BERKS NATURE - NEVERSINK MOUNTAIN TRAIL ASSESSMENT

READING, PA

APRIL 2022

Photo Credit Hansi Johnson

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ACKNOWLEDGMENTS

PREPARED FOR:

BERKS NATURE

PREPARED BY:

INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION (IMBA)

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ABOUT IMBA TRAIL SOLUTIONS

IMBA Trail Solutions (TS) is the international leader in developing trails, with experience in over 750 projects in North America, Europe, and Asia. Our staff excels at planning, design, and construction of trail systems that provide high-quality experiences for local riders and destination visitors while simultaneously minimizing environmental impacts.

Trail Solutions is a fee-for-service based arm of the International Mountain Bicycling Association (IMBA), a 501(c)(3) nonprofit organization. IMBA's mission is to create, enhance, and protect great places to ride mountain bikes. Based in Boulder, Colorado, and with staff distributed across the country and the world, IMBA meets its goal to create great mountain bike experiences through its Trail Solutions program. Trail Solutions employs approximately twenty professional trail planners and builders. In addition to being industry professionals and exceptional mountain bike riders, Trail Solutions staff hold a broad base of applicable skills and knowledge from planning, landscape architecture, and environmental sciences to GIS systems, CAD, and graphic design.

Our wealth of experience has allowed us to develop the gold standard guidelines for the creation of both sustainable and enjoyable singletrack trails. These guidelines have influenced all major federal land management agencies and a large number of state and local parks departments. We pride ourselves on the positive experiences Trail Solutions has provided to the millions of active trail users around the world and on the economic independence that communities have achieved through the development of destination trail systems.

PROJECT BACKGROUND

Berks Nature

Berks Nature engaged the International Mountain Biking Association (IMBA) to assess the current trail system at Neversink Mountain Preserve (NMP) and craft a plan that is focused on sustainability, protects the unique natural resources on the site, and provides for desired user experiences. Trail improvements, relocations, and closures will be identified within the plan.

Berks Nature, a 501(c)(3) non-profit conservation organization founded in 1974, serves Berks County as a leader in environmental conservation, land preservation, water protection, trail management, education, and environmental programing for the community. Their mission is to be a steward for the environment and the people of Berks County by protecting the natural environment where they live. The organization is based at The Nature Place at Angelica Creek Park. A newly constructed LEED Gold certified building serves as a demonstration campus for community outreach, educational programming, and events. Berks Nature manages 27 miles of trail on 425 acres of leased land and 424 acres of privately owned preserve. Neversink Mountain Preserve and its trail system are managed by Berks Nature.

Reading PA

Reading is a city of approximately 95,000 people in southeastern Pennsylvania. It is the county seat of Berks County. This industrial city was home to the Reading Railroad and was once a major transportation hub. The Schuylkill River runs along the western edge of the city. Mount Penn and Neversink Mountain rise above the eastern and southern edge of Reading. These prominent open spaces are rich in history and provide space for recreational activities for area residents. The historic Reading Pagoda is located on Mount Penn and is a well-known symbol of the city.

Neversink Mountain

Rising above the Schuylkill River, Neversink Mountain offers incredible views of the City of Reading. Neversink Mountain is part of a 1,000+ acre preserve managed by Berks Nature for wildlife and recreational purposes. The preserve is a mix of public and private parcels and includes many miles of gravel and natural surface trails open to hikers and mountain bikers.

The trail system on Neversink Mountain is a complex mix of sanctioned and user created trails that have developed over the years without cohesive planning. This network of managed and unmanaged trails has created a system that is unsustainable and impacting private landowners, sensitive ecological areas, as well as not providing the recreational opportunities the public is seeking.

History of Neversink Mountain

Neversink Mountain was a thriving resort destination from 1880 to 1930. The Neversink Railroad wound around and over the mountain from the South Ninth Street Trolley to Klapperthal Station, it was built to link resort destinations for vacationers and day users out for a picnic or sightseeing. The Klapperthal Trail, Neversink North and South Trails follow much of the rail lines original route, with some exceptions where it crosses private property. Numerous historic artifacts from this period can be observed as one walks these trails. Multiple Hotels were built upon Neversink Mountain but only remnants of these grand structures are visible today. The former railroad had nine stops along the route plus a few sidetracks, the stops include the following: The White House, Highland House, Haak Mine, Heiner's Wissel, Neversink Mountain Hotel, Point Lookout, Centennial Springs Hotel, Dengler's Glen House, Klapperthal Park and Klapperthal Pavilion. There was also an incline railway on the north facing slope of the mountain that was constructed to move people and goods up the hillside from 13th Street to the Highland House.

SITE VISIT & COMMUNITY ENGAGEMENT

Berks Nature, along with IMBA conducted three hybrid open house/digital (Zoom) community meetings on December 15th and 16th open to the public and area stakeholders. The meetings were well attended by City and County officials, local landowners, trail users and local mountain bike groups - Berks Area Mountain Biking Association (an IMBA chapter) and Berks Trail Works. Attendees were able to provide information and feedback about current use, vision, and goals for NMP via discussion and a series of engagement boards. A digital survey was also conducted prior to the meetings that Berks Nature emailed to stakeholder groups.

Community Meetings & Survey Results

A majority of respondents currently use the existing trail system for recreational activities. Visitors engage in walking (11%), hiking (47%), dog walking (6%), mountain biking (22%), road biking (3%), and nature viewing (11%). Visitors are looking for a range of trail types and experiences; 63% would like to see traditional shared use singletrack, 44% support mountain bike optimized singletrack, 11% are in favor of mountain bike skills trails, 40% are looking for gravity of downhill only trails, and 50% prefer hike only trails. Community identified issues include illegal dirtbike activity, off-leash dogs, steep difficult trails, hiker/biker conflicts (often the result of steep trails), lack of parking, and poor directional or wayfinding signage.

(See Appendix D for survey results and board images)
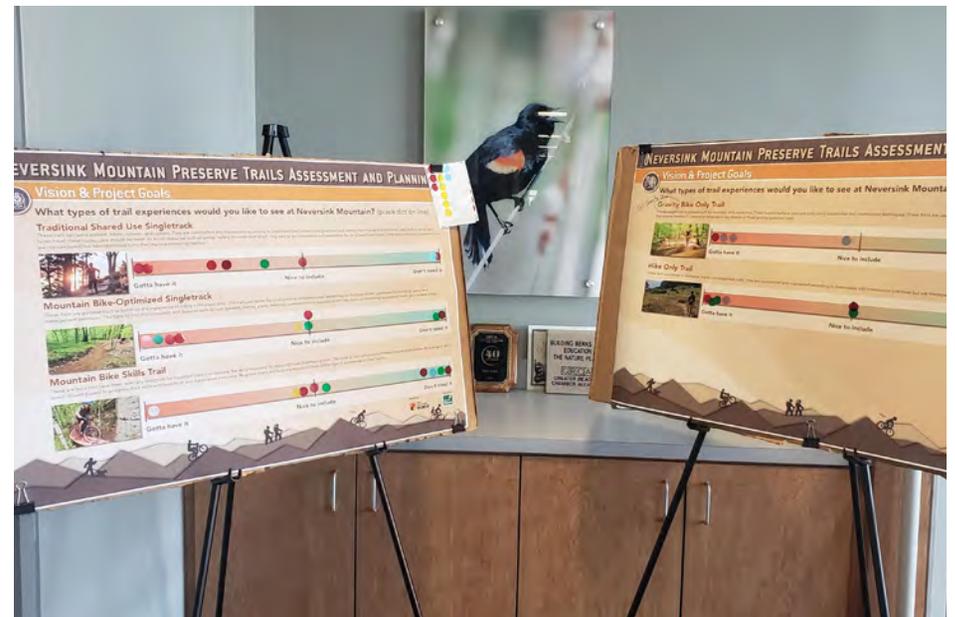
PROJECT SITE & EXISTING CONDITIONS

IMBA met with Berks Nature staff in December 2021 to get an understanding of the existing site and conducted a field assessment of the existing trail system at Neversink Mountain. During the assessment field data was gathered on existing and user created trails to generate a comprehensive picture of the existing system. The physical condition of the tread, surrounding environmental factors, and user satisfaction all come into play when assessing the environmental, physical, and social sustainability of trails. The trails on Neversink fall into three types: re-purposed roads or railroad grades, natural surface singletrack, and user created trails. The existing trail system is a piecemeal network that can be confusing and doesn't provide for desired user experiences. User created trails have developed because of this desire for a more diverse system. General improvement recommendations include rerouting steep sections, improving drainage in wet areas, avoiding the power-line corridors, providing more loop options, improving connectivity, trailhead improvements, and directional signage/wayfinding improvements.

General Issues

Steep trail alignments and erosion

Many of the existing trails on Neversink have steep fall line alignments which channelizes water and leads to erosion. Trails with steep grades or along the fall-line channelize water and are prone to increased rates of erosion. As water travels down the trail, it picks up speed and transfers tread material from the trail, creating gullies and deep channels in the trail tread. Unstable, steep trail alignments continually erode, resulting in sedimentation and becoming a constant maintenance concern. As steep channels are created, users will choose to travel along the sides of the trail which leads to gradual widening of the trail. Over time these sections may need to be rerouted and should be monitored for erosion. Some segments can be improved by installing rolling grade dips every 150' – 200' along

the length of the segment to minimize the channelized flow of water. Reroutes are recommended for most of the fall line segments on Neversink. Sustainable trail design principals should be followed. (See Recommendation section)

Trailheads and Signage

The three main trailheads are located at Klapperthal Road, Fairview Ave., and 9th street. All these sites have limited parking available and informational and wayfinding signage improvements are needed. Klapperthal Road has the most established trailhead and includes informational signage and map. The parking lot can fit approximately 6-7 vehicles. This lot is often full and there have been issues with people parking along the side of the road blocking emergency access. The site is fairly tight but continued engagement with the Forest Hills Cemetery should be pursued as this is an important access point to the trail system. Additional parking and a more formalized trailheads are needed at 9th Street, 15th Street, and 17th Street. These sites are underutilized and with trail improvements additional access points will provide important connections to the City of Reading. The proposed trail types near the 10th & 15th Street Playgrounds will expand recreational opportunities for area youth and create a place for them to engage in a fun,

healthy outdoor activity. Signage and trailhead improvements at the 10th Street and 15th Street playgrounds will activate this area of the mountain making it an inviting atmosphere and help displace unwanted use and vandalism. The Fairview Drive trailhead is the main access point for the Mount Penn neighborhood. This site has on street parking only. Additional parking could be provided in the flat area just past the gate – a new gate would need to be installed. The signage installed along the easement corridor made this area seem unwelcoming.

Well-placed, clear, and frequent signage allow visitors to easily find their way and make route decisions. Signage is particularly helpful to new or infrequent visitors who are looking for guidance and reassurance when traveling along the trail. A few locations with overall trail maps were observed, but many have been damaged or removed due to vandalism. Digital signage that can be access via smartphone and QR codes can help fill some of these gaps. QR codes were included on some of the current signage but the link to the trail map was broken and unusable. In many locations, signage was missing and/or infrequent.

Trails don't meet needs of users

The existing trail system consists of three main trail types – re-purposed gravel roads or rail-beds, steep fall line singletrack, and user created heard paths. Most of this network was built to serve the needs of a previous era and lacks cohesion and experiences sought after by today's trial users. Many trail users prefer narrow natural surface trails. These trails offer a wider range of experiences which vary depending on the user group. Walkers and hikers are often looking for efficient routes to a destination point or loops where they can immerse themselves in nature and observe the beauty of the world around them. Runners seek trails where they can travel uninterrupted for longer distances, challenge themselves with steeper grades and improve fitness. Mountain bikers seek variety to challenge themselves and improve their skills. Trails experiences can range from fast and flowing through open terrain, with swooping turns and rollers to challenging technical lines with natural or built features. Providing natural surface singletrack trails allow users a more immersive experience in nature, giving users expanded access to the outdoors which promotes healthy lifestyles.

