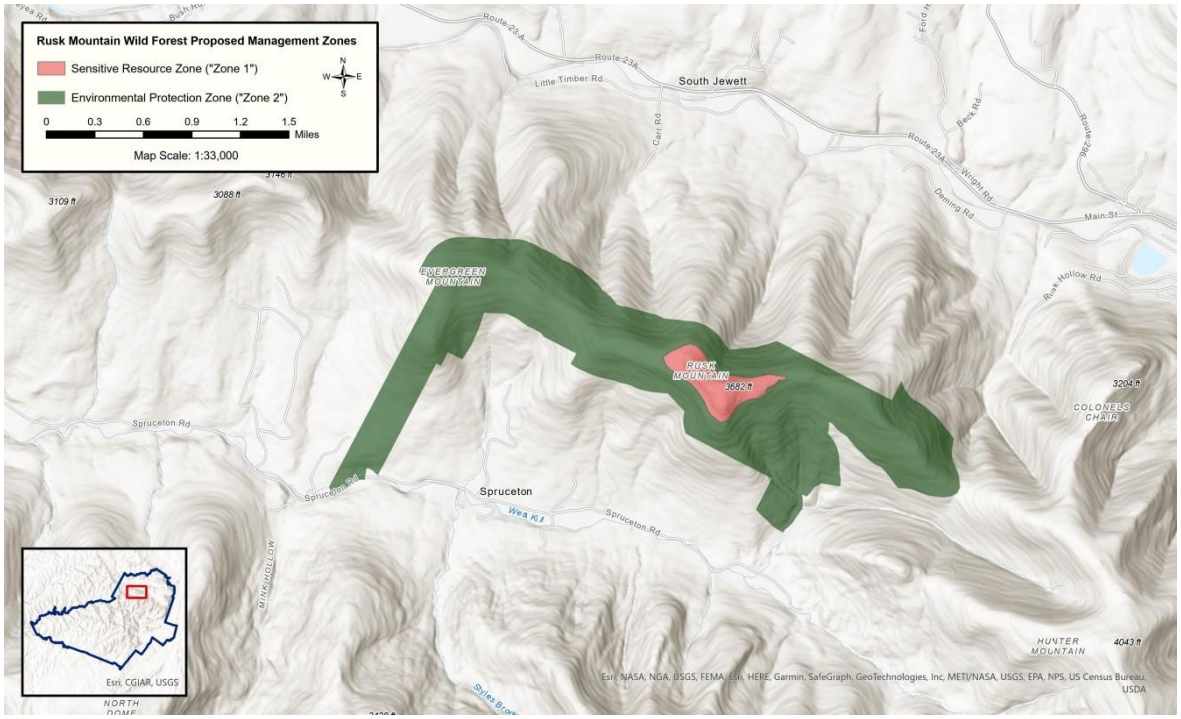
2. NYNHP Findings and Recommendations

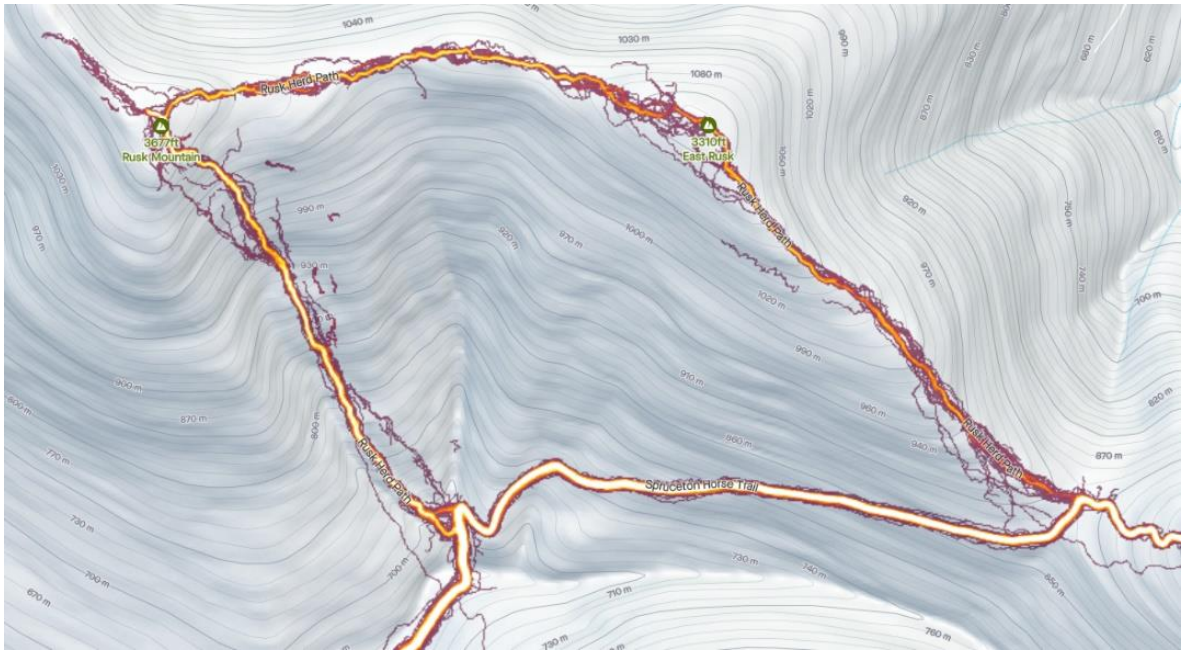
Rusk Mountain was surveyed on the informal trail that runs along the eastern edge of Ox Hollow out and back. That informal trail is well-defined for its entire length with moderate and higher impacts along much of the informal trail-tread. Impacts are the most significant along the steepest segments of the informal trails and at the summit surrounding the canister. A significant network of informal trails exists on the higher elevation areas surrounding the summit and on the beginning of the bushwack route leading to East Rusk Mountain.

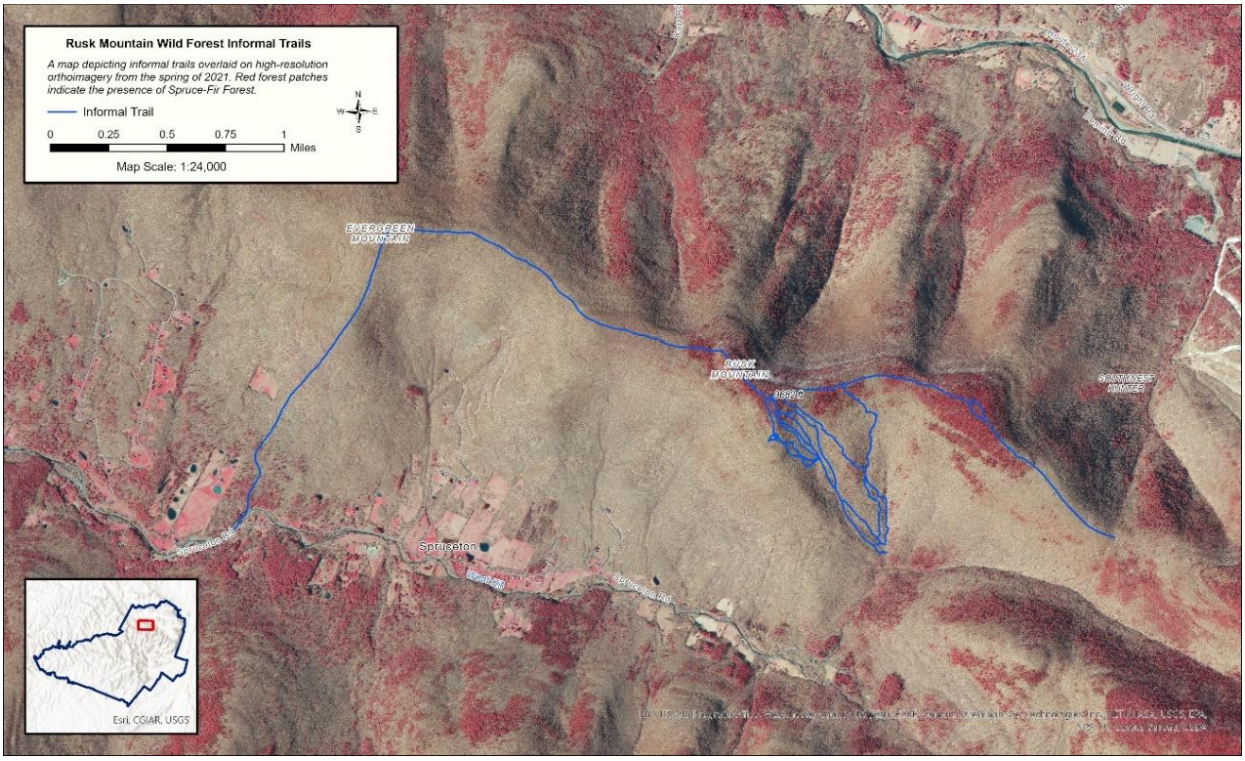
Areas of the Beech-Maple Mesic Forest surveyed were of good to excellent quality with a range of composition, structure, and tree age classes. Impacts to this forest type were limited to the informal trail tread or narrow swaths bordering them in localized areas. The Mountain Spruce-Fir Forest bordering the primary informal trail from the south to the east has been moderately (on level areas approaching the summit) to highly impacted (near canister). Establishment of a formal trail to the summits of both Rusk

and East Rusk Mountains may allow this community to recover from the current, significant level of disturbance and vegetation destruction as a result of trampling impacts.

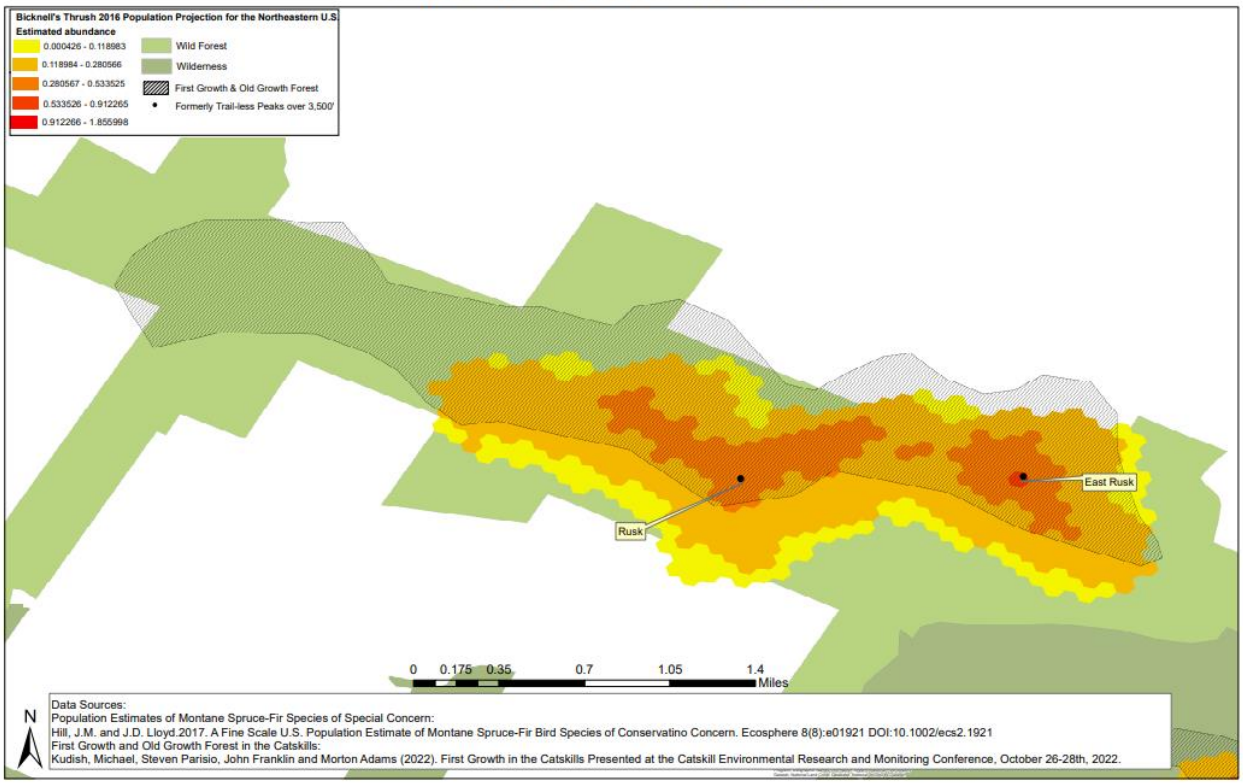
3. Rusk Mountain Wild Forest Maps







Unique Resource Values Rusk Wild Forest



4. Current Statistics

Zone 1 Indicator 1: Current Number of Patches

Peak	Total Area Zone 1 (Acres)	Current Number of Patches Zone 1	Current Informal Trail Length Zone 1 (Miles)
Rusk Mountain	87.42 acres	14 patches	1.83 miles

The proposed threshold for Zone 1 indicator 1 is that there will be no more than 3 patches above 3,500' in elevation.

Zone 1 Threshold Analysis

Peak	Threshold for Indicator 1 Zone 1 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity Zone 1	Management Action Required
Rusk Mountain	Y	High	N	Y

The fragmentation analysis results show that the threshold for Zone 1, Indicator 1 has been exceeded on Rusk Mountain, requiring management action.

Desired Future Condition Zone 1 Rusk Mountain Wild Forest

Peak	Total Area Zone 1 (Acres)	Projected Number of Patches if a Preferred Route is Marked	Projected Trail Length if a Preferred Route is Marked (Miles)
Rusk	87.42	3.0	1.48

By designating a preferred route on Rusk Mountain, conditions in Zone 1 would meet the management standard by bringing the total number of patches from 14 to 3 patches. The informal trail network in Zone 1 would be reduced from approximately 1.83 miles to approximately 1.48 miles. The proposed threshold for the Zone 2 indicator is that there

will be no more than 6 patches below 3,500’ in elevation.

Zone 2 Indicator: Current Number of Patches

Peak(s)	Total Area Zone 2 (Acres)	Current Number of Patches Zone 2	Current Informal Trail Length Zone 2 (Miles)
Rusk Mountain	1,350.97	16	8.28

Zone 2 Threshold Analysis

Peak	Threshold for Indicator 2 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity Zone 2	Management Action Required
Rusk	Y	High	N	Y

The fragmentation analysis results show that the threshold for Zone 2 on Rusk Mountain has been exceeded, requiring management action.

Desired Future Condition Zone 2 Rusk Mountain Wild Forest

By designating a preferred route, conditions on Rusk Mountain would meet the management standard by bringing the total number of patches to 3 patches. Marking a preferred route in Zone 2 would reduce the current number of patches caused by informal trails from approximately 16 to 3 and would reduce the length of informal trail from approximately 8.28 miles to 7.92 miles.

Peak	Total Area Zone 2 (Acres)	Projected Number of Patches in Zone 2 if a	Projected Trail Length if a Preferred Route

		Preferred Route is Marked	is Marked (miles)
Rusk	1,350.97	3.0	7.92

5. Proposed Management Actions

- Mark a preferred route to Rusk Mountain to consolidate foot traffic to a single corridor and reduce the aggregate area of disturbance.
- Conduct a trail sustainability analysis on preferred routes.
- Conduct a desktop analysis to determine potential routes for relocating unsustainable trails or sections of trails.
- Develop a trail design plan including trail rehabilitation plans or relocation needs.
- Where needed build a trail or reroute consistent with DEC CP-78 policy.

F. Kaaterskill Wild Forest

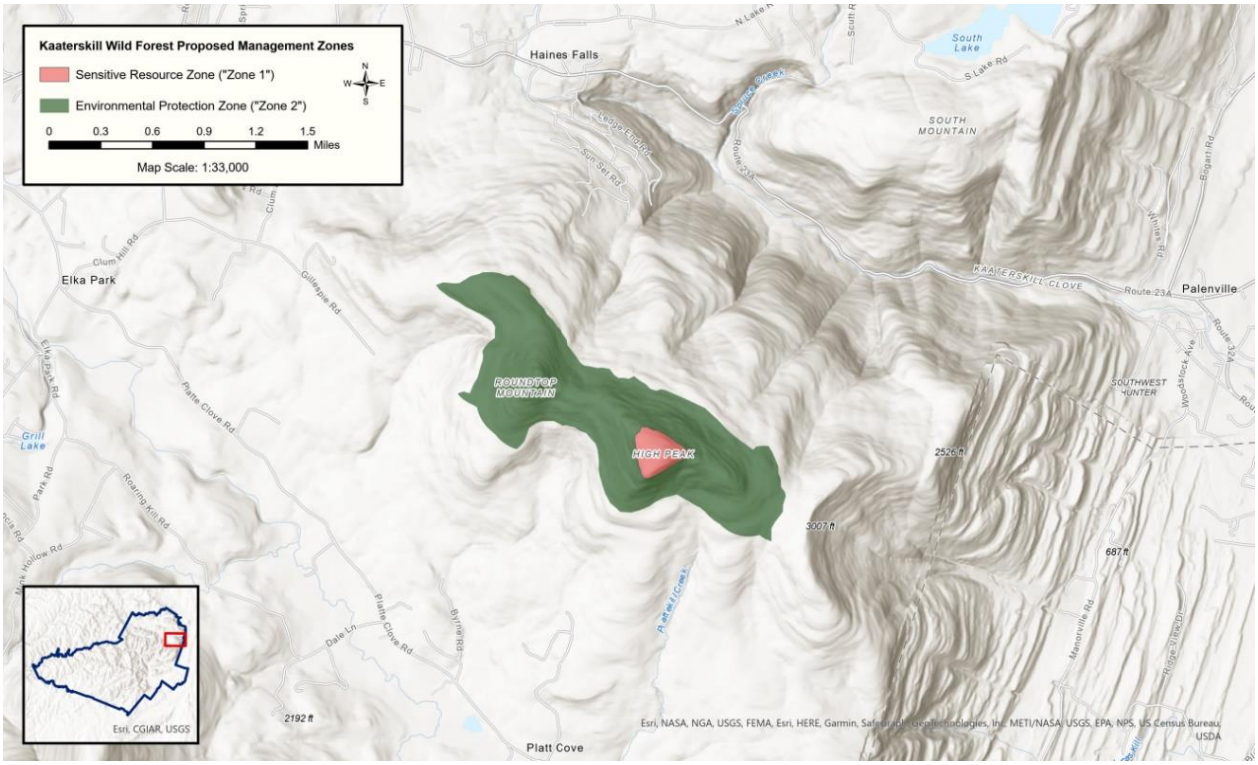
1. Kaaterskill Wild Forest Trailless Peaks UMP Guidance

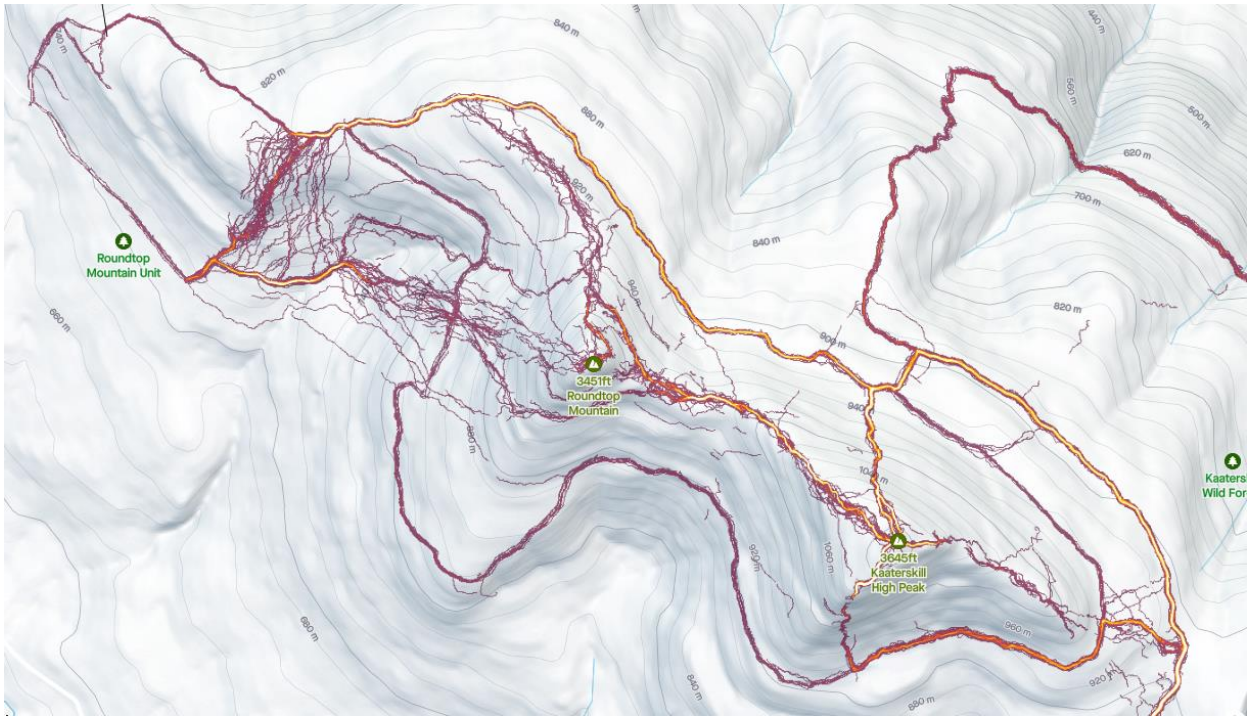
There is no reference to, or management guidance for the trailless area within Kaaterskill Wild Forest in the 1987 UMP.

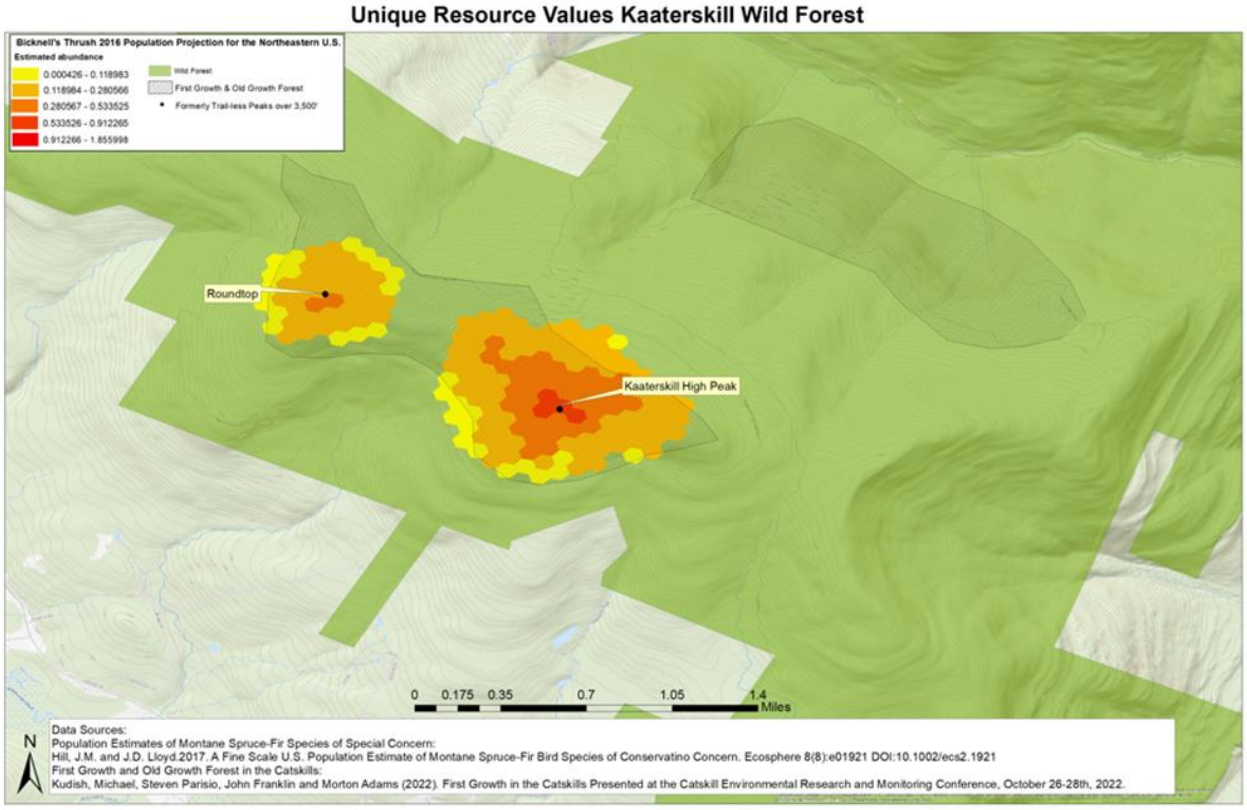
2. NYNHP Findings and Recommendations

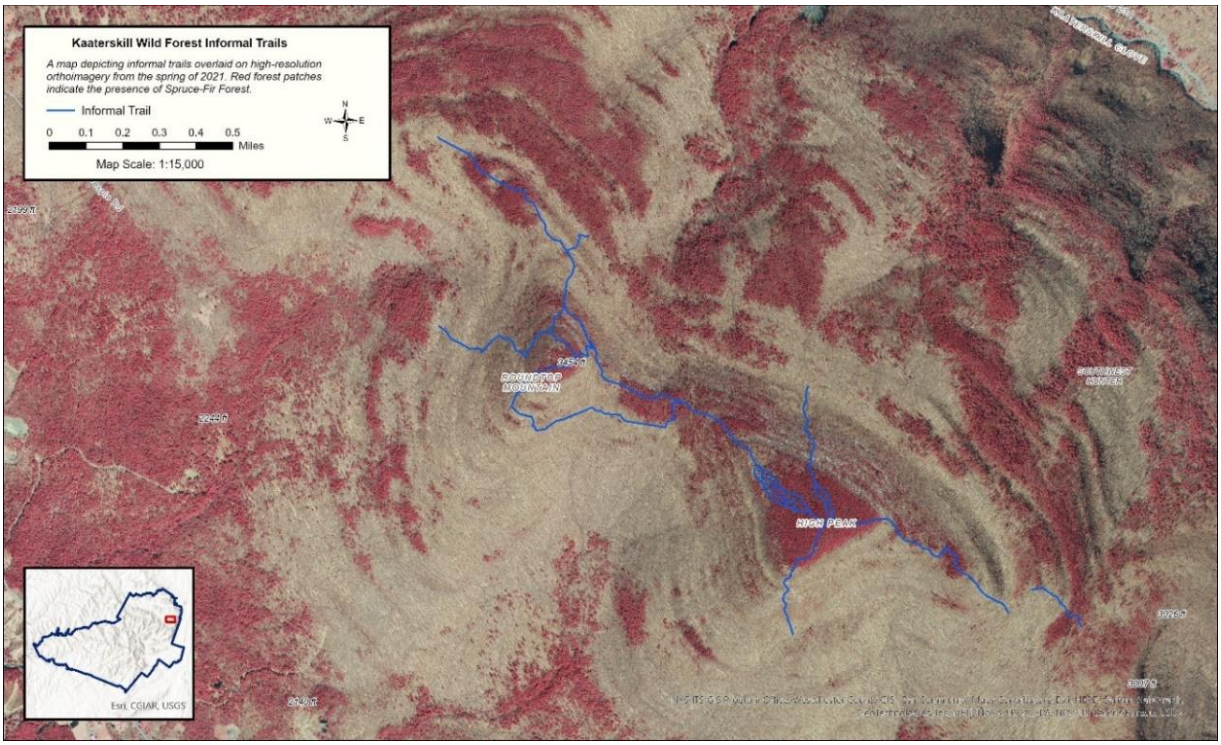
The informal trail on the south face of Kaaterskill High Peak (KHP) that originates at the Kaaterskill High Peak Snowmobile Trail and passes through Beech-Maple Mesic Forest for approximately 200 meters before entering a Mountain Spruce-Fir Forest community. The informal trail is vertically aligned for much of its length, resulting in areas of deep erosion down to bedrock in some locations. The area at the summit is crisscrossed with informal trails resulting in extensive damage to the Mountain Fir Forest at the summit, including loss of vegetation and exposed bedrock and tree roots. The forest is missing the herbaceous, sapling, and shrub layers associated with this natural community. A survey was conducted for Bicknell's Thrush, and none were detected. The lack of saplings and shrubs may have reduced the habitat suitability for Bicknell's Thrush on the peak. The species was last detected on KHP in 2001.

3. Kaaterskill Wild Forest Maps




Roundtop
Mountain Unit
3451ft
Roundtop
Mountain
3645ft
Kaaterskill
High Peak
840 m
820 m
860 m
880 m
900 m
940 m
1040 m
1060 m
920 m
960 m
700 m
620 m
560 m
500 m
440 m
680 m


Unique Resource Values Kaaterskill Wild Forest
Bicknell's Thrush 2016 Population Projection for the Northeastern U.S.
Estimated abundance
0.000426 - 0.118983
0.118984 - 0.280566
0.280567 - 0.533525
0.533526 - 0.912265
0.912266 - 1.855998
Wild Forest
First Growth & Old Growth Forest
Formerly Trail-less Peaks over 3,500'
Roundtop
Kaaterskill High Peak
0 0.175 0.35 0.7 1.05 1.4
Miles
N
Data Sources:
Population Estimates of Montane Spruce-Fir Species of Special Concern:
Hill, J.M. and J.D. Lloyd.2017. A Fine Scale U.S. Population Estimate of Montane Spruce-Fir Bird Species of Conservatino Concern. Ecosphere 8(8):e01921 DOI:10.1002/ecs2.1921
First Growth and Old Growth Forest in the Catskills:
Kudish, Michael, Steven Parisio, John Franklin and Morton Adams (2022). First Growth in the Catskills Presented at the Catskill Environmental Research and Monitoring Conference, October 26-28th, 2022.



4. Current Statistics

Zone Indicator: Current Number of Patches

Peak	Total Area Zone 1 (Acres)	Current Number of Patches Zone 1	Current Informal Length Zone 1 (Miles)
Kaaterskill High Peak	37.25	10	1.19

The proposed threshold for Zone 1 indicator 1 is that there will be no more than 3 patches above 3,500’ in elevation.

Zone 1 Threshold Analysis

Peak	Threshold for Indicator 1 Zone 1Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity Zone 1	Mngt Action Required
Kaaterskill High Peak	Y	High	N	Y

The fragmentation analysis results show that the threshold for Zone 1, indicator 1 has been exceeded on Rusk Mountain, requiring immediate management action.

Desired Future Condition Zone 1 Kaaterskill Wild Forest

Peak	Total Area Zone 1 (Acres)	Projected Number of Patches Zone 1	Projected Trail Length Zone 1 (Miles)
Kaaterskill High Peak	37.25	4.0	0.51

Marking a preferred route in Zone 1 on Kaaterskill High Peak would result in a trail network configuration with 4 patches, which still exceeds the management standard of 3 patches or less. As an interim strategy, a preferred route will be marked, and the area will be re-assessed to determined where future management efforts should be focused to further reduce the patch configuration in Zone 1. By designating a preferred route, Zone 1 of the Kaaterskill Wild Forest would see a decrease in the number of informal trail created patches from 10 to 4 and the length of the informal trails would be reduced from approximately 4.54 miles to approximately 0.51 miles.

Zone 2 Indicator: Current Number of Patches

The proposed threshold for the Zone 2 indicator is that there will be no more than 6 patches below 3,500’ in elevation.

Peak(s)	Total Area Zone 2 (Acres)	Current Number of Patches Zone 2	Current Informal Trail Length Zone 2 (Miles)
Kaaterskill HP	709.95	11	4.54

Zone 2 Threshold Analysis

Peak	Threshold for Indicator 2 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity	Management Action Required
Kaaterskill HP	Y	High	N	Y

The fragmentation analysis results show that the threshold for Zone 2 on Kaaterskill Wild Forest has been exceeded and immediate management action is required.

Zone 2 Future Desired Condition Kaaterskill Wild Forest

Peak	Total Area Zone 2 (Acres)	Projected Number of Patches Zone 2	Projected Trail Length Zone 2 (Miles)
Kaaterskill High Peak	709.95	6.0	2.73

The fragmentation analysis results indicate that if a preferred route is marked in Zone 2 of Kaaterskill Wild Forest, the projected number of patches would decrease from 11 to 6 which meets the management standard established for Zone 2. The length of informal trails would be decreased from approximately 4.54 miles to approximately 2.73 miles by designating a preferred route.

5. Proposed Management Actions

- Mark a preferred route to the summit of Kaaterskill High Peak and out to Hurricane Ledge to consolidate the informal trail network to a single corridor and reduce the aggregate area of disturbance on the summits. At this time, the Long Path will not be re-routed to be aligned with the preferred route. The marking of a preferred route is considered an inter-rim management strategy, not a permanent one. The desired conditions for Zone 1 and Zone 2 must be reached before co-aligning the Long Path with the preferred route over Kaaterskill High Peak can be considered.
- Include updated informational kiosk signage at the parking area located on Steenburgh Rd.
- Conduct a trail sustainability analysis on preferred routes.

- Conduct a desktop analysis to determine potential routes for relocating unsustainable trails or sections of trails.
- Develop a trail design plan including trail rehabilitation plans or relocation needs.
- Where needed build a trail or reroute consistent with DEC CP-78 policy.

G. Bearpen Mountain State Forest

1. Bearpen Mountain UMP Guidance

Unlike the other trailless peaks contained within the study area, Bearpen Mountain and Vly Mountain are classified as State Reforestation Area. A UMP for Bearpen Mountain State Forest is currently under development. At this time, the management of the lands on and around both peaks is guided by the Strategic Plan for State Forest Management.

2. NYNHP Findings and Recommendations

The Bearpen Mountain State Forest, which contains Bearpen and Vly summits, falls outside of the Catskill Park Blue Line. In 2023, NYNHP conducted a visitor impact survey for the trailless peak on Vly Mountain from the Bearpen-Vly Trailhead. The first mile of the trail passes along a steep, gravel section of County Rd 3 and crests at a hunter's cabin on the boundary of Bearpen Mountain State Forest. The trailhead can be found to the southeast of the cabin, where it diverts from the gravel road.

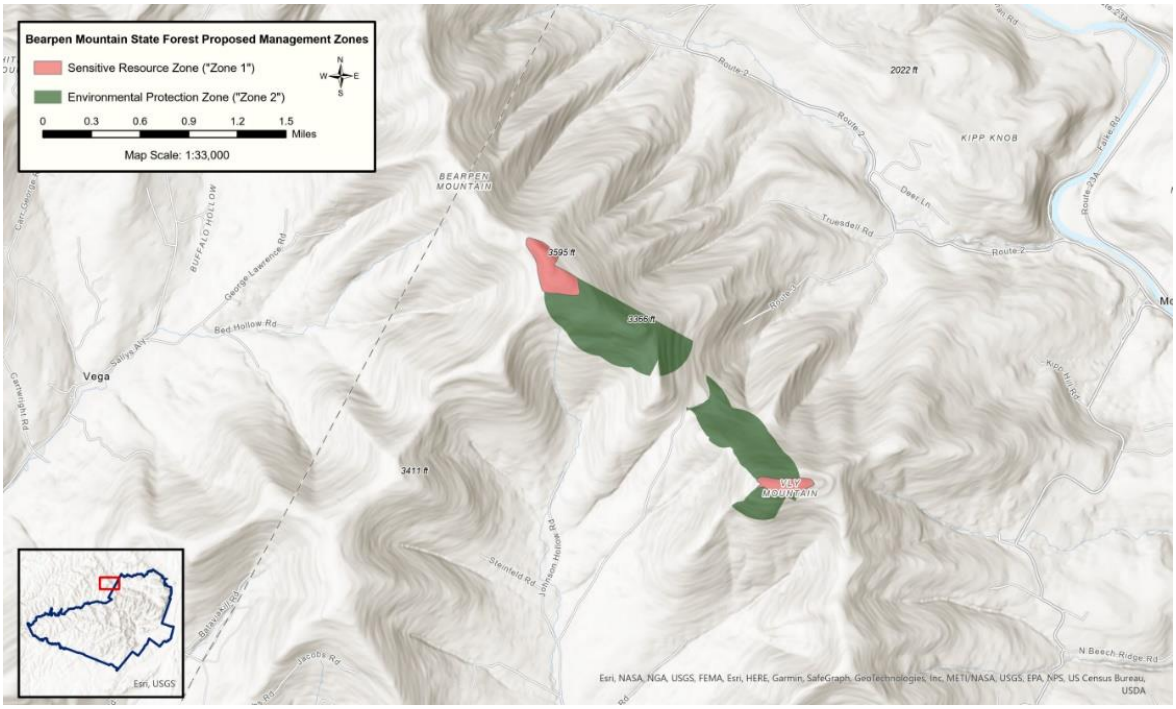
The informal trail to the summit of Vly Mountain is heavily trafficked and follows a blue-painted private boundary line to. Passing through Beech Maple Mesic Forest, most of the informal trail is a single track between 1-2 feet wide and devoid of vegetation with compact soil and exposed rock. About 150 meters from the road, the informal trail splits into two distinct paths and rejoins a few meters later. At 2090' in elevation, the informal trail steepens, with foot traffic causing significant erosion to the hillside and broken talus. The landscape levels out at 3,050' in elevation, with sections of the informal trail becoming muddy and trampled; the largest section being approximately 3 meters wide by 4 meters long. The informal trail forks and diverts northeast with the older section blocked off by small branches and showing signs of revegetation. This 300-meter-long ridge was surveyed for a newly proposed natural community called a Ridge Woodland, containing a stand of stunted, multi-stemmed black cherry and yellow birch.

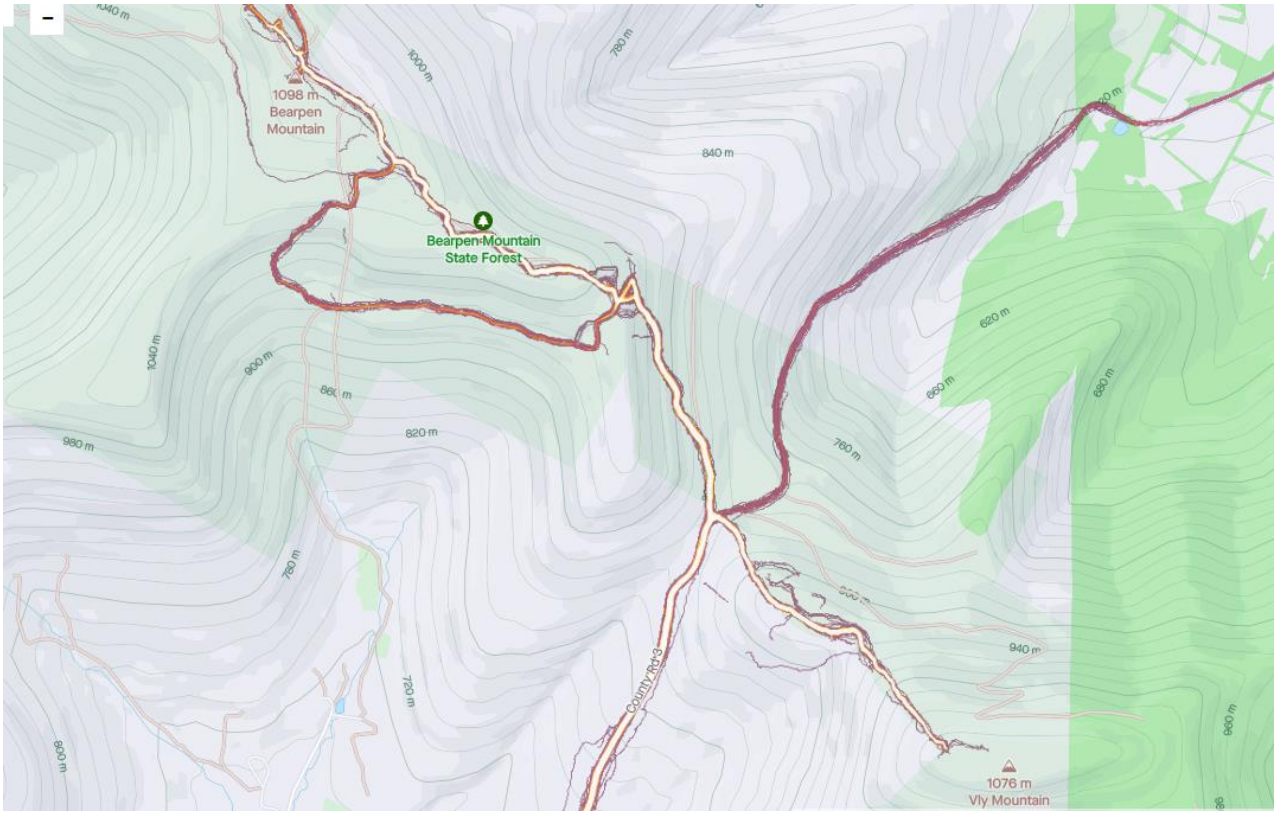
The informal trail steepens at 3,200' in elevation, passing through Beech Maple Mesic Forest with erosion of rocky slope from foot traffic and possible water drainage. The Vly Mountain summit around the canister is a round area about 5 meters in diameter that is devoid of vegetation with multiple informal trails that continue down the ridge. This summit ridge was also surveyed for the proposed Ridge Woodland and found to be an exemplary example with stunted, multi-stemmed black cherry, yellow birch, and

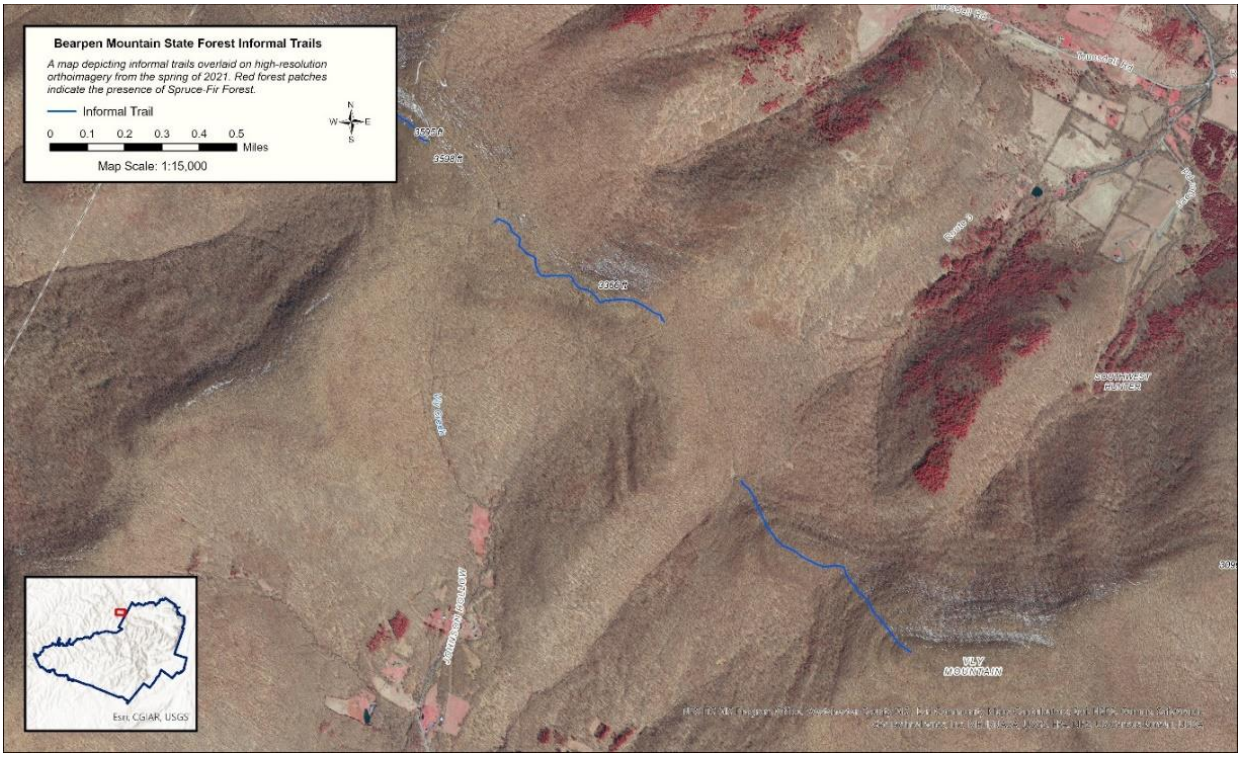
American beech. At 3,300’ in elevation, the informal trail encounters a steep, rocky section that is heavily eroded with exposed roots and shale broken from the slope. The informal trail becomes periodically muddy from foot traffic along a ridge at 3,350’ in elevation. This ridge was surveyed for a newly proposed natural community that is being called a Ridge Woodland. About 0.3 miles from the forest road, there is a 1-3 meter wide by 20-meter-long section of trampled mud. With no ability to rock hop, the erosion continues to spread outward as hikers go around. The trail forks but rejoins 15 meters later with the southern trail blocked off by branches and beginning to revegetate. At 3,430’ in elevation, the informal trail becomes a deep channel for runoff as it rejoins the forest road. Erosion is mostly contained to a single, heavily used informal trail with the stated exceptions.

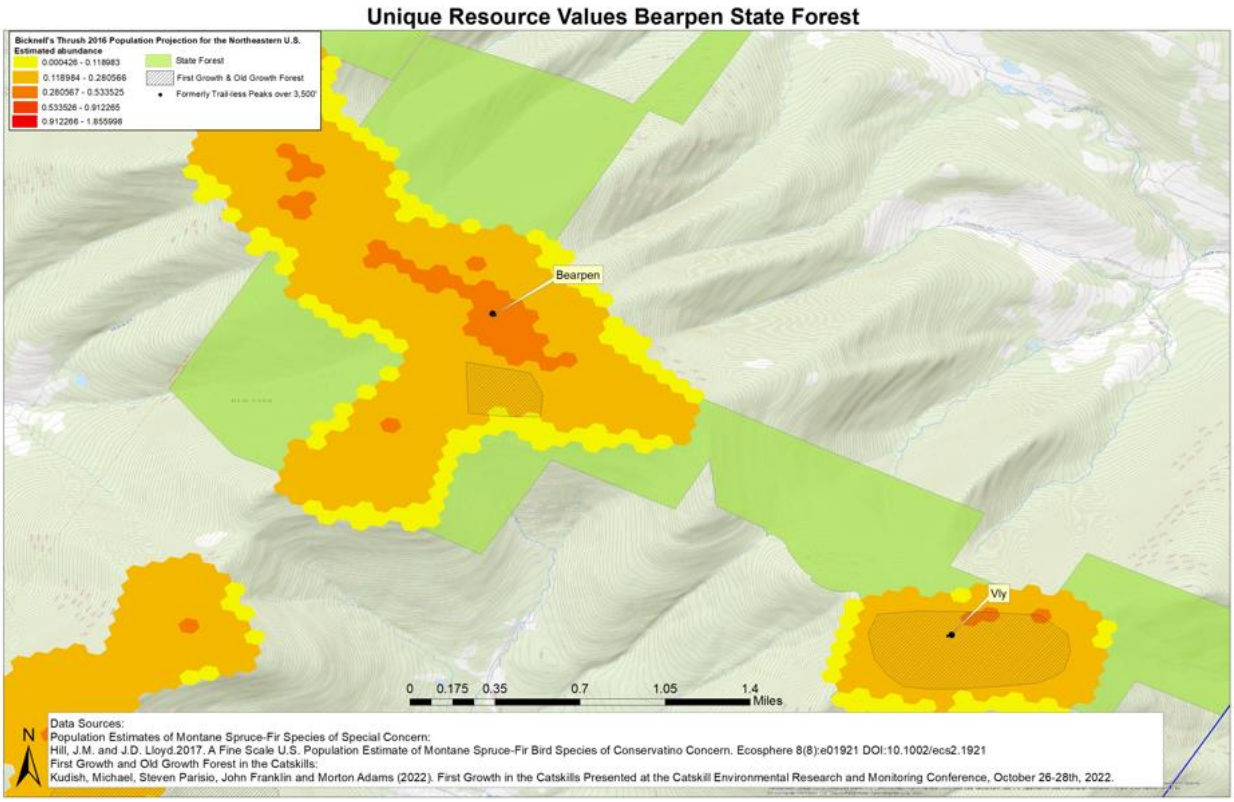
The forest road passes through Beech Maple Mesic Forest and leads to the summit of Bearpen, where the summit is heavily altered by the intersection of multiple forest roads, previous logging, and a now abandoned ski resort. The summit ridge was previously clearcut and is now comprised of regrowth from young, multi-stemmed yellow birch and cherry.

3. Bearpen Mountain State Forest Maps




1098 m
Bearpen
Mountain
Bearpen Mountain
State Forest
840 m
1000 m
780 m
620 m
660 m
680 m
1040 m
900 m
860 m
820 m
980 m
760 m
720 m
940 m
County Rd 3
1076 m
Vly Mountain


Bearpen Mountain State Forest Informal Trails
A map depicting informal trails overlaid on high-resolution orthoimagery from the spring of 2021. Red forest patches indicate the presence of Spruce-Fir Forest.
Informal Trail
0 0.1 0.2 0.3 0.4 0.5
Miles
Map Scale: 1:15,000
N
W
E
S
Esri, CGIAR, USGS
VLY MOUNTAIN



4. Current Statistics

Zone 1 Indicator: Current Number of Patches

Peak	Total Area Zone 1 (Acres)	Current Number of Patches Zone 1	Current Informal Trail Length Zone 1 (Miles)
Bearpen Mountain	36.65	2	0.12
Vly Mountain	16.39	1	0.04
Totals	53.09	3	0.2

The current conditions in Zone 1 on Vly and Bearpen meet the management standard for Zone 1. No immediate management action is required.

Zone 1 Threshold Analysis

Peak	Threshold for Indicator 1 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity	Management Action Required
Bearpen	N	Low	Y	N
Vly	N	Low	Y	N

The threshold established for Zone 1 has not been exceeded on Bearpen and Vly. No management action is required to bring the current conditions back into alignment with the management standard for Zone 1.

Desired Future Condition Zone 1 Bearpen Wild Forest

Zone 1

Peak	Total Area Zone 1 (Acres)	Projected Number of Patches Zone	Projected Trail Length Zone 1 (Miles)
Bearpen	36.65	2	0.12
Vly	16.39	1	0.04
Totals	53.04	3	0.16

The current conditions in Zone 1 meet the management standard and the threshold has not been exceeded. The summits will be routinely monitored and assessed to ensure that the conditions on both peaks meet the landscape connectivity conditions established for the zone management standard.

Zone 2 Indicator: Current Number of Patches

Peak(s)	Total Area Zone 2 (Acres)	Current Number of Patches Zone 2	Current Informal Trail Length (Miles)
Bearpen Mountain	181.65	4	0.6
Vly Mountain	140.65	4	0.43
Totals	322.5	8	1.03

Zone 2 Threshold Analysis

Peak	Threshold for Indicator 2 Exceeded (Y/N)	Level of Management Concern	Meets Management Standard for Landscape Connectivity	Management Action Required
Bearpen	N	Low	Y	N
Vly	N	Low	Y	N

The threshold established for Zone 2 has not been exceeded on Bearpen or Vly. The informal trail network will be assessed for sustainability and where necessary and appropriate, trail re-routes on side hill alignments will be constructed.

Desired Future Condition Zone 2 Bearpen Wild Forest

The current conditions in Zone 2 meet the management standard and the threshold has not been exceeded. No immediate management action is required.

Peak	Total Area (Acres)	Projected Number of Patches if a Preferred Route is Marked in Zone 2	Projected Trail Length in Zone 2 if a Preferred Route is marked (miles)
Bearpen	181.7	4	0.63
Vly	140.7	4	0.42
Totals	322.3	8	1.05

5. Proposed Management Actions

- Consider marking a preferred route to the summit of Vly Mountain from County Rd 3 to consolidate foot traffic. Consolidation of the informal trail network to a single corridor would reduce the aggregate area of disturbance around, and on the summits.
- Conduct a trail sustainability analysis on preferred routes.
- Conduct an analysis to determine potential routes for relocating unsustainable trails or sections of trails.
- Develop a trail design plan including trail rehabilitation plans or relocation needs.
- Construct new trails and realignments in accordance with DEC policy.

- Forest management on Bearpen Mountain State Forest will allow for conditions on both peaks to meet the management standards for Zone 1 and Zone 2 established in this plan.

V. Implement, Monitor, Evaluate & Adjust

The final section of this plan addresses Element 4 of the VUM framework: Implement, Monitor, Evaluate and Adjust. Information about the monitoring priorities, procedures and processes can be found in this section. The lands described throughout this VUM plan will continually be monitored for the quality of visitor experiences, intensity of use and changing natural resource conditions. After management actions are implemented, the data gathered during the monitoring process will be used to assess how effective the actions were in achieving desired conditions. If the desired conditions and landscape connectivity standards are not being met, additional corrective measures will be implemented. DEC will re-evaluate management actions and make any necessary adjustments to accomplish the landscape connectivity objectives and to reach the desired conditions. The monitoring strategy outlined in this section is designed to give land managers guidance on the collection of information that is needed to make data driven, science-based decisions about the management direction for the lands covered by this plan.

Monitoring refers to the long-term systematic repetition of natural resource surveys and analysis of that data to predict or detect natural and human induced changes in resource conditions and to assess if management objectives are being met (Marion, 2024). The VUM framework requires the use of monitoring to routinely evaluate resource conditions for comparison to thresholds to determine if those conditions are approaching or exceeding established thresholds. Monitoring is an essential part of visitor use, as it provides feedback for managers to evaluate the effectiveness of management actions in achieving and maintaining desired conditions. Without monitoring, managers cannot determine whether their management strategies and actions are effective. When designed correctly, monitoring programs prevent subjective determination of unacceptable conditions. A successful monitoring program routinely analyzes data associated with indicators to assess whether changes in management actions are needed and utilizes indicators that can be accurately, precisely, and efficiently measured. (Marion, 2024) This iterative practice of monitoring, implementing corrective strategies and then continuing to monitor to gauge the effectiveness of those actions allows land managers maximize the benefits for visitors while achieving and maintaining desired conditions for natural resources. Monitoring visitation patterns and the extent of natural resource impacts will inform which management actions need to be adjusted to meet desired experiential conditions for the lands within the study area.

The management mandates for land classifications, legal requirements, desired conditions, indicator(s), thresholds, and suggested visitor use management strategies

within the project area are described in the preceding sections. A detailed description of the current conditions, resource concerns and management challenges on the formerly trailless peaks over 3,500' is provided. The justification for creating a long-term monitoring program for the project area is provided by those data. As the previous sections illustrate, the current condition of many of the peaks do not meet the landscape connectivity standard, and thresholds have been exceeded. This VUM monitoring program will assess the efficacy of the management actions after implementation and detect deteriorating conditions before severe or irreversible changes to natural resources occur.

Formerly Trailless Peaks Monitoring Program Goals:

- Summarize indicator conditions efficiently and accurately across management zones using a combination of desktop analysis tools and field data collection.
- Analyze and compare current and previous indicator conditions to describe the pace and magnitude of change over time and document progress towards achieving desired conditions.
- Proactively detect and address deteriorating natural resource conditions before irreversible impacts to the landscape occur.
- Assess impact acceptability by periodically comparing the current indicator conditions to thresholds.
- Evaluate the efficacy of management strategies and actions that have been implemented on the ground.
- Use impact severity data to request and/ or justify support for management actions.
- Continue to support montane bird research and monitoring.

Data collection through monitoring can help rectify any misconceptions regarding visitor use as monitoring results can objectively show the pace and magnitude of change over time. There are two different types of visitor use monitoring approaches. The first phase of monitoring asks, "What is the status and trends associated with visitor use"? Initial natural resource assessments are often viewed as a "baseline" of resource conditions that provide information that can inform management processes, particularly where formal standards of resource conditions have been established and initial conditions can be compared to these standards. This information provides a starting point for ongoing monitoring to examine trends over time. Inventories of the condition of natural resources within the study area have been collected since 2019 in the form of condition class assessments of informal trails on the formerly trailless peaks over 3,500'. This data been used to detect changes in visitor use intensities and natural resource conditions over the last six years. The second phase of monitoring asks the question, "Are current actions achieving and maintaining desired conditions"? This monitoring approach is

applied after management actions have been implemented on the ground and is used to assess the effectiveness of those management actions in achieving desired conditions. The monitoring approach for the lands covered by this plan attempt to answer two key questions:

- For selected indicator(s), what is the status and trends of conditions following implementation of management actions?

- How do current conditions compare with thresholds?

A key task in managing visitor use is committing to monitoring change over time. An effective monitoring program needs to be efficient, accurate and precise as well as financially and administratively feasible. Inventory processes that provide objective information about informal trail conditions (i.e. condition class assessments, grade, trail slope alignment angles and trail width measurements) have, and will continue to be collected and added to the information taken from previous assessments. The future monitoring effort will collect information that will answer the following questions:

1) How are informal trails changing in their aggregate length, density, and impact on resource conditions following implementation of management actions?
2)
3) How is vegetation and soil loss changing over time?
4)
5) What are the recreation related impacts to high elevation montane bird species?

The types of monitoring protocols for informal trails will utilize a combination of point sampling surveys and continued condition class assessments for comparative purposes.

Monitoring Strategy & Scope

What will be monitored?

The goal of the data collection is to evaluate visitor use patterns, patch counts, high elevation bird species distribution and abundance, and the state of the natural resources in Zones 1 and 2 on the 16 formerly trailless summits.

Techniques to measure indicator(s)?

The indicator that will be monitored in Zone 1 and Zone 2 is the Patch Number Indicator. Locations and condition of informal trails in Zone 1 and Zone 2 will continue to be documented, digitized, and compared to Strava heat map activity to generate an estimate of the patch number and distribution following implementation of any management action. The fragmentation analysis procedures that were developed in 2022 will be replicated for subsequent fragmentation analyses.[30]

Timing of the monitoring task:

Periodic reassessments of natural resource conditions will be conducted to correlate with the same phase in phenological development each monitoring season. Monitoring will occur outside of the high elevation bird breeding and nesting season which occurs between May and mid-July. Field monitoring will involve continued condition class assessments on informal trails. Point assessments will be collected as resources and staff time permits. Data collection for point assessments will consist of two staff members performing a random start, fixed interval sampling method that measures trail sustainability metrics like trail width, slope, and trail slope alignment. Data will be collected and aggregated in Survey 123. An established protocol has been established for both point assessments and condition class assessments (additional information contained Appendix J).

The fragmentation analysis that was conducted in 2023 will be repeated to determine the success of management interventions that utilize a combination of field data and novel data sources. STRAVA data will be collected once a year in August and analyzed for potential changes in the informal trail network configuration. After 2025, the frequency of monitoring will depend on whether the desired conditions are being achieved and maintained, each mountain in the study area will be evaluated on a case-by-case basis.

Equipment Required:

Field monitoring requires use of handheld GPS devices, map, and compass, clinometers, and cameras. An iPad with Survey 123 software is used to collect and store condition class information and point assessment information. The desktop fragmentation analysis requires the use of ArcMap and ArcPro GIS software.

Use of Monitoring Data:

The data generated from monitoring will be used by DEC to provide a reliable, defensible, and transparent justification for making salient decisions. This could include

[30] DEC will continue to explore how condition class assessments could be used as a future indicator. (Identifying a threshold for the condition class assessments has proven problematic so it was not initially selected as an indicator.)

placing limitations on visitor use in cases where management actions are shown to be ineffective. Monitoring data and results will be provided on the Formerly Trailless Catskill High Peaks webpage as it becomes available.

Number of indicators to be monitored:

Adopting a monitoring strategy with more indicators than can be realistically tracked over time can be a common pitfall in VUM monitoring program design. DEC has given careful thought and consideration to indicator selection. The patch number indicator is tied directly to visitor use, can be easily, objectively measured, and reliably tracked over time in a cost-effective manner without overburdening DEC staff. If necessary and appropriate, additional indicators and thresholds may be identified and included in future monitoring efforts.

How will data be managed?

Data collected in the field will be stored in Survey 123 software and backed-up in DEC's centralized database to ensure that the data is secure and available now and for future reference.

Monitoring Schedule:

An additional analysis was carried out to determine the anticipated decrease in informal trail density if a preferred route was to be marked. This led to the establishment of a procedure for arranging monitoring priorities based on current impacts caused by visitor use and the potential for implementing management actions that could quickly and effectively address those impacts.

The hierarchy of monitoring priorities is as follows:

- If designation of a preferred route would reduce the existing informal trail density by less than 25%, the area is deemed a low priority for an immediate management intervention and monitoring.

- If designation of a preferred route would reduce the existing informal trail density between 25% and 50%, the area is considered medium priority for immediate management intervention and monitoring.

- If designation of a preferred route would reduce the existing informal trail density by over 50%, the area is considered a high priority for immediate management intervention and monitoring.

The Zone 1 fragmentation analysis results were as follows:

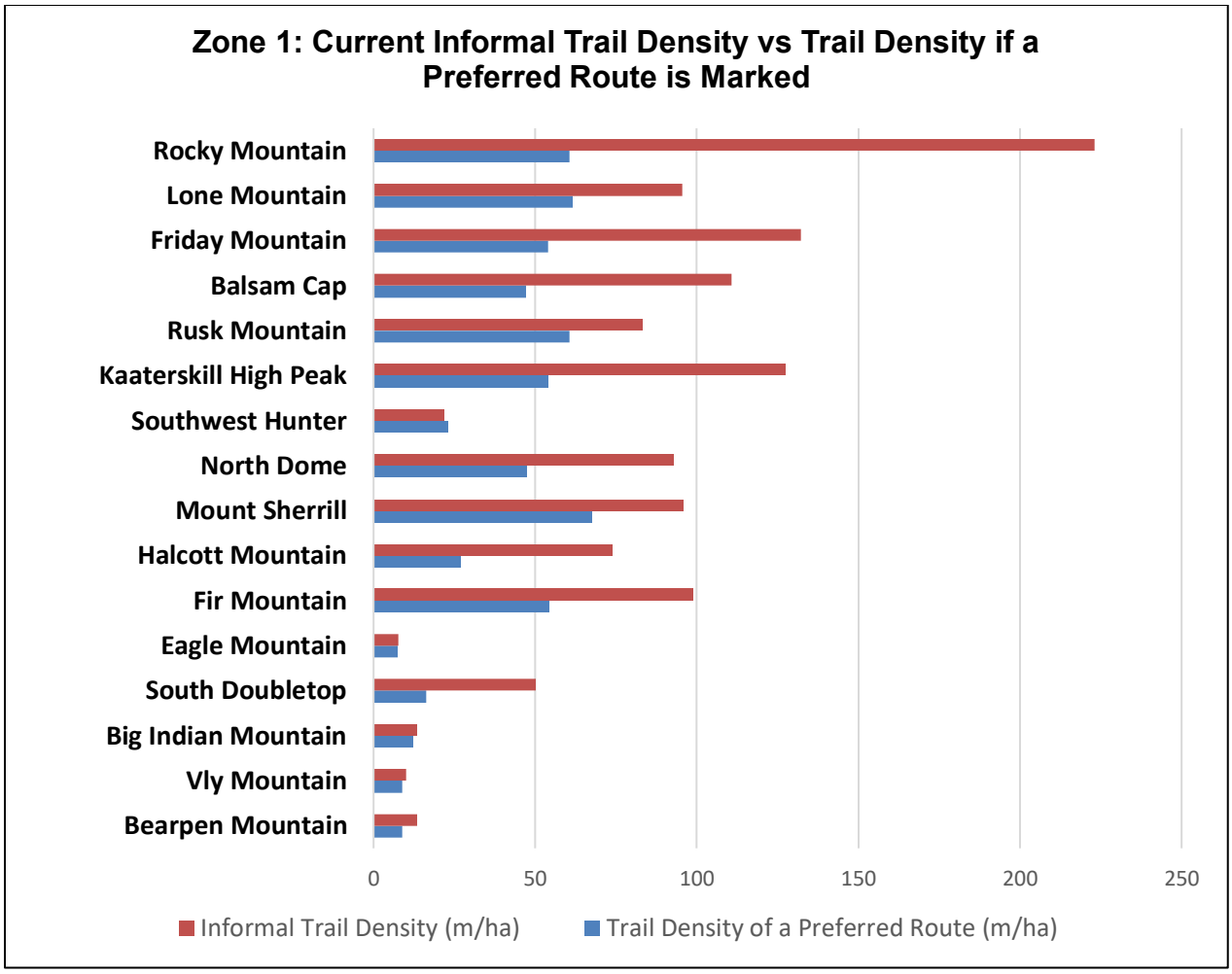


Figure 26. This graph illustrates how the informal trail density in Zone 1 on all summits would be reduced by marking a preferred route.

Zone 1: Projected % Change in Informal Trail Density if a Preferred Route is Marked			
Peak	***Current IT Density Conditions (m/ha)***	***Projected Trail Density if a Preferred Route is Marked (m/ha)***	***% Change Trail Density***

Bearpen Mountain	13.4	8.81	-34.25%
Vly Mountain	10.13	8.81	-13.03%
Big Indian Mountain	13.44	12.2	-9.23%
South Doubletop	50.17	16.35	-67.41%
Eagle Mountain	7.65	7.54	-1.44%
Fir Mountain	98.76	54.14	-45.18%
Halcott Mountain	73.93	27.02	-63.45%
Mount Sherrill	95.84	67.65	-29.41%
North Dome	92.97	47.38	-49.04%
Southwest Hunter	21.99	22.88	0.05%
Kaaterskill High Peak	127.49	54.01	-57.64%
Rusk Mountain	83.27	60.61	-27.21%
Balsam Cap	110.7	47.23	-57.34%
Friday Mountain	132.15	54.08	-59.08%
Lone Mountain	95.46	61.65	-35.42%
Rocky Mountain	223.05	60.61	-72.83%

This table indicates the potential informal trail density reduction in Zone 1 if a preferred route was marked. Note: In a scenario where a preferred route is marked, negative values in the % change of the trail density category indicate a projected decrease in the density of informal trails. In this instance, a positive direction of change (i.e., decreasing trail density) is indicated by the negative values.

Results of trail density analysis for Zone 1 show that:

- The projected percent change in trail density by marking a preferred route in Zone 1 is below 25% on Vly, Big Indian, Eagle and South-West Hunter making these summits a lower priority for monitoring and immediate management intervention.

- The projected percent change in trail density by marking a preferred route in Zone 1 is between 25%-50% on: Bearpen, Fir, North Dome, Mount Sherrill, Rusk Mountain, and Lone Mountain making these summits a medium priority for monitoring and for an immediate management intervention.

- The projected percent change in trail density by marking a preferred route in Zone 1 is above 50% on: South Doubletop, Halcott Mountain, Kaaterskill High Peak, Balsam Cap, Friday Mountain, and Rocky Mountain, making these summits a high priority for monitoring and an immediate management intervention.

The results from the informal trail density analysis in Zone 1 were used to objectively establish a hierarchy of monitoring priorities using the projected percent change in informal trail density if a preferred route is marked. [31]

The same fragmentation analysis was conducted for the informal trail network in the Zone 2 Environmental Protection Zone. Similar to Zone 1, negative values in the trail density category's percent change in Zone 2 indicate a predicted decline in the density of unofficial trails in the event that a preferred path is designated. In this instance, a positive direction of change (i.e., decreasing trail density) is indicated by the negative values.

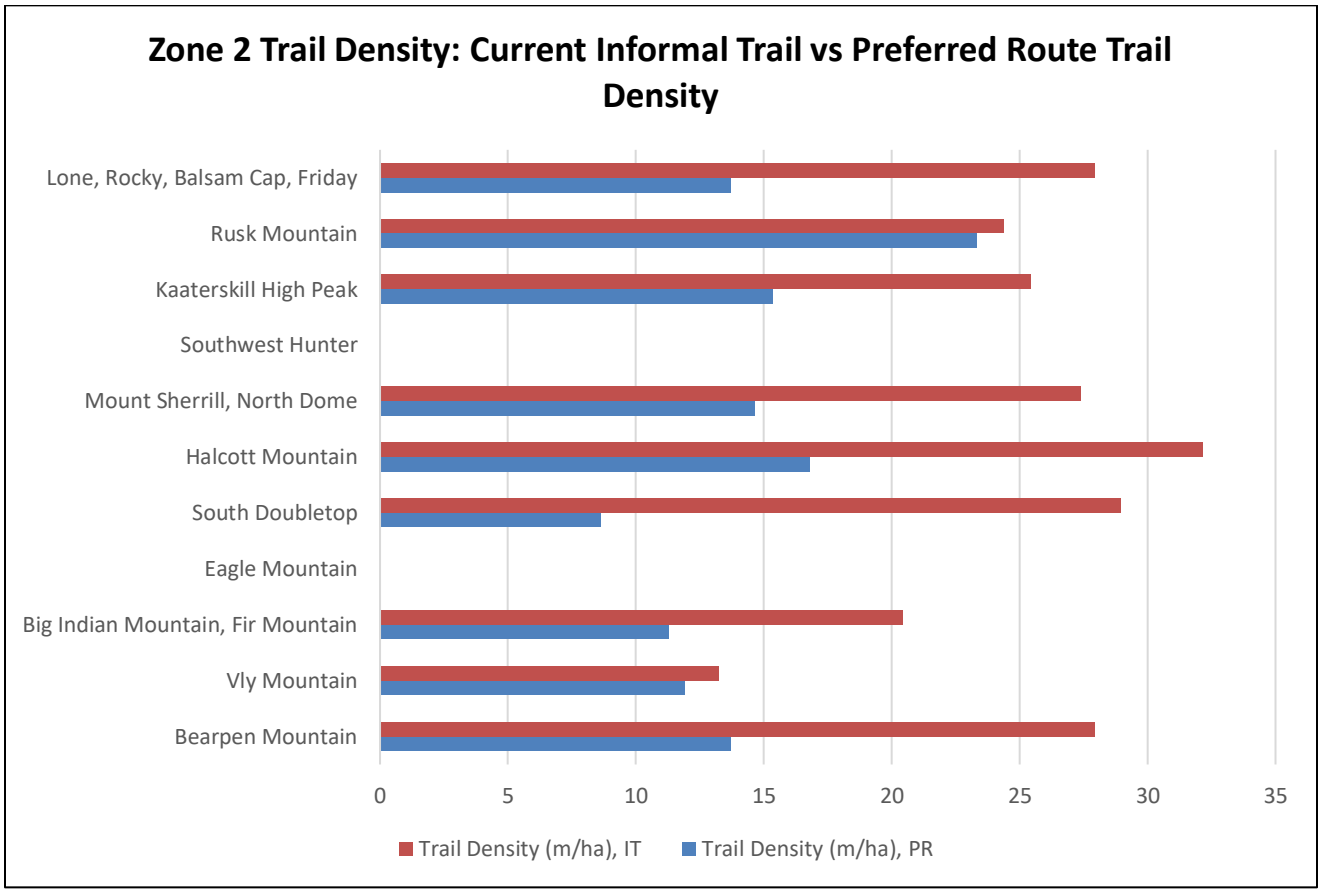


Figure 27. The graph illustrates how the trail density in Zone 2 would be reduced by marking a preferred route. Note: There is no data for SW Hunter and Eagle in this graph because these peaks do not contain informal trail networks below 3,500'. The informal trail networks on those two peaks are above 3,500' in elevation'.

[31] The complete descriptive statistics tables for Zone 1 are included in Appendix I for additional analysis information.

Zone 2: Projected % Change in Informal Trail Density if Preferred Route is Marked			
Peak(s)	***Current IT Density Conditions (m/ha)***	***Projected Trail Density if a Preferred Route is Marked***	***% Change Trail Density***
Bearpen Mountain	27.91	13.69	-50.95%
Vly Mountain	13.24	11.89	-10.20%
Big Indian Mountain, Fir Mountain	20.41	11.27	-44.78%
Eagle Mountain	N/A	N/A	N/A[32]
South Doubletop	28.97	8.62	-70.25%
Halcott Mountain	32.13	16.78	-47.77%
Mount Sherrill, North Dome	27.38	14.62	-46.60%
Southwest Hunter	N/A	N/A	N/A
Kaaterskill High Peak	25.45	15.32	-39.80%
Rusk Mountain	24.37	23.33	-4.27%
Lone, Rocky, Balsam Cap, Friday	27.91	13.68	-50.99%

[32] The N/A values for Eagle and SW Hunter are because these two peaks have no informal trails in Zone 2.

This table indicates the potential informal trail density reduction in Zone 2 if a preferred route was marked.

The results from the informal trail density analysis in Zone 2 have been used to objectively establish a hierarchy of monitoring priorities using the projected percent change in informal trail density if a preferred route is marked.

Results of the trail density analysis for Zone 2 show that:

- The projected percent change in Zone 2 trail density by marking a preferred route is below 25% on Vly and Rusk making the area of land in Zone 2 a lower priority for an immediate monitoring and management interventions on these mountains.

- The projected percent change in Zone 2 trail density by marking a preferred route is between 25%-50% on Big Indian and Fir, Halcott, Mount Sherrill, North Dome, Kaaterskill High Peak Mountains making these summits a medium priority monitoring and for an immediate management interventions.

- The projected percent change in Zone 2 trail density by marking a preferred route is above 50% on Lone, Rocky, Balsam Cap, Friday, South Doubletop, Bearpen making these summits a high priority for monitoring and management interventions. These peaks will be the primary focus of the 2024-2025 monitoring effort.

The fragmentation analysis conducted in Zone 2 reveals that the current condition of many of the formerly trailless peaks exceed the management zone's thresholds. To bring the conditions back into line with the desired conditions, management interventions will be necessary.[33]

A. Interim Monitoring Objectives

- Reduce the number of patches created by informal trails by promoting use of a preferred route and discourage use of visitor created informal trails that reduce contiguous forest.
- Measure efficacy of management actions through a combination of desktop analysis and field work.
- Develop partnerships with smart phone hiking app companies so that DEC can supply them with accurate, up-to-date information and messaging.

[33] Appendix H contains the full descriptive statistics tables for Zone 2.

- Use the Leave No Trace's "Authority of the Resource" messaging in education and outreach efforts. Hikers should have access to the latest natural resource impact information so that they can make informed choices when recreating.
- Continue to collect data on the distribution and abundance of montane bird species using the Mountain Bird Watch protocol to build on the research and monitoring work that took place during the 2023 and 2024 field seasons.

B. Future Monitoring

Objectives

- Conduct slope analyses to identify corridors where sustainably designed trails could potentially be located in the future as part of a long-term management strategy for these lands.
- Collect STRAVA heat maps and AllTrails heat maps on an annual basis to assess the efficacy of the use of Leave No Trace's "Authority of the Resource" messaging and the effectiveness of consolidating visitation to a single trail corridor.
- Foster relationships with smartphone hiking app companies to ensure that the publicly available GPS tracks are using routes with sustainable alignments and to avoid known locations containing critical habitat for sensitive and vulnerable plant and animal species.
- Reduce the extent of informal trail networks within the study area to meet landscape connectivity standards and desired conditions.

The strategy for management of the study area will likely include a combination of actions for minimizing resource impacts and improving visitor experiences. The management actions will be designed to improve trail resiliency, sustainability and enhance the visitor experience while protecting natural resources. Location of use will be modified, and trail resiliency and sustainability will be enhanced. Efforts to modify visitor behavior will be an essential component of future education and outreach efforts by using Leave No Trace's "Authority of the Resource" technique.

C. Proactive Monitoring for Remaining Trailless Areas Under 3,500'

Technology has had two distinct influences on sustainable recreation; the first relates to how people connect to the land and the second relates to how an agency can collect data for research and management. (Valenzuela, 101) Thanks to technological advancements, Wild Forest and Wilderness peaks over 3,500' in the Catskills are more accessible than ever before. Visitors' digital footprints can be traced on a variety of smartphone applications and access to this information can be useful to land managers. There is growing recognition that these technologically aided users are among those for whom we are now providing recreational opportunities. The data collection and research contained within this plan have concluded that peaks over 3,500' that were managed as trailless have duplicative, redundant, and unsustainably aligned visitor created trails that correlate directly with smartphone hiking GPS information that is provided by smartphone hiking app companies. Fortunately, use and visitation to many Catskill Wilderness peaks that are under 3,500' have seen very low levels of use and minimal informal trail development due to the absence of publicly available GPS tracks for these mountains.

The CPSLMP management guidance seeks to promote self-reliant route finding in the remaining trailless landscapes and summits with the intent to prevent creation and proliferation of informal trails. The need for early detection of informal trail development is necessary for managers seeking to pro-actively retain the trailless character of peaks under 3,500' in elevation. There are multiple peaks under 3,500' that do not have formal trail systems that have been approved through DEC administrative procedures and processes. These peaks have retained their trailless character because at this time, they have not been included in many of the hiking challenges and currently there are no smartphone hiking apps that are promoting GPS tracks to these peaks.