On popular trails, mountain bikers, hikers, walkers, and runners share the same trail. User conflicts can happen where wide trails and steep grades increased the speed of mountain bikers. This can be seen on some of the steeper gravel road sections on the West Valley/Neversink, St. Lawrence, and Upper Glenn Trails. Potential user conflicts exist where mountain bikers are traveling at fast speeds when descending and exit directly onto shared-use, bi-directional trails. This can be mitigated with speed-slowing techniques such as chokes and corrals that narrow the tread and force riders to navigate around features before entering an intersection. Improving trail alignments and add a slight uphill before an intersection is another technique used to slow speeds and reduce conflicts.

Impeded and/or slow drainage from the tread

Wet/muddy sections were observed mainly on lower portions of the Glen Trail along Klapperthal Creek and lower sections of the Red/White blazed trail where it crosses the wetland and stream. Water appears to be collecting on the trail due to poor drainage away from the trail tread. Much of the water seems to be coming from seeps off the adjacent hillside, along with surface flow from the trail itself. As users walk or bike over waterlogged trails, they press into the malleable

soil, leaving ruts and indents as the soil dries. This results an uneven tread and "cupping" of the trail which leads to increased water retention after a rain event. Additionally, trail users tend to skirt around these muddy sections leading to trail widening. Improvements are needed to remove water from the trail and harden the tread surface. Rolling grade dips and knicks should be used to allow water to exit the tread surface. Some uphill ditching or turnpiking may be necessary to collect water seeping from the hillside and direct it to the drain structure. Bridges or boardwalks may be necessary for some sections. Some of the existing structures are old and in disrepair and should be replaced. Additionally, rock armoring/riprap should be used to harden muddy sections and prevent soil erosion.

Existing Trail System

There are over 21 miles of trail within Neversink Mountain Preserve. The majority of trails are re-purposed roads or rail-beds. These segments were either part of the Neversink Railroad or built to access the numerous hotel sites or other point of interest on the mountain. The Neversink trail follows much of the former railroad route around the lower portion of the mountain and is in good condition with gentle grades but connectivity to other trails, trailheads and points of interest could be improved. The St. Lawrence and West Valley trails are located on transmission line access roads. These corridors are extremely steep; the tread surface consists of loose gravel making travel hazardous, these trails should be closed and alternative routes developed.

The Glen Trail is the main route to the summit overlook from the Klapperthal trailhead. It follows an old road and includes multiple steep fall line sections. Muddy segments along the lower portion of the trail will need additional boardwalks and drainage structures. The Cove trail is another steep gravel road, realigning this trail would provide better access for all users to the Schuylkill River overlook. A formalized connection between the two overlooks is needed, a stone staircase for hikers should be built creating a loop with the Neversink Trail. Currently people are using a herd path along the rock outcrop that is steep and eroded. The East Ridge trail climbs the wooded ridge on the eastern side of the mountain. This trail is one of the few singletrack options in the preserve with nice views and provides an important connection to the St. Lawrence side of the mountain. Segments of this trail can be improved with reroutes around some of the steep sections. Adding

a second trail from the Fairview Road trailhead would make this a great loop option for a wide range of users. The West Woodland Trail follows an old roadbed on the north side of the mountain, there are numerous gullied out sections that need drainage improvements. The southwestern section of the West Woodland Trail follows the fall line of a steep ridge down to the even steeper section of the West Valley Trail. A new trail connection to the 9th street trailhead would provide a better experience for trail users.

User Created Trails

Approximately 30% of the trail on Neversink are user created. Most of these trails are concentrated on the northwest side of the mountain, a few additional trails are accessed from the Klapperthal Trailhead. These trails have developed because riders are looking for a more bike focused trail experience, many of the legacy trails are steep and unmanageable for many riders. The user created trails generally follow contour alignments but have been developed in an extremely haphazard way and have a lot of PUD's (pointless up and down sections). Mainly created by being ridden in, these trails are little more than depressions in the leaf litter – there has been almost no tread development or bench cuts.

Numerous relic trails were observed on site with painted blazes still visible (white blazed trail, yellow/blue blazed trail). Some of these trails should be adopted as official routes with some adjustments. They often follow more sustainable

alignments than some of the existing network and provide visitors with a "wilderness" type experience in the city.

Existing Trail Statistics

There are **21.3 Miles** of trail within Neversink Mountain Preserve.

- **11.1 - miles of sanctioned trail**
  - Gravel Road/Railroad – 7.1
  - Other road cut/doubletrack – 2.2
  - Paved road - .07
  - Singletrack – 1.7
- **10.1- miles of unsanctioned trail**
  - Gravel Road/Railroad – 1.6
  - Other road cut/doubletrack – 0.2
  - Singletrack – 8.4
    - » Historic Trail – 2.1
    - » User created/social trail – 6.3

Trailheads

- Klapperthal Road
  - ° 6-7 vehicle capacity
  - ° Information Kiosk
- Fairview Drive
  - ° On-Street Parking
  - ° Information Kiosk
- 9th Street
  - ° Road shoulder parking for a few vehicles
- Neversink Mountain Road
  - ° 2 vehicle capacity

Points of Interest

- McIlvain Pavilion
- City Overlook
- Schuylkill River Overlook
- Quarry Bluffs
- Abandoned quarry sites
- Upper Glen Pond
- Historic artifacts from Neversink Railroad and Hotels

NEVERSINK MOUNTAIN PRESERVE
Existing Conditions

CITY OF READING

Aulenbach Cemetery

MOUNT PENN

Cemetery

TH City Overlook

LOWER ALSACE

Empire Wrecking Dump

Abandoned Quarry

Poplar Neck

Forest Hills Cemetery

CUMRU

EXETER

Prepared for:

Berks Nature

Prepared by:

TRAIL SOLUTIONS IMBA

Note: This map is intended for planning purposes only. Property boundaries are Approximate. Do not use for design development or construction estimates.

Legend

Existing Conditions

- Neversink Mountain Preserve Boundary
- Public Areas
- Private Property Stay on Trail
- Private Property Keep Out
- Roads
- Electrical Transmission Line
- Streams
- River
- Gate
- TH Trailhead

Existing Trails

- Existing - Gravel Roadbed
- Existing - Natural Surface Roadbed
- Existing - Singletrack
- Unsanctioned - Gravel Roadbed
- Unsanctioned - Natural Surface Roadbed
- Unsanctioned - Singletrack

North

0'   200'   400'   800'

1" = 400'

NEVERSINK MOUNTAIN PRESERVE
Proposed Action Plan

CITY OF READING

Aulenbach Cemetery

MOUNT PENN

Cemetery

City Overlook

LOWER ALSACE

Empire Wrecking Dump

Poplar Neck

CUMRU

Abandoned Quarry

Forest Hills Cemetery

EXETER
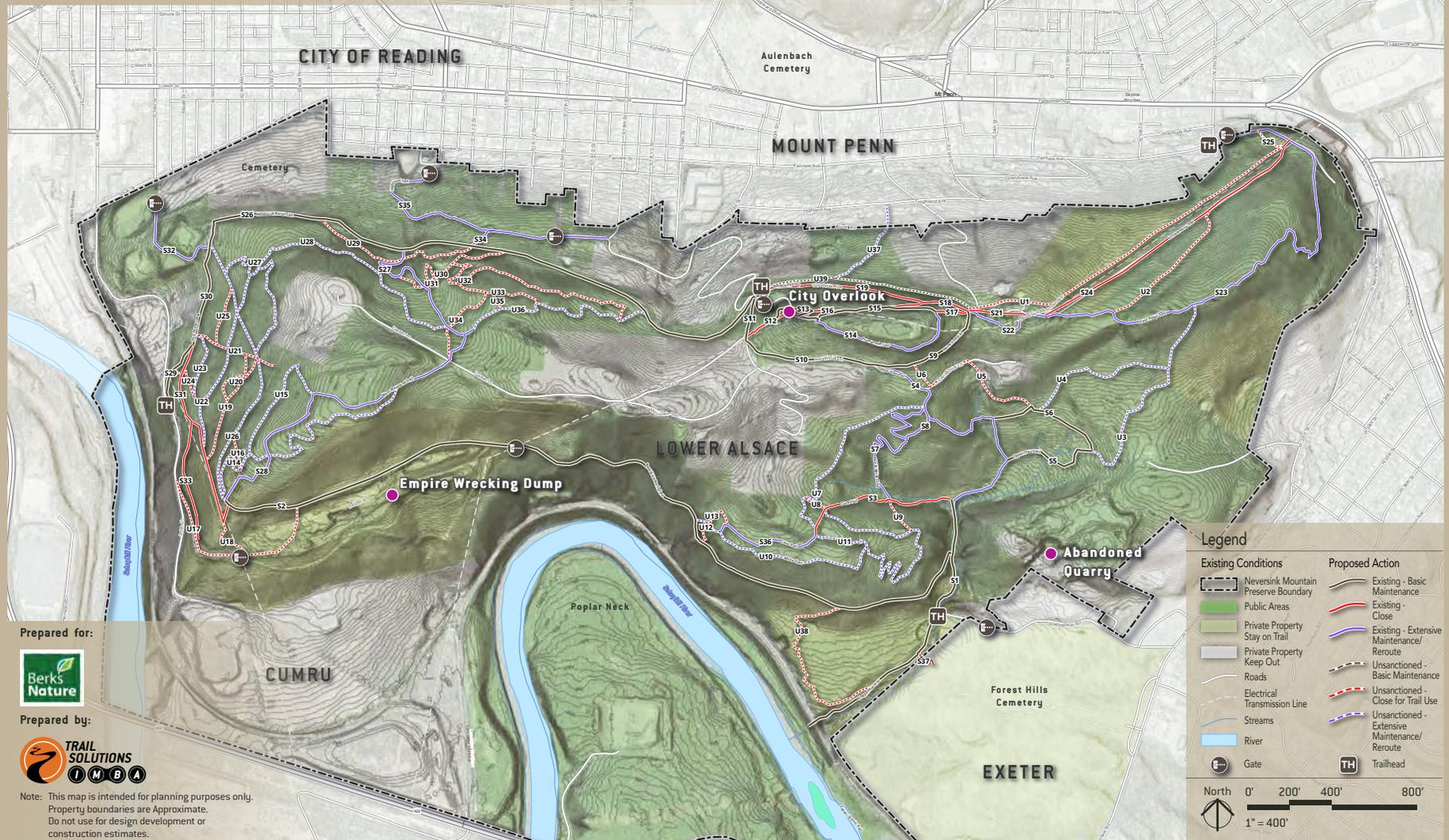
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Legend

Existing Conditions

- Neversink Mountain Preserve Boundary
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- Roads
- Electrical Transmission Line
- Streams
- River
- Gate
- TH Trailhead

Proposed Action

- Existing - Basic Maintenance
- Existing - Close
- Existing - Extensive Maintenance/Reroute
- Unsanctioned - Basic Maintenance
- Unsanctioned - Close for Trail Use
- Unsanctioned - Extensive Maintenance/Reroute

North

0' 200' 400' 800'

1" = 400'

Trail Assessment Matrix - Existing Network

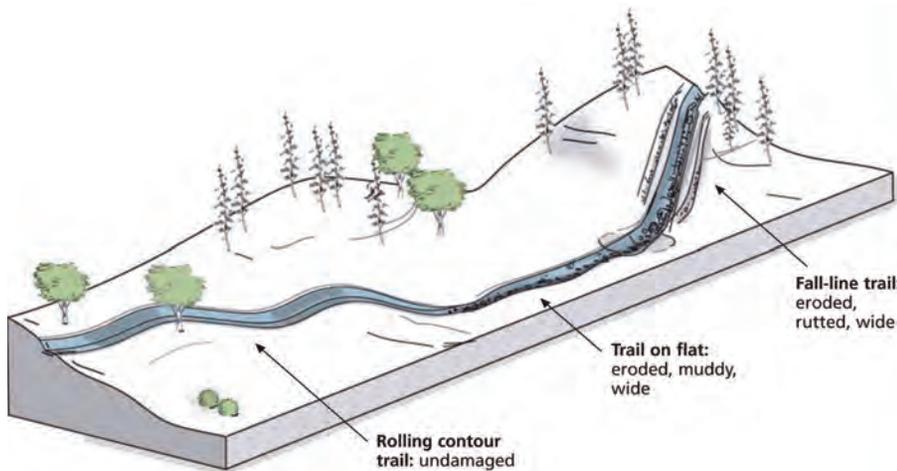| Segment	Trail Name	Surface	Trail Type	Trail Style	User	Status	Proposed Action	Length Miles	Trail Assessment Notes
S 1	Klapperthal Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.53	- Klapperthal Road trailhead - not much parking available and can fill up quickly - Tread surface is old road or railroad grade - Newer bridges over streams installed recently by BAMBA - Well maintained section - Kiosk sign by entry
S 2	Neversink South Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	1.51	- Old railroad grade in good condition - Viewpoint of Schuylkill River, needs a connection to the upper Viewpoint above cliff band, user created trail is causing erosion - Needs better access on west side of the mountain
S 3	Cove Trail	Gravel	GRD	Road	Hike	Sanctioned	Close	0.29	- Steep road up to highpoint - Eroded in sections - Not great hiking or biking experience - Find alternate route for beginner/intermediate access
S 3	Cove Trail	Natural	SGL	CLX	Hike, Bike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.27	- Steep sections - Ends at viewpoint above Neversink South Trail, connection needed - Grade for beginner/intermediate access
S 4	Upper Glen Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.53	- Main access route to summit viewpoint McIlvain Pavilion - Wet segments near the bottom need improved boardwalks - Old roadbed with steep eroded sections - Moderately graded access to the top is needed
S 5	Upper Glen Trail	Natural	RDB	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.18	- Gentle grades to pond, easier access to pond - Use as alternate route past steep section on trail S3
S 6	Upper Glen Trail	Natural	SGL	CLX	Hike, Bike	Sanctioned	Basic Maintenance	0.21	- Gentle grades to pond, easier access to pond - Use as alternate route past steep section on trail S3
S 7	Red and White	Natural	SGL	CLX	Hike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.40	- Steep hike only trail along stream and wetlands - Needs extensive maintenance, tread armoring, steps, and some reroutes in muddy areas
S 8		Natural	SGL	CLX	Hike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.07	- Short bypass trail - Steep segments
S 9	Neversink Trail	Gravel	RBD	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.22	- Old road or railroad grade - Muddy section near gate
S 10	Upper Glen Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.24	- Access road to private residences
S 11	Upper Glen Trail	Paved	PAV	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.08	- Access road to private residences
S 12		Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.11	- Steep fall line trail to McIlvain Pavilion - Crosses under powerlines - Part of powerline access road (powerline access for maintenance and emergencies to remain) - Alternate access route needed
S 13	City Overlook Loop	Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.14	- City overlook side trail, great views - Crosses under powerlines - Part of powerline access road (powerline access for maintenance and emergencies to remain)
S 14	Promenade Trail	Natural	RBD	Road	Hike, Bike	Sanctioned	Extensive Maintenance/Reconstruction/Reroute	0.28	- Old railroad grade in good condition - Creates summit loop from McIlvain Pavilion
S 15	Promenade Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.22	- Part of summit loop - Crosses under powerlines - Part of powerline access road (powerline access for maintenance and emergencies to remain)
S 16		Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.05	- Crosses under powerlines (powerline access for maintenance and emergencies to remain)
S 17	Neversink Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.06	- Steep fall line trail to McIlvain Pavilion - Crosses under powerlines (powerline access for maintenance and emergencies to remain) - Alternate access route needed
S 18	Neversink Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.06	- Steep fall line trail to McIlvain Pavilion - Crosses under powerlines - Part of powerline access road (powerline access for maintenance and emergencies to remain) - Alternate access route needed
S 19	Neversink Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.27	- Old railroad grade - Steeper grades and more exposed to the powerlines, U39 is a better route

Segment	Trail Name	Surface	Trail Type	Trail Style	User	Status	Proposed Action	Length Miles	Trail Assessment Notes
S 20	Neversink Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.04	- Small trailhead near cliffs - Explore opportunities to expand access
S 21	Neversink Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.10	- Under powerlines and part of access road (powerline access for maintenance and emergencies to remain)
S 22	Neversink Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.16	- Use existing bench cut to move alignment away from powerlines and into the woods
S 23	East Ridge Trail	Natural	SGL	CLX	Hike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.96	- Trailhead with street parking at Fairview Ave, on street parking only, signage improvements needed - Steep hike only trail to ridgeline - Nice surrounding slopes for reroutes that would allow for intermediate shared use access
S 24	St. Lawrence Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.54	- Steep fall line trail under powerlines - Powerline access route, alternate route needed (powerline access for maintenance and emergencies to remain) - Create contour loop trail from trailhead to top of ridge, connect with trail East Ridge Trail
S 25	St. Lawrence Trail	Natural	SGL	CLX	Hike, Bike	Sanctioned	Close Segment	0.06	- Reroute steep segment - Create single access trail off powerline road
S 26	Neversink North Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	1.10	- Old railroad grade - Good condition
S 27	West Woodland Trail	Natural	RBD	Road	Hike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.31	- Steep, eroded gullied out roadbed - Trail hardening needed
S 28	West Woodland Trail	Natural	SGL	CLX	Hike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.62	- Trail follows old road grade - Steep, eroded, fall line trail - Adjacent unsanctioned trail offers better alignment option and down valley views
S 29		Gravel	GRD	Road	Hike, Bike	Sanctioned	Basic Maintenance	0.13	- Formalize trailhead, add parking and signage
S 30	West Valley Trail	Natural	GRD	Road	Hike	Sanctioned	Basic Maintenance	0.18	- Old railroad grade
S 31	West Valley Trail	Natural	GRD	Road	Hike	Sanctioned	Close	0.37	- Steep, eroded fall line trail, intimidating/unsafe grades along the "Electric Slide" segment - Powerline access road, alternate route needed to trailhead (powerline access for maintenance and emergencies to remain)
S 32	West Valley Trail	Gravel	GRD	Road	Hike, Bike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.18	- Formalize trailhead from playground, signage and trail improvements to create welcoming access point - Trail improvements needed (brush clearing, tread work)
S 33		Gravel	GRD	Road	Hike, Bike	Sanctioned	Close	0.22	- Access road to powerlines (powerline access for maintenance and emergencies to remain) - Used as alternate way around "Electric Slide"
S 34	Highland Trail	Natural	RBD	Road	Hike, Bike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.04	- Formalize trailhead access from neighborhoods, add signage - Trail improvements needed (brush clearing, tread work)
S 35	Highland Trail	Natural	RBD	Road	Hike, Bike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.54	- Formalize trailhead access from neighborhoods, add signage - Trail improvements needed (brush clearing, tread work) - There are opportunities for beginner loops along lower slopes with a connection to the park
S36	Cove Trail	Natural	SGL	CLX	Hike, Bike	Sanctioned	Extensive Maintenance, Reconstruction, Reroute	0.20	- Trail improvements needed (brush clearing, tread work) - Reroute sections to reduce steep fall line segments
S 37		Natural	SGL	Road	Hike, Bike	Sanctioned	Close	0.05	
U 1		Gravel	GRD	Road	Closed	Unsanctioned	Close	0.65	- Powerline access road (powerline access for maintenance and emergencies to remain), keep closed as trail
U 2	Green and White	Natural	SGL	CLX	Closed	Unsanctioned	Close	0.27	- Legacy Trail
U 3		Natural	SGL	CLX	Closed	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.40	- Legacy Trail, Blue/Yellow Blazes - Adopt as formal trail with some reroutes
U 4		Natural	SGL	CLX	Closed	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.28	- Legacy Trail - Adopt as formal trail with some reroutes - Create connection to newly acquired property
U 5		Gravel	GRD	Road	Closed	Unsanctioned	Close	0.24	- Driveway to private parcel, keep closed
U 6		Natural	SGL	CLX	Closed	Unsanctioned	Close	0.05	- Fall line, redundant, keep closed
U 7	Scotts Run	Natural	SGL	TRD	Hike, Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.39	- Formalize with some reroutes
U 8		Natural	SGL	TRD	Hike, Bike	Unsanctioned	Close	0.04	- Close to private parcel - Redundant
U 9		Natural	SGL	CLX	Hike, Bike	Unsanctioned	Close	0.07	

Segment	Trail Name	Surface	Trail Type	Trail Style	User	Status	Proposed Action	Length Miles	Trail Assessment Notes
U 10	White Blazed	Natural	SGL	TRD	Hike, Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.83	- Legacy Trail, White Blazes - Adopt as formal trail with some reroutes
U 11		Natural	SGL	CLX	Hike, Bike	Unsanctioned	Close	0.11	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 12		Natural	SGL	CLX	Hike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.05	- User created - Formalize connection to overlook
U 13		Natural	SGL	CLX	Hike, Bike	Unsanctioned	Close	0.11	- Herd path to viewpoint
U 14		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.56	- Reroute to create bike optimized experience
U 15		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.25	- Formalize and reroute away from driveway for shared-use, uphill access
U 16		Natural	SGL	CLX	Bike	Unsanctioned	Close	0.06	
U 17		Gravel	GRD	Road	Closed	Unsanctioned	Close	0.37	- Access road to Empire Wrecking Dump
U 18		Natural	SGL	CLX	Closed	Unsanctioned	Close	0.09	- User created shortcut to avoid "electric slide", find alternative route
U 19		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.20	- User created shortcut to avoid "electric slide", find alternative route
U 20		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.13	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 21	Incline	Natural	RDB	Road	Hike, Bike	Unsanctioned	Close	0.15	- Old incline route - Steep, fall line keep closed
U 22		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.33	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 23		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.14	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 24		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.07	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 25		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.11	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 26		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.50	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 27		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.35	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 28		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.43	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 29		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.30	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 30		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.27	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 31		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.03	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 32		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.45	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 33		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.15	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 34		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.16	
U 35		Natural	SGL	TRD	Bike	Unsanctioned	Close	0.03	
U 36		Natural	SGL	TRD	Bike	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.38	- User created - Look for better aligned intermediate and advanced bike optimized routes
U 37		Natural	SGL	CLX	Closed	Unsanctioned	Extensive Maintenance, Reconstruction, Reroute	0.18	- User created - Potential neighborhood access point, formalize access - Adopt as formal trail with some reroutes
U 38	Dip N Dots	Natural	SGL	TRD		Unsanctioned	Close	0.37	- User created - Adopt as formal trail with some reroutes
U 39		Gravel	GRD	Road	Closed	Unsanctioned	Basic Maintenance	0.37	- Former rail corridor, provides better access option than upper segment, wooded - less steep - away from powerlines - Adopt as formal trail

PRINCIPLES OF SUSTAINABLE TRAILS

All new trails should be constructed using techniques that result in "Sustainable Trails". Sustainable trails balance many elements. They have little impact on the environment; resist erosion through proper design, construction, and maintenance, and blend with the surrounding area. A sustainable trail also appeals to and serves a variety of users, adding an important element of recreation to the community. It is designed to provide enjoyable and challenging experiences for visitors by managing their expectations and their use effectively. Following trail design and construction guidelines allows for high-quality trail and education experiences for its users while protecting the sensitive resources.