DEC is committed to providing a variety of experiences and access to people of all abilities. Visitors that rely on hiking apps have numerous "trailed" peaks that they can explore. The bushwacking hiking pursuits of people using maps and compasses should also be accommodated. This will require close cooperation and partnership with smartphone hiking app companies to remove any future GPS tracks that may be advertised on trailless peaks below 3,500' in elevation. There is a critical need for early informal trail detection for land managers aiming to retain trailless conditions and STRAVA heat map information will be routinely consulted to identify any emerging changes to visitation patters on the trailless peaks under 3.500' in elevation.

The long-term desired conditions for the remaining truly trailless peaks below 3,500' is to promote self-reliant route-finding within a trailless landscape. Visitors to these mountains will be asked to follow a dispersal strategy designed to prevent the occurrence of visitor impacts and development and entrenchment of informal trails. The management objective for these mountains is to protect their wilderness and wild forest character by preserving a natural landscape with no visible human impact. Managers

have sought to provide trailless hiking experiences for visitors where route-finding skills are necessary for navigation and are a component of the desired experience.

Hiking App Partnerships

DEC is committed to fostering and creating partnerships with smartphone hiking app companies that promote the use of trails and facilities on State land. DEC will work with those companies with the goal of correcting misinformation and to prevent unauthorized and unapproved visitor created trails from becoming incised on the landscape. In addition, the DEC will capitalize on the broad audience that smartphone hiking app companies reach and will provide them with educational information that will increase ecological awareness and promote responsible recreation. The CAG recommended the following, in part, for developing working relationships with smartphone app developers:

> *The State should establish working relationships with entities whose smartphone hiking apps (AllTrails, STRAVA etc.) and search engines drive visitation to certain areas of Catskill Park {…} The State should help these companies pair their maps with information about Leave No Trace, park rules and regulations and more (CAG,2022)*

In response to the CAG recommendation, DEC has entered into partnership agreements with STRAVA Metro and the AllTrails Public Lands Portal so that land managers have more input over the availability and accuracy of GPS tracks and messaging. These partnerships allow DEC to have more direct access to making content changes, educating visitors with alerts, and understanding usage patterns.

Citizen Science Opportunities

Visitors can help DEC monitor change and the responses to it, by sharing observations of plants and wildlife to iNaturalist and eBird. There are growing opportunities for the hiking community to further conservation efforts and inform and support ecological management strategies. Using data from participatory science in conjunction with information from other sources is a strategy for developing effective conservation and management plans. Participatory scientists' bird observations can have a significant impact on our understanding of species distribution and abundance which is crucial for developing successful conservation strategies. To learn more about these citizen science opportunities visit: https://ebird.org/home and https://www.inaturalist.org/.

D. Future Visitor Use Management and Planning

To ensure that this VUM plan is a dynamic document that meets the changing needs of the Forest Preserve and State Forest lands over time, DEC may supplement this VUM

plan with updated information, provide minor changes to management actions, add management actions that help the DEC to meet changes in recreational trends and visitor demands, adapt to changes in the natural environment and maintain a high-quality visitor experience. Implementation of this plan will involve continuous evaluation and adaptive management strategies which may or may not warrant formal updates. As monitoring of conditions continues, DEC may decide to modify or add indicators if better ways are found to measure important changes in resource and experiential conditions.

To ensure resources and visitor experiences are protected, field protocols for tracking these indicators have been developed. Having the monitoring program in place will ensure land managers and planners have a mechanism for understanding the changes before they are likely to occur (See Appendix L). While thresholds would not be changed or altered merely because they are not being achieved, new information and research could inform an update to existing indicators and thresholds. Specifically, this new information would need to improve land managers' quantitative understanding of how desired conditions are represented (or not represented) within the study area.

This plan is adaptive in that it can be amended to update management direction based on new knowledge and information. While the plan includes all components necessary for protection of the natural and cultural resources of the project area, it also provides for the flexibility needed to respond to future uncertainty, including events and social change, that may be important to consider at the time future decisions need to be made. Similarly, the timing of implementation of this plan is intended to be flexible enough to leverage resources as they become available. The overall goal of this plan is to provide experiential opportunities that are sustainable and that meet the needs of current and future generations.

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Appendix A. Preliminary Public Comment Reponses

The comments below were submitted to DEC in 2022, early in the development of this draft plan. Comments received during the public comment period for the draft VUM plan will be summarized with responses in the final VUM plan.

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Comment: In our view, the ultimate solution is to establish well-designed, marked, and maintained trails to each Catskill Trailless High Peak. Limiting pedestrian traffic is essential for long term protection of the Forest Preserve.

Response: *After 6 years of data collection and research, the most appropriate and rapid response to address adverse impacts to natural resources will require marking of a preferred route to most (not all) formerly trailless peak summits.*

Comment: It is time to install formal trails to the summits of all the Catskill trailless peaks. Inaction has created a mess in the ADKs and the same will soon happen in the Catskills.

Response: *Thank you for your comment. See the response above.*

Comment: Move quickly to identify locations with known or probable occurrences of rare, threatened and endangered species or natural communities and physically prevent trampling in those areas while simultaneously providing a preferred alternate route. DEC must take steps in the immediate future to prevent further degradation of the most sensitive habitats.

Response: *DEC holds a contract with the New York State Natural Heritage Program (NYNHP) to conduct biological inventories and other data collection efforts on State lands. NYNHP staff are expert ecologists that map and document rare, threatened, and endangered species (RTE) information on DEC owned lands throughout the state. NYNHP performed a complete biological inventory assessment of the study area over the course of the 2022 field season. Future management decisions for the lands contained in the study area will rely on the latest scientific information, data and management interventions designed to protect RTE species will be implemented as quickly as possible upon completion and adoption of this VUM plan.*

Comment: Expeditiously identify a preferred informal trail route for each trailless high peak using desktop resources such as slope, Natural Heritage data etc. If all the

existing informal trails on a given peak are likely to significantly degrade resources, DEC should create and temporarily mark/flag a suitable informal route. The selected informal routes may not be ideal, but they will likely safeguard resources far better than uncoordinated access.

Response: *In identifying a temporary preferred route, DEC assessed NYNHP data for each mountain within the study area to ensure that impacts to element occurrences of any listed species are minimized as much as possible. Condition class assessments were used to categorize segments of informal trails based on the presence or absence of sustainable features. Every mountain is different. Re-routes of informal trails or portions to more sustainable alignments will be required.*

Comment: Rapidly complete a desktop prioritization of trailless high peaks in most urgent need of attention, drawing upon a combination of STRAVA heat map data, slope, Natural Heritage data and other relevant sources so that problems can be addressed in order of threat to natural resources. This desktop prioritization can be supplemented and refined later in response to data from the field, but DEC should not postpone an initial prioritization while waiting on further data or public input.

Response: *The fragmentation analysis results established a hierarchy of monitoring priorities based on the level of impact from informal trails. Peaks with the most significant impacts were ranked as the highest priorities for management action and monitoring. Additional information is included in section V of the plan.*

Comment: Use all readily available communications channels including social media, partner organizations, the Catskill Visitor Center, temporary signs at informal trailheads, etc. to rapidly and widely share inter-rim trail route recommendations.

Response: *DEC appreciates its strong relationships and partnerships with stakeholders and individuals across the Catskill region and will utilize those relationships to amplify messaging and educational outreach efforts. In addition, DEC has started partnerships with hiking app companies which will allow DEC to include updates and relevant information for these areas on the hiking app pages themselves.*

Comment: DEC should map out a schedule for the design and construction of appropriate trails for each High Peak, to be implemented over the next few years in priority order.

Response: *Noted. As part of the monitoring program, the condition of the peaks will be routinely assessed and areas with the highest natural resource concerns and segments of the most unsustainably aligned informal trails will be addressed first.*

Comment: Collaborate with partners to develop and implement an education and outreach campaign to accompany the development of formal trails for each peak, emphasizing Leave No Trace principles. DEC should build upon its existing investments in the Catskill Visitor Center and Catskill Steward Program to educate the public as they plan their visits at each peak.

Response: *DEC identified services offered by the Leave No Trace Hot Spot program that will amplify the education and outreach efforts associated with this project. DEC recognizes the educational value in the Catskill Steward Program and the Catskill Center and will continue to work to support these partnerships to reach as many visitors to the Catskills as possible.*

Comment: Ongoing collection of both field and digital data is imperative for effective protection of the entire Forest Preserve, at the High Peaks and beyond.

Response: *Noted. The monitoring program for this project has been designed to include data driven, science-based information from field work as well as desktop analysis that will be used to inform future management considerations and proposals.*

Comment: In recent years, far more hikers than ever before have climbed the high peaks, including the trailless peaks. With the arrival of sophisticated GPS navigational services, hikers are now considerably more confident venturing off trail. Many hikers follow existing digital tracks to ensure they stay on their route. These changes have had a noticeable impact. The Catskill 3500 Club acknowledges that our challenge of summiting the high peaks has encouraged new off trail hikers and contributed to the degradation of sensitive habitat. We understand that a return to the old mentality of minimal traffic and dispersed route finding is not realistic. We believe that trail infrastructure must be enhanced, and hikers must modify their behavior in order to stop degradation of these summits.

Response: *Noted. The proliferation of hiking challenges in the Catskills has driven the expansion of unsustainably aligned informal trails in many locations. DEC will integrate Leave No Trace's "Authority of the Resource" messaging in education and outreach efforts as a strategy to inform visitors about the unique resources associated with sensitive mountain summit habitats and how they can minimize their impact.*

Comment: The Catskill 3500 Club recognizes the significance and sensitivity of boreal habitat found on many of the higher elevation peaks and ridges in the Catskill Park, including most of the trailless summits. This ecosystem is dominated by balsam fir, red spruce, mountain ash, and birches and is home to bird species with declining populations such as the Bicknell Thrush and the Blackpoll warbler. The Catskill 3500 Club believes that hiking routes through these ecosystems must be concentrated and sustainably implemented in order to protect the plants and animals that live there.

Response: *Noted. The management zone for spruce-fir forest summits was delineated using ortho-imagery that depicts the location and extent of spruce-fir habitat on formerly trailless peak mountain summits. These areas contain critical habitat for several montane bird species that may be adversely impacted from diffuse hiking behavior. A montane bird monitoring project conducted during the 2023 montane bird breeding season provided important information about bird species abundance and distribution on these summits that will be used to inform long term management strategies for these areas. DEC proposes an interim strategy to identify and mark a preferred route to consolidate foot traffic to a single corridor.*

Comment: If you are ever in the need of volunteers to assist with monitoring, I would love to get involved. I have always been troubled by the herd path impacts, especially the Friday-Balsam Cap-Lone- Rocky route. It would be rewarding to be part of the solution.

Response: *Noted. Once the final VUM plan is adopted, DEC will be looking to identify volunteers to assist with a variety of tasks associated with this project.*

Comment: I am concerned about how DEC will respond given the restrictions that were placed on places in the Adirondacks and with the way the Peekamoose area was handled. I suspect that trail use will decline again some since the pandemic effect has declined. It looks like you are seeing that already. I hope that the pandemic effect will be taken into consideration when decisions are made.

Response: *Noted. There was an 8% decrease in the total number of canister sign-ins between 2021 and 2022. However, visitation rates continue to greatly exceed levels of visitation that were documented in 2009. DEC has the responsibility and privilege to protect natural resources for future generations and has concluded that the type of use that is currently occurring within the project area and particularly on mountain summits, is unsustainable and may lead to irreversible damage to natural resource if management interventions are not taken as soon as possible.*

Comment: Almost all of the 3500 peaks, trailed and untrailed have multiple herd paths. As was done with the Adirondack High Peaks that were untrailed, there should be ONE maintained and unmarked trail and the other paths should be brushed in to keep people on one path.

Response: *Noted. As an interim management strategy, DEC proposes to mark a preferred route on each of the trailless peak to consolidate foot traffic as quickly as possible. DEC will closely monitor visitors' use of the preferred marked trails to assess if this management strategy has a desirable effect on reducing informal trail networks.*

Comment: Hiking the "grid" (climbing each of the 35 peaks in each month) should be discouraged by the hiking clubs. The same for hiking each of the 35 High Peaks in each season. Spring for example.

Response: *Noted. There are several hiking challenges that have requirements that require participants to hike to mountain summits during times of the year when numerous declining bird species are breeding and nesting. Several of these species nest on the ground and are likely experiencing adverse impacts from diffuse hiking behavior. DEC encourages hikers participating in hiking challenges to take the free Leave No Trace online education course available on: https://lnt.org/courses/online_awareness_take_action_html5/#/ and to routinely visit the DEC's Formerly Trailless peaks webpage for the latest news and recommendations for responsibly enjoying these areas. https://www.dec.ny.gov/lands/125487.html*

Comment: I hike with a dog and agree with the concern that hiking with dogs may have an impact on wildlife.

Response: *To protect sensitive species and habitats, DEC encourages hikers to avoid bringing dogs to mountain summits during times of the year when species are nesting and fledging, particularly during May and June. Visitors that are recreating with their dogs are strongly encouraged to keep them leashed to prevent unnecessary disturbances to wildlife.*

Comment: Hiking Clubs, informal groups and meet-up groups should limit the number of hikers on a given outing.

Response: *Noted. The Catskill Park State Land Master Plan places limitations on group hiking sizes but hikers are encouraged to voluntarily reduce group size when visiting these areas to reduce potential for disturbing sensitive species.*

Comment: I believe that the canisters should be removed from the summits that contain them.

Response: *Noted. The canisters have provided valuable visitation data since 2009. The Catskill Park State Land Master Plan allows for canisters to be maintained at select summits through a Volunteer Stewardship Agreement with the Catskill 3500' Club. DEC will continue to monitor impacts to the natural resources in proximity to the canisters and will implement management actions as appropriate.*

Comment: I would like to see our Catskill trailless peaks maintained with "softly maintained" paths, such as the 46ers do in the ADK's, by organizations coordinating through the NYNJTC. The summits should be marked, to avoid people trampling

vegetation while wandering around looking for them. A small disk as used in the ADKs would be great.

Response: *Noted. DEC will use DEC trail markers to clearly identify the preferred path for hikers.*

Comment: I think the wilderness designation needs to be re-evaluated. Modern equipment and trail building technology should be used by the DEC and volunteers to build and maintain trails. Any new trails being built should follow the US Forest Service Guidelines for trails.

Response: *The guidelines for the management and use of Wilderness Areas are provided in the Catskill Park State Land Master Plan and further addressed through individual unit management plans. In addition, DEC has established trail building and maintenance guidelines based on the latest available information and technology available, including employing technologies derived from other sources including Federal, State and private sources.*

Comment: Mountain biking trails should be allowed in more areas. Areas underneath the Blackhead Range in Windham Blackhead Wilderness have been mountain biked for years and are now not accessible because of strict wilderness regulations. Hardly anyone hikes those areas because they are not maintained and basically bushwacks, more evidence that bushwack trails are bad ideas and shod be built to modern standards and maintained.

Response: *The guidelines for the management and use of wilderness areas are provided in the Catskill Park State Land Master Plan. Currently as per the CPSLMP, bicycles are not permitted within wilderness areas. A new Forest Preserve "Primitive Bicycle Corridor" land classification was identified in the 2008 CPSLMP which created bicycle corridors through wilderness areas in cases where the public identified those corridors as important routes within the mountain bicycling community. Any additional land classification changes are not within the scope of this Visitor Use Management Plan.*

Comment: Banning hikers from visiting the trailless peaks would be wildly unpopular and virtually unenforceable given DEC's current staffing situation and resources. Furthermore, enforcement would be limited by the large area encompassed by the trailless peaks. Perhaps the creation of special zones near the summits to restrict travel in especially vulnerable areas would be respected.

Response: *DEC delineated special management zones on summit areas according to the presence or absence of certain natural resources. The summit management zones*

will be intensively monitored and will consider a range of management actions designed to protect sensitive species and summit habitats.

Comment: The existing herd path to the summit of Southwest Hunter could easily be converted to a permanent blazed trail, perhaps with some modifications to make it more accessible.

Response: *DEC assessed each peak individually. Management proposals are customized for each summit based on natural resource occurrences and extent and severity of hiker impacts. DEC has also assessed whether there are any peaks which could remain unmarked. Currently, for example, the informal trail leading to the summit of Eagle is clearly defined and aligned reasonably enough that diffuse hiking behavior on this peak has not reached a point requiring management interventions. DEC will continue to monitor the area and will initiate management actions as necessary. Therefore, the route to the summit of Eagle will be left unmarked.*

Comment: I think that a targeted approach individualized to particular circumstances of each trailless peak with attention to the distribution of endangered birds would be best. Each peak is unique and requires its own plan.

Response: *Noted. Please see comment above.*

Comment: A plan to relocate the Pine Hill West Branch over the summit of Big Indian Mountain might be easily accomplished sustainably with minimal impact. A short trail to the summit of Eagle Mountain from the Pine Hill West Branch trail could also be very easily accomplished.

Response: *Currently, DEC does not have plans to relocate the Pine Hill West Branch trail over the summit of Big Indian. The informal trail that leads to the summit of Eagle Mountain from the Pine Hill West Branch trail is very short in length and acceptably aligned. DEC has tried to identify summits that could remain unmarked due to current minimal natural resource impacts. Based on the above information, the Department will leave Eagle Mountain unmarked but will continue to monitor the area for changes in impacts to the natural resources of the area.*

Comment: The Long Path in the Pine Plains area should be relocated to pass over the summit of Kaaterskill High Peak, creating a single trail which almost everyone would use to access the summit. Perhaps the most sustainable route would go from the current Long Path from the north to a point between the summit of KHP and Roundtop and then follow the herd path to the KHP summit. The new trail would then follow the existing informal trail down the east face and back to the Long Path. The high visitation to the KHP summit and the terrible condition of the Long Path in the Pine Plains area requires attention and a carefully designed management strategy.

Response: *The purpose of this VUM plan is to provide interim management solutions to address negative impacts occurring from the development of informal trail networks on the formerly trailless peaks. This plan proposes marking a "preferred route" to the summit of Kaaterskill High Peak as an interim management action to reduce visitor impacts on natural resources. Relocation of the Long Path is outside the scope of this VUM plan and would be more appropriately addressed through the Unit Management Planning process.*

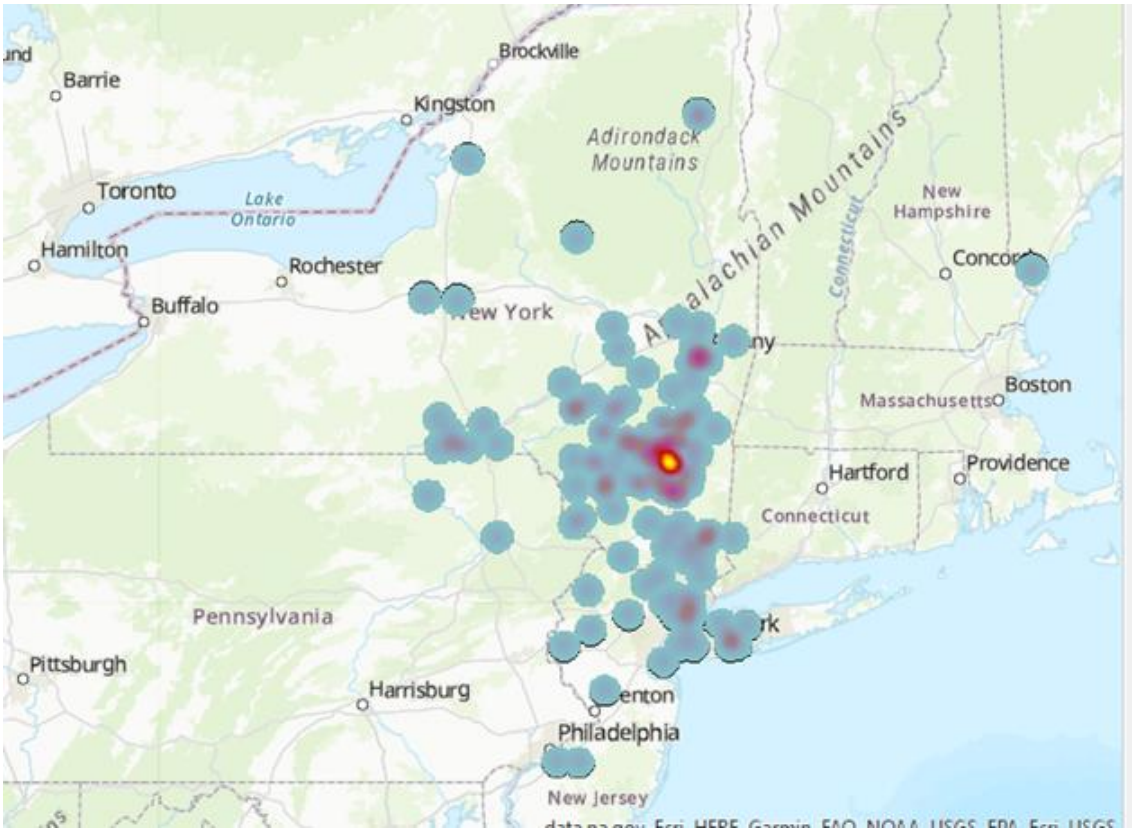
Comment: The existing regulations that prohibit camping above 3,500' should be amended to restrict camping and fires to a lower elevation to protect sensitive habitats from increased illegal camping activity and fire use above 3,500''.

Response: *Thank you for your comment. DEC will review current regulations and assess whether changes are warranted at this time.*

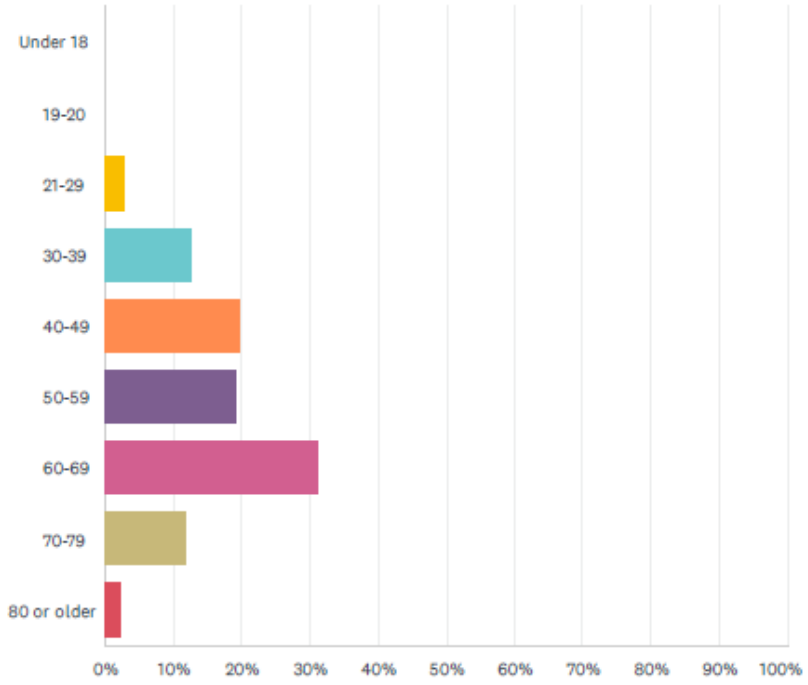
Appendix B. 2022 Visitor Experience Survey Results

2024 Visitor Experience Results are available at:
https://dec.ny.gov/sites/default/files/2024-04/2023catskilltraillesssurveyreport.pdf

What is your zip code? (Answered: 168, Skipped: 1)

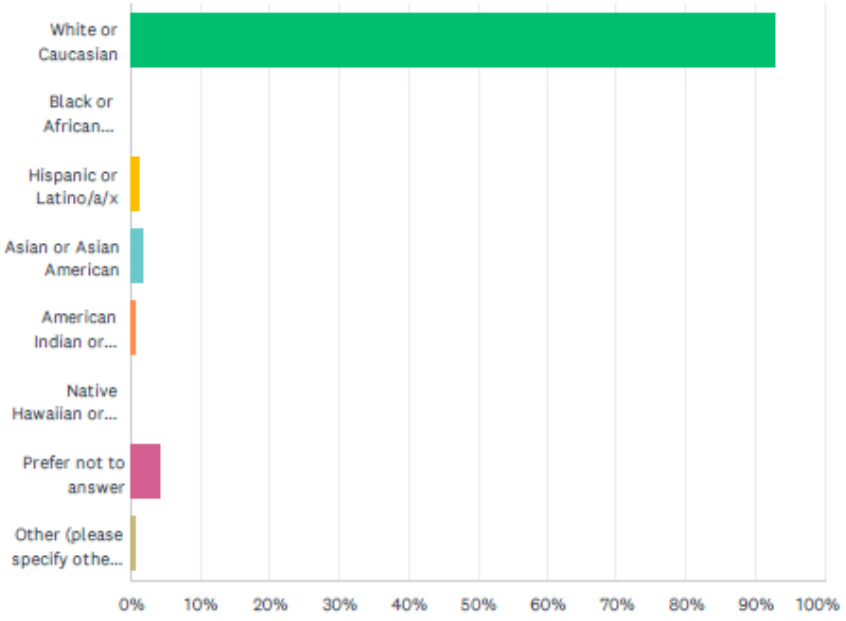


What is your age range?



ANSWER CHOICES	RESPONSES	
Under 18	0.00%	0
19-20	0.00%	0
21-29	2.99%	5
30-39	12.57%	21
40-49	19.76%	33
50-59	19.16%	32
60-69	31.14%	52
70-79	11.98%	20
80 or older	2.40%	4
TOTAL		167

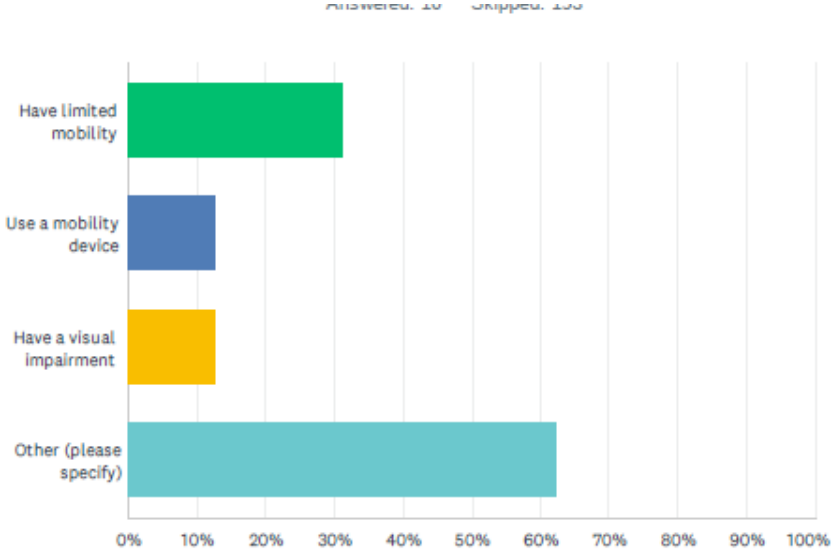
How would you describe yourself? (Answered: 166, Skipped:3)



ANSWER CHOICES	RESPONSES	
White or Caucasian	92.77%	154
Black or African American or African Heritage	0.00%	0
Hispanic or Latino/a/x	1.20%	2
Asian or Asian American	1.81%	3
American Indian or Alaska Native	0.60%	1
Native Hawaiian or other Pacific Islander	0.00%	0
Prefer not to answer	4.22%	7
Other (please specify other race)	0.60%	1
Total Respondents: 166		

#	OTHER (PLEASE SPECIFY OTHER RACE)	DATE
1	jewish	10/25/2022 10:12 AM

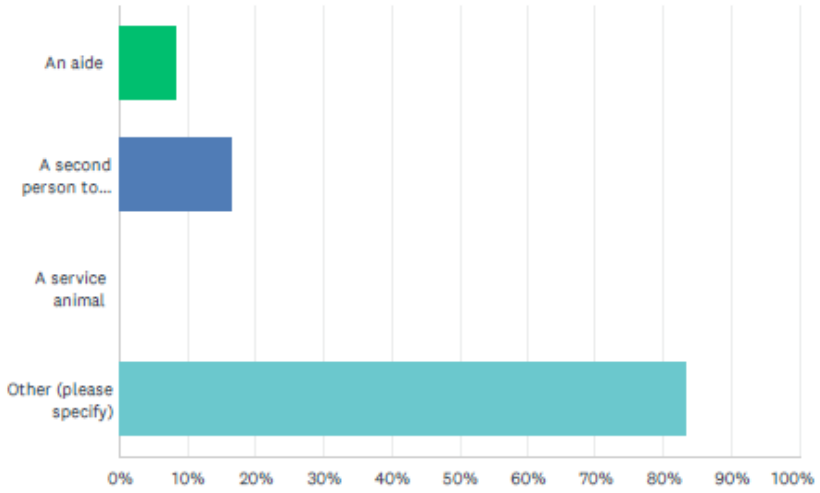
Do any of the following apply to your recreational abilities? Check all that apply
(Answered: 16, Skipped: 153)



ANSWER CHOICES	RESPONSES	
Have limited mobility	31.25%	5
Use a mobility device	12.50%	2
Have a visual impairment	12.50%	2
Other (please specify)	62.50%	10
Total Respondents: 16		

#	OTHER (PLEASE SPECIFY)	DATE
1	recent limited mobility	11/11/2022 1:39 PM
2	asthma	11/1/2022 9:07 AM
3	no	10/26/2022 7:48 PM
4	experiencing health issues that make strolls over 2 miles challenging	10/26/2022 11:26 AM
5	Poorly written question.	10/25/2022 2:37 PM
6	use poles to hike	10/25/2022 1:02 PM
7	None	10/25/2022 10:30 AM
8	Glasses, cane	10/25/2022 10:22 AM
9	none	10/25/2022 10:04 AM
10	None	10/25/2022 10:01 AM

When visiting outdoor recreation areas, do you require any of the following? (Answered: 12, Skipped: 157)



ANSWER CHOICES	RESPONSES	
An aide	8.33%	1
A second person to accompany you	16.67%	2
A service animal	0.00%	0
Other (please specify)	83.33%	10
Total Respondents: 12		

#	OTHER (PLEASE SPECIFY)	DATE
1	recently can't hike. hopefully temporary	11/11/2022 1:39 PM
2	inhaler	11/1/2022 9:07 AM
3	no	10/26/2022 7:48 PM
4	I don't require a second person with me but am unlikely to hike alone	10/26/2022 11:26 AM
5	I think it's safer to have a companion canine or human.	10/25/2022 1:02 PM
6	prefer a second person to accompany me	10/25/2022 10:32 AM
7	None	10/25/2022 10:30 AM
8	none	10/25/2022 10:04 AM
9	Level surfaces and benches	10/25/2022 10:01 AM
10	None	10/25/2022 10:01 AM

This sub-section presents the results of the survey questions regarding participants support for various potential visitor use management actions as well as their experiences during a trailless peak hike. Also included in this section are participants' reactions to heatmap images and photographs, perceptions of acceptable and unacceptable impacts to natural resources and support for, or opposition to potential management actions.

Question 6: We would like to know what type of trail network configurations you think are acceptable on summits over 3,500'' in the Catskills. To help you judge this, we are providing you with maps of formal (designated) and informal (visitor created) trail networks from several summits over 3,500''. Please look at the images and rate the trail networks in the provided chart by how acceptable you find them. (Answered:166, Skipped: 3)

Photo A. Slide Cornell Wittenberg Trail over summits

Photo B. N. Dome & Sherrill Summit Informal Trail Network

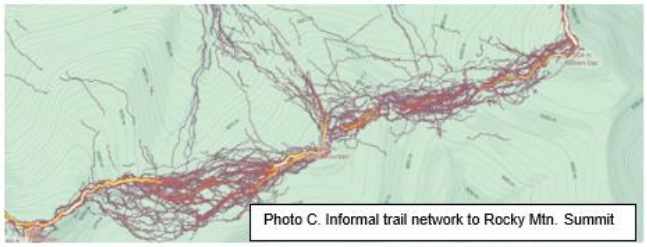


Photo C. Informal trail network to Rocky Mtn. Summit

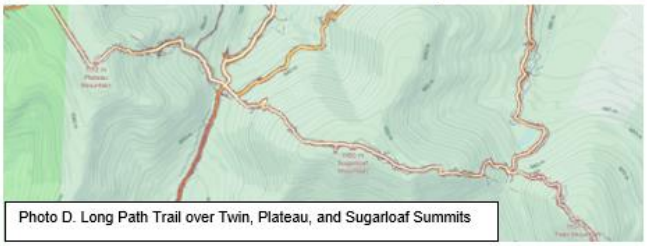


Photo D. Long Path Trail over Twin, Plateau, and Sugarloaf Summits

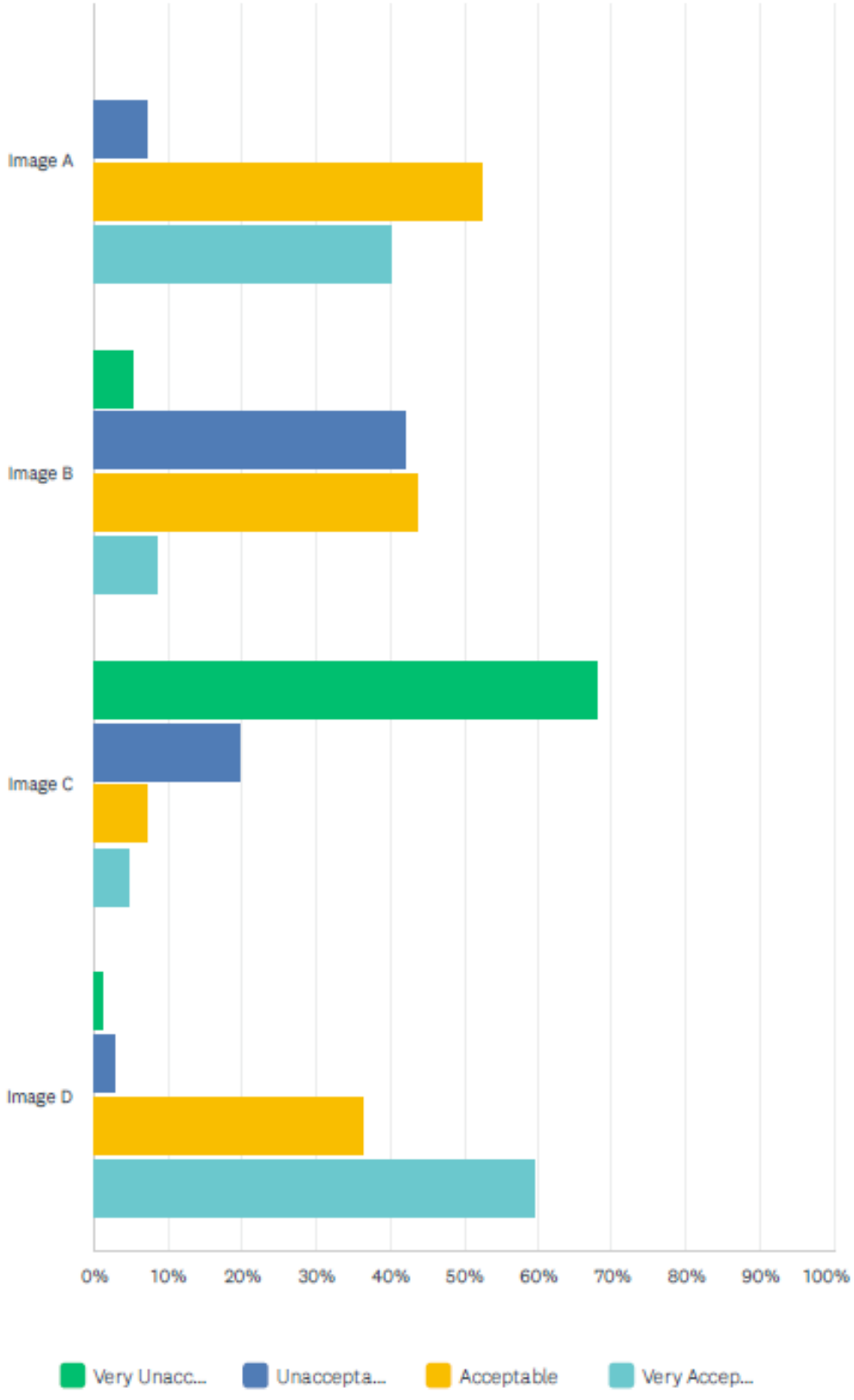


Image A
Image B
Image C
Image D
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Very Unacc...
Unacceptа...
Acceptable
Very Accep...