The Effect of Proper Trail Design

Fall-line trail: eroded, rutted, wide

Trail on flat: eroded, muddy, wide

Rolling contour trail: undamaged

Do not exceed the Half Rule

A trail's grade shouldn't exceed half the grade of the hillside or sideslope that the trail traverses. If the grade does exceed half the sideslope, it is considered a fall-line trail. Water will flow down a fall-line trail rather than run across it. Measure the sideslope with a clinometer, then be sure to keep the tread grade below half of that figure in order to ensure good drainage. For example, if you're building across a hillside with a sideslope of 20 percent, the trail-tread grade should not exceed 10 percent. There is an upper limit to this half rule: You must also apply knowledge about maximum sustainable grades. Very steep trails will erode even if their grade meets the half rule. For example, a trail with a grade of 24 percent that traverses a steep, 50-percent sideslope will be unsustainable even though it complies with the half rule.
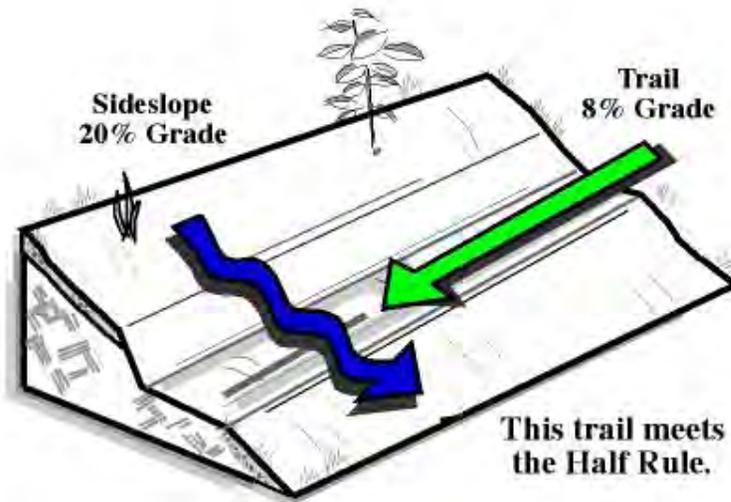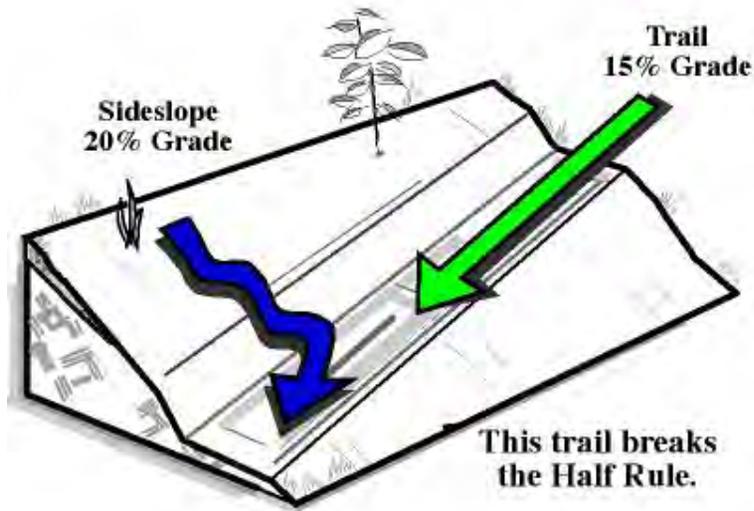
Follow the Ten Percent Average Guideline

Generally, an average trail grade of 10 percent or less is most sustainable, average trail grade is the slope of the trail from one end to the other. Many trails will have short sections steeper than 10 percent, and some unique situations will allow average trail grades of more than 10 percent. A trail's average grade is calculated by dividing total elevation gain by total length, multiplied by 100 to convert to percent.
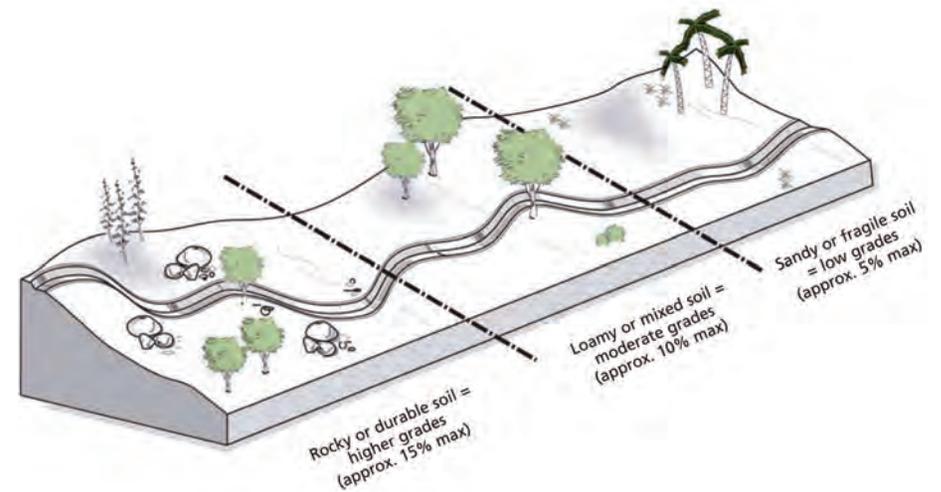
Overall Average Grade

Average Grade = 8%

Elev. 458 feet (139.5 meter)

Rise = 8 feet (2.4 meter)

4%

15%

5%

7%

9%

Elev. 450 feet (137 meter)

Run = 100 feet (30.5 meter)

Half Rule

Sideslope 20% Grade

Trail 15% Grade

This trail breaks the Half Rule.

Sideslope 20% Grade

Trail 8% Grade
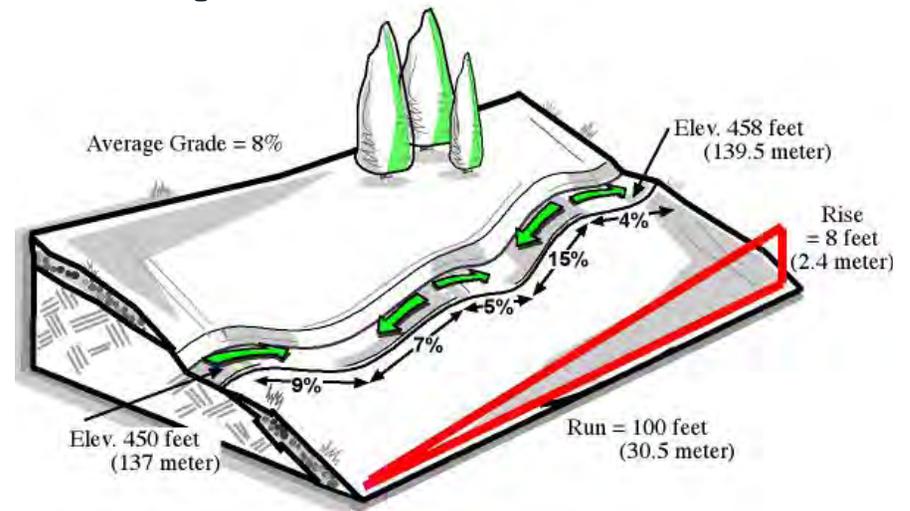
This trail meets the Half Rule.

Maximum sustainable trail grade is typically about 15 percent; it is site-specific and fluctuates slightly based on several factors. The variables to be considered when setting your target maximum trail grade include:

- Half Rule
- Soil Type
- Rock
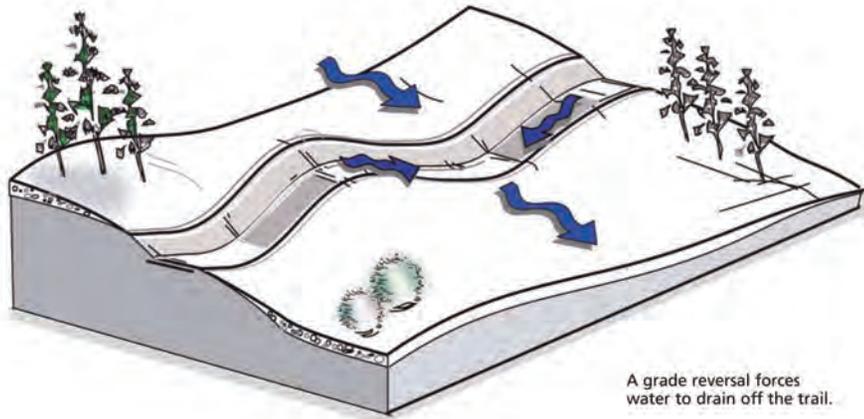- Annual Rainfall Amount
- Grade Reversals
- Type of Users
- Number of Users
- Difficulty Level

Max Sustained Grade

Rocky or durable soil = higher grades (approx. 15% max)

Loamy or mixed soil = moderate grades (approx. 10% max)

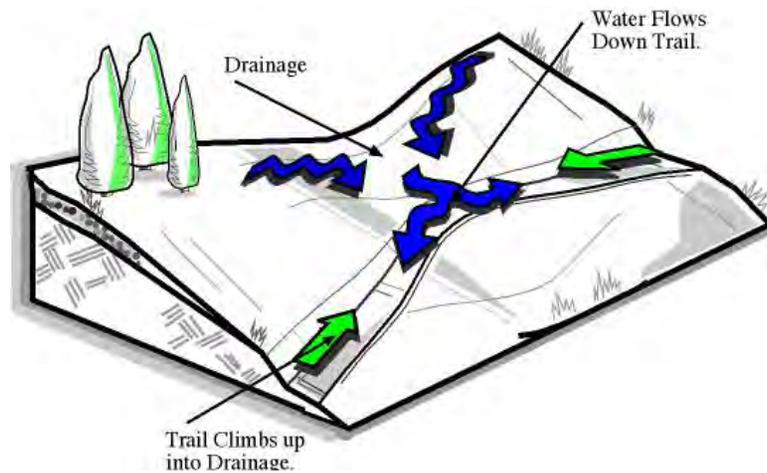Sandy or fragile soil = low grades (approx. 5% max)

Construct Grade Reversals

A grade reversal is just what it sounds like—a spot at which a climbing trail levels out and then changes direction, dropping subtly for 3 to 15 linear meters before rising again. This change in grade forces water to exit the trail at the low point of the grade reversal, before it can gain more volume, momentum, and erosive power. Grade reversals are known by several different terms, including grade dip, grade brake, drainage dip, and rolling dip.
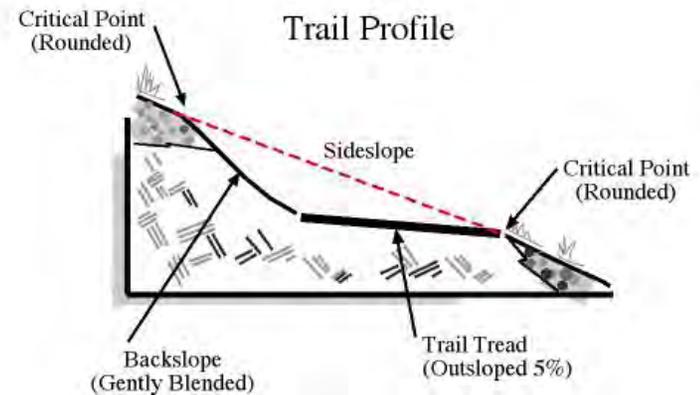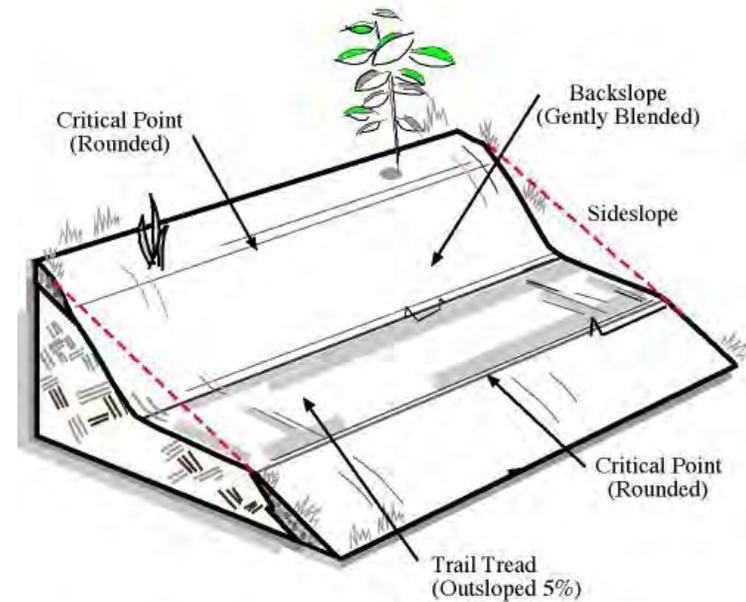
Grade Reversal

A grade reversal forces water to drain off the trail.

Improper Drainage Crossing

Water Flows Down Trail.

Drainage

Trail Climbs up into Drainage.

Full Bench Trail

Critical Point (Rounded)

Backslope (Gently Blended)

Sideslope

Critical Point (Rounded)

Trail Tread (Outsloped 5%)

Critical Point (Rounded)

Trail Profile

Sideslope

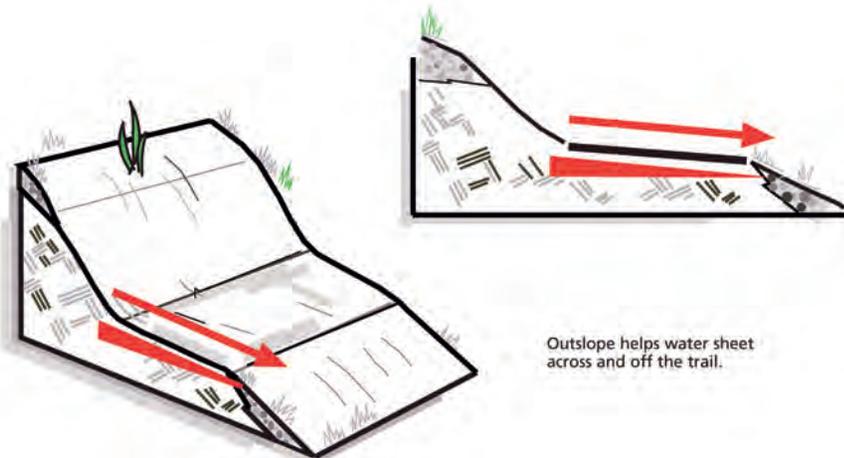Critical Point (Rounded)

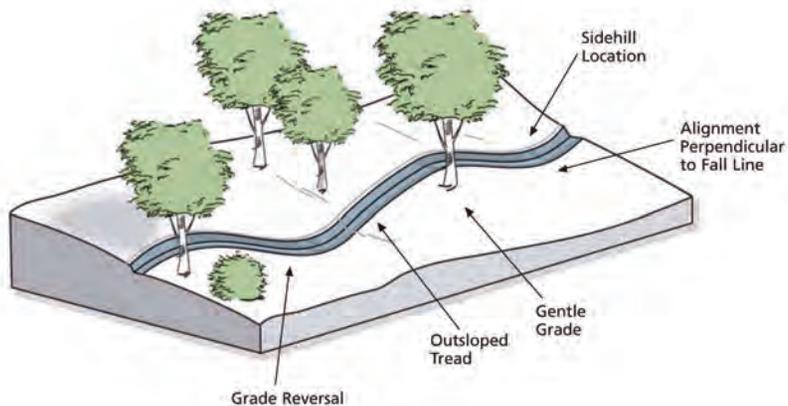Backslope (Gently Blended)

Trail Tread (Outsloped 5%)

Construct trails that Outslope about 5%

As the trail contours across a hillside, the downhill or outer edge of the tread should tilt slightly down and away from the high side. This tilt is called outslope, and it encourages water to sheet across and off the trail instead of funneling down its center. Outslope is one reason why contour trails last for years and years. IMBA recommends that all trail treads be built with a 5-percent outslope.

Outslope

Outslope helps water sheet across and off the trail.

Rolling Contour Trail

Sidehill Location

Alignment Perpendicular to Fall Line

Gentle Grade

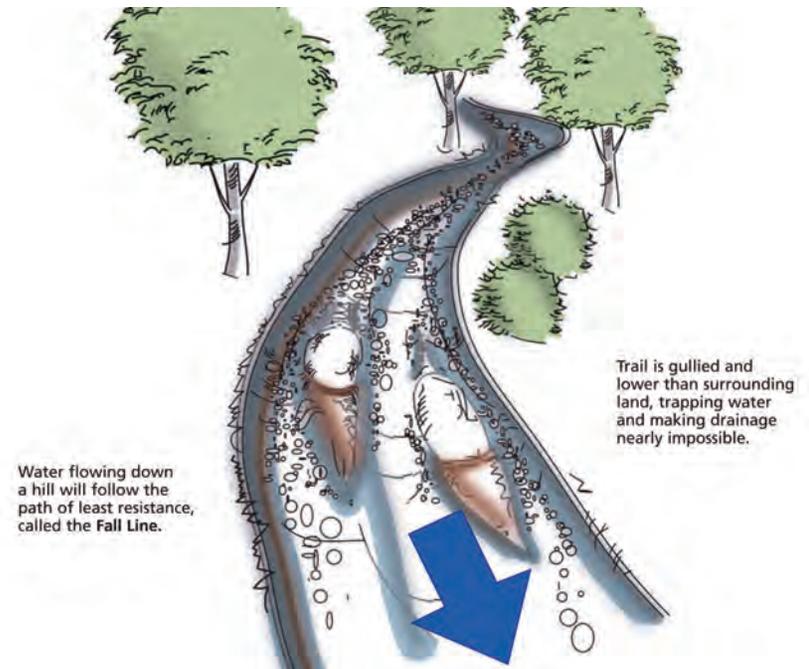Outsloped Tread

Grade Reversal

Avoid The Fall Line

Fall-line trails usually follow the shortest route down a hill, the same path that water follows. The problem with fallline trails is that they focus water down their length. The accelerating water strips the trail of soil, exposing roots, creating gullies, and scarring the environment.

Avoid Flat Areas

Flat terrain lures many trail builders with the initial ease of trail construction. However, if a trail is not located on a slope, it will become a muddy wet basin full of water. The trail tread must always be slightly higher than the ground on at least one side of it so that water can drain off properly.

Fall Line

Trail is gullied and lower than surrounding land, trapping water and making drainage nearly impossible.

Water flowing down a hill will follow the path of least resistance, called the **Fall Line**.

GENERAL TRAIL WORK ACTIONS

If executed in a consistent and well-planned manner these prescriptions will lead to an enjoyable hiking and mountain bicycling experience that can be sustainably managed. A well-managed trail system can continue to be expanded or developed to meet the changing needs of users while minimizing impacts upon natural resources.

Basic Maintenance

Regular basic maintenance (BM) should be carried out on all routes. Trails which are heavily used will need attention on an annual basis at minimum. This class of trails have minimal density of issues that can usually be fixed using hand tools. The majority of existing damage is caused by water or user behavior. Effective drainage should be a priority.

Remove or trim vegetation (sidecutting) to create clear sight lines to increase user safety and decrease conflict. A crowded trail with a mix of runners, dog walkers, and children calls for greater visibility. If the trail is smooth and wide, mountain bikers may be tempted to ride too fast. Keep some vegetation below waist level to control trail width and anchor turns but still allow for clear sight lines. Vegetation should be cut back to leave a trail corridor which is at least 18" wide at pedal height. Do not remove trees near the trail; instead trim their branches for better visibility. Special attention should be given to intersections and the many blind corners that trails in forested or brushy areas possess. These areas have the highest potential for conflict and injuries to users.

Waterbars should not be used as a solution to direct water off of trails. Rather rolling grade dips and "knicks" should be used to replace water canals to control and direct it off of the trail. Remove all water canals, often called water bars. These structures accelerate water, which increases erosion. If not maintained the canal will fill with sediment and water will flow across it or undermine its foundation. They are also dangerous for mountain bikers who are not expert riders. The trail tread should be corrected by removing pointy or protruding rocks to allow a relatively consistent riding surface. Rounded, flat, or smooth rocks should remain in place to maintain technical challenge and increase surface durability.

Correct the cupped tread that has developed along many trails. This cupping will focus water down the trail, resulting in increased erosion. Removing the berm and vegetation at the outside edge of the tread will improve drainage and also serves to define the tread.

Move signs, fences and fence posts at least 6 feet from the edges of trails to prevent injuries and possibly death. Hang flags or signs on fences or wires that cross the trail to give users time to stop, and therefore avoid injury.

Extensive Maintenance

Some trails need Extensive Maintenance (EM). EM requires the same actions as BM, but typically trail segments requiring EM have a higher density and more severity of issues. EM can include extensive sidecutting, improving/replacing existing drainage structures, installing additional drainage structures, repairing/replacing bridge structures, fixing tread issues, and repairing/moving signage.

Reconstruction

In addition to actions in BM and EM, some trails require Reconstruction (RC). These are trail sections which have excessive erosion, are severely cupped, fall line sections requiring rerouting, or have become overgrown from lack of use. These issues are usually so intensive that machinery such as a mini-excavator with an experienced trail builder in control may be required for effective repairs. Mechanized equipment should not be used unless the operator is a skilled and experienced mountain bicycle trail builder.

- Water crossings or swales with high water flow should be armored with stone.
- Tight corners on switchback turns are impossible to navigate by bike, requiring the rider to dismount, this should be avoided. Turns should be made wider with a radius of 12-30 feet depending on the hill slope, making them suitable to traverse by mountain bike

- Fall line trail sections promote erosion; these should be rerouted, with new trail constructed on a sustainable grade of less than 15% on average.

- Add grade reversals every 20-150 feet to control runoff

Reroute

Some trails should be relocated from their current alignment. Usually these segments violate one or more of the fundamental rules of sustainable trail design or are negatively impacting natural or cultural resources. Trails must be rerouted when:

- Built at a steeper grade than the "Half Rule" allows.

- Built on the fall line.

- Built across flat or wet ground.

Trail realignment and decommissioning

When existing trails show signs of unsustainable construction methods and/or are not meeting the trail experience goals set by the land manager, trail realignments and/or trail decommissioning are methods to resolve these issues.

Trails built at unsustainable grades (typically along steep grades) evidenced by signs of erosion, like gullies and loose tread, add sediment to waterbodies. Scenarios like this require constant maintenance and don't serve users with a stable walking or biking surface. Once these issues are identified, realignments should be considered that provide the desired trail user experience in a sustainable manner. Realignments will need adequate space in appropriate terrain to create a new alignment with a constant and stable surface. The new trail alignment should utilize rolling contour design to climb and descend contours at sustainable grades. Construction of turns may be needed to place the trail in the available terrain. Once complete, signage may be required to inform new and repeat visitors of the alignment and can also educate users as to why the realignment was needed.
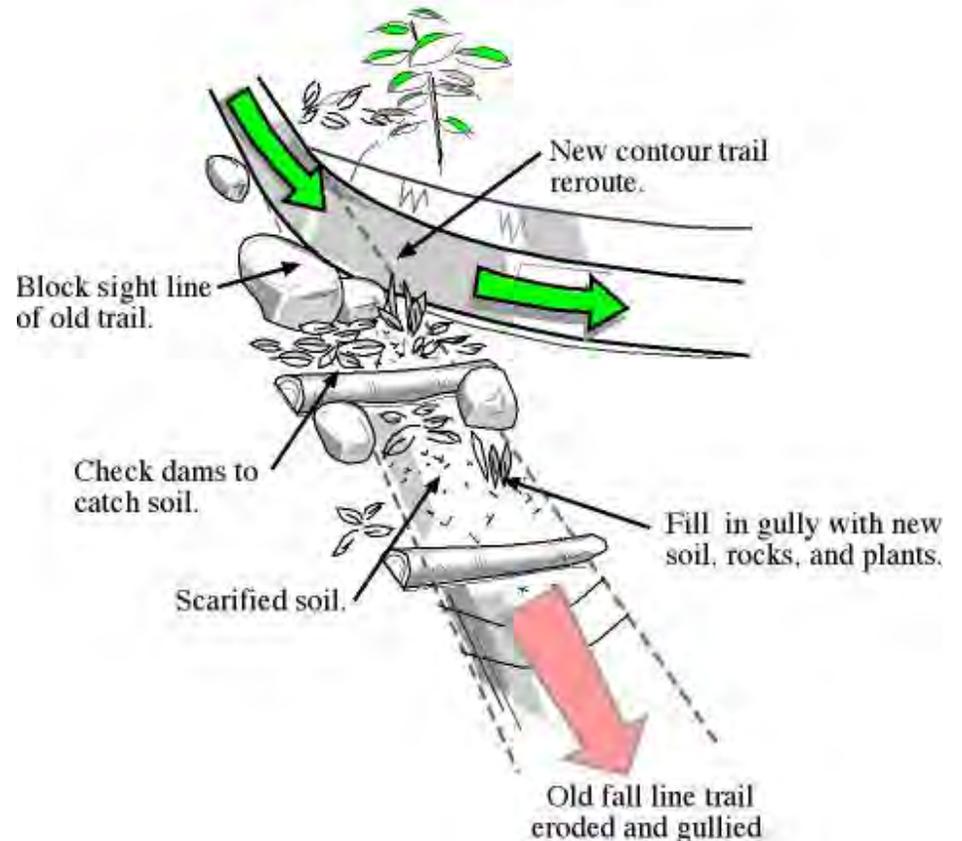
Land managers have a couple options when a realignment has been constructed to replace a previous unsustainable trail. Options include either removing/retaining portions of the old trail or completely decommissioning the trail. Many times, it is best to do the latter to discourage visitors on old sections leading to continued use on historically unsustainable sections. The new trail alignment will better serve the land manager with a sustainable and maintainable trail while users will not miss the old trail as long as the new experience is better than the previous.