	VERY UNACCEPTABLE	UNACCEPTABLE	ACCEPTABLE	VERY ACCEPTABLE	TOTAL
Image A	0.00% 0	7.23% 12	52.41% 87	40.36% 67	166
Image B	5.42% 9	42.17% 70	43.98% 73	8.43% 14	166
Image C	68.07% 113	19.88% 33	7.23% 12	4.82% 8	166
Image D	1.21% 2	3.03% 5	36.36% 60	59.39% 98	165

Questions 7-9: We would like to know how much visible impact you think is acceptable on **informal** trails in the Catskills. (widened trails, trampled vegetation, erosion, standing water, etc.). To help you judge this, we are providing you with a series of photographs that show different levels of impacts on informal trails. Please look at each photograph and rate in the provided chart how acceptable you find the impact shown. (Answered 164 Skipped:3)

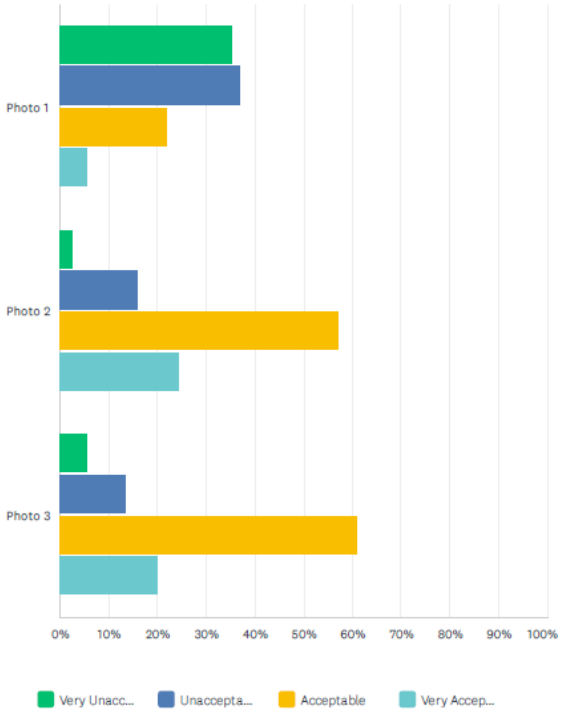


Photo 1
Photo 2
Photo 3
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Very Unacc...
Unacceptа...
Acceptable
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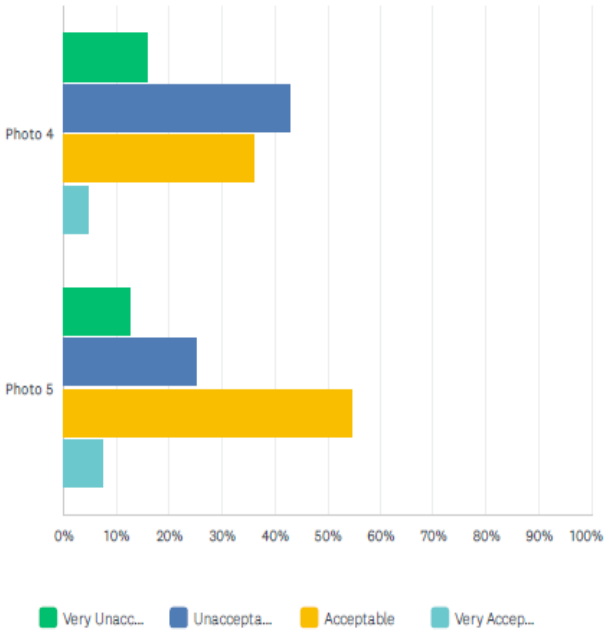
Photo 4
Photo 5
0%
10%
20%
30%
40%
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60%
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100%
Very Unacc...
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Acceptable
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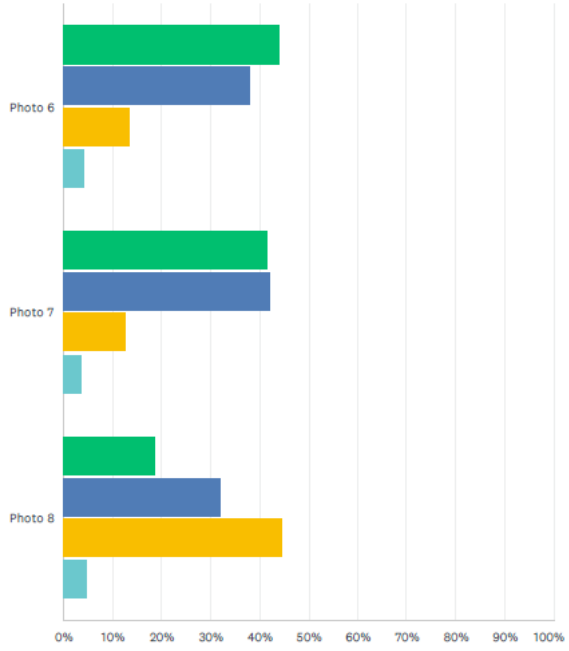


Photo 6
Photo 7
Photo 8
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

	VERY UNACCEPTABLE	UNACCEPTABLE	ACCEPTABLE	VERY ACCEPTABLE	TOTAL
Photo 1	35.37% 58	37.20% 61	21.95% 36	5.49% 9	164
Photo 2	2.45% 4	15.95% 26	57.06% 93	24.54% 40	163
Photo 3	5.49% 9	13.41% 22	60.98% 100	20.12% 33	164

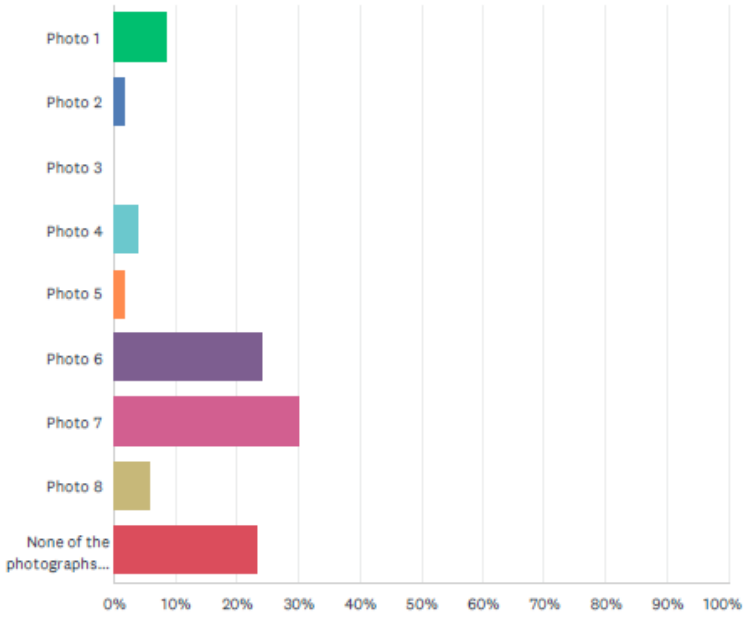
	VERY UNACCEPTABLE	UNACCEPTABLE	ACCEPTABLE	VERY ACCEPTABLE	TOTAL
Photo 4	15.95% 26	42.94% 70	36.20% 59	4.91% 8	163
Photo 5	12.88% 21	25.15% 41	54.60% 89	7.36% 12	163

	VERY UNACCEPTABLE	UNACCEPTABLE	ACCEPTABLE	VERY ACCEPTABLE	TOTAL
Photo 6	44.24% 73	38.18% 63	13.33% 22	4.24% 7	165
Photo 7	41.57% 69	42.17% 70	12.65% 21	3.61% 6	166
Photo 8	18.67% 31	31.93% 53	44.58% 74	4.82% 8	166

Perceptions of Potential Management Proposals

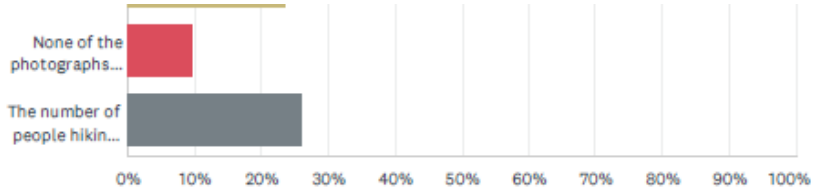
This section of the survey produced evaluative information regarding visitor's perceptions of, tolerances for, and attitudes about managing visitor use on the formerly trailless peaks.

11. In your opinion, which photograph in Question 7-9 shows the amount of environmental impact that is so unacceptable that you would no longer hike on that informal trail. If none of the photographs represent this, condition, please choose the last option in the dropdown list. (Answered:153, Skipped: 16)



12. In your opinion, which photographs in Questions 7-9 show the level of environmental impact that you think that we should allow on the formerly trailless Catskill High Peaks? If you think visitor use should not be restricted at all, please check the appropriate box below. (Answered: 157, Skipped: 12)

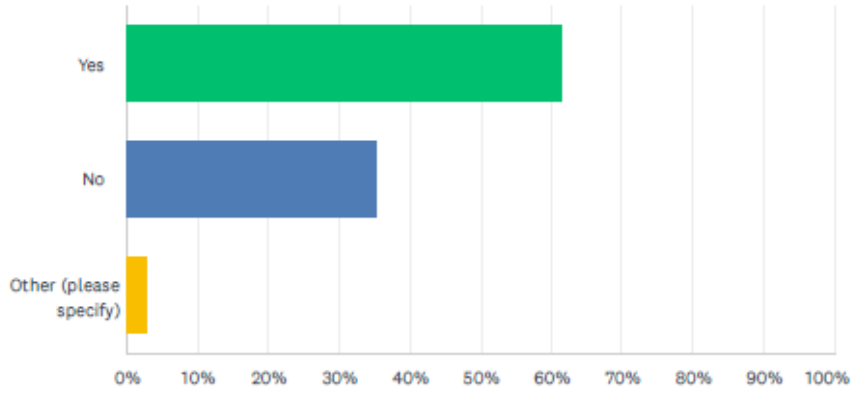
ANSWER CHOICES	RESPONSES	
Photo 1	8.50%	13
Photo 2	1.96%	3
Photo 3	0.00%	0
Photo 4	3.92%	6
Photo 5	1.96%	3
Photo 6	24.18%	37
Photo 7	30.07%	46
Photo 8	5.88%	9
None of the photographs represent conditions that are so unacceptable that I would no longer hike on the informal trails.	23.53%	36
TOTAL		153



13.

	RESPONSES	
	12.74%	20
Photo 2	40.76%	64
Photo 3	39.49%	62
Photo 4	14.65%	23
Photo 5	25.48%	40
Photo 6	8.28%	13
Photo 7	10.83%	17
Photo 8	23.57%	37
None of the photographs show a high enough level of environmental impact that warrants restricting people from hiking on these informal trails.	9.55%	15
The number of people hiking on these informal trails should not be restricted.	26.11%	41
Total Respondents: 157		

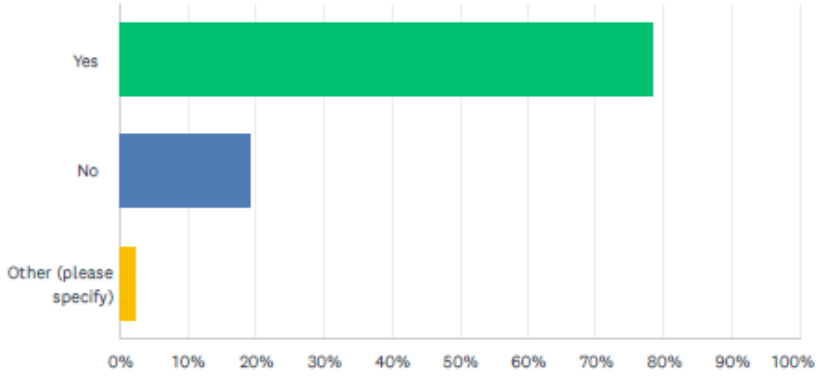
Prior to the presentation, were you aware that the formerly trailless peaks provide critical nesting habitat for several species of ground nesting threatened and/or vulnerable bird species? (Answered:167, Skipped: 2)



ANSWER CHOICES	RESPONSES	
Yes	61.68%	103
No	35.33%	59
Other (please specify)	2.99%	5
TOTAL		167

#	OTHER (PLEASE SPECIFY)	DATE
1	The amount of damage we do to this planet, you're barking up the wrong tree.	11/11/2022 5:30 PM
2	I don't care. Animals can go in my stew.	11/11/2022 4:51 PM
3	Several threatened and/or vulnerable documented?	10/25/2022 3:08 PM
4	As a responsible hiker, I would make that assumption	10/25/2022 2:02 PM
5	Assumed yes	10/25/2022 9:49 AM

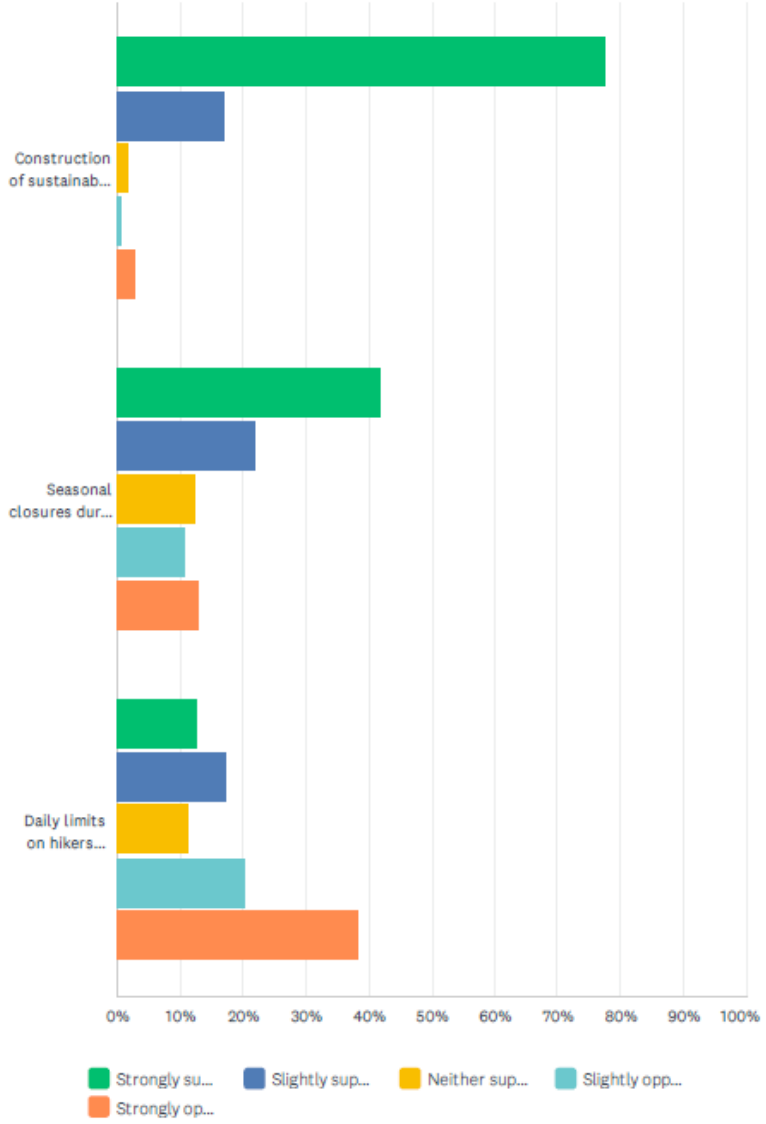
14. Prior to the presentation, were you aware that vulnerable plants communities have been detected on some of the peaks? (Answered:167, Skipped:2)



ANSWER CHOICES	RESPONSES	
Yes	78.44%	131
No	19.16%	32
Other (please specify)	2.40%	4
TOTAL		167

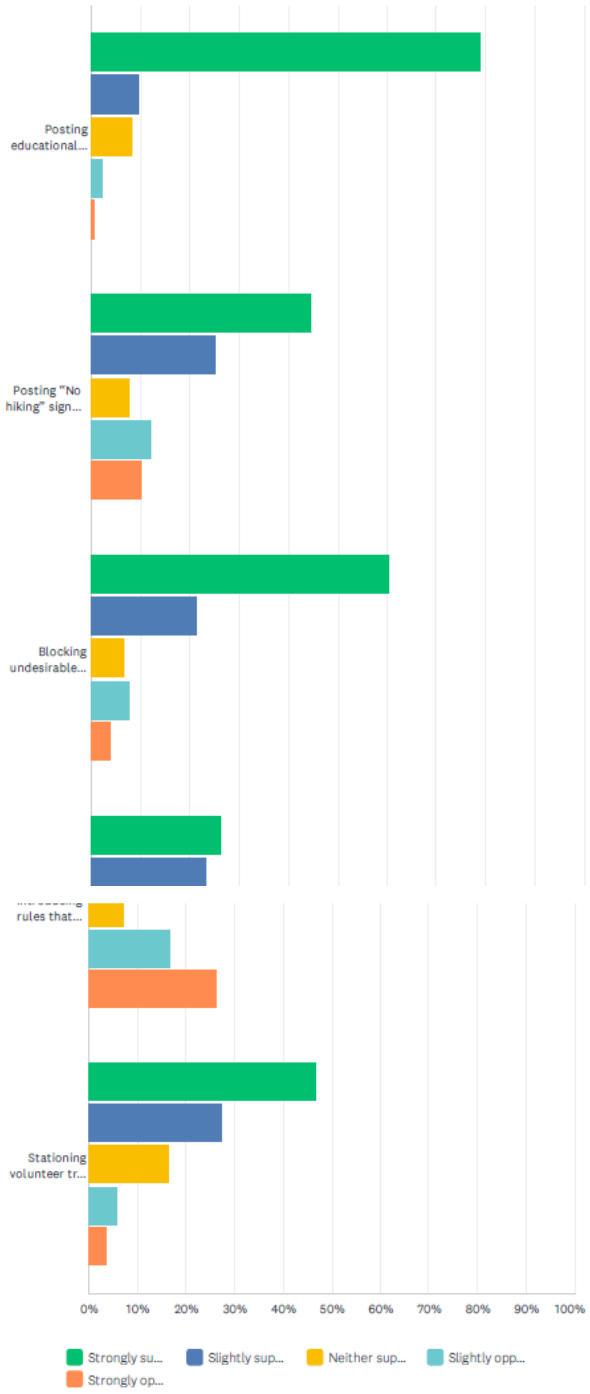
#	OTHER (PLEASE SPECIFY)	DATE
1	I don't care. There are enough plants already.	11/11/2022 4:51 PM
2	Im sure I had some ideas...when I was doing them.	10/26/2022 3:07 PM
3	As a responsible hiker, I would make that assumption	10/25/2022 2:02 PM
4	Assumed yes	10/25/2022 9:49 AM

15.Would you support or oppose the following potential long term management practices for hiking on a formerly trailless peak? (Answered: 169, Skipped:0)



	STRONGLY SUPPORT	SLIGHTLY SUPPORT	NEITHER SUPPORT OR OPPOSE	SLIGHTLY OPPOSE	STRONGLY OPPOSE	TOTAL
Construction of sustainably designed trails to summits of formerly trail-less peaks to prevent impacts to natural resources.	77.51% 131	17.16% 29	1.78% 3	0.59% 1	2.96% 5	169
Seasonal closures during bird breeding and nesting months on formerly trail-less peaks to protect vulnerable bird species.	42.01% 71	21.89% 37	12.43% 21	10.65% 18	13.02% 22	169
Daily limits on hikers permitted to each summit to each mountain in lieu of constructing trails to each summit	12.57% 21	17.37% 29	11.38% 19	20.36% 34	38.32% 64	167

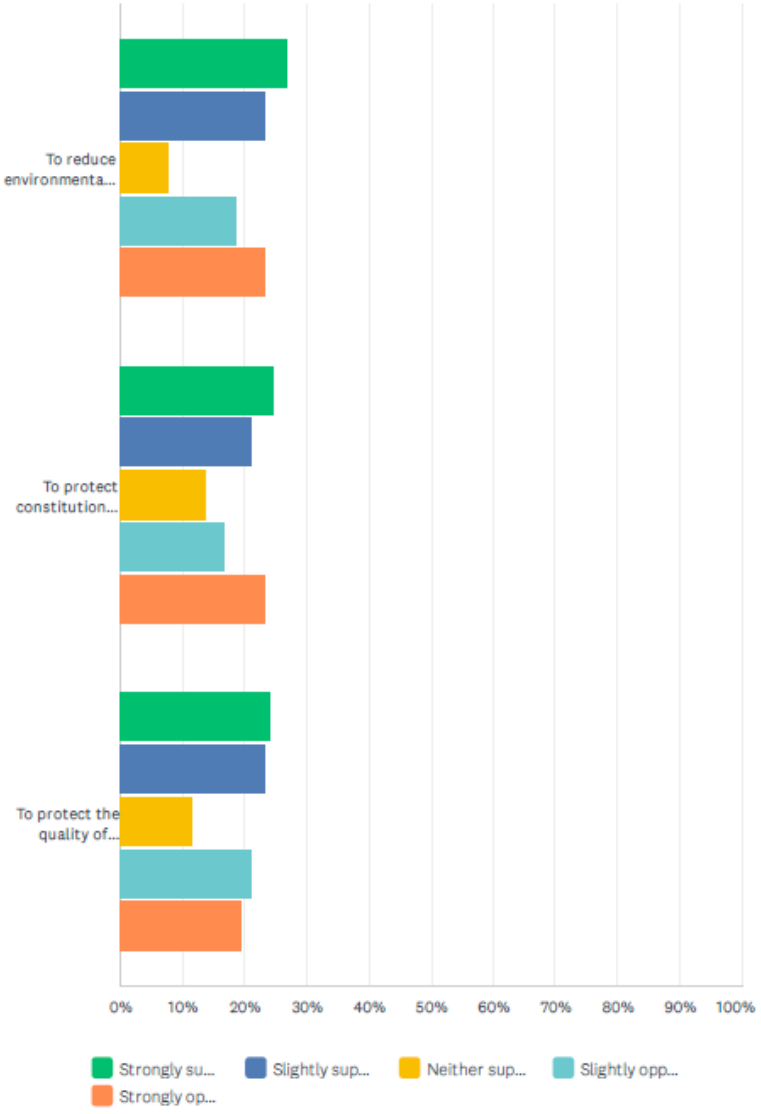
16. Would you support or oppose the following potential management and educational outreach actions to reduce informal trail travel in sensitive areas? (Answered: 169, Skipped:0)



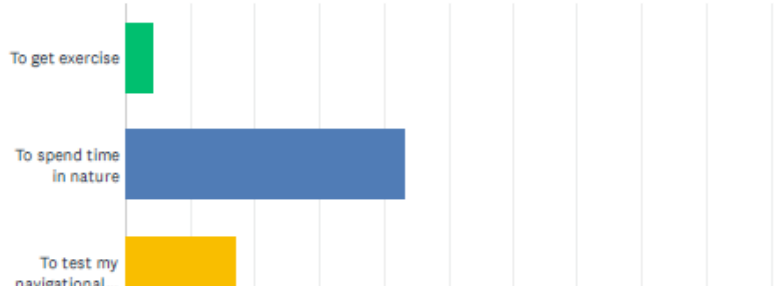
	STRONGLY SUPPORT	SLIGHTLY SUPPORT	NEITHER SUPPORT OR OPPOSE	SLIGHTLY OPPOSE	STRONGLY OPPOSE	TOTAL
Posting educational signage at trailheads that provides information on the damage that can informal trails can cause to rare plants and ground nesting birds.	79.04% 132	9.58% 16	8.38% 14	2.40% 4	0.60% 1	167
Posting "No hiking" signs at those unofficial non-blazed informal trail segments that are unsustainably aligned and impact natural resources.	44.58% 74	25.30% 42	7.83% 13	12.05% 20	10.24% 17	166
Blocking undesirable segments of informal trails with brush and logs.	60.36% 102	21.30% 36	6.51% 11	7.69% 13	4.14% 7	169
Introducing rules that prohibit visitors from hiking outside designated formal trails.	26.35% 44	23.35% 39	7.19% 12	16.77% 28	26.35% 44	167
Stationing volunteer trail stewards who engage with visitors and ask them to stay on designated trails.	46.75% 79	27.22% 46	16.57% 28	5.92% 10	3.55% 6	169

17. In your opinion, should the number of people allowed to hike a formerly trailless peak be limited by permit or other mechanism for any of the following reasons? This

may limit when you can hike in those areas. Please mark your level of support for each row. (Answered:138, Skipped:31)



18. What was the primary motivation for you to hike a trailless peak? (Answered: 141, Skipped: 28)



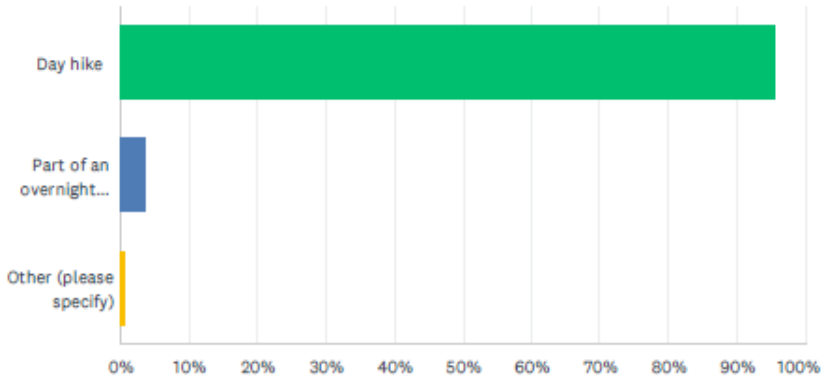
	STRONGLY SUPPORT	SLIGHTLY SUPPORT	NEITHER SUPPORT OR OPPOSE	SLIGHTLY OPPOSE	STRONGLY OPPOSE	TOTAL
To reduce environmental impacts	26.81% 37	23.19% 32	7.97% 11	18.84% 26	23.19% 32	138
To protect constitutionally protected wilderness values	24.82% 34	21.17% 29	13.87% 19	16.79% 23	23.36% 32	137
To protect the quality of visitor experiences in wilderness areas	24.09% 33	23.36% 32	11.68% 16	21.17% 29	19.71% 27	137

ANSWER CHOICES	RESPONSES	
To get exercise	4.26%	6
To spend time in nature	43.26%	61
To test my navigational competency using a map and compass	17.02%	24
To complete a hiking challenge (please indicate which challenge(s)) in the box below.	35.46%	50
TOTAL		141

#	TO COMPLETE A HIKING CHALLENGE (PLEASE INDICATE WHICH CHALLENGE(S)) IN THE BOX BELOW.	DATE
1	Navigation, exercise and beauty. And because they are there and I have not hiked them.	11/25/2022 6:43 PM
2	3500 Club, then Winter, now All Seasons	11/13/2022 7:04 PM
3	Catskill 3500	11/13/2022 5:25 PM
4	Catskill 35	11/13/2022 1:05 PM
5	Catskill 3500 Club	11/13/2022 11:56 AM
6	3500 club, 3500 Grid to spend time in nature	11/12/2022 4:03 PM
7	35ers	11/12/2022 10:48 AM
8	3500 3500/winter	11/12/2022 5:40 AM
9	Catskills 3500	11/11/2022 8:21 PM
10	3500 club	11/11/2022 8:09 PM
11	Hikers Anonymous Single Season Challenge	11/11/2022 4:51 PM

12	3500 Club; Winter 35; All-Seasons; 420 Grid	11/11/2022 4:46 PM
13	3500 club	11/11/2022 3:05 PM
14	3500 club	11/11/2022 2:46 PM
15	3500	11/11/2022 2:20 PM
16	Catskill 100 Highest	11/11/2022 2:15 PM
17	Catskill 3500	11/11/2022 1:50 PM
18	Catskills 3500	11/11/2022 1:39 PM
19	Catskill 3500	11/11/2022 1:25 PM
20	Catskill 3500 Club Membership	11/11/2022 1:07 PM
21	Catskills 3500 cliv	11/11/2022 12:25 PM
22	Catskills 3500	11/11/2022 12:06 PM
23	Catskill 3500 Club and Catskill Mountain Club	11/11/2022 11:51 AM
24	Catskill 3500 club	11/11/2022 11:43 AM
25	Catskills 35er but learning how to navigate peaks without trails has been an important skill	11/11/2022 11:22 AM
26	3500	11/11/2022 11:13 AM
27	Catskill 3500	11/11/2022 10:56 AM
28	3500 club	11/11/2022 10:50 AM
29	3500 club	11/11/2022 10:48 AM
30	All of then	11/11/2022 10:41 AM
31	Catskill 3500 Club the first time. Now I hike them to spend time in nature and get exercise	11/11/2022 9:48 AM
32	do not wish to identify the challenge	11/5/2022 5:55 PM
33	3500	10/28/2022 10:55 AM
34	Catskill 3500	10/26/2022 3:07 PM
35	Catskil 3500 club.	10/26/2022 1:26 PM
36	peaks over 3500 feet	10/26/2022 12:48 PM
37	3500 club	10/25/2022 9:47 PM
38	3500 club and test my compass skills	10/25/2022 9:34 PM
39	3500 club	10/25/2022 8:45 PM
40	To get away from the crowds and find my own journey to the summit	10/25/2022 3:56 PM
41	3500 Club	10/25/2022 3:39 PM
42	3500 winter	10/25/2022 3:33 PM
43	3500	10/25/2022 2:52 PM
44	W35 and foraging	10/25/2022 1:56 PM
45	Catskill 3500	10/25/2022 1:49 PM
46	3500 club	10/25/2022 11:56 AM
47	I am a volunteer backpacking leader with AMC.	10/25/2022 10:57 AM
48	four season 3500 challenge	10/25/2022 10:12 AM
49	Catskill 3500	10/25/2022 10:04 AM

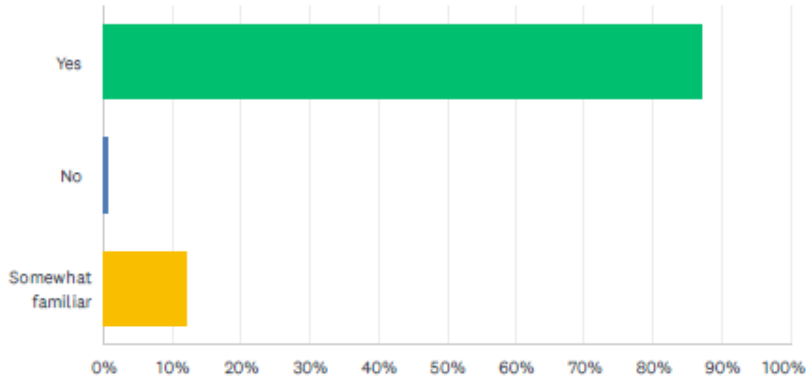
19. Which of the following best describes your last hiking experience on one of the formerly trailless peaks? (Answered:141 Skipped: 28)



ANSWER CHOICES	RESPONSES	
Day hike	95.74%	135
Part of an overnight backpacking trip	3.55%	5
Other (please specify)	0.71%	1
TOTAL		141

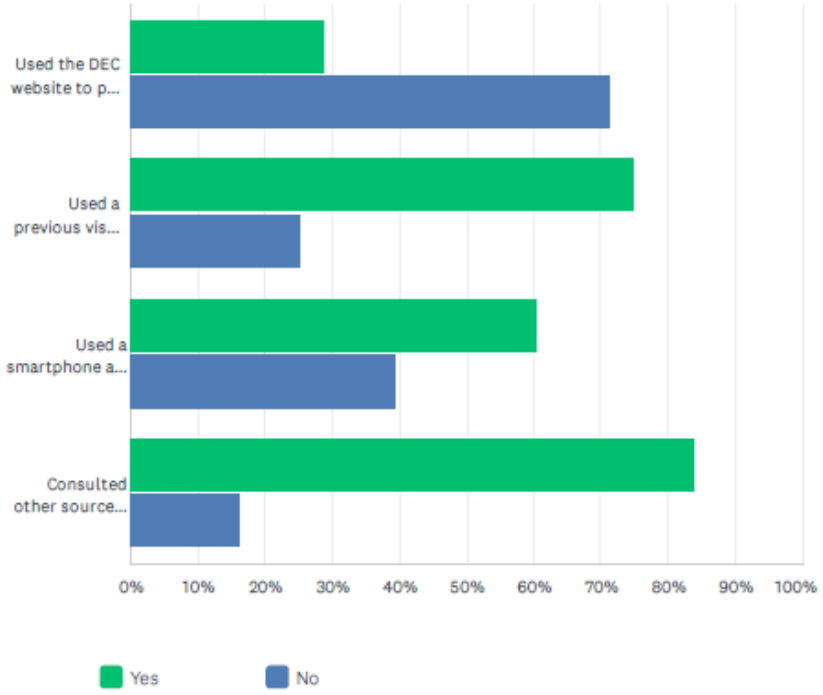
#	OTHER (PLEASE SPECIFY)	DATE
1	Backcountry skiing	11/11/2022 1:46 PM

20. Are you familiar with the seven principles of leave no trace? (Answered 148 Skipped:21)



ANSWER CHOICES	RESPONSES	
Yes	87.16%	129
No	0.68%	1
Somewhat familiar	12.16%	18
TOTAL		148

21. We would like to know which of the following types of information you used to plan and/ or prepare for your hike on a formerly trailless peak? (Answered:143 Skipped 26)



	YES	NO	TOTAL
Used the DEC website to plan and or prepare for your hike to a formerly trail-less peak	28.79% 38	71.21% 94	132
Used a previous visit to plan and/or prepare for a hike on a trail-less peak	74.81% 101	25.19% 34	135
Used a smartphone app to plan and/or prepare for a hike on a trail-less peak? If yes, please indicate which app you used below.	60.58% 83	39.42% 54	137
Consulted other sources of information. Please indicate what sources of information you used:	83.85% 109	16.15% 21	130

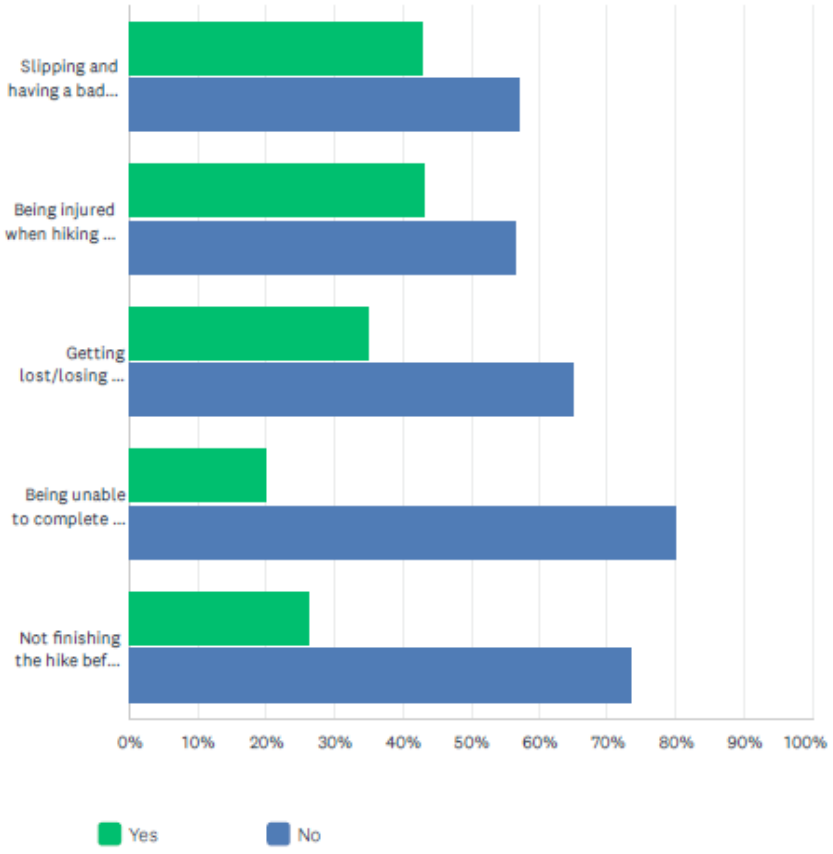
#	OTHER (PLEASE SPECIFY)	DATE
1	AllTrails, and went with friend who had hiked those peaks.	11/25/2022 6:43 PM
2	NYNJTC Maps	11/15/2022 7:44 AM
3	Trail Conference maps, both print and Avenza Maps	11/14/2022 9:15 AM
4	Gaia GPS, NYNJTC Map	11/13/2022 11:42 PM
5	All Trails	11/13/2022 7:04 PM

6	Research the best paths on multiple websites	11/13/2022 5:25 PM
7	All trails and paper map	11/13/2022 1:05 PM
8	New York-New Jersey Trail Conference maps	11/13/2022 11:56 AM
9	NJ NY trail conference maps	11/12/2022 4:03 PM
10	Websites, guidebooks and printed maps	11/12/2022 1:32 PM
11	CalTopo/SARTopo, AllTrails, Avenza using NYNJTC maps, and sites from other well-known Catskill hikers.	11/12/2022 12:30 PM
12	maps and web sites	11/12/2022 10:23 AM
13	Website and maps	11/12/2022 8:35 AM
14	Hiking books, maps including USGS topographical maps	11/12/2022 5:24 AM
15	Avanza, NYNTC maps	11/11/2022 10:20 PM
16	NYNJ trail conference maps, Facebook pages	11/11/2022 8:21 PM
17	Avenza and Gaia Apps.	11/11/2022 6:34 PM
18	Avenza app with NYNJ trail conference maps, also carrying the physical maps. Hiking friends, FB hiking groups, hiking meetup groups, hiking blogs	11/11/2022 5:58 PM
19	Google maps and paper maps	11/11/2022 5:30 PM
20	Gaia, CalTopo, NYNJTC paper map set	11/11/2022 5:19 PM
21	Catskillhiker.com Catskill mountaineer.com Catskill trail conditions Facebook 3500 club website	11/11/2022 5:01 PM
22	AllTrail	11/11/2022 4:51 PM
23	Avenza and Gaia; map & compass	11/11/2022 4:46 PM
24	All Trails and Avenza with NYNJTC maps	11/11/2022 3:05 PM
25	Nynj Trail conference maps; Catskill 3500 newsletter	11/11/2022 2:20 PM
26	Talked/ communicated with knowledgeable, experienced hiking friends.	11/11/2022 2:15 PM
27	Catskills Trail Conditions Facebook group	11/11/2022 2:09 PM
28	Hiking websites	11/11/2022 1:50 PM
29	Catskillhiker.net	11/11/2022 1:49 PM
30	Avena w/NJNYTC maps	11/11/2022 1:47 PM
31	Map	11/11/2022 1:46 PM
32	Maps, and trail conditions pages on social media	11/11/2022 1:39 PM
33	maps	11/11/2022 1:39 PM
34	Avenza/NYNJTC maps; websites like catskill mountaineer with terrain description to avoid steep ledges and dangers	11/11/2022 1:25 PM
35	All Trails and Catskill Trail Conditions Facebook Group. I also consult with other experienced hikers who have recently gone to the areas I am looking to hike.	11/11/2022 1:07 PM
36	Catskill mountaineer.	11/11/2022 1:04 PM
37	Catskills 3500 club guided hike	11/11/2022 12:25 PM
38	All Trails	11/11/2022 12:06 PM
39	Garmin Basecamp, Caltopo.com, Catskill Mountaineer Website	11/11/2022 11:51 AM
40	Trail conference maps, hiking groups on social media	11/11/2022 11:43 AM