When a trail is decommissioned, certain measures are necessary to reestablish vegetation and discourage users from traveling the familiar trail alignment. To encourage revegetation, the tread requires scarification to loosen and aerate the soil, creating suitable conditions for the establishment of seeds and plants. When a trail is first decommissioned and vegetation is growing in, install signage educating users of the purpose and intended results of the trail decommission including the importance of refraining from use along the old alignment. Logs, fences, or physical barriers may need be temporarily placed to discourage entry into the historical alignment. With a seamless connection to the new trail alignment, users will be drawn to the new trail that meets their needs and desired experience.

In some instances, steep trails that contain compacted tread, don't show signs of erosion, and are a favored alignment by visitors may be retained if the trail meets the goals of the land manager. Proper management and signage are techniques to educate users of designated uses or directions of the trail.

Trail Closure and Reclamation

Ensure smooth transition from existing trail to new trail.

New contour trail reroute.

Block sight line of old trail.

Check dams to catch soil.

Fill in gully with new soil, rocks, and plants.

Scarified soil.

Old fall line trail eroded and gullied

BIKE FACILITIES & TRAILS

The types of mountain bike trails and facilities considered in this feasibility study are explained below. These narratives are meant to provide a brief description of the envisioned experience, intended user, construction considerations, and approximate ranges of construction costs. The construction costs reflect the cost of retaining a professional trail contractor and are provided for financial planning purposes only. The cost ranges do not include planning, design, and permitting needed to develop the facilities, typically estimated at 10-20% of construction costs. It is important to consider ongoing maintenance costs of trails and bike facilities; these can range from 5-25% of the installation cost.

Trail Types

Modern trail systems use specific trail types as a way of managing users and providing them with the best possible visitor experience. Extensive planning and design should be dedicated to the goal of maximizing a visitor's trail experience while simultaneously balancing the demands of physical, environmental, and social sustainability. This list is not exhaustive.

Traditional Shared-Use Singletrack

These trails can serve walkers, hikers, runners, cyclists, and equestrians. Trails should be constructed and maintained according to sustainable trail construction practices and employ techniques that minimize user conflict. Multiple user types travel these routes; therefore, care should be taken to avoid obstacles such as jumps or water bars which may lead to undesirable trail experiences for some. Turns are constructed sustainably, but are generally not cambered like bike-optimized turns that improve cornering traction. Keeping trail grades within certain ranges ensures both a positive trail experience for users and enables proper stormwater drainage with minimized erosion. Depending on soil conditions, these trails may need surface hardening techniques to provide a durable four-season trail.

Approximate Construction Costs: $40,000-$70,000 per mile

Mountain Bike-Optimized Singletrack

These trails are purpose-built to optimize the experience of riding a mountain bike. The trails can either be unidirectional or bidirectional depending on the type of trail, preferred circulation of users, and management decisions. This type of trail is constructed with features such as rock gardens, berms, grade reversals, cambered turns (typically wider than turns on traditional singletrack trails), and modest jumps. These trails should make use of gravitational forces and, where possible, be managed to enhance trail flow for descending riders. These trails may need surface hardening to provide a durable four-season trail. They should be designed for a range of users from beginner to advanced skill levels. Optional advanced features can be located along the side of the trail to provide challenges for intermediate and advanced riders. This allows many skill levels to experience the full trail mileage, while providing for skill progression within a smaller trail footprint.

- Approximate Construction Costs: $50,000-$100,000 per mile

Adaptive Mountain Bike Trails

Adaptive mountain bike trails are natural surface trails that feature specific design parameters to accommodate adaptive mountain bikes (aMTBs) while providing a high-quality experience for "different-abled" riders. Adaptive mountain bikes are equipped with the proper positioning and geometry to allow the millions of Americans have a mobility disability to enjoy the outdoors. The bikes have three wheels (trikes) or four (quads) and may position the riders in a laid back, recumbent position for most crosscountry style bikes or face-forward with the riders back to the sky which is common for all-mountain style bikes. The style and make of the bikes vary, but all are wider, larger, and heavier than traditional mountain bikes which results in significant changes to acceleration, deceleration, and the ability to change direction and corner.

Adaptive mountain bike trails combine an appropriate combination of width, radius, and grade to create an accessible layout and design of the trail. In general, the adaptive mountain bike trails must be wider, uphill gradients decreased and less abrupt, turning radius increased, bridges and trail features widened, and access to trails must be barrier free with low grade climbs. Riders are positioned lower to the ground which must be accounted for when creating clear sightlines. When a trail traverses steep slopes, the tread width should be increased and tread outslope must be greatly lessened or removed to uphold clear passage in landscapes with high exposure. Rollers and undulations in the trail must be gradual and require adequate spacing between each to allow riders to coast through without pedaling. Pull-outs along the side of the trail should be installed to allow riders to rest along the trail and allow other riders to pass. Trails must free of obstacles for easy (green) aMTB trails, but can feature obstacles, such as rocky sections, on more advanced trails.

Planning and designing for these trails at the beginning of a project is necessary to create trail specifications and a layout that delivers the intended experience. Due to the tread width of aMTB trails, the most feasible way to build these trails is with the assistance of machines.

EXPERIENCE ZONES & PREFERRED-USE TRAILS

Experience zones and preferred-use trails are showing up in trail systems around the world. Experience zones divide management areas into special-use zones designed around specific activities: one zone may be preferred for mountain biking and another for accessible, interpretive trails. Implementation of such zones can provide a variety of visitor experiences and recreational opportunities that reduce conflict between differing user groups while providing sustainable, long-lasting trails.

Single use challenges the notion that all trails must be all things to all people. In this case, land managers designate certain trails as "preferred" for certain activities. For example, a trail that is single use for mountain bikers might be designed to be fast and flowing through open terrain, with swooping turns and dips. Hiking-preferred trails, meanwhile, may be more about travel efficiency with stairs, tight switchbacks, short distances, or other qualities that would be less attractive to bikers and equestrians. Visitors will be drawn to routes that match their desired experience.

Each trail system should, of course, include a variety of trails. One way to include numerous types of trails is to have shared-use trails at the beginning of the network near parking lots, with preferred-use trails branching off farther along. The number of trails designated for each mode of travel should be based on the habits and needs of the user groups being managed.

RECOMMENDATIONS

Improvements to connectivity, access, user experience, and existing tails are proposed for Neversink Mountain Preserve. These recommendations are geared to provide visitors with a quality trail experience and establish a sustainable trail system for visitors of all ages and ability levels. The Proposed Trail Plan Graphic illustrates the proposed trail type corridors, these are intended to provide general guidance, but additional field design and flagging will be needed to dial in specific alignments.

Access from the Klapperthal trailhead will remain the main point of entry to the trail system, trailhead improvements and expanded parking capacity are needed. Continued engagement with the Forest Hills Cemetery should be pursued. The land between the Neversink Trail and Klapperthal Trail provides the best opportunity for expanded parking as it has gentle slopes and could accommodate a larger parking area and additional trailhead amenities such as restrooms and visitor information/education. Multiple shared use loops are available from this location, hike only, shared-use traditional singletrack, and bike optimized shared-use singletrack are all proposed for this area. Segment 206 will replace the existing steep gravel road and provide a mellow shared use singletrack loop to the Schuylkill River Viewpoints where a connection to Neversink North Trail can be made. Constructing a stone staircase will link the two viewpoints for hikers and a slightly longer trail segment with grades under 8% will allow bikers to make the connection as well. Segments 207 and 205 create a sustainable shared use loop with connectivity to the McIlvain Pavilion and City Overlook near the summit. Re-routes along segments 209 and 210 will create an easier route to the summit and avoids the steep power line and radio tower access roads. Segment 301 (red/white trail) needs extensive maintenance but is a nice hike only option for visitors, stone steps, drainage improvements, trail hardening and a re-route of the lower section out of the wetland area will improve the sustainability of this trail. The shared-use bike optimized trails from the Klapperthal side include segments 404 and 406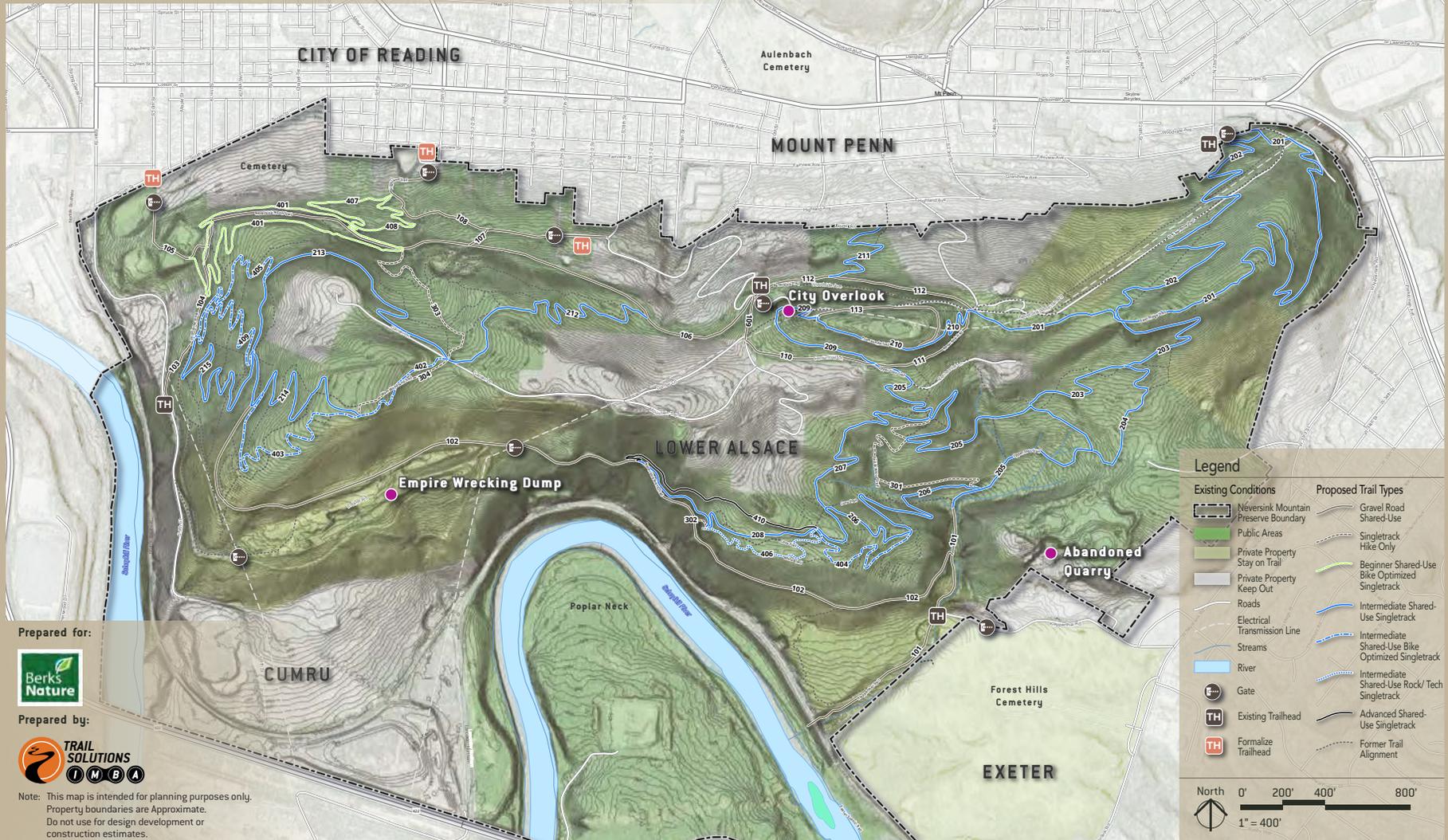. These short loops take advantage of the rocky ridges and provide an opportunity for some of the technical challenge riders are looking for along with an opportunity to separate user groups.

The East Ridge Trail includes some steep segments, re-routes are recommended along these sections as this trail is the main route to the summit from the Fairview Ave, Trailhead. The addition of Segment 202 will make this a nice intermediate loop and avoids the steep gravel access road and power line corridor. Segments 203 and 204 provide additional connectivity and loop options between the summit, Klapperthal Trailhead, and Fairview Ave. Trailhead.

The northwest side of Neversink Mountain is detached from the Klapperthal and Fairview Ave. Trailheads, separated by larger private land parcels, the Neversink Trail is the only connection point between the two sides. This creates an excellent opportunity for a more bike optimized zone that is close to city playgrounds and neighborhoods. The 9th street trailhead is the main access point, trailhead improvements and expanded parking should be implemented here. The 10th and 15th Street playgrounds provide an important connection to the City of Reading with trailhead and trail improvements needed to make them more welcoming for kids and families and residents. The terrain between the playgrounds is the only location on site suitable for beginner trails with easy grades (under 5%). Segments 401, 407, 408 create two loops and provide 1.7 miles of fun easy trails for kids and accessible walking loops. Trails along the upper portions of the slopes are both shared use and bike optimized focused. They follow some of the ideas of the existing user created trails but planned in a sustainable way that create opportunities for progression and minimize user conflicts. Segment 215 creates an easier route between the upper and lower legs of the Neversink Trail and removes people from the steep power-line trail that is currently being utilized. Segments 213 and 212 create an upper singletrack connection to the West Woodland trail and intermediate and advanced bike optimized trails. Segment 214 re-routes the steep portions of the West Woodland Trail and would provide uphill bike access to Segment 403.

NEVERSINK MOUNTAIN PRESERVE
Proposed Trail Plan

CITY OF READING

Aulenbach
Cemetery

MOUNT PENN

Cemetery

City Overlook

LOWER ALSACE

Empire Wrecking Dump

Abandoned
Quarry

Poplar Neck

CUMRU

Forest Hills
Cemetery

EXETER

Legend

Existing Conditions

- Neversink Mountain Preserve Boundary
- Public Areas
- Private Property Stay on Trail
- Private Property Keep Out
- Roads
- Electrical Transmission Line
- Streams
- River
- Gate
- TH Existing Trailhead
- TH Formalize Trailhead

Proposed Trail Types

- Gravel Road Shared-Use
- Singletrack Hike Only
- Beginner Shared-Use Bike Optimized Singletrack
- Intermediate Shared-Use Singletrack
- Intermediate Shared-Use Bike Optimized Singletrack
- Intermediate Shared-Use Rock/ Tech Singletrack
- Advanced Shared-Use Singletrack
- Former Trail Alignment

North   0'   200'   400'   800'

1" = 400'

Prepared for:

Berks Nature

Prepared by:

TRAIL SOLUTIONS
I M B A

Note: This map is intended for planning purposes only. Property boundaries are Approximate. Do not use for design development or construction estimates.

IMPLEMENTATION

Community Outreach and Visioning

The concept plan reflects the suitable locations for bike facilities based upon analysis of the site and identified goals. The proposed locations work in tandem with existing recreational amenities and are located based upon the assessment of opportunities, constraints, nearby supporting infrastructure, and community amenities. The concept plan is preliminary at this point in the planning process. Public outreach, such as community and stakeholder meetings, is encouraged to gather input, generate excitement and support for the plan, create a stewardship base of future trail users, and build a sense of ownership and pride of the bike facilities. In addition to reaching out to residents, communication with local bike organizations and other mountain bike enthusiasts will help build an understanding of the existing ridership, their interests, and concerns while creating relationships. These mountain bike enthusiasts can share local knowledge of trails, construction experience, and lessons learned on past projects.

Since many of the bike facilities presented in this study would be a new type of recreational amenity to the area, the facilities and their benefits may be unfamiliar to residents, stakeholders, and community leaders. Continued education, through community meetings, field trips to trails and bike facilities, and demonstration projects will help residents understand the potential of these facilities and generate support for future projects.

To create a regionally-significant destination, coordination early on with the tourism bureau and community development organizations will help create necessary branding, content, and platforms to spread the word of the bike facility development.

Risk Management

As the bike facilities would introduce a new type of recreation with unknown liability concerns, an assessment and clear understanding of recreation protections, laws, and precedents is necessary to ease concerns and create a plan to mitigate risk. Professional legal advice is recommended to ensure all liability concerns are understood and create a plan to mitigate risk. Warnings of the inherit risk of mountain biking should be clearly provided on park signage and should be reviewed by a legal professional.

Bike Facility and Trail Development

Once the design has been refined, the creation of construction plans with specifications and details is necessary to guide and communicate the construction. Based upon the facility type and conditions, permitting plan sets may be necessary. For the development of all trails and bike facilities, we recommend a professional trail designer/builder field flag the trail alignments, construct the trails or bike facilities, and provide training for staff and volunteers. The construction of asphalt features will require the services of a specialized designer and builder. For the construction of the pumptrack, we recommend an experienced rider/builder to provide consultation services and oversight during construction to ensure the proper design, spacing, and scale of features. When retaining a professional trail building firm, we recommend having a qualified construction manager experienced with mountain bike trail development provide oversight during the construction progress, perform inspections, and provide quality assurance services.

Maintenance

Ensuring a quality, consistent riding experience is key to attracting visitors and keeping a local riding community satisfied and growing. As such, maintenance is an ongoing activity and should be planned for. Many bike park land managers follow an operations and maintenance plan to ensure all maintenance tasks are planned, scheduled, and recorded on an ongoing and regular basis. Performing regularly-scheduled maintenance tasks and recording such activities is recommended as an element of the park's risk management approach. Maintenance can include watering and shaping features, seal coating, landscaping, checking fasteners, and inspecting wear/tear on tread and features. Dirt features, such as the pumptrack, require a water source to maintain compaction and shape for riding.

Typical annual maintenance budgets for bike parks range between 20%-25% of the installation cost. Bike park features can typically be maintained by trained staff. Increasingly, destination mountain bike trail systems are funding and hiring part- or full-time staff to provide maintenance to bike parks and trail systems. Professional assistance will occasionally be required. The frequency will depend upon ongoing maintenance as well as weather patterns and use. Some of the annual maintenance for all trails can be performed by managed and trained volunteers. These tasks will include landscape maintenance around the bike park and corridor trimming, downed tree removal, general clean up, and minor drainage work of trails.

Programming

To fully activate and create a community around outdoor recreation and mountain biking, certain programming is recommended. Mountain bike skills clinics and/or guided rides can be provided by area groups such as Berks Area Mountain Bike Association (BAMBA) to help introduce the sport to new riders and help them improve skills. The trail system provide the potential to host competitions. Having scheduled volunteer days keeps the community engaged, invested in their local trails, and helps improve the conditions of the trails while reducing the maintenance workload of land managers. Events and programming keep visitation numbers high throughout the year.

CONCLUSION

Next Steps

This concept plan serves as a guiding vision for the development of trails at Neversink Mountain. This plan looks at conceptual opportunities but will require refinement and detailed design. We recommend consulting with a professional trail designer/builder to finalize the layout of the plan. To bring these concepts and ideas into fruition, the next step is to share the findings of this report with the appropriate stakeholders and staff to gather their feedback, strategize the next steps, and identify funding sources. This coordination will help identify the key areas of need and prioritize projects. Public meetings with community leaders, residents and other stakeholders are encouraged to engage the public and build interest in the project. Additional design, community engagement, site surveys, and permitting will be needed before construction begins. Recommendations for project phasing are provided on pages 28 - 29 creating a framework for development. An engineer should be engaged for the bridges and stormwater needs. Permits may also be needed for wetlands and site construction, along with a survey of wetlands, utilities and other infrastructure.

Summary

This document presents an assessment of the existing trail system at Neversink Mountain and outlines key opportunities, constraints, and recommendations for a sustainable trail network that will provide high quality experiences for all users. There is a dedicated community of trail supporters, hikers, and mountain bikers that share a passion for the resource and trail stewardship. Improvements to the system will serve existing outdoor enthusiasts and provide additional recreational opportunities for undeserved area residents. With the addition of new trail types, the resulting trail system offers visitors increased mileage, a diversity of experiences for all users, greater circulation options, and sustainable trail alignments that will provide a durable surface for generations to come.
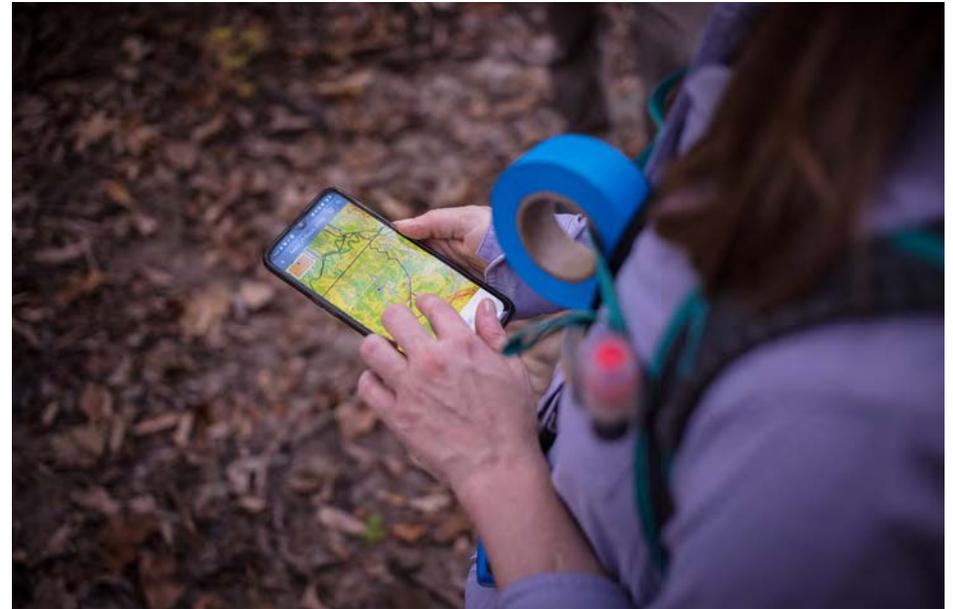
APPENDIX A: FIGURES

Figure 1: Neversink Mountain Preserve - Existing Conditions

Figure 2: Neversink Mountain Preserve - Proposed Action Plan

Figure 3: Neversink Mountain Preserve - Proposed Trail Plan

NEVERSINK MOUNTAIN PRESERVE
Existing Conditions

CITY OF READING

Aulenbach Cemetery

MOUNT PENN

Cemetery

City Overlook

LOWER ALSACE

Empire Wrecking Dump

Abandoned Quarry

Poplar Neck

CUMRU

Forest Hills Cemetery

EXETER

Prepared for:

Berks Nature

Prepared by:

TRAIL SOLUTIONS
IMBA

Note: This map is intended for planning purposes only.
Property boundaries are Approximate.
Do not use for design development or
construction estimates.