41	I use the Avenza App with the NY/NJ Trail Conference Catskill Combined map as well as Gaia. I have ALLTrails but use it more in the planning phase rather than for navigation.	11/11/2022 11:38 AM
42	All trail, Gaia, speaking with other hikers about routes	11/11/2022 11:22 AM
43	Gaia, Avenza, maps	11/11/2022 11:19 AM
44	Catskill Mountaineer	11/11/2022 11:18 AM
45	I use gaia to track my 'bushwhacks' so I cna use the same route, but most of my planning is map and compass :-)	11/11/2022 11:08 AM
46	Alltrails Catskillmountaineer Mountain-hiking	11/11/2022 10:56 AM
47	Gaia Other hiking resources (books, websites, other hikers experiences)	11/11/2022 10:51 AM
48	Other websites, reports from other hikers	11/11/2022 10:50 AM
49	Mapped out route via caltopo.com and brought a printed map	11/11/2022 10:49 AM
50	Friends with experience	11/11/2022 10:48 AM
51	NY NJ TC paper maps, their digital map in Avenza, and Gaia gps is used to track my hikes (kept private for me to see only)	11/11/2022 9:48 AM
52	3500 Club, NYNJTC	11/10/2022 3:52 PM
53	Avenza app with NYNJTC maps is used in addition to map and compass.	11/10/2022 3:05 PM
54	gaiagps for navigation hired a NYS licensed guide	11/5/2022 5:55 PM
55	Catskill Park trail maps (Nat Geo and NYNJTC)	11/2/2022 4:12 PM
56	Avenza Maps, All Trails and Facebook groups to learn of daily information.	10/31/2022 12:39 PM
57	too map and compass	10/28/2022 11:16 PM
58	All Trails, hiking book, hard copy maps	10/28/2022 10:55 AM
59	Catskill Mountaineer info on each mountain. Alan Via's book for the other 65 of the hundred highest. I very rarely use DEC website because it is poorly designed. I do use the notifications that are emailed also.	10/27/2022 11:01 PM
60	Web searches & trip reports. All Trails on the web	10/26/2022 4:55 PM
61	Used NY/NJ trails maps	10/26/2022 1:26 PM
62	NYNJTC Catskill maps	10/26/2022 12:48 PM
63	Friend, family member	10/26/2022 8:03 AM
64	catskillhiker	10/25/2022 10:50 PM
65	internet websites	10/25/2022 9:47 PM
66	Adirondack mountain club Catskill trails 4th edition	10/25/2022 9:34 PM
67	Friends knowledge (a registered guide)	10/25/2022 8:45 PM
68	trail guide publications trail maps hiking organization websites hiking social media sites	10/25/2022 5:50 PM
69	GaiaGPS.com, NYNJTC maps	10/25/2022 5:36 PM
70	NY/NJ Trail conference maps	10/25/2022 5:08 PM
71	maps, books, websites	10/25/2022 5:03 PM
72	NY NJ TRAIL CONFERENCE MAP & COMPASS AS WELL AS AVENZA	10/25/2022 4:06 PM
73	PAPER MAPS!!!	10/25/2022 3:56 PM
74	Avenza, NYNJTC maps & compass	10/25/2022 3:39 PM
75	NYNJTC maps Catskill mountaineer	10/25/2022 3:33 PM

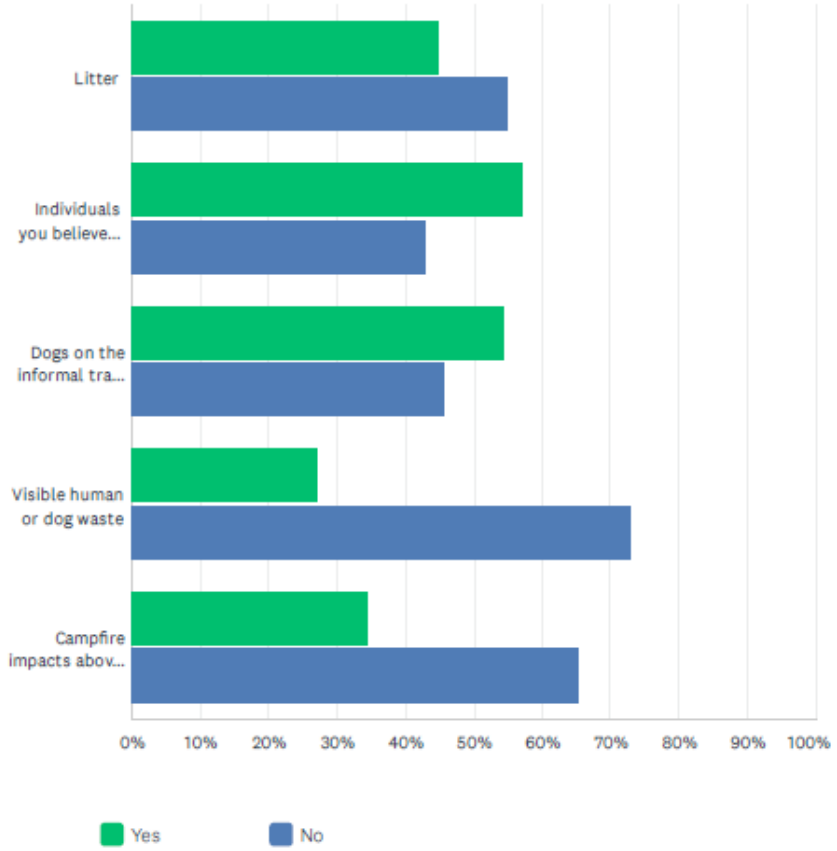
76	AllTrails adk publications and ny nj trail conf maps	10/25/2022 2:52 PM
77	Guide books Map apps & websites	10/25/2022 2:52 PM
78	3D Maps Pro App. and NYNJ trail conference map set. If there is any sign of a herd path, I stay on it.	10/25/2022 2:02 PM
79	Gaia, AllTrails and Avenza	10/25/2022 1:56 PM
80	Not sure	10/25/2022 1:53 PM
81	topographic map and compass	10/25/2022 1:49 PM
82	Books and websites	10/25/2022 1:40 PM
83	Trail maps	10/25/2022 12:26 PM
84	US Topo Maps	10/25/2022 12:15 PM
85	Trail Conference map w Avenza	10/25/2022 11:56 AM
86	I went with a friend who is familiar with the area.	10/25/2022 11:51 AM
87	USGS topographic quadrangles	10/25/2022 11:36 AM
88	Topographic maps	10/25/2022 11:26 AM
89	Gaia (USGS maps), Avenza apps. NYNJTC Map Set	10/25/2022 11:05 AM
90	I have not visited the trail-less peaks. Nevertheless, I am graduated of Mountain Leadership School and volunteer faculty of AMC. Thus, we create trip plans relative to maps, guidebooks or reliable websites, for example, DEC or Parks. I consulted the DEC website when accessing the Danbury Forest, however, have all the maps from the Finger Lake Association. I avoid going off trail unless some emergency occurs. Thus, I like to plan my trips noting water sources and alternative routes including evacuation or bipass.	10/25/2022 10:57 AM
91	Contour Maps , Friends	10/25/2022 10:32 AM
92	Maps, compass or and trail field guides	10/25/2022 10:30 AM
93	Fatmap, other hikers, map & compass	10/25/2022 10:26 AM
94	USGS Maps	10/25/2022 10:13 AM
95	maps, weather reports	10/25/2022 10:12 AM
96	Strava	10/25/2022 10:04 AM
97	Trail Conference Maps	10/25/2022 10:04 AM
98	Friends who have hiked. Books, maps and websites to get familiar with topography.	10/25/2022 10:01 AM
99	Other hikers	10/25/2022 9:57 AM

22. Did you worry about any of the following risks during your hike to a formerly trailless peak? (Answered: 145 Skipped: 24)



	YES	NO	TOTAL
Slipping and having a bad fall while hiking on the informal trail	42.96% 61	57.04% 81	142
Being injured when hiking on the informal trail	43.36% 62	56.64% 81	143
Getting lost/losing the informal trail	34.97% 50	65.03% 93	143
Being unable to complete the whole hike	20.00% 29	80.00% 116	145

23. Did you encounter any of the following on your visit to a formerly trailless peak?



	YES	NO	TOTAL
Litter	45.00% 63	55.00% 77	140
Individuals you believe were unprepared for the hike	57.25% 79	42.75% 59	138
Dogs on the informal trails and summits. If yes, please indicate below if they were leashed.	54.35% 75	45.65% 63	138
Visible human or dog waste	27.14% 38	72.86% 102	140
Campfire impacts above 3,500'	34.53% 48	65.47% 91	139

#	OTHER (PLEASE SPECIFY)	DATE
1	Yes leashed.	11/25/2022 6:43 PM
2	Yes the dog was leashed	11/13/2022 11:42 PM
3	Leashed and unleashed but very friendly	11/13/2022 1:05 PM
4	Please create formal tails to these peaks to limit the impact to a single trail rather than having more widespread impact.	11/12/2022 9:56 PM
5	off leash	11/12/2022 4:03 PM
6	Mostly unleashed dogs, but both.	11/11/2022 10:20 PM
7	Most waste and trash encountered is on sustainable trails. If you build it, they will come. People avoid trailers peaks out of fear. If you make them easier you invite the masses and achieve the opposite effect of what you set out to do. By all means teach and promote safe practices but leave wilderness areas as is.	11/11/2022 5:30 PM
8	Almost all dogs leashed and well behaved I encountered. Only seen a handful.	11/11/2022 4:46 PM
9	Some dogs not leashed. Camp fire on the summit of rocky.	11/11/2022 3:05 PM
10	Both leashed and unleashed	11/11/2022 1:47 PM
11	Unleashed dogs, off trail and on. Far too often.	11/11/2022 1:46 PM
12	leash was available	11/11/2022 1:39 PM
13	Unleashed dogs common	11/11/2022 1:25 PM
14	Dogs that were unleashed.	11/11/2022 1:07 PM
15	Litter is very rare on the trail-less peaks, but I have seen campfires at or near some of the peaks, certainly above 3500'. However, many of them appeared to be years old. Biggest issue I've encountered is unprepared hikers; I've lead a few back to trailheads...	11/11/2022 11:08 AM
16	Both leashed and unleashed.	11/11/2022 10:51 AM
17	Dogs were leashed or in control of owner	11/11/2022 9:48 AM
18	leashed dogs	11/10/2022 3:52 PM
19	dogs are leashed and unleashed	11/10/2022 3:05 PM
20	dog unleashed on Friday	11/5/2022 5:55 PM
21	Dogs off leash	11/2/2022 4:12 PM
22	Unleashed	10/27/2022 11:01 PM
23	unleashed/marginally controlled	10/26/2022 4:55 PM
24	Summit erosion and herd path that didn't exist on a previous visit	10/26/2022 3:07 PM
25	Leashed dog	10/26/2022 8:03 AM
26	Some were leashed, most were not	10/25/2022 9:47 PM
27	Dog was leashed and great - no problem there	10/25/2022 8:45 PM
28	Thanks for taking this issue seriously.	10/25/2022 8:17 PM
29	well-behaved unleashed dog clearly under voice control	10/25/2022 7:06 PM
30	some were and some not	10/25/2022 6:10 PM
31	I have encountered each of these conditions on trailed peaks.	10/25/2022 5:50 PM
32	People off trail are much more oriented towards Leave No Trace, prepared and accommodating than anyone on DEC trails!! DO NOT CONTINUE THIS!!	10/25/2022 3:56 PM
33	dogs on & off leash	10/25/2022 3:39 PM

34	Dogs are allowed in the Catskills and so far less damage than humans.	10/25/2022 3:33 PM
35	Leashed	10/25/2022 3:08 PM
36	Dogs never leashed, no misbehavior, camp fires rare, happens, not on trail-less. 3500Club# 2422	10/25/2022 2:02 PM
37	Rarely leashed	10/25/2022 1:56 PM
38	I don't hike for peaks/views. I look for places with fewer people. I think that we should discourage peak challenges.	10/25/2022 12:15 PM
39	I have not hiked a trail-less peak, but strongly oppose this due to environmental destruction it causes. Please consider prohibiting all such recreation.	10/25/2022 11:43 AM
40	leashed and unleashed dogs	10/25/2022 11:05 AM
41	I do not hike the untrailed peaks because of all the reasons concerning slip and falls. About AMC, we have a novice backpacking program and a backpacking with your dog program. I am doing the finishing touches on dog program and started the Novice Program in 2017. However, I no longer teach it because I am unable to bring my dog to the Harriman Center but have offered to assist during one day and leave for home.	10/25/2022 10:57 AM
42	Both leashed and off-leash	10/25/2022 10:35 AM
43	Have seen very few dogs on the trails. Worry more about Invasive plants and insects. Campfires usually below 3500.	10/25/2022 10:32 AM
44	leashed	10/25/2022 10:26 AM
45	I think the key is good trail design. So many Catskill trails are straight up and down trails that don't conform to contours and concentrate water movement therefore don't shed water incrementally and cause erosion. Trails need to meander and flow with the topography.	10/25/2022 10:13 AM
46	not leashed	10/25/2022 10:12 AM
47	Unleashed dogs and poop bags!	10/25/2022 10:01 AM
48	Questions 7-9 list "Very Unacceptable" twice when the farthest right choice category should state "Very Acceptable"	10/25/2022 9:56 AM
49	Unleashed	10/25/2022 9:45 AM

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Appendix C. 2023 Visitor Experience Survey Results

Results of the 2023 “Catskill Formerly Trailless” Peaks Survey Report can be found online at: https://dec.ny.gov/sites/default/files/2024-04/2023catskilltraillesssurveyreport.pdf

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Appendix D. Leave No Trace Principles

Each of us plays a vital role in protecting our national parks. As we spend time outdoors, in the natural world and in wilderness, it's important to be conscious of the effects our actions may have on plants, animals, other people, and even entire ecosystems. Following the **Leave No Trace Seven Principles**, summarized below, can help us minimize those impacts. They can be applied anywhere, at any time, while taking part in recreational activities.

Plan Ahead and Prepare

- Know the regulations and special concerns for the area you'll visit.
- Prepare for extreme weather, hazards, and emergencies.
- Schedule your trip to avoid times of high use.
- Visit in small groups when possible. Consider splitting larger groups into smaller groups.
- Repackage food to minimize waste.
- Use a map and compass or GPS to eliminate the use of marking paint, rock cairns or flagging.

Travel and Camp on Durable Surfaces

- Durable surfaces include maintained trails and designated campsites, rock, gravel, sand, dry grasses, or snow.
- Protect riparian areas by camping at least 200 feet from lakes and streams.
- Good campsites are found, not made. Altering a site is not necessary.
    - *In popular areas:*
        - Concentrate use on existing trails and campsites.
        - Walk single file in the middle of the trail, even when wet or muddy.
        - Keep campsites small. Focus activity in areas where vegetation is absent.
    - *In pristine areas:*
        - Disperse use to prevent the creation of campsites and trails.

- Avoid places where impacts are just beginning.

Dispose of Waste Properly

- Pack it in, pack it out. Inspect your campsite, food preparation areas, and rest areas for trash or spilled foods. Pack out all trash, leftover food, and litter.
- Utilize toilet facilities whenever possible. Otherwise, deposit solid human waste in catholes dug 6 to 8 inches deep, at least 200 feet from water, camp, and trails. Cover and disguise the cathole when finished.
- Pack out toilet paper and hygiene products.
- To wash yourself or your dishes, carry water 200 feet away from streams or lakes and use small amounts of biodegradable soap. Scatter strained dishwater.

Leave What You Find

- Preserve the past: examine, photograph, but do not touch cultural or historic structures and artifacts.
- Leave rocks, plants, and other natural objects as you find them.
- Avoid introducing or transporting non-native species.
- Do not build structures, furniture, or dig trenches.

Minimize Campfire Impacts

- Campfires can cause lasting impacts to the environment. Use a lightweight stove for cooking and enjoy a candle lantern for light.
- Where fires are permitted, use established fire rings, fire pans, or mound fires.
- Keep fires small. Only use down and dead wood from the ground that can be broken by hand.
- Burn all wood and coals to ash, put out campfires completely, then scatter cool ashes.

Respect Wildlife

- Observe wildlife from a distance. Do not follow or approach them.
- Never feed animals. Feeding wildlife damages their health, alters natural behaviors, [habituates them to humans], and exposes them to predators and other dangers.

- Protect wildlife and your food by storing rations and trash securely.
- Control pets at all times or leave them at home.
- Avoid wildlife during sensitive times: mating, nesting, raising young, or winter.

Be Considerate of Other Visitors

- Respect other visitors and protect the quality of their experience.
- Be courteous. Yield to other users on the trail.
- Step to the downhill side of the trail when encountering pack stock.
- Take breaks and camp away from trails and other visitors.
- Let nature's sounds prevail. Avoid loud voices and noises.

These principles were established by the Leave No Trace Center for Outdoor Ethics, and built on work by the US Forest Service, National Park Service, and Bureau of Land Management in the mid-1980s. This relationship continues today. The principles are based on and informed by scientific research in the fields of recreation ecology and human dimensions of natural resources. Take a look at the **science behind the principles** on the Leave No Trace website.

Thank you for doing your part to protect our natural world.

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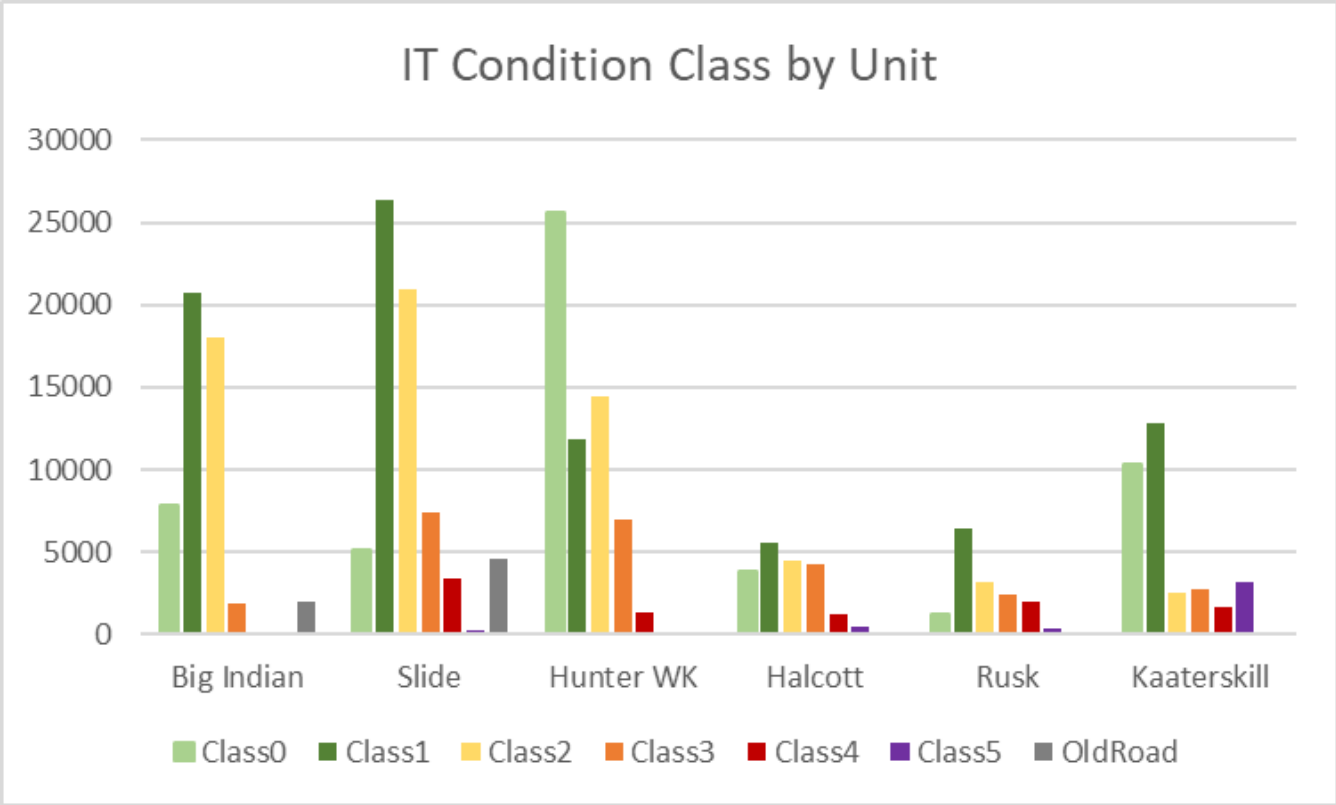
Appendix E. 2022 Condition Class Maps & Point Assessment Locations

Source: Bolland, G. (2023) Monitoring and Mapping Informal Trail Locations Using Smartphone Applications: A Literature Review and Case Study in the Catskills. 2022 Catskill Science Collaborative Project in partnership with SUNY Environmental School of Forestry and DEC

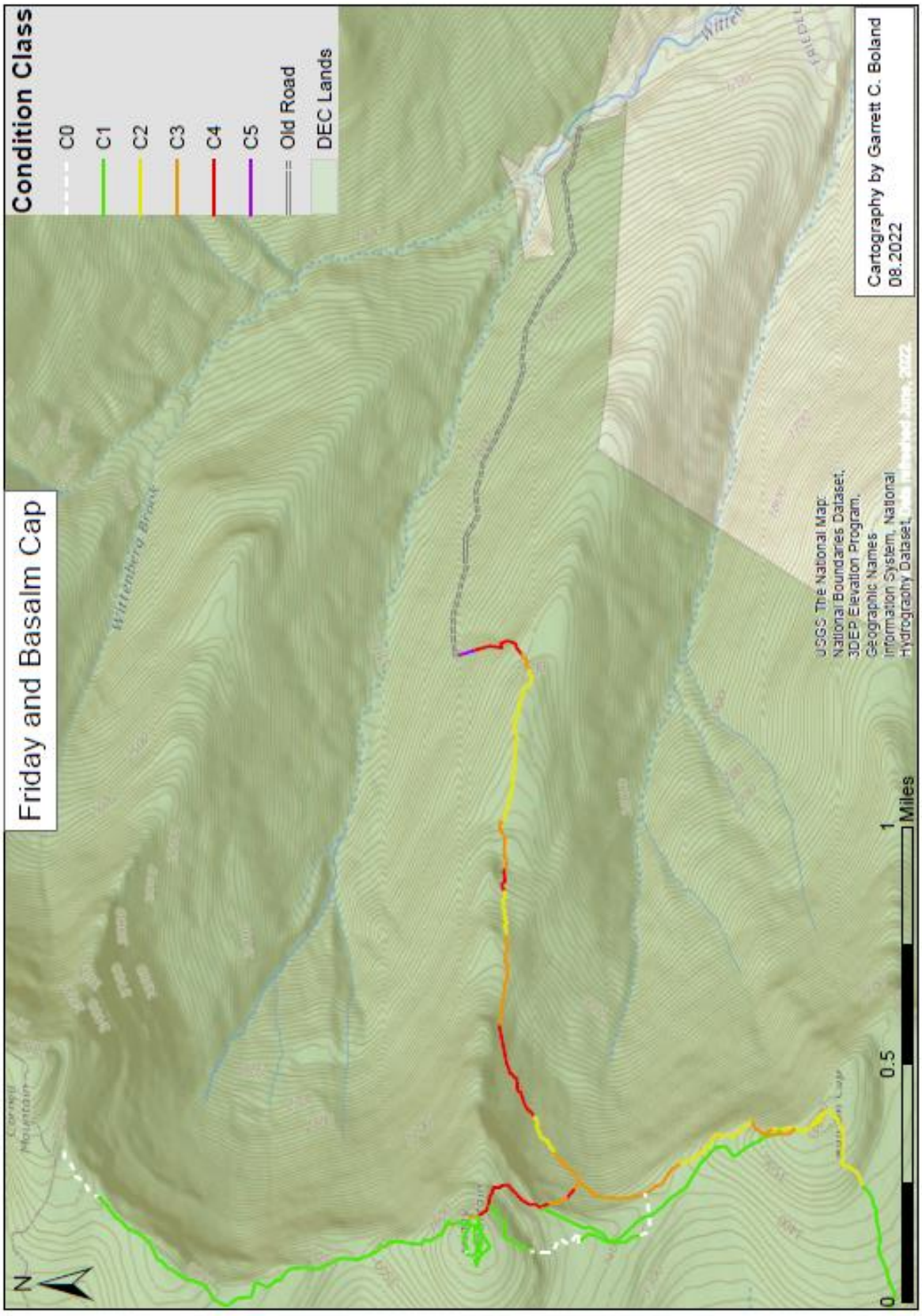
This chart reflects the condition classification mileage for each type of condition class found in individual planning units over the course of the 2022 field season.

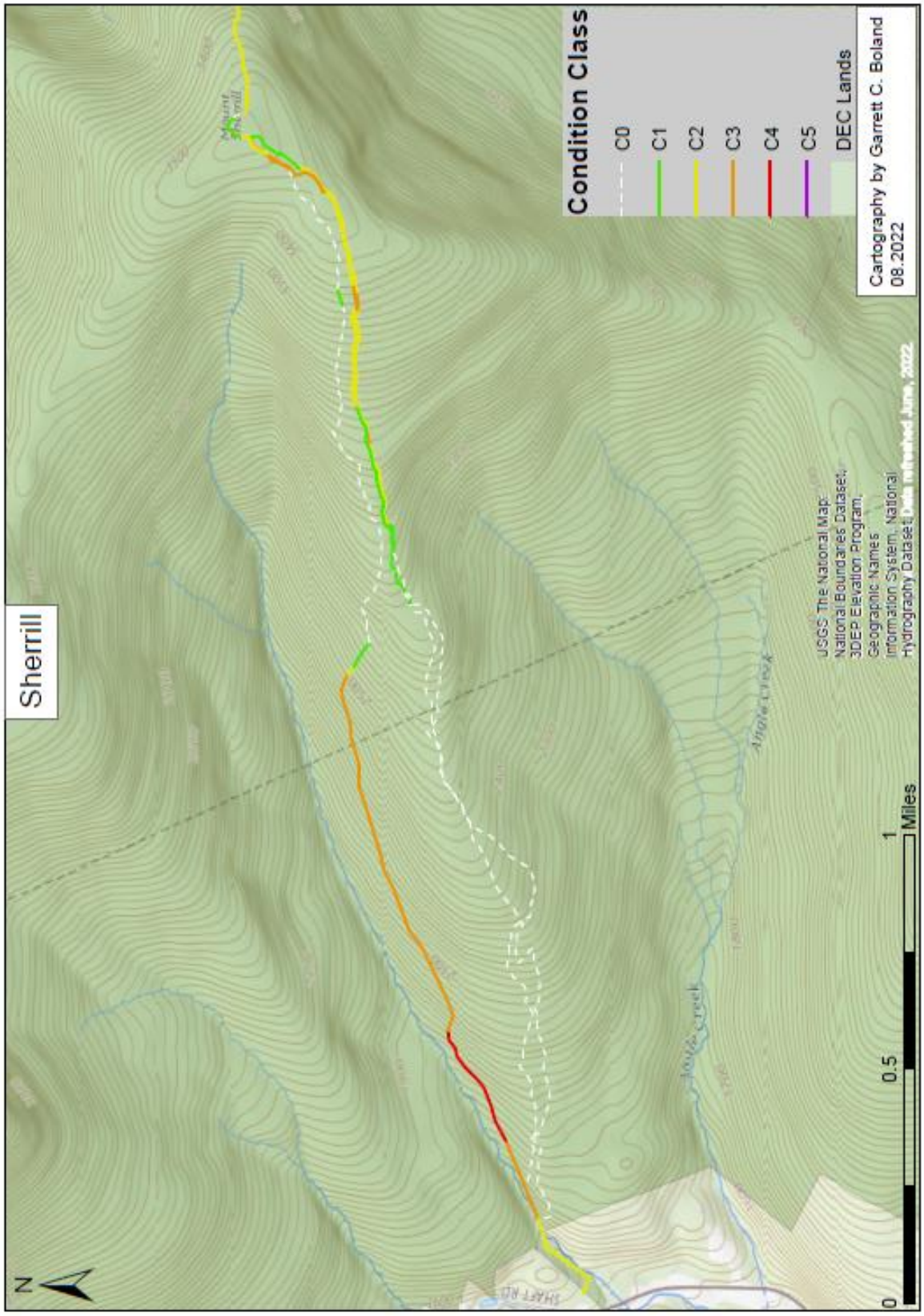
2022 Condition Class Assessment	Big Indian	Slide	Hunter WK	Halcott	Rusk	Kaaterskill	% of total mileage	Miles
Class0	7,851	5,153	25,576	3,854	1,213	10,277	21.81%	10.21297
Class1	20,767	26,323	11,886	5,532	6,401	12,788	33.86%	15.85139
Class2	18,019	20,993	14,396	4,438	3,171	2,555	25.72%	12.04004
Class3	1,826	7,393	6,967	4,289	2,393	2,701	10.34%	4.842531
Class4	126	3,374	1,276	1,219	1,967	1,676	3.90%	1.825536
Class5	0	229	0	462	387	3121	1.70%	0.795236
Total Miles IT per unit	9.2	12.01	11.38	3.74	2.94	6.27		
Old Road	1,991	4,617	0	0	0	0	2.67%	1.251575
Total Feet	50,580	68,082	60,101	19,794	15,531	33,118	100%	47 miles

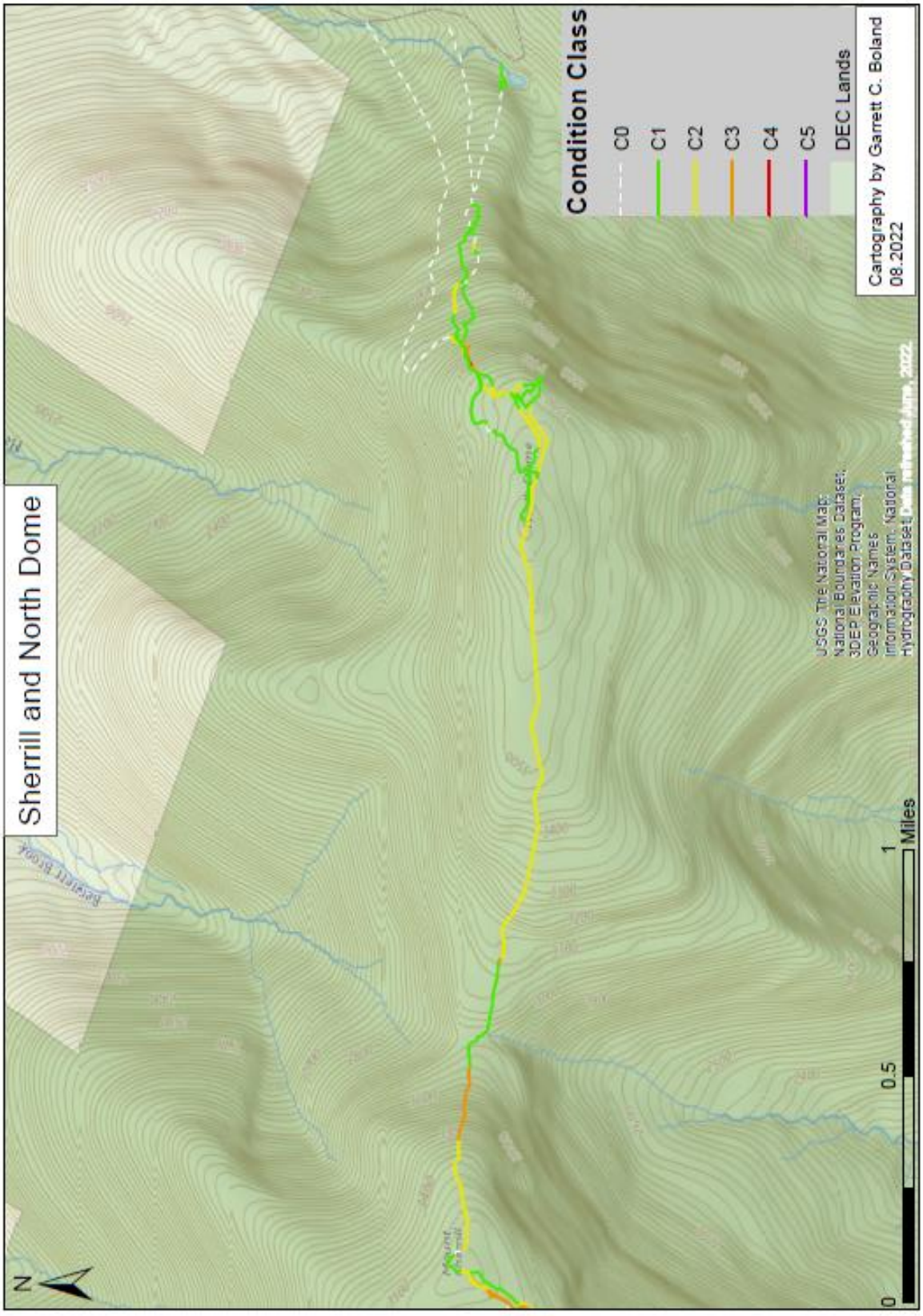


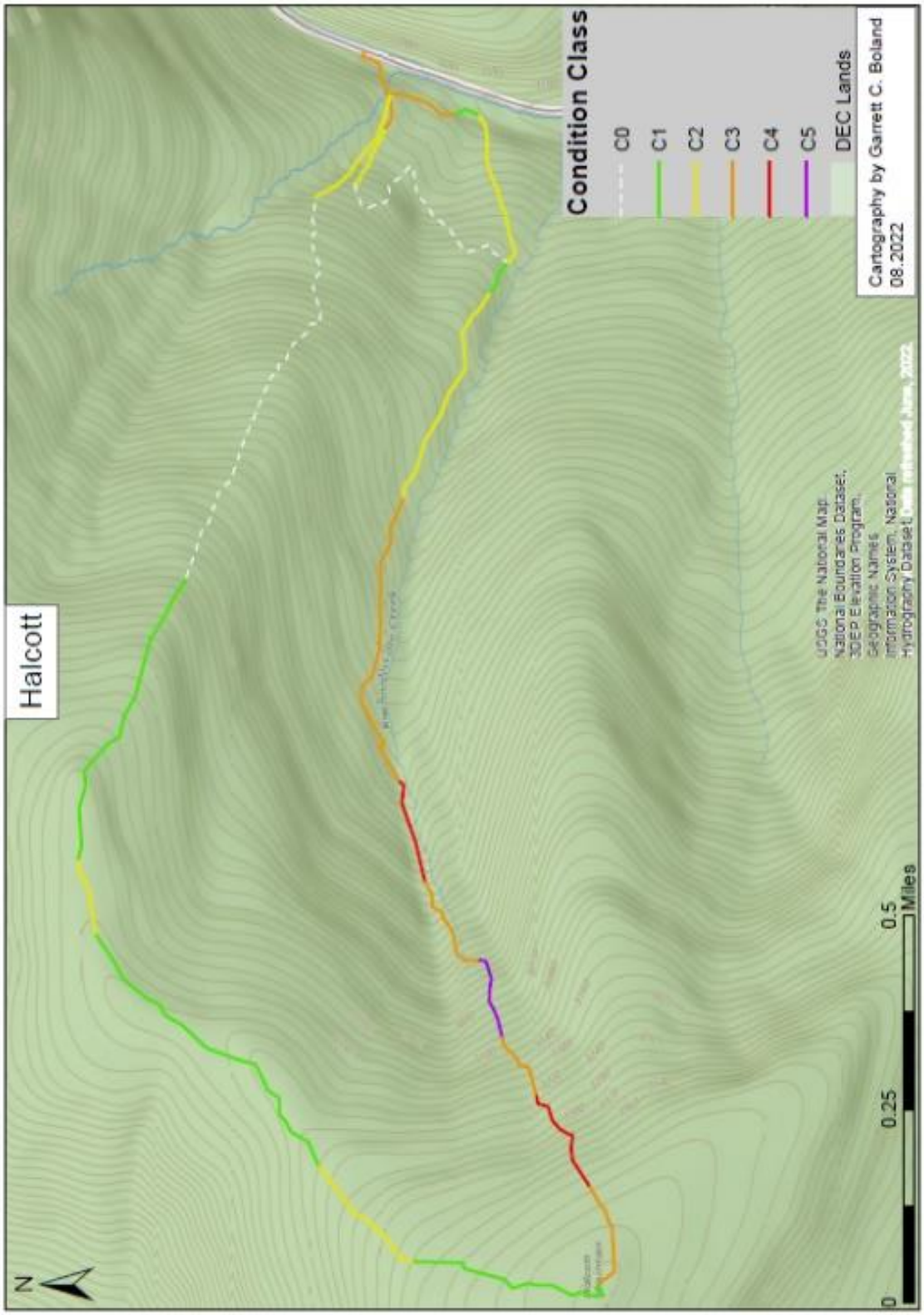
The following maps reflect the informal trail condition class ratings that were recorded during the fieldwork that occurred from May-August 2022.


Big Indian Wilderness
Condition Class
C0
C1
C2
C3
C4
C5
Old Road
DEC Lands
Cartography by Garrett C. Boland
08.2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System: National
Hydrography Dataset
Miles
0
0.25
0.5
1
1.5
2
N
Elk Bushkill
Big Indian Mountain
Doubletop Mountain
Dry Brook

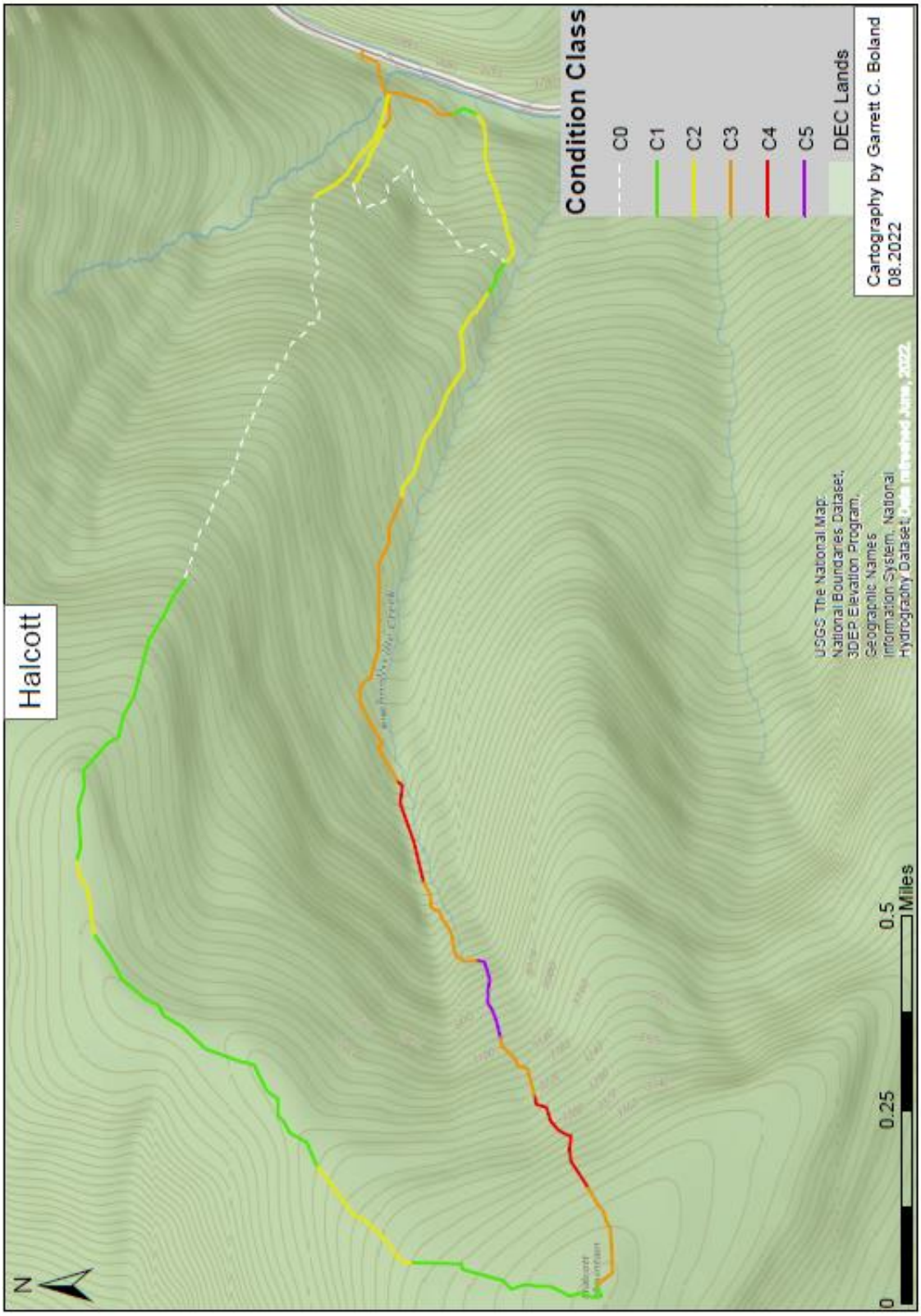

Friday and Basalm Cap
Condition Class
C0
C1
C2
C3
C4
C5
Old Road
DEC Lands
Cartography by Garrett C. Boland
08.2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset,
N
0
0.5
1
Miles

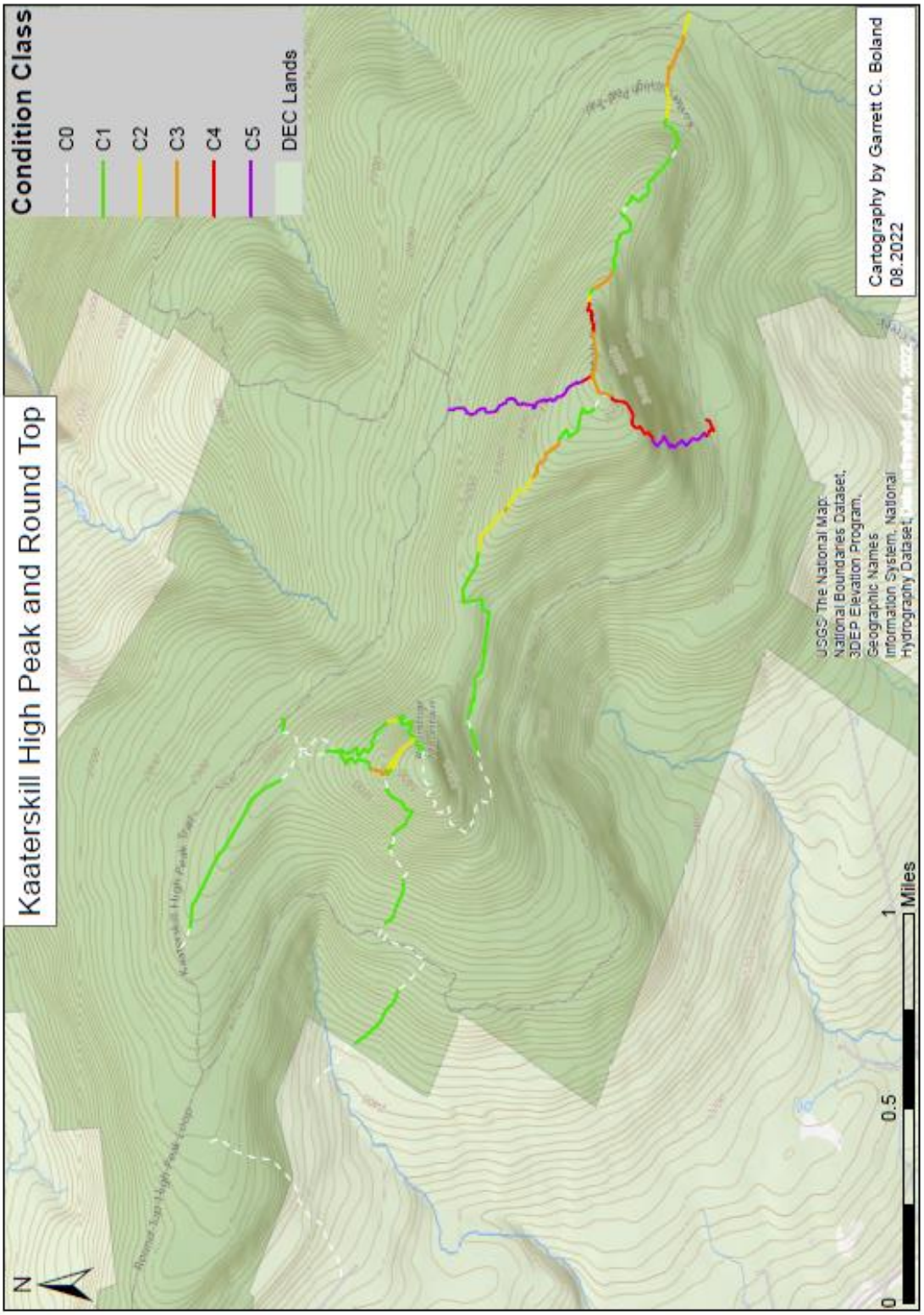

Sherrill
Condition Class
C0
C1
C2
C3
C4
C5
DEC Lands
Cartography by Garrett C. Boland
08.2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset
0
0.5
1
Miles
N

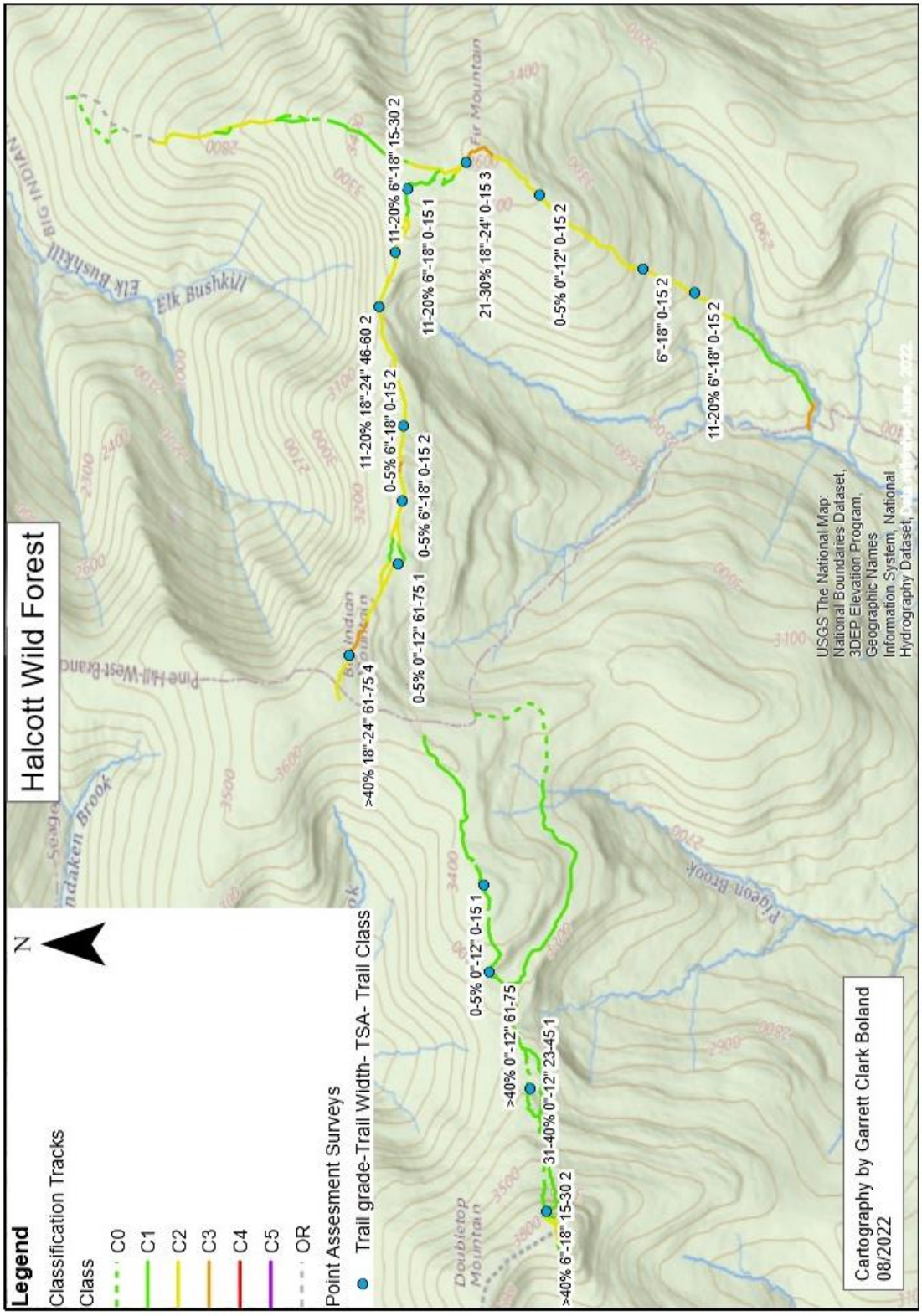

Sherrill and North Dome
Condition Class
C0
C1
C2
C3
C4
C5
DEC Lands
Cartography by Garrett C. Boland
08.2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System: National
Hydrography Dataset
N
0
0.5
1
Miles

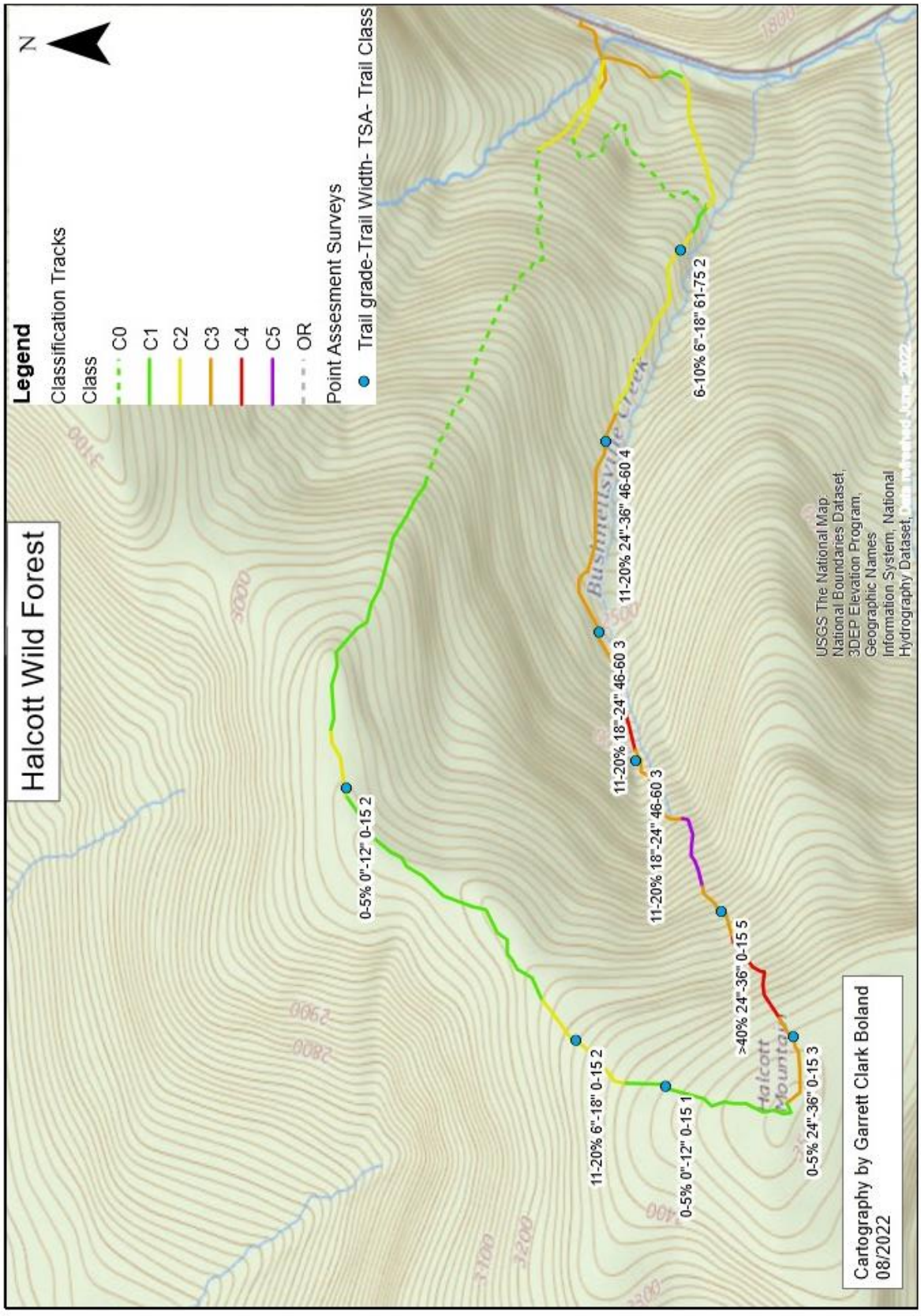

Halcott
Condition Class
C0
C1
C2
C3
C4
C5
DEC Lands
Cartography by Garrett C. Boland
08.2022
USGS The National Map
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset
0
0.25
0.5
Miles
N

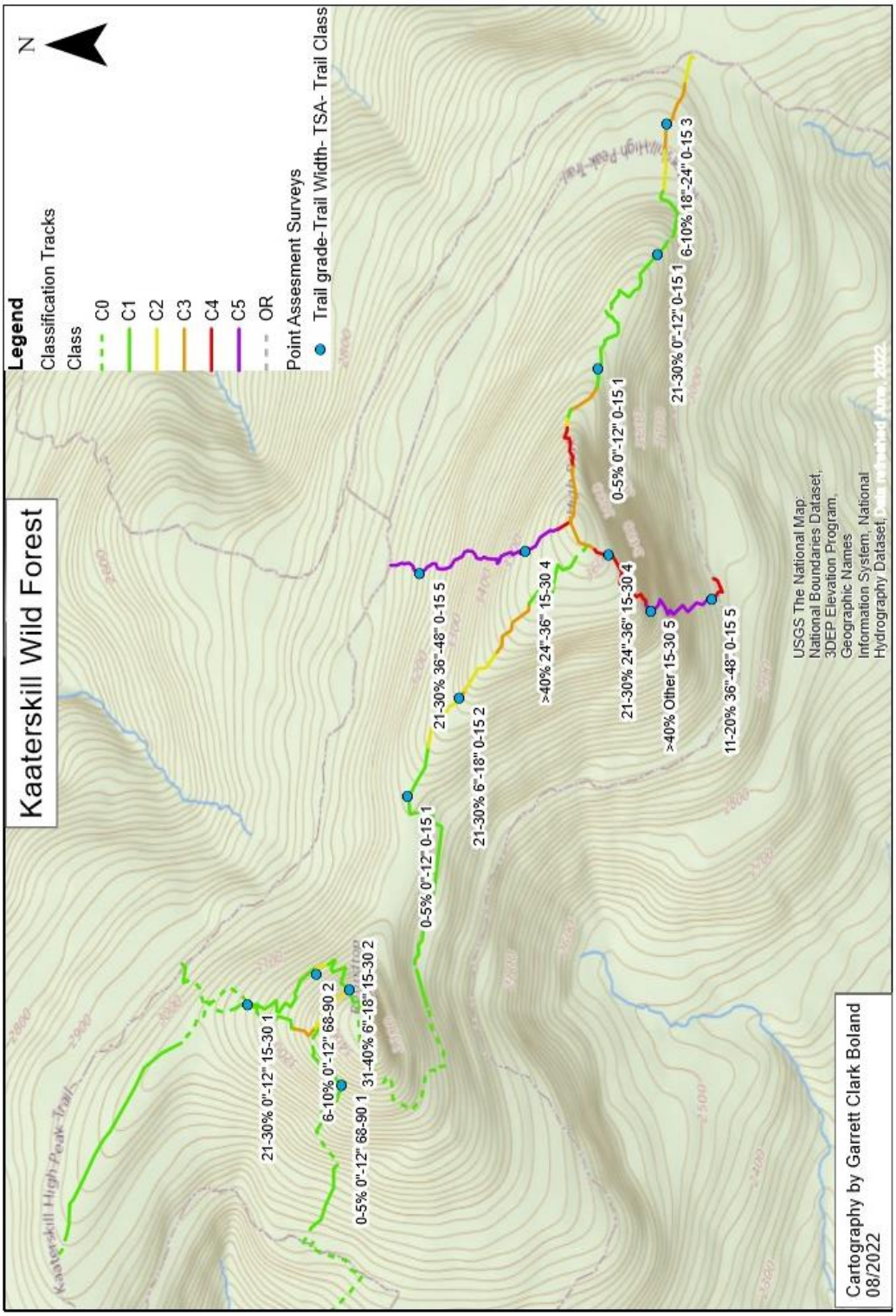

Rusk and East Rusk
Condition Class
C0
C1
C2
C3
C4
C5
DEC Lands
Cartography by Garrett C. Boland
08.2022
Hunter Brook
Rusk Mountain
Ox Hollow
N
0
0.375
0.75
Miles

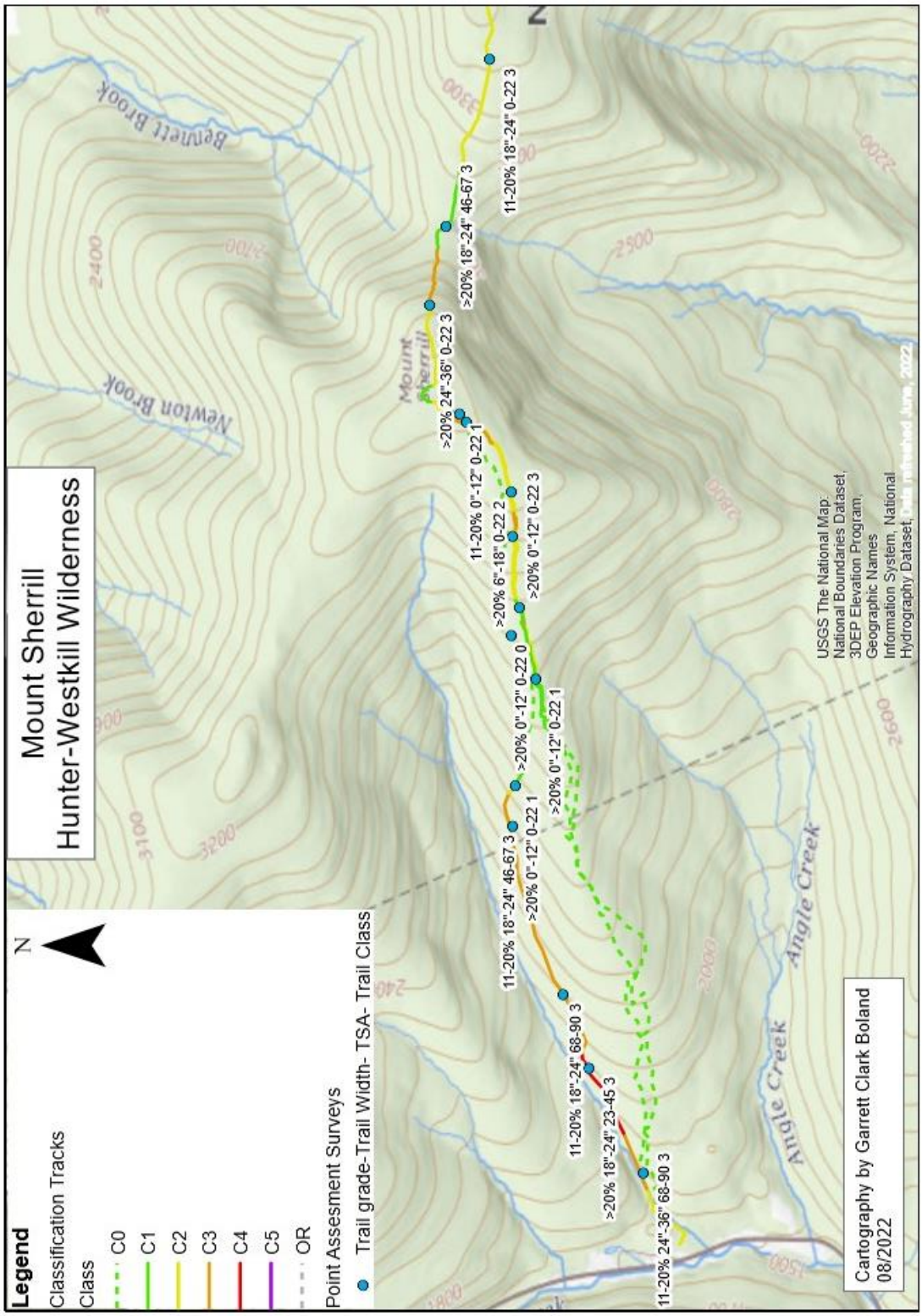

Halcott
Condition Class
C0
C1
C2
C3
C4
C5
DEC Lands
Cartography by Garrett C. Boland
08.2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset
N
0
0.25
0.5
Miles

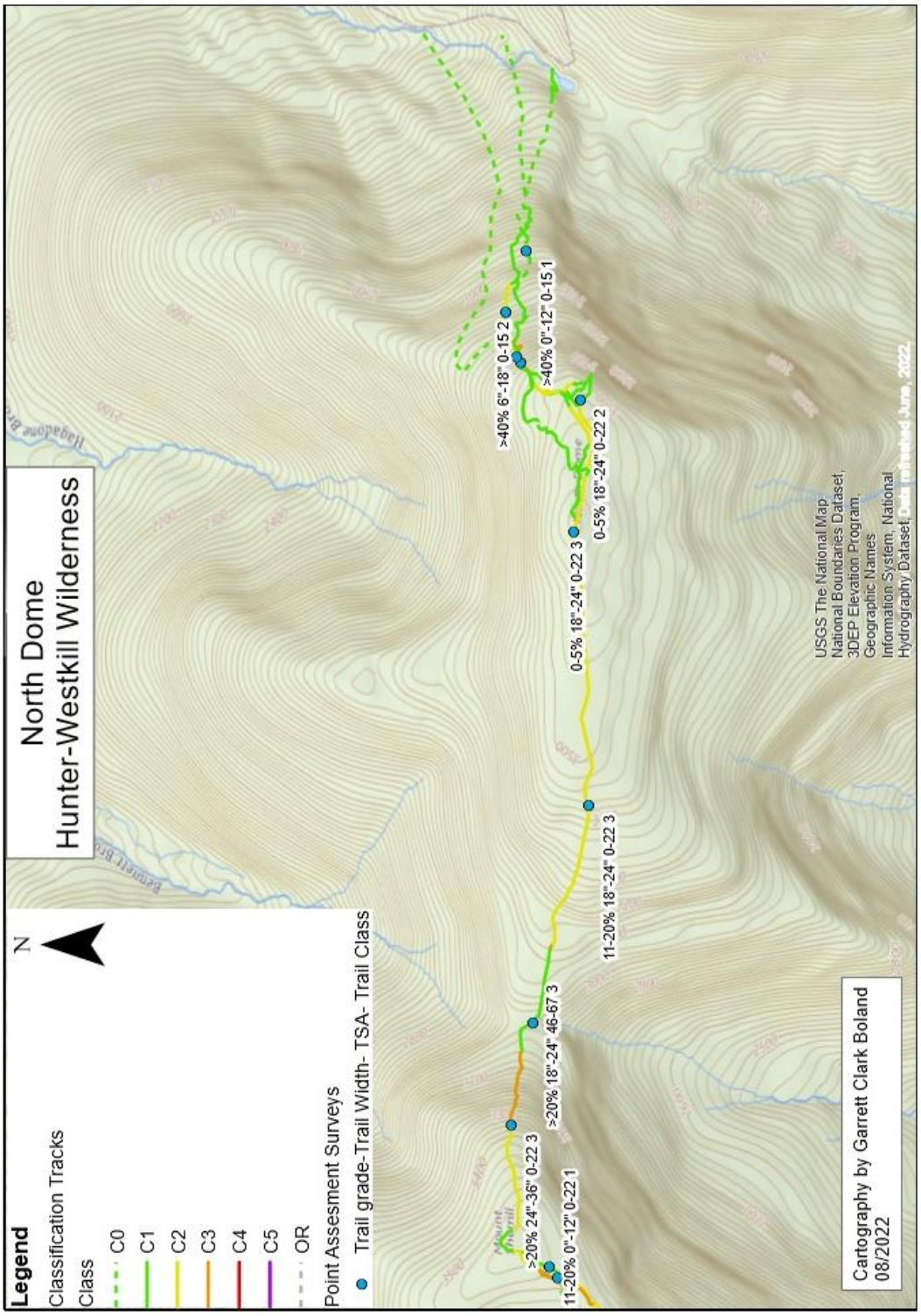

Kaaterskill High Peak and Round Top
Condition Class
C0
C1
C2
C3
C4
C5
DEC Lands
Cartography by Garrett C. Boland
08.2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset,
N
0
0.5
1
Miles

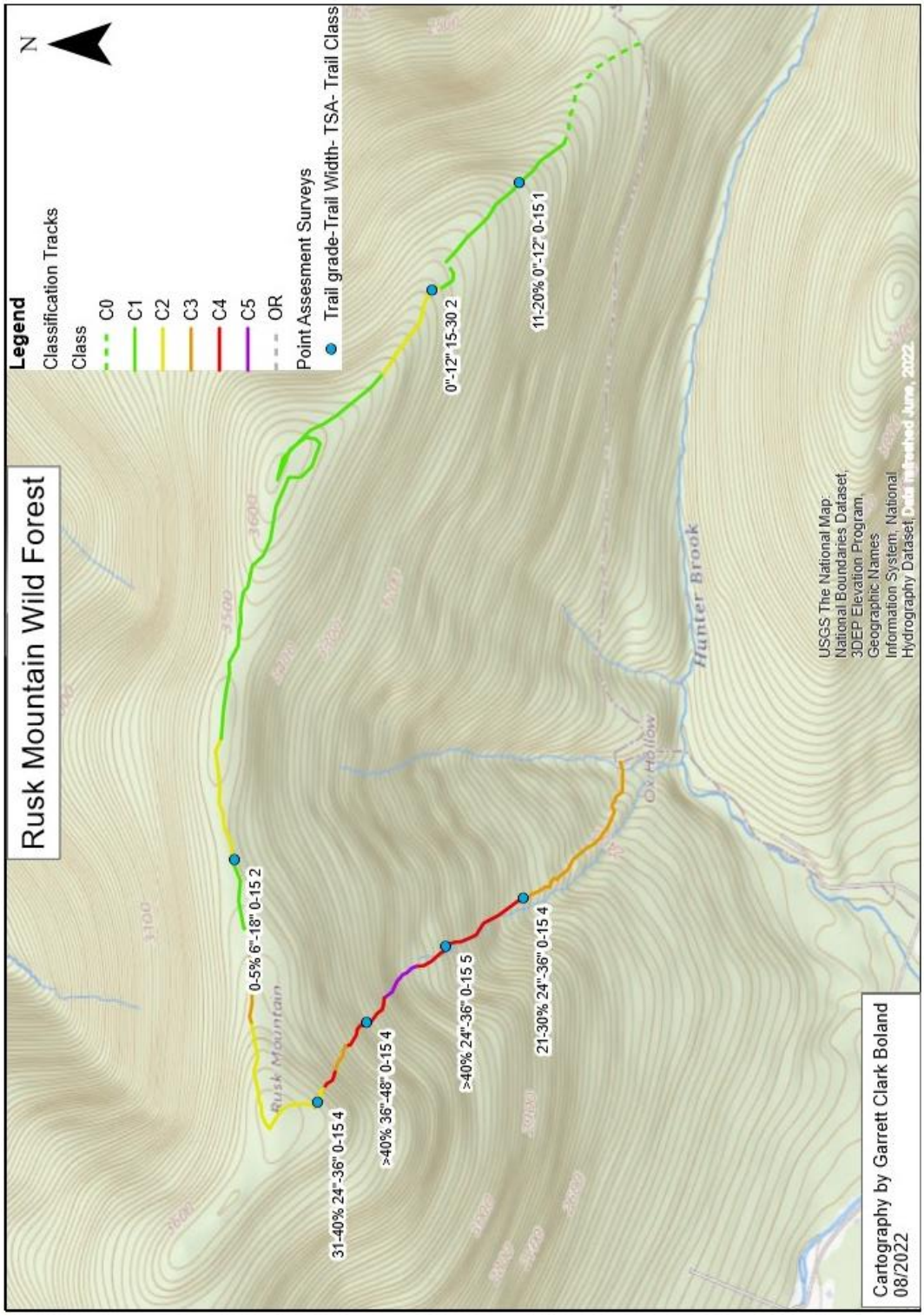

Halcott Wild Forest
N
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
>40% 6"-18" 15-30 2
31-40% 0"-12" 23-45 1
>40% 0"-12" 61-75
0-5% 0"-12" 0-15 1
>40% 18"-24" 61-75 4
0-5% 0"-12" 61-75 1
0-5% 6"-18" 0-15 2
0-5% 6"-18" 0-15 2
11-20% 18"-24" 46-60 2
11-20% 6"-18" 15-30 2
11-20% 6"-18" 0-15 1
21-30% 18"-24" 0-15 3
0-5% 0"-12" 0-15 2
6"-18" 0-15 2
11-20% 6"-18" 0-15 2
Elk Bushkill
Big Indian
Fir Mountain
Doubletop Mountain
Pigeon Brook
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset,
Cartography by Garrett Clark Boland
08/2022

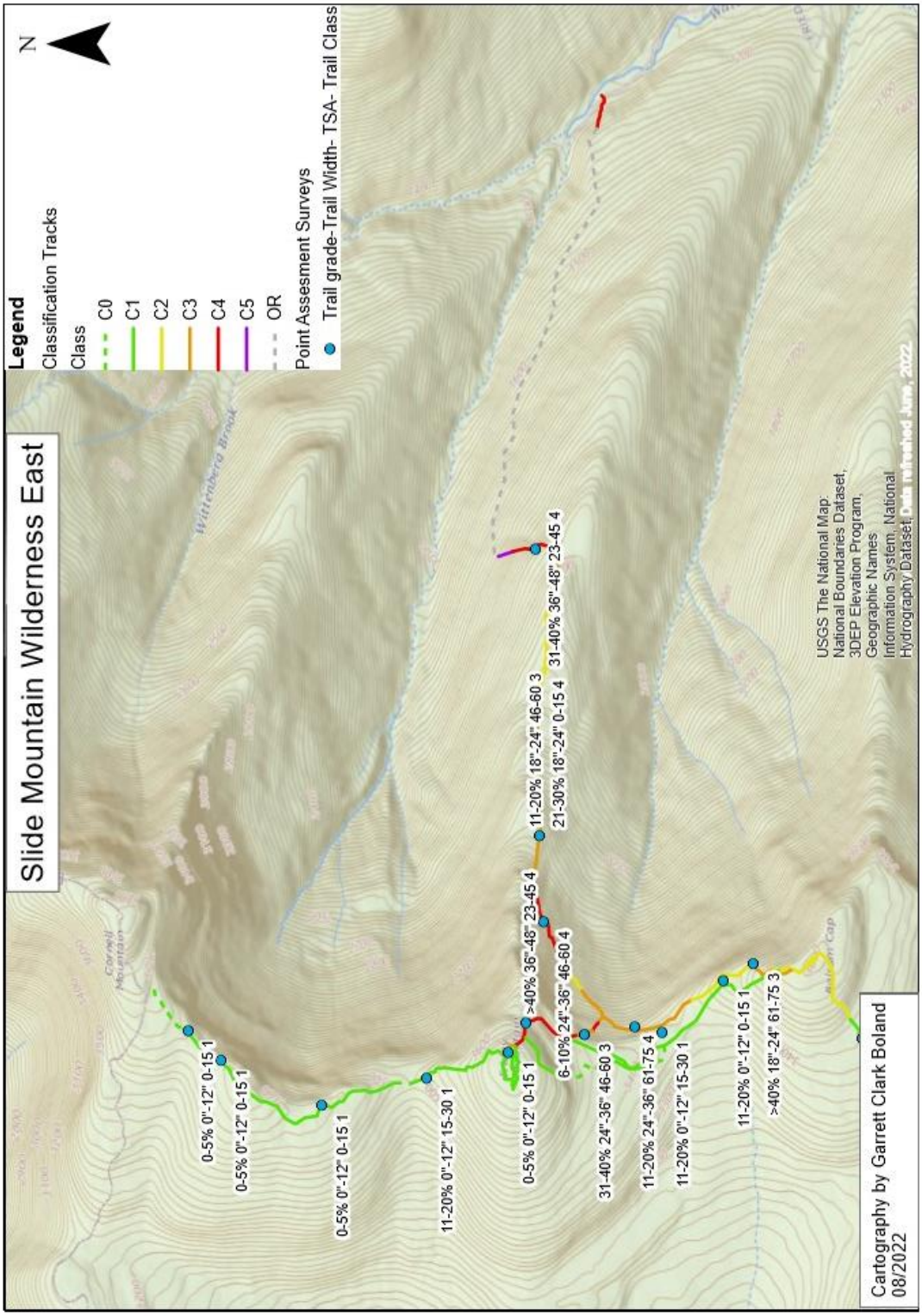

Halcott Wild Forest
N
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
0-5% 0"-12" 0-15 2
11-20% 6"-18" 0-15 2
0-5% 0"-12" 0-15 1
>40% 24"-36" 0-15 5
0-5% 24"-36" 0-15 3
11-20% 18"-24" 46-60 3
11-20% 18"-24" 46-60 3
11-20% 24"-36"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

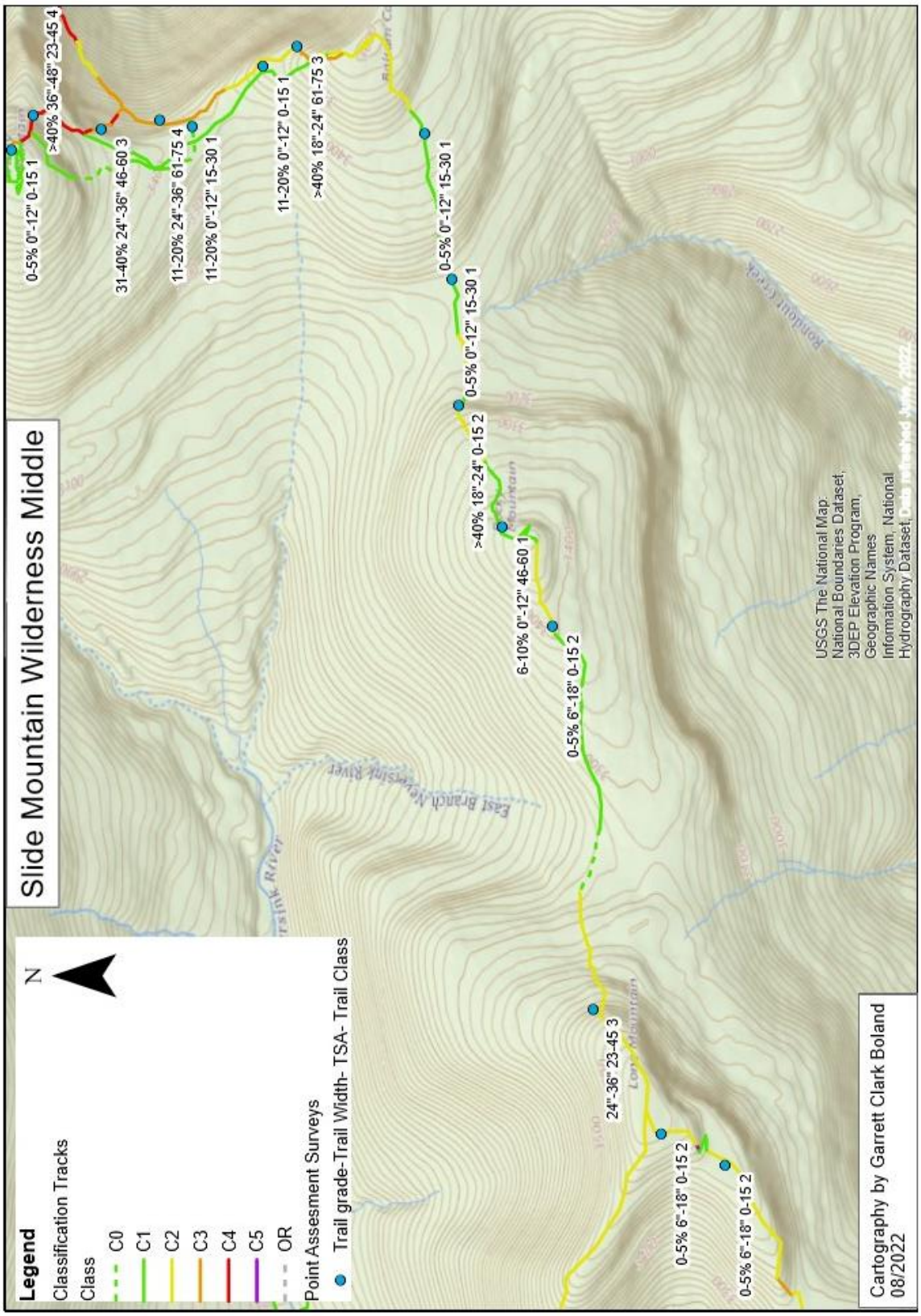

Kaaterskill Wild Forest
N
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
21-30% 0"-12" 15-30 1
6-10% 0"-12" 68-90 2
0-5% 0"-12" 68-90 1
31-40% 6"-18" 15-30 2
0-5% 0"-12" 0-15 1
21-30% 6"-18" 0-15 2
21-30% 36"-48" 0-15 5
>40% 24"-36"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

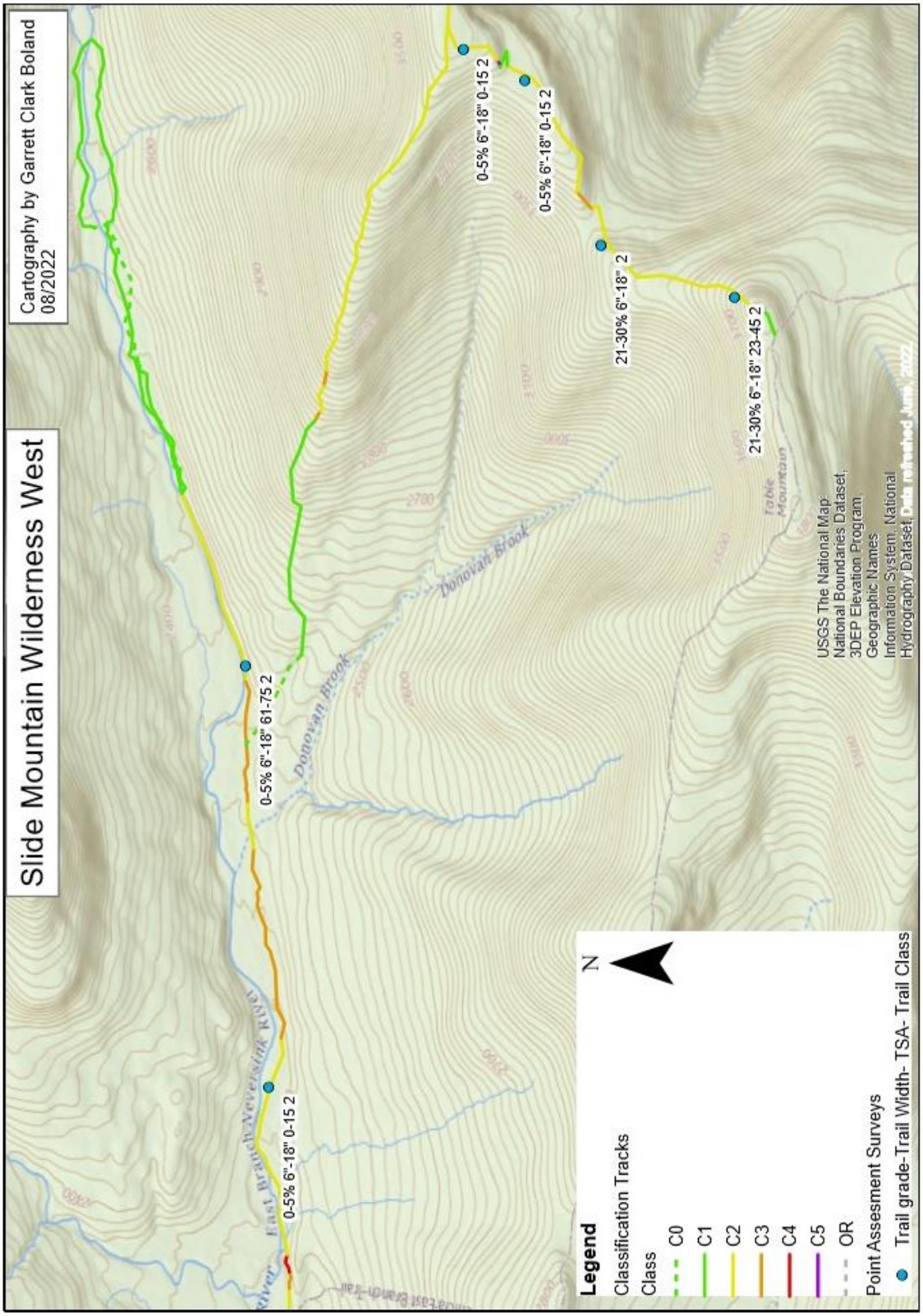

Mount Sherrill
Hunter-Westkill Wilderness
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
N
Bennett Brook
Newton Brook
Mount Sherrill
Angle Creek
11-20% 18"-24" 46-67 3
>20% 24"-36" 0-22 3
11-20% 0"-12" 0-22 1
>20% 6"-18" 0-22 2
>20% 0"-12" 0-22 3
>20% 0"-12" 0-22 0
>20% 0"-12" 0-22 1
11-20% 18"-24" 68-90 3
11-20% 18"-24" 23-45 3
>20% 18"-24" 68-90 3
11-20% 24"-36" 68-90 3
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset,
Cartography by Garrett Clark Boland
08/2022


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


Rusk Mountain Wild Forest
N
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class
0-5% 6"-18" 0-15 2
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
Rusk Mountain
Ox Hollow
Hunter Brook
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System: National
Hydrography Dataset
Cartography by Garrett Clark Boland
08/2022


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
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
11-20% 18"-24" 46-60 3
21-30% 18"-24" 0-15 4
31-40% 36"-48" 23-45 4
Cartography by Garrett Clark Boland
08/2022
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset


Slide Mountain Wilderness Middle
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
>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,
Cartography by Garrett Clark Boland
08/2022


Slide Mountain Wilderness West
Cartography by Garrett Clark Boland
08/2022
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
Donovan Brook
Donovan Brook
East Branch Vevebrink River
Table Mountain
USGS The National Map:
National Boundaries Dataset,
3DEP Elevation Program,
Geographic Names
Information System, National
Hydrography Dataset,
N
Legend
Classification Tracks
Class
C0
C1
C2
C3
C4
C5
OR
Point Assesment Surveys
Trail grade-Trail Width- TSA- Trail Class

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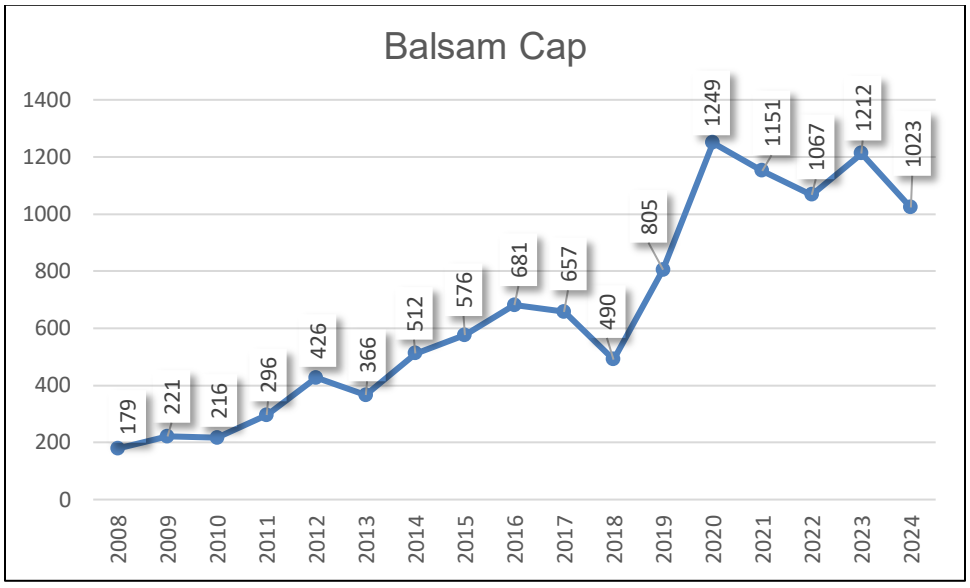
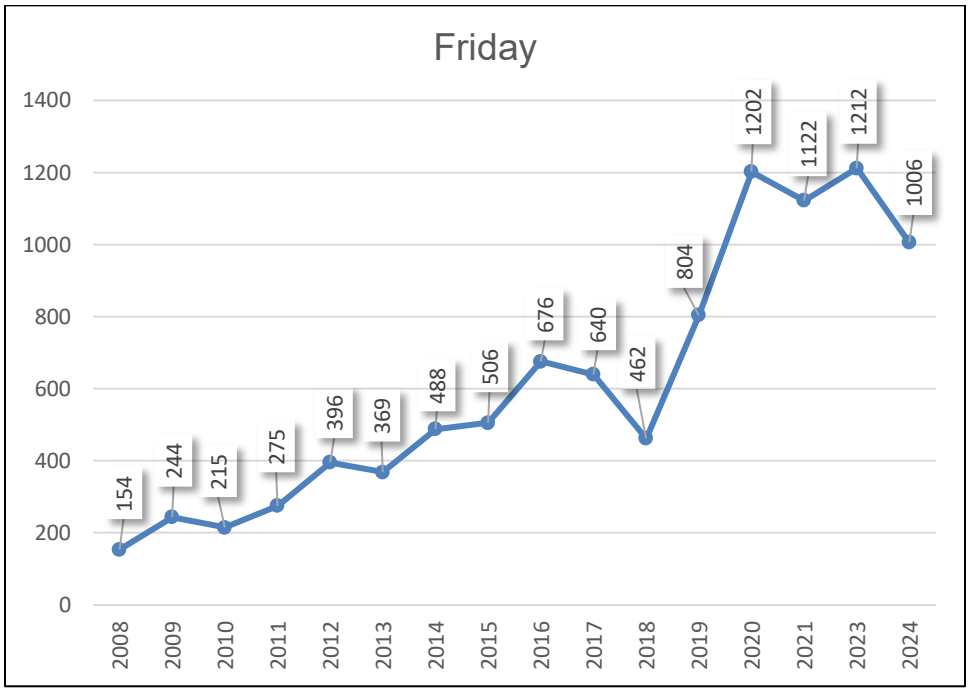
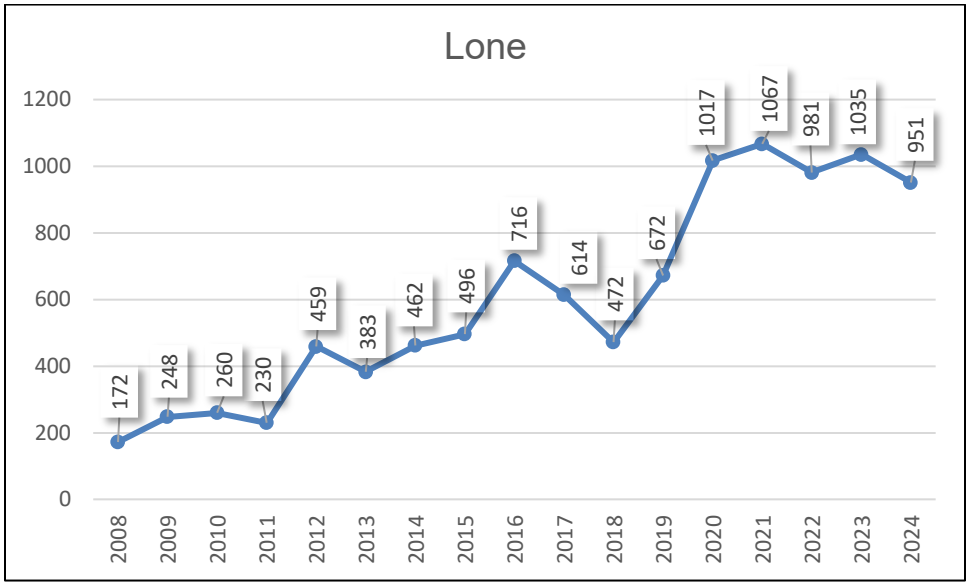
Appendix F. Canister Sign-in Analysis

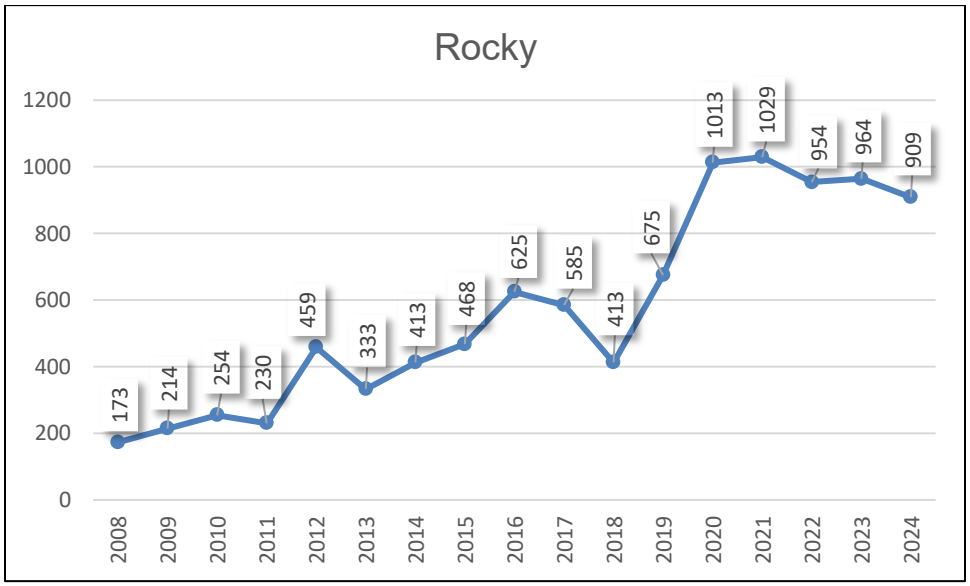
Graphs in Appendix F show the relationship between individual peaks and the canister sign-in results from 2008 until 2024. Canisters were not added to Eagle or Kaaterskill High Peak until 2020 so data for those peaks only reflects sign-ins from 2020-2024.

% Increase or Decrease in Canister Sign-in Rate by Peak					
Peak	**2009**	**2023**	**2024**	**% Increase 2009-2024**	**% Increase or decrease from 2023-2024**
SW Hunter	301	1196	1125	273%	-5.9
Vly	228	1128	1029	351%	-8.7
Rusk	197	1036	952	383%	-8.1
Balsam Cap	221	1212	1023	362%	-15.5
Friday	244	1212	1006	312%	-16.9
Halcott	201	1012	916	355%	-9.4
Fir	226	985	843	273%	-14.4
North Dome	155	979	828	434%	-15.4
Rocky	214	964	909	324%	-5.7
Lone	248	1035	951	283%	-8.1
Big Indian	334	985	927	177%	-5.8


Balsam Cap
1400
1200
1000
800
600
400
200
0
179
221
216
296
426
366
512
576
681
657
490
805
1249
1151
1067
1212
1023
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024


Friday
1400
1200
1000
800
600
400
200
0
154
244
215
275
396
369
488
506
676
640
462
804
1202
1122
1212
1006
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2023
2024


Lone
1200
1000
800
600
400
200
0
172
248
260
230
459
383
462
496
716
614
472
672
1017
1067
981
1035
951
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024


Rocky
1200
1000
800
600
400
200
0
173
214
254
230
459
333
413
468
625
585
413
675
1013
1029
954
964
909
2008
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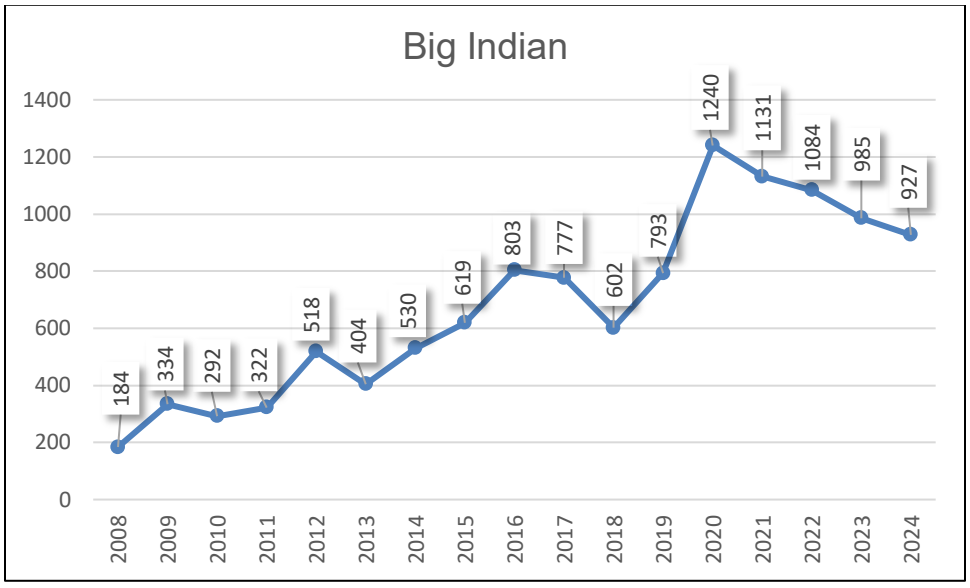
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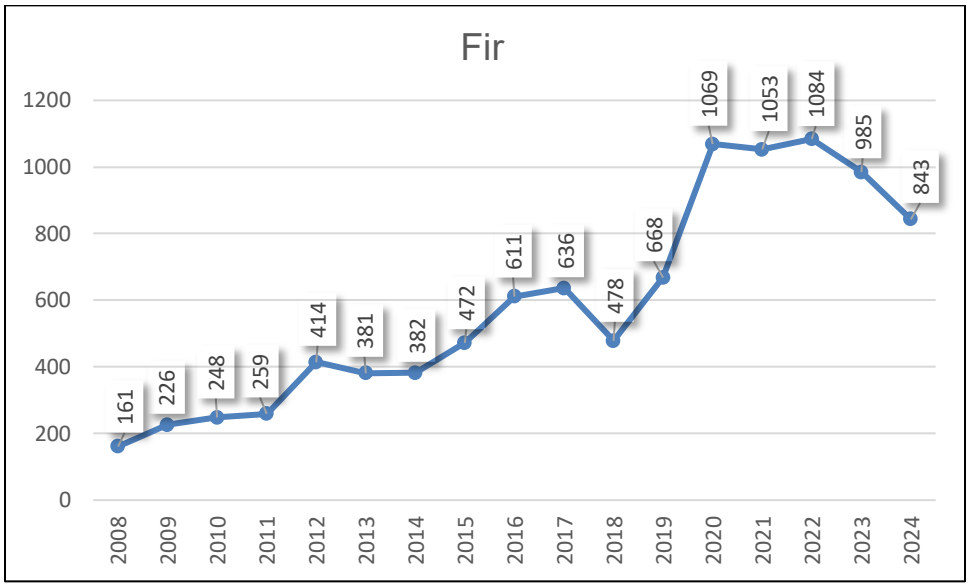
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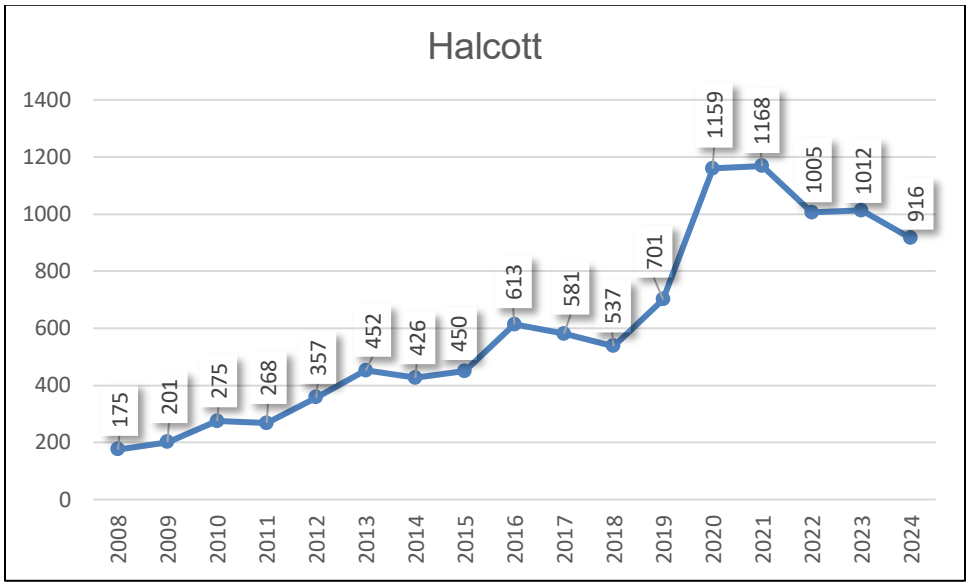
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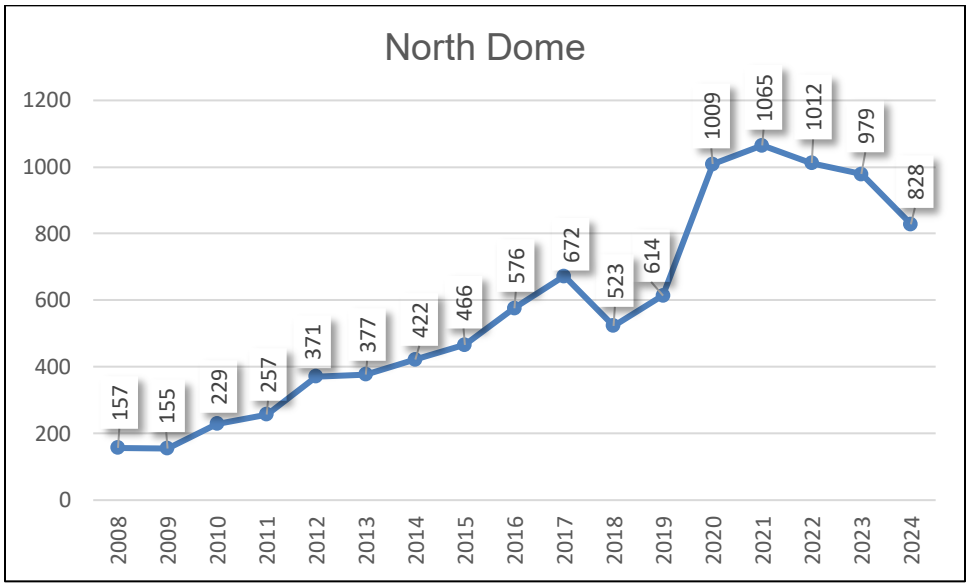
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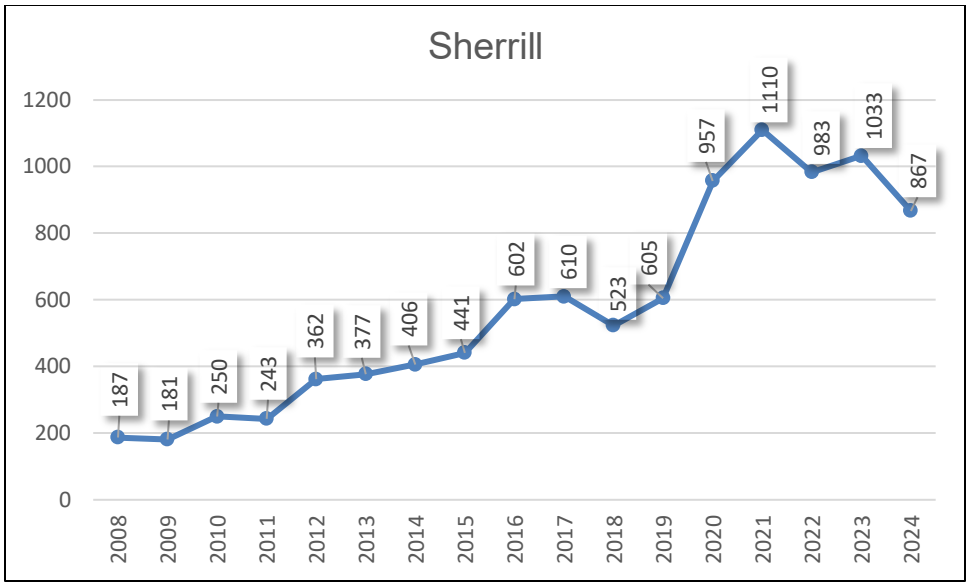
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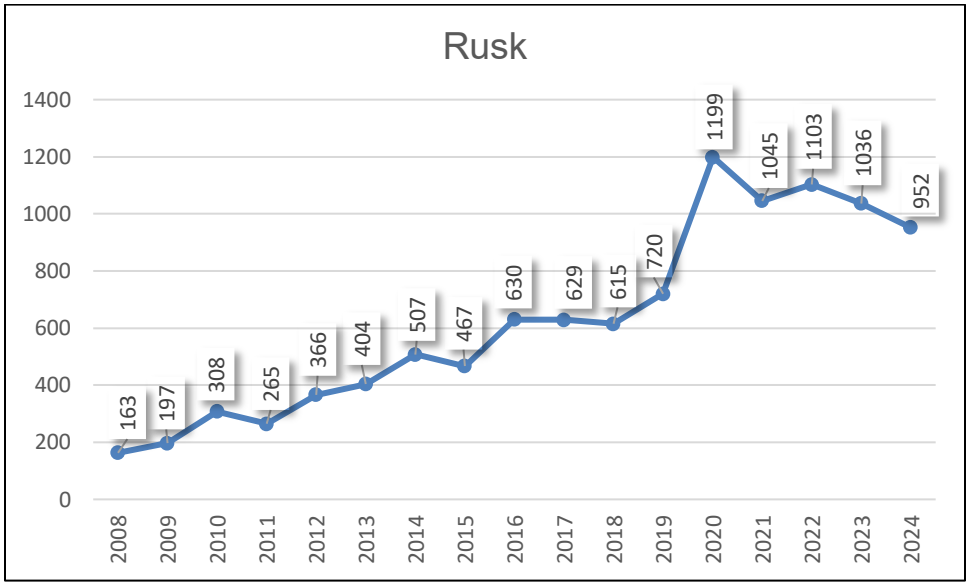
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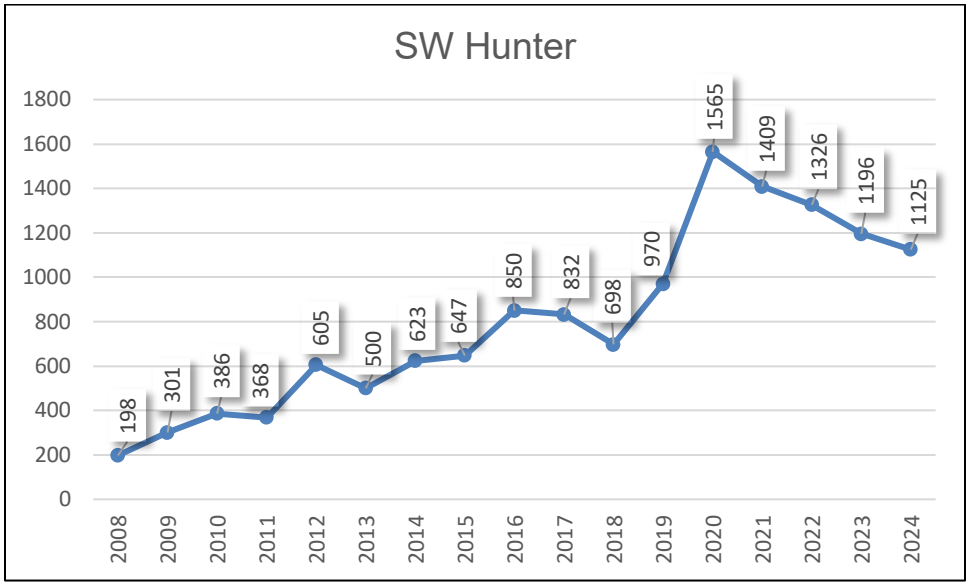
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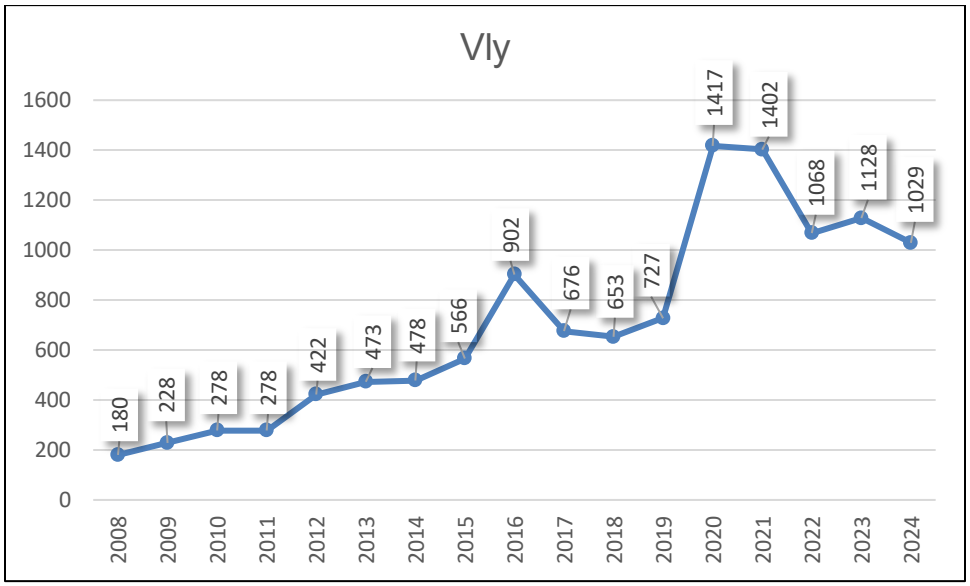
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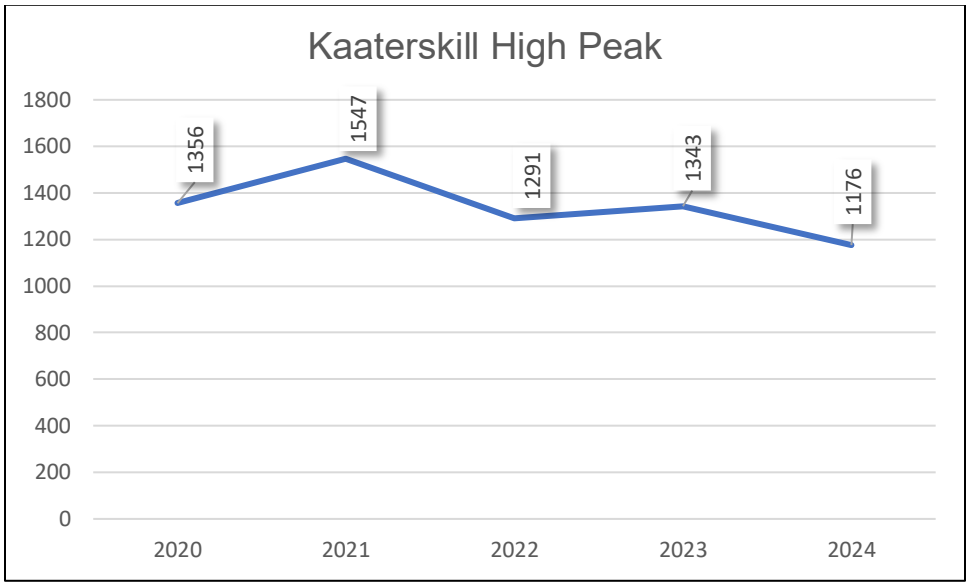
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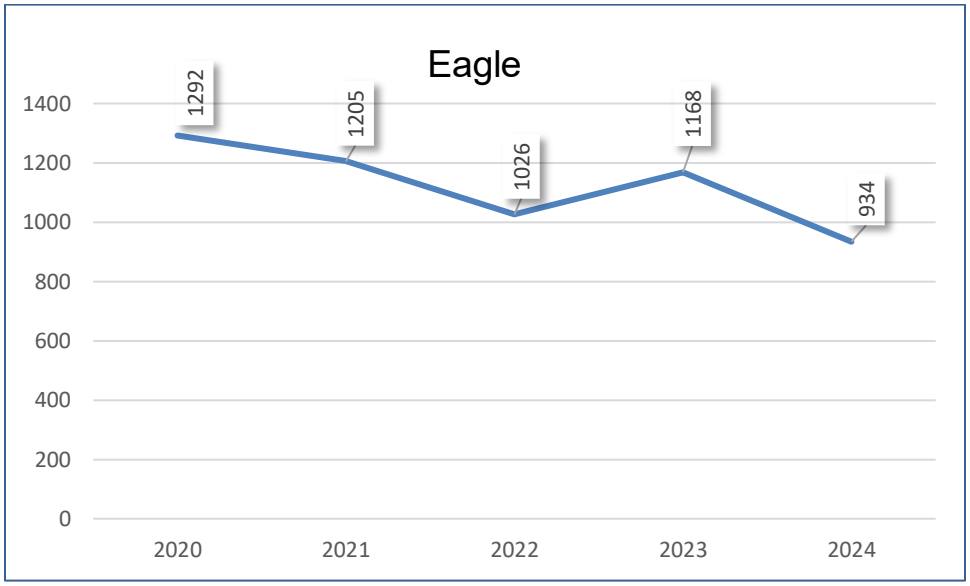
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Appendix G. NYNHP At Risk Species Classification Definitions

DEC uses the ranking system described below and developed by the New York Natural Heritage Program (NYNHP), which is a joint program supported by the DEC and The Nature Conservancy. The rankings compile multiple layers of regulations and protections along with the programs research into one useful system.

NYS Rank;

S1*-Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in NYS*

S2*- Typically 6-20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in NYS.*

S3*- Typically 21 to 100 occurrences, limiting acreage, or miles of stream in New York State.*

S4*- Apparently secure in NYS*

S5*- Demonstrably secure in NYS*

SH*- Historically known from NYS but not seen in the past 15 years*

SX*- Apparently extirpated from NYS*

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Appendix H. Fragmentation Analysis Methods

Informal Trails

Multiple data sources were aggregated to best map the network of informal trails across the peaks. High use routes represented by white, yellow, and orange tracks on the STRAVA Global Heatmap were digitized and converted to shapefiles in ArcGIS Pro. 34 user-generated routes from AllTrails were downloaded and converted to shapefiles in ArcGIS Pro. GPS tracks of informal trails on the formerly trailless peaks were collected by DEC employees during the 2019 and 2022 field seasons and converted to shapefiles in ArcGIS Pro.

Formally Established Trail and Road Network

The New York State Land Transportation Layer provided by DEC was used to indicate formalized disturbance infrastructure in and around the formerly trailless peaks. The layer contains polyline features for paved roads, unpaved roads, motorized vehicle paths, and foot paths.

Auxiliary Data

100’ contour maps available through the NYS GIS Resources website were downloaded and used in ArcGIS Pro to designate the Sensitive Resource Protection Zone on each peak which is described in detail in this section. The DEC Public Lands GIS layer was included to ensure that the designated management zones and preferred routes did not trespass on private property. A feature class of montane spruce-fir forest occurrences was provided by the New York Natural Heritage Program.

Methods

1. Creating the Informal Trail Network

The first step was to compile and develop the informal trail network in GIS software. This was done by collecting crowdsourced route data from STRAVA and AllTrails to supplement previously collected field GPS tracks. STRAVA routes were created by digitizing the Global Heatmap available through the STRAVA website. The Global Heatmap shows the intensity of routes created by aggregated public activities over the

previous 12 months and is updated monthly. Prioritization was given to the high intensity routes, represented by orange, yellow, and white coloration on the heatmap. This was done reduce the risk of capturing false-positive trail occurrences and due to limitations of the STRAVA software. The digitization process was carried out for each of the 16 formerly trailless peaks (Figure 1). Digitized routes were then downloaded as *.gpx* files from the STRAVA website and converted into shapefiles and merged into a single feature class for analysis in ArcGIS Pro.

Figure 5. Digitization of STRAVA heatmap for routes between Lone Mountain and Rocky Mountain. Orange and yellow coloration indicates high-intensity usage. STRAVA only supports the creation of a single, continuous route per map instance, limiting the efficiency of digitization.

AllTrails routes were collected through a comprehensive search of the AllTrails website. The name of each trailless peak was entered in the search bar and the resulting routes were downloaded as *gpx* files. 34 AllTrails routes were downloaded and converted into shapefiles and merged into a single feature class for analysis in ArcGIS Pro. GPS tracks were provided by DEC from the 2019 and 2022 field seasons. These field tracks were not comprehensive but provided supplementary, ground-truthed references for the digitally acquired data. The input data from each feature class were cleaned up by extending line segments to connect with formal trail routes and smoothing erroneous GPS data (Figure 2). Corrections were only applied when the line connections or GPS errors were obvious. The state lands transportation layer which shows the formal trail networks was used as a boundary for defining the extent of an informal trail. The

corrected lines were merged into a single feature class and projected into the NAD 1983 UTM Zone 18.

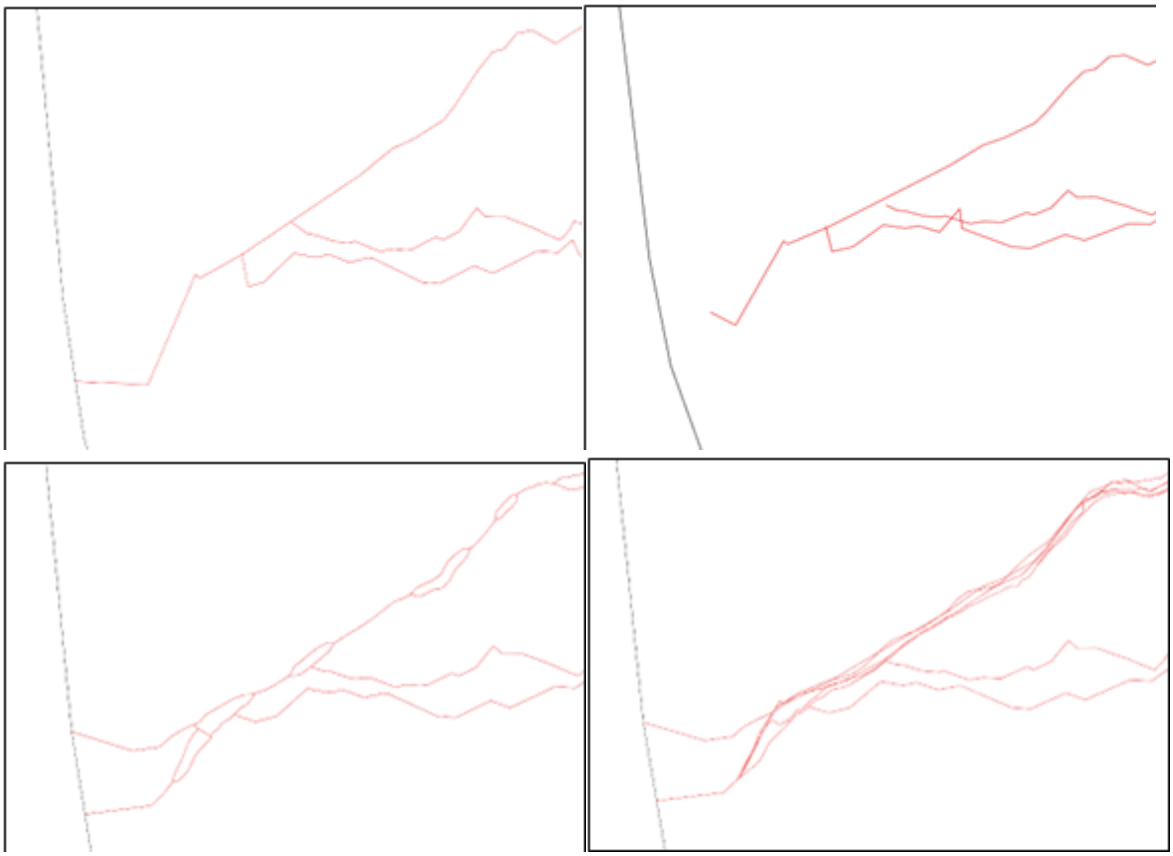

Figure 6. Example of informal trail network compiling.

The images on the left show pre-correction, and the images on the right shows post-correction. The bottom left shows the same location after merging the three feature classes. Bottom right shows the trail network after buffering, dissolving, and recreating the lines. Red lines indicate informal trails, and the gray line indicates a formal trail.

The merged feature class of informal routes contained substantial route duplication due to errors and differences in the precision of the three data sources. Conducting an analysis of the raw route data would lead to an overestimation of informal trail density. This issue was addressed by buffering and dissolving the trails and to create single route within a specified distance. Duplicate trails were eliminated by using the Pairwise Buffer Tool in ArcGIS with a buffer distance input of 7 meters. This tool creates a buffer around each polyline and then dissolves overlapping sections to create continuous polygons. The National Technology and Development Program conducts accuracy assessments of GPS receivers and reports that modern cellular devices from Samsung and Apple have an accuracy of 5-10 meters depending on the density of the forest cover. Another consideration for the 7-meter buffer distance was the size of the study

areas. A large buffer zone, such as the 25-meter used by Millhouser & Singer (2018), would not be appropriate for the small spatial scale of the mountain summit zones where unique trails exist in close proximity. A single trail route was recreated in the polygons using the Polygon to Centerline tool. However, this process is difficult to automate due to inconsistencies with GPS data and further quality control of the resulting line segments was conducted. This was applied where erroneous connections, which were cross-referenced with raw trail routes, were created between parallel trail segments. The resulting feature class provided an estimation of the informal trail network based on the available input data.

The “Sensitive Resource Zone,” or Management Zone 1, was defined as the summit areas at or above 3,500’ feet. It was created by using the trace tool to draw polygons around the 3,500’-foot contour line. Contour layers were downloaded from the NYS Contours web application provided through the NYS GIS Resources (NYS Contours | gis). Zone 1 was delineated at the 3,500’-foot line for two reasons. Firstly, it remains consistent with existing management and signage protocol within the Catskill Park. For instance, fires and camping are prohibited above 3,500’ feet in the Catskills. Secondly, Zone 1 areas roughly align with recorded occurrences of montane Spruce-Fir Forest habitat affirmed by observational comparisons between high-resolution color-infrared orthoimagery (Orthoimagery | gis (ny.gov)), GIS data provided by the New York Natural Heritage Program, and the Zone 1 polygons. The montane Spruce-Fir ecosystem is uncommon in the Catskill region and provides suitable habitat for rare ground-nesting bird species, such as Bicknell’s Thrush. Impacts to habitat resulting from the informal trail network were identified to be more severe in these montane Spruce-Fir areas (Henschell, 2022). The montane Spruce-Fir habitat was not specifically used for delineating Zone 1 due to several formerly trailless peaks not having occurrences as well as difficulties in objectively determining where to draw management areas in large, contiguous forest patches. The 3,500’-foot contour line provides an objective and straightforward delineation that addresses the special consideration required for montane habitats. Rocky Mountain (~3,508 feet) and Halcott Mountain (~3,537 feet) were two exceptions. As the two smallest of the formerly trailless peaks, the summit areas above 3,500’ were limited. The 3,400-foot line was used instead on these two peaks to delineate Zone 1.

The “Environmental Protection Zone,” or Management Zone 2, was defined as the area below the elevation of Zone 1 and within a 500-meter distance from an informal trail. Zone 2 was created in ArcGIS Pro by using a 500-meter buffer around the informal trail network and then clipping the polygons to be within the New York State public land boundaries. This buffer distance was determined based on the findings from Naughton (2021). Naughton conducted an exhaustive and comprehensive literature review of wildlife-recreation relationships and identified primary and secondary zones of influence,

reaching 100-meters and 200-meters respectively, with the recommendation to be used for management decisions. The secondary zone of influence was used to delineate Zone 2 as it accounts for unresearched and far-ranging species (i.e., black bear). Naughton defines this as the “distances at which most far-ranging species are no longer highly impacted by trail recreation” (43). In contrast to Zone 1 habitat, the dominant forest habitats found in Zone 2, beech-maple mesic, spruce-northern hardwood, and hemlock northern hardwood, are less sensitive and less impacted by informal trail usage (Henschell, 2022).

The “zone of influence” (ZOI) describes the area surrounding a trail where wildlife may be affected by recreation. This concept describes how close wildlife must be to a recreator for the wildlife to show a behavioral response, often referred to as flight initiation distance (FID) or alert distance. The ZOI varies across species, context, disturbances, and landscapes. Trails can have minor and temporary impacts on wildlife such as when a deer moves away from an approaching hiker, to return to browse once it is gone. Other changes have wider ramifications and duration- such as when an aggressive bird species follows trails, expanding their habitat, displacing sensitive species, and preying on songbirds and other neotropical migrants. Recreation ecology research has shown the ZOI for North American wildlife can extend up to 500m from a trail. (Naughton, 43). Using this information, informal trails below 3,500’ in beech-maple mesic, spruce-northern hardwood and hemlock-northern hardwood dominated forests were digitized and then buffered using a 500 m setback to define Zone 2 Environmental Protection Zone.

2. Mapping Technology

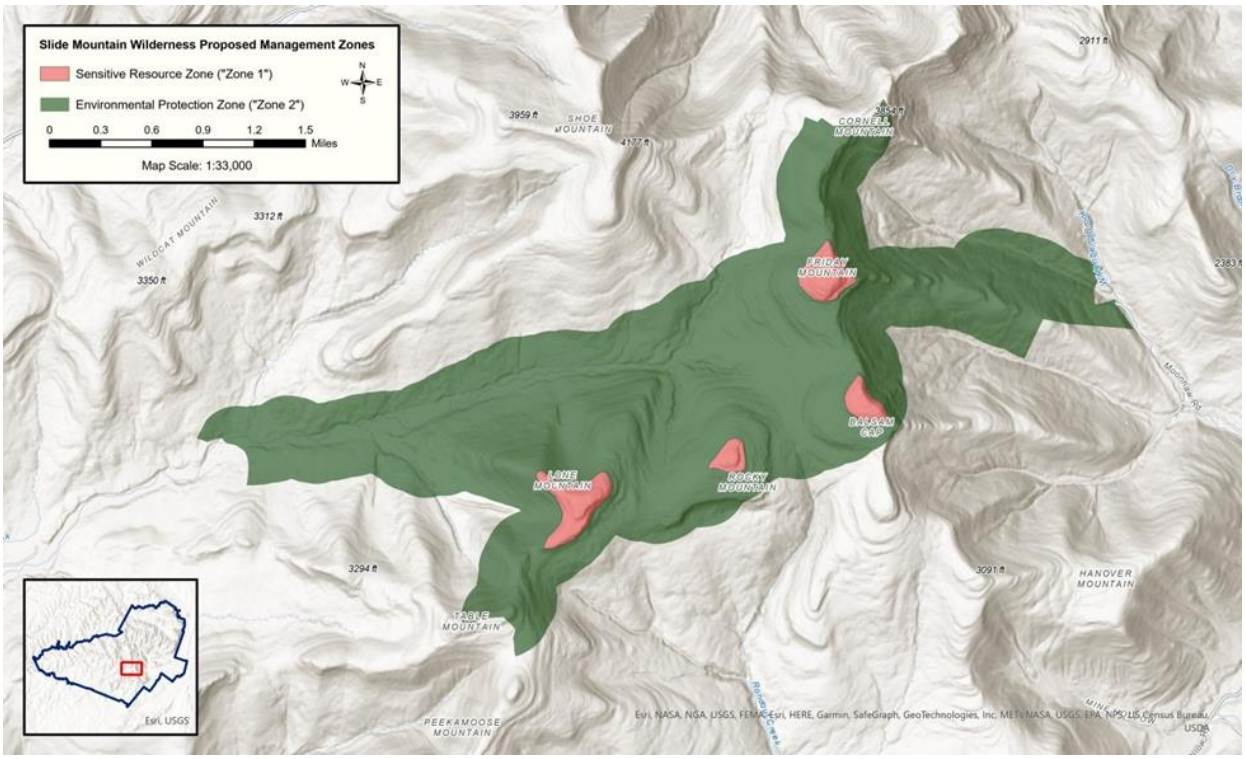

Figure 7. Map of the management zones for the formerly trailless 3,500'-foot peaks in the Slide Mountain Wilderness. Created using ArcGIS Pro.

3. Patch Analysis

Patch statistics were generated for Management Zones 1 and Management Zones 2 adapted from the steps outlined by Moskal & Halabisky (2011). The informal trail network was Clipped to each management zone and buffered by a ¼ meter to simulate a ½ meter trail width. These trail areas were then erased from the management zones to form individual patches. Next, the Explode tool was utilized to separate each patch into a unique feature. The Calculate Geometry tool was then applied to each feature to quantify distance and area measures. Resulting data tables were exported and converted into Excel files formatting into tables, unit conversion, and trail density calculation to complete the initial analysis. Quantified metrics include total area (acres), mean patch size (acres), number of patches, cumulative informal trail length (miles), informal trail area (acres), and trail density (meter/hectare).

- *Total Area (acres):* The total spatial area of the management zones for each formerly trailless peak. Used to calculate the management zone trail density.
- *Mean Patch Size (acres):* Simply the average spatial area of all patches within a peak's management zones. Decreasing values suggest a higher degree of fragmentation.

- *Number of Patches:* The total number of patches within a peak's management zones. Increasing values suggest higher degrees of fragmentation.
- *Informal Trail Length (miles):* Total length of mapped informal trails within a peak's management zones. Used to calculate the management zone trail density.
- *Informal Trail Area (acres):* Provides an indication of the spatial extent of the informal trail network.
- *Trail Density (meters/hectare):* Calculated by dividing the total area of a peak's management zone by the total length of informal trail in that zone. Increasing values suggest a larger area of impact.

These metrics are straightforward and have precedent for describing fragmentation analysis (Moskal & Halabisky, 2011). They provide a descriptive insight into the current informal trail network.

4. Comparative Analyses

A comparative analysis was conducted to simulate the potential fragmentation dynamics resulting from the institution of a marked route on a previously trailless peak. This simulated route is referred to as the "preferred route." Popular AllTrails routes for each trailless peak were selected as the preferred route. This aligns with the proposed interim management strategy of temporarily marking the most popular existing informal trails (See Management Proposals Section VI). Analysis with the preferred route was conducted in the same manner as the informal trail network (described in section C.3). Quantitative comparative evaluation of the informal trail network and the preferred route was carried out by calculating the percent change in trail density and mean patch size using the formula: [(Preferred Route - Informal Trails) ÷ Informal Trails] * 100. For mean patch size, increasing percent values indicate greater reductions in mean patch size and therefore less fragmentation. For trail density, decreasing percent values indicate reductions in fragmentation.

Results

Analysis results indicate varying levels of fragmentation across the formerly trailless peaks. For instance, statistics for Rocky Mountain suggest high levels of fragmentation, with a trail density of 223.05 m/ha in Zone 1 and 21 distinct habitat patches. In contrast, Eagle Mountain shows low levels of fragmentation with a trail density of 7.65 m/ha and 2 distinct patches in Zone 1. A similar variability is seen in Zone 2. This is consistent with findings from Roehrs & Rice (2019) and Roehrs (2022) who reported fragmentation impacts to be disproportionately affecting specific peaks. In addition, trail density measures across all peaks suggest that Zone 1, having mean trail density of 77.05

m/ha, is more greatly impacted than Zone 2, having mean trail density of 19.28 m/ha. This supports field observations recorded by Henschell (2022) and is likely the result of converging informal trails in summit areas.

Results from the preferred route simulation suggest reductions in fragmentation. The mean trail density for Zone 1 under preferred route conditions was reduced to 38.59 m/ha and 11.74 m/ha in Zone 2. This was a -50.62% change for Zone 1 and a -39.11% change for Zone 2. Negative percent change values for trail density indicate a decrease in trail density when comparing the informal trail condition to the preferred route condition. Similar to findings from the first analysis, comparative analysis revealed varying degrees of fragmentation reduction. Rocky Mountain, cited earlier as showing high levels of fragmentation, showed a -72.38% change in trail density and a 954.76% change in mean patch size when comparing the preferred route to the informal trail network. Positive percent change values for mean patch size indicate an increase in patch size when comparing the informal trail condition to the preferred route condition.

Limitations and Future Research

This analysis provided a quantitative investigation into habitat fragmentation resulting from informal trail networks on formerly trailless Catskill peaks over 3,500”. STRAVA Global Heatmap only provides publicly uploaded route data for the past 12 months, meaning the heatmap is subject to constant variation in recreation patterns. AllTrails and STRAVA do provide valuable information on recreationist activity and are useful for preliminary estimation of informal trail networks. An alternative to using crowdsourced data is *in-situ* mapping of all informal trails on each peak using a handheld GPS device. Future research should investigate the ground accuracy of crowdsourced data in backcountry montane environments. Additionally, collaborations between land managers and crowdsourced mapping services would likely lead to significant improvements in data quality.

Another limitation with the analysis is that the metrics of total area, mean patch size, informal trail length, and informal trail area metrics are descriptive in nature and therefore not useful for comparisons between peaks (inter-peak). This is because they are heavily influenced by the spatial extent of the management zones. Unlike the earlier metrics, trail density is a ratio of trail distance to total area which can be used for inter-peak comparison. The number of distinct patches per peak is similarly less influenced by area differences than the descriptive metrics. Furthermore, conducting the preferred route simulation allowed for comparative analysis within each peak using the descriptive metrics. Future investigations should explore weighted metrics that allow for comparisons between peaks. Several of these are described by Moskal & Halabisky

(2011), including Weighted Mean Patch Index (WMPI), Largest Patch Index, and Percent Core Area.

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Appendix I. Complete Descriptive Statistics Tables

Zone 1: Informal Trail Statistics

Peak	Total Area (Acres)	Mean Patch Size (Acres)	# of Patches	IT Length (Miles)	*IT Area (Acres)	Trail Density (m/ha)
Bearpen Mountain	36.65	18.33	2	0.12	0.02	13.4
Vly Mountain	16.39	16.39	1	0.04	0.01	10.13
Big Indian Mountain	130.67	26.13	5	0.44	0.09	13.44
South Doubletop	47.48	7.9	6	0.6	0.12	50.17
Eagle Mountain	76.18	38.02	2	0.15	0.02	7.65
Fir Mountain	74.92	6.79	11	1.86	0.28	98.76
Halcott Mountain	60.66	7.56	8	1.13	0.17	73.93
Mount Sherrill	23.19	3.3	7	0.56	0.08	95.84
North Dome	70.43	5.4	13	1.65	0.24	92.97
Southwest Hunter	230.15	114.98	2	1.27	0.19	21.99
Kaaterskill High Peak	37.25	3.71	10	1.19	0.18	127.49
Rusk Mountain	87.42	6.22	14	1.83	0.27	83.27
Balsam Cap	24.39	3.04	8	0.68	0.1	110.7
Friday Mountain	45.62	3.24	14	1.52	0.22	132.15
Lone Mountain	61.8	4.11	15	1.48	0.22	95.46
Rocky Mountain	18.94	0.89	21	1.06	0.16	223.05
Total	1,042.14	*7.42	*8.69	15.58	2.37	*77.05
		*Mean of all patches	*Mean # patches per peak		*0.5 meter trail width	*Mean trail density

Zone 1: % Change Mean Patch Size

Peak	Mean Patch Size with IT Conditions (Acres)	Mean Patch Size with Preferred Conditions (Acres)	% Change Mean Patch Size
Bearpen Mountain	18.33	18.33	0.00%
Vly Mountain	16.39	16.39	0.01%
Big Indian Mountain	26.13	32.67	25.01%
South Doubletop	7.90	47.48	501.26%
Eagle Mountain	38.02	37.96	-0.14%
Fir Mountain	6.79	24.89	266.59%
Halcott Mountain	7.56	30.26	300.26%
Mount Sherrill	3.30	7.71	133.49%
North Dome	5.40	23.40	333.48%
Southwest Hunter	114.98	230.15	100.16%
Kaaterskill High Peak	3.71	9.27	150.00%
Rusk Mountain	6.22	29.05	366.68%
Balsam Cap	3.04	12.16	300.41%
Friday Mountain	3.24	15.15	367.36%
Lone Mountain	4.11	20.52	399.86%
Rocky Mountain	0.89	9.43	954.76%
Mean Patch Size	7.42	62.14	737.47%

Zone 1: Preferred Route Statistics

Peak	Total Area (Acres)	Mean Patch Size (Acres)	# of Patches	Trail Length (Miles)	*Trail Area (Acres)	Trail Density (m/ha)
Bearpen Mountain	36.65	18.33	2	0.08	0.02	8.81
Vly Mountain	16.39	16.39	1	0.03	0.01	8.81
Big Indian Mountain	130.67	32.67	4	0.4	0.08	12.2
South Doubletop	47.48	47.48	1	0.2	0.14	16.35
Eagle Mountain	76.18	37.96	2	0.14	0.03	7.54
Fir Mountain	74.92	24.89	3	1.02	0.2	54.14
Halcott Mountain	60.66	30.26	2	0.41	0.08	27.02
Mount Sherrill	23.19	7.71	3	0.39	0.05	67.65
North Dome	70.43	23.4	3	0.84	0.22	47.38
Southwest Hunter	230.15	230.15	1	1.32	0.15	22.88
Kaaterskill High Peak	37.25	9.27	4	0.51	0.15	54.01
Rusk Mountain	87.42	29.05	3	1.48	0.2	60.61
Balsam Cap	24.39	12.16	2	0.29	0.06	47.23
Friday Mountain	45.62	15.15	3	0.62	0.14	54.08
Lone Mountain	61.8	20.52	3	0.96	0.19	61.65
Rocky Mountain	18.94	9.43	2	0.29	0.06	60.61
Total	1,042.14	*62.14	*2.44	8.99	1.78	*38.59
		*Mean of all patches	*Mean # patches per peak		*0.5 meter trail width	*Mean trail density

Zone 1: % Change Trail Density			
Peak	***Trail Density with IT Conditions (m/ha)***	***Trail Density with Preferred Conditions (m/ha)***	***% Change Trail Density***
Bearpen Mountain	13.4	8.81	-34.25%
Vly Mountain	10.13	8.81	-13.03%
Big Indian Mountain	13.44	12.2	-9.23%
South Doubletop	50.17	16.35	-67.41%
Eagle Mountain	7.65	7.54	-1.44%
Fir Mountain	98.76	54.14	-45.18%
Halcott Mountain	73.93	27.02	-63.45%
Mount Sherrill	95.84	67.65	-29.41%
North Dome	92.97	47.38	-49.04%
Southwest Hunter	21.99	22.88	0.05%
Kaaterskill High Peak	127.49	54.01	-57.64%
Rusk Mountain	83.27	60.61	-27.21%
Balsam Cap	110.7	47.23	-57.34%
Friday Mountain	132.15	54.08	-59.08%
Lone Mountain	95.46	61.65	-35.42%
Rocky Mountain	223.05	60.61	-72.83%
Mean Trail Density	78.15	38.59	-50.62%

Zone 2: Informal Trail Statistics

Peak(s)	Total Area (Acres)	Mean Patch Size (Acres)	# of Patches	IT Length (Miles)	IT Area (Miles)	Trail Density (m/ha)
Bearpen Mountain	181.65	45.27	4	0.6	0.12	27.91
Vly Mountain	140.65	35.12	4	0.43	0.09	13.24
Big Indian Mountain, Fir Mountain	1,284.90	80.17	16	6.59	1.32	20.41
Eagle Mountain	80.01	26.66	3	0	0	0
South Doubletop	472.39	58.88	8	3.44	0.68	28.97
Halcott Mountain	715.68	37.55	19	5.78	1.15	32.13
Mount Sherrill, North Dome	1,743.60	34.09	51	12	2.39	27.38
Southwest Hunter	130.86	43.62	3	0	0	0
Kaaterskill High Peak	709.95	70.81	11	4.54	0.91	25.45
Rusk Mountain	1,350.97	84.23	16	8.28	1.65	24.37
Lone, Rocky, Balsam Cap, Friday	3,309.91	33.68	98	23.23	4.64	27.91
Total	10,120.57	*40.75	*21.18	64.91	12.94	*19.28
		*Mean of all patches	*Mean # patches per management unit or peak		*0.5 meter trail width	*Mean trail density

Zone 2: % Change Mean Patch Size

Peak(s)	Mean Patch Size with IT Conditions (Acres)	Mean Patch Size with Preferred Conditions (Acres)	% Change Mean Patch Size
Bearpen Mountain	45.27	45.27	0.00%
Vly Mountain	35.12	35.13	0.02%
Big Indian Mountain, Fir Mountain	80.17	263.28	228.38%
Eagle Mountain	26.66	26.66	0.00%
South Doubletop	58.88	146.66	149.09%
Halcott Mountain	37.55	238.32	534.73%
Mount Sherrill, North Dome	34.09	435.63	1177.70%
Southwest Hunter	43.62	43.61	-0.03%
Kaaterskill High Peak	70.81	101.15	42.83%
Rusk Mountain	84.23	449.90	434.13%
Lone, Rocky, Balsam Cap, Friday	33.68	551.26	1536.72%
Mean Patch Size	40.75	224.70	451.41%

Zone 2: Preferred Route Statistics

Peak(s)	Total Area (Acres)	Mean Patch Size Acres)	# of Patches	Trail Length (Miles)	*Trail Area (Acres)	Trail Density (m/ha)
Bearpen Mountain	181.65	45.27	4	0.63	0.12	13.69
Vly Mountain	140.65	35.13	4	0.42	0.09	11.89
Big Indian Mountain, Fir Mountain	1,284.90	263.28	5	3.64	0.72	11.27
Eagle Mountain	80.01	26.66	3	0	0	0
South Doubletop	472.39	146.66	3	1.02	0.21	8.62
Halcott Mountain	715.68	238.32	2	3.02	0.6	16.78
Mount Sherrill, North Dome	1,743.60	435.63	4	6.41	0.89	14.62
Southwest Hunter	130.86	43.61	3	0	0	0
Kaaterskill High Peak	709.95	101.15	6	2.73	0.54	15.32
Rusk Mountain	1,350.97	449.9	3	7.92	0.99	23.33
Lone, Rocky, Balsam Cap, Friday	3,309.91	551.26	6	11.38	2.04	13.68
Total	10,120.57	*224.70	*3.91	37.18	6.22	*11.74
		*Mean of all patches	*Mean # patches per management unit or peak		*0.5 meter trail width	*Mean trail density

Zone 2: % Change in Trail Density

Peak(s)	Trail Density with IT Conditions (m/ha)	Trail Density with Preferred Conditions (m/ha)	% Change Trail Density
Bearpen Mountain	27.91	13.69	-50.95%
Vly Mountain	13.24	11.89	-10.20%
Big Indian Mountain, Fir Mountain	20.41	11.27	-44.78%
Eagle Mountain	0	0	N/A
South Doubletop	28.97	8.62	-70.25%
Halcott Mountain	32.13	16.78	-47.77%
Mount Sherrill, North Dome	27.38	14.62	-46.60%
Southwest Hunter	0	0	N/A
Kaaterskill High Peak	25.45	15.32	-39.80%
Rusk Mountain	24.37	23.33	-4.27%
Lone, Rocky, Balsam Cap, Friday	27.91	13.68	-50.99%
Mean Trail Density	19.28	11.74	-39.11%

Appendix J. Informal Trail Assessment Methods

Access Survey

This approach documents the number and distribution of all informal trails that intersect a road or formal trail corridor. This is an efficient survey method that can be conducted quickly but provides no information on trail alignments or destinations. This procedure involves a rapid search of the area immediately adjacent to the visitor access area and returns a count of the number of traces and informal trails present. This procedure provides a quick indicator of informal trail formation and can help determine whether more extensive monitoring procedures need to be initiated.

Line Transect Survey

This survey finds and documents the number, location, and condition of informal trails. This procedure involves establishing line transects perpendicular to the anticipated direction of travel in areas of likely visitor use. Once established, line transects can be relocated and monitoring procedures repeated during future efforts.

Census Mapping Survey

This approach documents the location, spatial distribution, and lineal extent of all informal trails within selected search polygons. With continued monitoring, census mapping survey procedures allow managers to accurately track and characterize changes in number, spatial distribution, and length of informal trails. Data can also be used to help decide which informal trails should be closed to evaluate the success of management efforts to close selected trails or prevent the creation of new trails.

Source: Monz, C., Marion, J., Reed, J. (2012) Informal Trail Monitoring in the Atigun Gorge Area of the Artic National Wildlife Refuge. Final Research Report.

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Appendix K: Sliding Scale of Analysis

INTERAGENCY
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Sliding Scale Decision Support Tool

Decision Support Tool

	RATING QUESTIONS	RATIONALE	HIGH MODERATE LOW
Project:			
1	What is the likelihood that the situation involves sensitive, rare, or irreplaceable **natural** resources?	There are vulnerable, threatened ground-nesting bird species in the project area.	High
2	What is the likelihood that the situation involves sensitive, rare, or irreplaceable **cultural** resources?	There are no known or confirmed culural resources that have been detected at this time in the project area.	Low
3	What is the likelihood of imminent and significant changes to the natural or cultural resources?	There is an imminent threat to long term viability of montane bird species and spruce fir forest habitat.	High
4	What is the likelihood of imminent and significant changes to **visitor experience?**	There will be some significant changes to the visitor experience by marking a preferred route.	Moderate
5	How will the issue affect other aspects of land management in the area or surrounding areas?	The issue will not likely affect other aspects of management in the surrounding areas because the types of recreation allowed will be the same	Low
6	What is the geographic extent of the issue's impacts? Scales of impacts include: national, regional, state, local/county, and site or project.	The scale of impact is confined to the study area on Forest Preserve and State Forest land.	Moderate

Decision Support Tool	RATING QUESTIONS	RATIONALE	HIGH MODERATE LOW
7	What is the relative interest of stakeholders affected by the action? Stakeholders may include: local communities, general public, special interest groups, recreational visitors, commercial users, traditional-subsistence users, tribes, and others.	There is significant stakeholder involvement and high interest in this project.	High
8	Is the impact temporary (low) or long lasting (high)?	The impact is long lasting and could include permanent trail reroutes.	High

CRITERIA - Use the ratings assigned to questions 1-8 to evaluate the following 4 sliding scale criteria. Combine those criteria into a single qualitative rating (high, moderate, or low) of the project's appropriate location on the sliding scale.

	CRITERIA	RATIONALE	HIGH MODERATE LOW
A	**Issue Uncertainty**	At this time, it is unknown how marking a preferred route will impact visitation.	Moderate
B	**Impact Risk**	Several vulnerable ground nesting bird species are being impacted by visitation during the breeding and nesting months May-June.	High
C	**Stakeholder Involvement**	Several stakeholders promote hiking challenges and have their own ideas of what the best management approach is.	High
D	**Level of Controversy**	Objective monitoring data that has been collected over the course of this project has helped to make this project less controversial.	Moderate
	Location on the Sliding Scale	This project is on the high end of the sliding scale because of the severity of natural resource impacts and significant stakeholder involvement.	High

Appendix L. Survey 123 Guidance

This Survey 123 guidance document was created to guide researchers and NYS DEC staff who use survey 123 to inventory and collect data on informal trail networks.

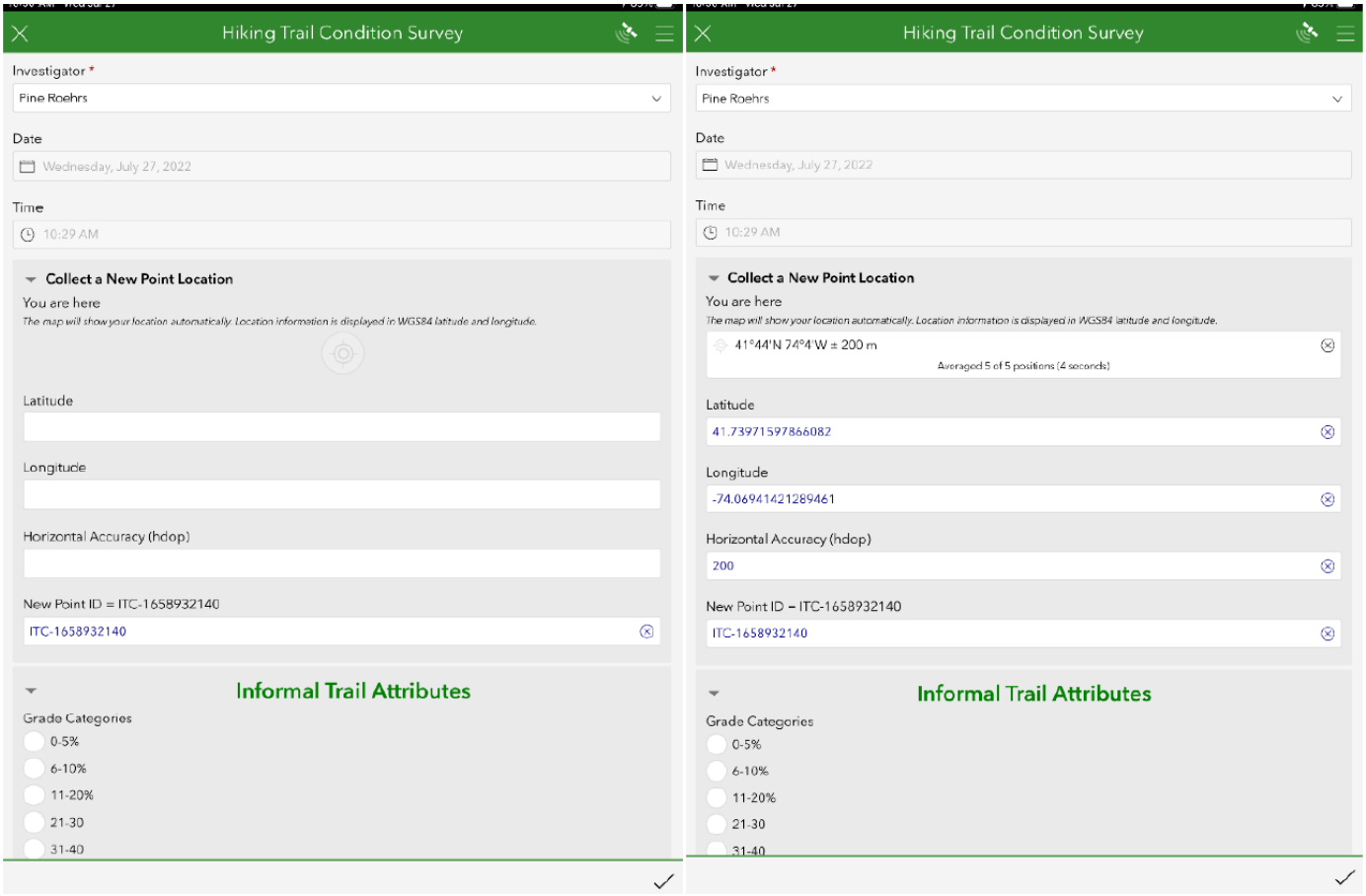
Informal Trail Monitoring with Survey 123

The following information describes the steps and methods used to conduct point assessments on informal trails in the Catskills using Survey 123. The methods used can be duplicated on any DEC iPad with Survey 123 software.

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

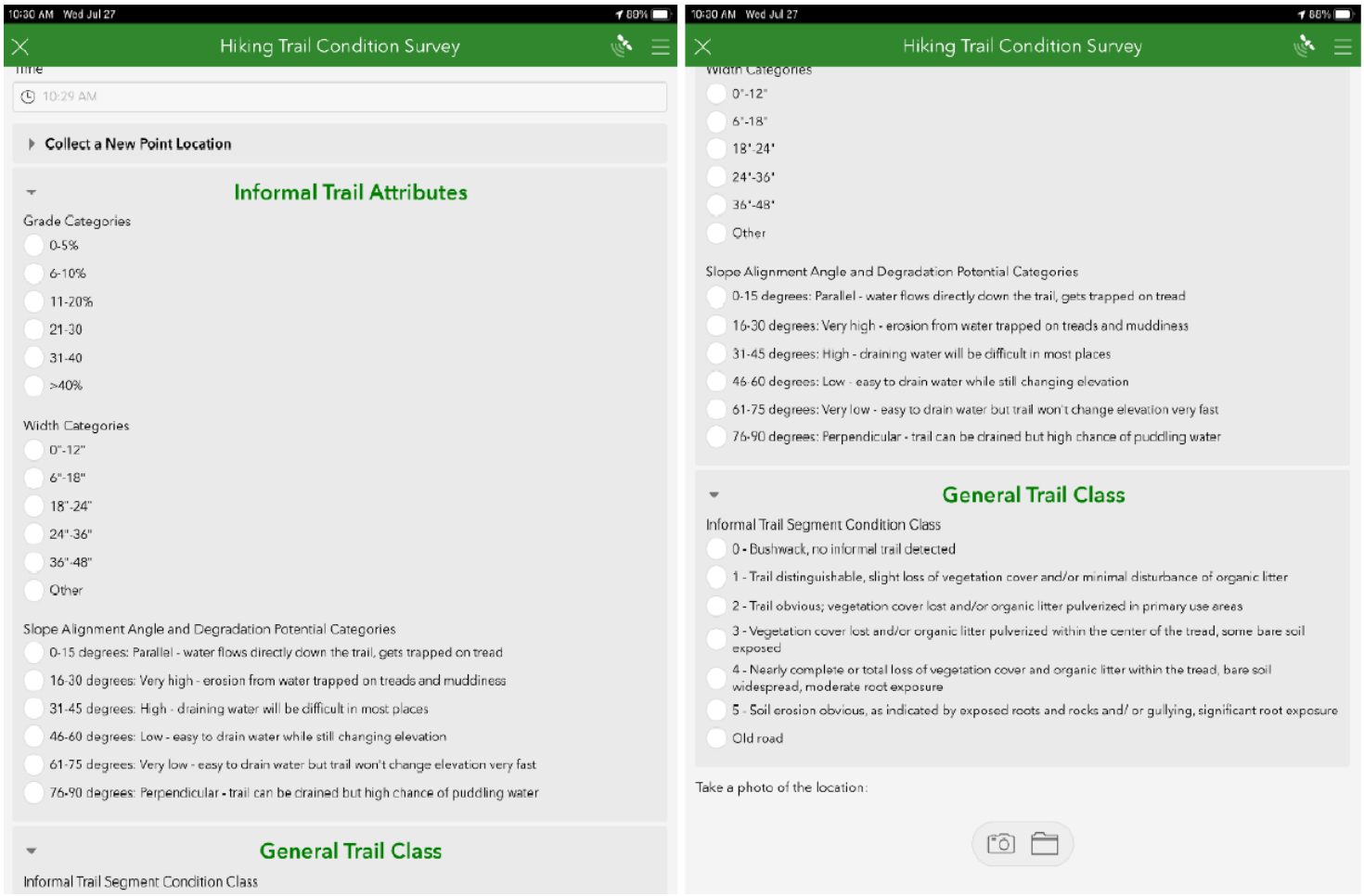
1) **Starting Survey 123**
   Unlock the iPad and open Survey 123, then login if not already using DEC login credentials. This is done by selecting “enterprise” and entering in “nysdec”, the using your DEC email and password. You should see your surveys on the opening page. Choose the survey that you would like to use and then hit the “collect” button on the bottom of the page.
   (Note: this document does not provide information on creating surveys, it is assumed that 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 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 to pulsing again and collect additional coordinates. Survey 123 will average out all of the coordinates it collects while you complete the survey to get the most accurate location information (Figure 2).



Note- sometimes the iPad will not 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 to collect coordinate information.

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



Condition Class Assessment for Informal Trails
Select one for each category

Informal Trade Grade Categories % (Multiple Choice)
0-5%
6-10%
11-20%
>20%

Informal Trail Width (Multiple Choice)
0”-5”
6”-12”
13”-23”
24”-35”
36”-48”
Other

Adapted from Forest Service Trail Fundamentals and Trail Management Objectives: Trail Design Parameters page 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 and widening due to the difficulty of shedding and draining water from incised trail tread- both slopes are often higher than the tread surface.

Method for Finding TSA

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

Informal Trail Condition Class Categories (choose one)

0- No informal trail detected.
1- Informal train distinguishable; slight loss of vegetative cover or disturbance of organic litter.

2- Informal trail obvious: vegetation cover lost and/ or organic litter pulverized in primary use areas.
3- Vegetation cover lost and or organic litter pulverized continuously through center of informal trail tread, some bare soil exposed.
4- Nearly complete or total loss of vegetation cover and organic litter within the informal trail 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.

Mapping Protocols for Condition Class Assessments

Record informal trails as vectors and label each with the corresponding condition class. Ignore condition class changes affecting <10ft of informal trail. Walk the informal trail while collecting the feature information until it reaches a junction or changes condition class. Use features such as trails, streams, and roads along with prior survey data to divide the area into manageable units. Prior data can be used as guide but not as an authoritative catalog of where informal trails will be found and mapped.

Finishing and saving the survey

-Save the survey to the outbox when completed with the assessment. All completed surveys will be stored in the Outbox in Survey 123 on the iPad.

- Once 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 send to your AGOL account.

From your AGOL account back on your desktop go to “My Groups” and locate the survey. From here you can download a shapefile or File Geodatabase pf the surveys for use in ArcMap.