Legend

Existing Conditions

- - - Neversink Mountain Preserve Boundary
Public Areas
Private Property Stay on Trail
Private Property Keep Out
Roads
Electrical Transmission Line
Streams
River
Gate
TH Trailhead

Existing Trails

Existing - Gravel Roadbed
Existing - Natural Surface Roadbed
Existing - Singletrack
Unsanctioned - Gravel Roadbed
Unsanctioned - Natural Surface Roadbed
Unsanctioned - Singletrack

North

0'   200'   400'   800'

1" = 400'

NEVERSINK MOUNTAIN PRESERVE
Proposed Action Plan

CITY OF READING

Aulenbach Cemetery

MOUNT PENN

Cemetery

LOWER ALSACE

City Overlook

Empire Wrecking Dump

Abandoned Quarry

CUMRU

Poplar Neck

Forest Hills Cemetery

EXETER

Schuylkill River

TH — Trailhead

Prepared for:

Berks Nature

Prepared by:

TRAIL SOLUTIONS
IMBA

Note: This map is intended for planning purposes only.
Property boundaries are Approximate.
Do not use for design development or construction estimates.

Legend

Existing Conditions

- - - Neversink Mountain Preserve Boundary
Public Areas
Private Property Stay on Trail
Private Property Keep Out
Roads
Electrical Transmission Line
Streams
River
Gate
TH Trailhead

Proposed Action

Existing - Basic Maintenance
Existing - Close
Existing - Extensive Maintenance/Reroute
Unsanctioned - Basic Maintenance
Unsanctioned - Close for Trail Use
Unsanctioned - Extensive Maintenance/Reroute

North
0'   200'   400'   800'
1" = 400'

Trail labels: S25, S24, S23, S2, S35, S26, S28, S29, S30, S32, S34, S27, U28, U27, U29, U30, U31, U32, U33, U35, U36, U34, U25, U21, U23, U24, U20, U15, U22, U19, U26, U16, U14, U17, U18, S33, S31, S1, S3, S4, S5, S6, S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S18, S19, S21, S22, S36, S37, U1, U2, U3, U4, U5, U6, U7, U8, U9, U10, U11, U12, U13, U37, U38, U39

NEVERSINK MOUNTAIN PRESERVE
Proposed Trail Plan

CITY OF READING

Cemetery

MOUNT PENN

Aulenbach Cemetery

City Overlook

LOWER ALSACE

Empire Wrecking Dump

Abandoned Quarry

CUMRU

Poplar Neck

Forest Hills Cemetery

EXETER

Schuylkill River

Prepared for:

Berks Nature

Prepared by:

TRAIL SOLUTIONS
IMBA

Note: This map is intended for planning purposes only.
Property boundaries are Approximate.
Do not use for design development or
construction estimates.

Legend

Existing Conditions

- ⸺ Neversink Mountain Preserve Boundary
- Public Areas
- Private Property Stay on Trail
- Private Property Keep Out
- Roads
- Electrical Transmission Line
- Streams
- River
- Gate
- TH Existing Trailhead
- TH Formalize Trailhead

Proposed Trail Types

- Gravel Road Shared-Use
- Singletrack Hike Only
- Beginner Shared-Use Bike Optimized Singletrack
- Intermediate Shared-Use Singletrack
- Intermediate Shared-Use Bike Optimized Singletrack
- Intermediate Shared-Use Rock/ Tech Singletrack
- Advanced Shared-Use Singletrack
- Former Trail Alignment

North

0'   200'   400'   800'

1" = 400'

APPENDIX B: GENERAL TRAILS PLANNING & DESIGN GUIDELINES

The following are guidelines for the construction and maintenance of trails. The natural environment is dynamic and unpredictable. The nature of recreational trails and roads, the desired user experience, and the constant forces acting on natural surface trails and roads make strict standards untenable and undesirable. As such, the guidelines below are simply that: best management practices that should be followed within environmental constraints.

Trail System Design

Mountain Bike-Optimized Trails and Preferred Direction Trails

Mountain bike-optimized singletrack trails are designed and constructed to enhance trail experiences specifically for mountain bikers. Mountain bike-optimized trails might differ from traditional trails in several ways: enhanced tread shaping, directional or one-way travel, and the addition of man-made technical trail features (TTFs). Bicycles move differently along a trail than other modes of transportation. The movement of the wheel, the use of gravity and friction, the transfer of energy from the rider to the wheel – these offer both opportunities and constraints for trails and trail features that may differ from those of other users.

Mountain bike-optimized and one-way trails that harness gravity are a growing area of interest for mountain bikers. These trails can be designed and built at any level, from beginner friendly flow trails to extremely difficult race-oriented downhill trails. Riders cherish the feeling of flight that a bicycle provides while coasting through a succession of bike-optimized features from top to bottom. A consistent trail is not necessarily a boring or easy trail (though it can be), it's one that is designed such that a preceding section of trail prepares users for the subsequent sections. This is a hallmark of flow trails and can be particularly important for beginner trails, as well as for higher speed trails with gravity features, such as jumps and drops.

As trail systems grow and become congested, one-way trails help to take the pressure off popular shared-use trails. Riders looking for speed, thrill, and challenge will have their own designated areas, and users travelling at slower speeds will have their own trails. Well-designed mountain bike-optimized singletrack and gravity singletrack are exciting for mountain bikers but are also designed to help manage risk and minimize user conflict

Rolling Contour Design

Providing consistent climbs and extended descents is a design priority. Trails may contour gently up or down for consistent lengths to maximize climbs and descents. This is known as rolling contour design. All shared- use trails should be of rolling contour design to minimize impact and sedimentation in the watershed.

Stacked Loops

A stacked-loop system is a series of loops somewhat like links in a chain. The loops can vary in length and difficulty. In a stacked-loop system, the loops that are closest to the trailheads are more inviting to novice riders, and the loops further out cater to more advanced riders. This creates a progression of experiences and challenges as users explore the trails in more depth.

Progressive Hubs and Clusters

A trail system of hubs and clusters looks more like spokes radiating out from a central junction and intersecting at various points. A trailhead or major intersection is a hub. A cluster is a concentration of trails radiating out from the hub. Like a stacked loop system, hubs and clusters are designed with skill level progression in mind. Hubs and clusters give users more trail options for varying skill levels at each hub, allowing for skill level diversity. At many intersections, riders have the option to change trail difficulty or continue on the same difficulty level.

With progressive trail features, a mountain biker may become a better rider by gradually moving up in trail difficulty. This practice also spreads out visitors and helps reduce trail user conflict. This is also a proven risk management tool. Signage shows difficulty levels at every hub and wherever necessary in the trail system to help users choose trails based on their skill levels and desired experience. Giving riders the option to warm up before hitting more technical segments provides a level of safety in the system.

Loops and clusters are often favored over out-and-back routes because they offer variety. People love the adventure of starting down one path and returning to the same point by way of a different trail. With loops or clusters in a trail system, visitors can choose a short route, a combination of routes, or a long outer route.

Progressive design and construction also allow users of different levels to ride the trails in the same system, so families and groups can enjoy being together in one place and riders can find a trail that matches their skills and progress.

Trail Difficulty Rating System

In order for a trail system to provide the varied riding experiences and skill progression which trail users seek, the trails must be built to provide relatively specific challenges and riding characteristics. For the purposes of this conceptual trail plan, the difficulty rating system has been simplified into three levels:

- Easiest Trails, Green Lines (green circle) – For beginners, these trails have a smoother and wider tread, lower trail grades, and less exposure.
- More Difficult, Blue Lines (blue square) – For intermediate riders, these trails can be steeper, more technically difficult, or longer.
- Very to Extremely Difficult Trails, Red Lines (black diamond or double black diamond) – For advanced riders, these trails offer a combination of difficult trail tread, technical features, and long distances for those looking for challenge and endurance-oriented experiences. Generally, they have significant exposure and have less predictable surfaces.

This system was adapted from the International Trail Marking System used at ski areas throughout the world. Many trail networks use this type of system, most notably resort-based mountain biking trail networks. The system applies well to mountain bikers and is also applicable to other visitors such as hikers and equestrians. These ratings should be posted on trail signage and in all maps and descriptions. Following is a summary of criteria to be considered when implementing a trail rating system.

Tread Width

The average width of the active tread or beaten path of the trail.

Tread Surface

The material and stability of the tread surface is a determining factor in the difficulty of travel on the trail. Some descriptive terms include hardened (paved or surfaced), firm, stable, variable, widely variable, loose, and unpredictable.

Trail Grade (maximum and average)

Maximum grade is defined as the steepest section of trail that is more than approximately 10 feet in length and is measured in percent with a clinometer.

Average grade is the steepness of the trail over its entire length. Average grade can be calculated by taking the total elevation gain of the trail, divided by the total distance, multiplied by 100 to equal a percent grade.

Natural Obstacles and Technical Trail Features

Objects that add challenge by impeding travel. Examples of natural obstacles include rocks, roots, logs, holes, ledges, drop-offs. The height of each obstacle is measured from the tread surface to the top of the obstacle. If the obstacle is uneven in height, measure to the point over which it is most easily ridden. Technical trail features are objects that have been introduced to the trail to add technical challenge. Examples include rocks, logs, elevated bridges, teeter-totters, jumps, drop-offs. Both the height and the width of the technical trail feature are measured.

IMBA Trail Difficulty Rating System

	EASIEST WHITE CIRCLE	EASY GREEN CIRCLE	MORE DIFFICULT BLUE SQUARE	VERY DIFFICULT BLACK DIAMOND	EXTREMELY DIFFICULT DBL. BLACK DIAMOND
TRAIL WIDTH	72" (1,800 mm) or more	36" (900 mm) or more	24" (600 mm) or more	12" (300 mm) or more	6" (150 mm) or more
TREAD SURFACE	Hardened or surfaced	Firm and stable	Mostly stable with some variability	Widely variable	Widely variable and unpredictable
AVERAGE TRAIL GRADE	Less than 5%	5% or less	10% or less	15% or less	20% or more
MAXIMUM TRAIL GRADE	Max 10%	Max 15%	Max 15% or greater	Max 15% or greater	Max 15% or greater
NATURAL OBSTACLES AND TECHNICAL TRAIL FEATURES (TTF)	None	Unavoidable obstacles 2" (50 mm) tall or less Avoidable obstacles may be present Unavoidable bridges 36" (900 mm) or wider	Unavoidable obstacles 8" (200 mm) tall or less Avoidable obstacles may be present Unavoidable bridges 24" (600 mm) or wider TTF's 24" (600 mm) high or less, width of deck is greater than 1/2 the height	Unavoidable obstacles 15" (380 mm) tall or less Avoidable obstacles may be present May include loose rocks Unavoidable bridges 24" (600 mm) or wider TTF's 48" (1,200 mm) high or less, width of deck is less than 1/2 the height Short sections may exceed criteria	Unavoidable obstacles 15" (380 mm) tall or less Avoidable obstacles may be present May include loose rocks Unavoidable bridges 24" (600 mm) or narrower TTF's 48" (1,200 mm) high or greater, width of deck is unpredictable Many sections may exceed criteria

Trailheads

Well-placed trailheads and parking lots contribute to a successful trail system. Trailheads should be located in areas of lower elevation, as most trail users prefer outbound climbs with inbound descents back to the parking area. This also helps mitigate risk by allowing fatigued riders an easier route back to their starting point. This is especially true for mountain bikers, and necessary for families and beginners. Trailheads should offer information useful for the trail users, including trail maps, location information, emergency contact details, and volunteer information.

Sustainable Trails

A sustainable trail balances many elements and is designed to have little impact on the environment. Sustainable trails resist erosion through proper design, construction, and maintenance and blend with the surrounding area. A sustainable trail also appeals to and serves a variety of users over many years. It is designed to provide enjoyable and challenging experiences for visitors by managing their expectations effectively. Following sustainable trail design and construction guidelines allows for high-quality trail and education experiences for users while protecting the land's sensitive resources. For additional trail design, construction, and maintenance techniques, refer to Trail Solutions: IMBA's Guide to Building Sweet Singletrack. These guidelines are appropriate for any hike, bike, or equestrian trail.

Signage

The development of a mountain bike trail network requires the development of a comprehensive system of signs. Signs are the most important communication tool between land managers and trail users. A well-implemented and maintained signage system enhances the user experience by helping visitors navigate the trail network and providing information about the area. Signage also plays a critical role in managing risk and deploying emergency services.

Recommended signage for the trails should be simple, uncluttered, and obvious with a sign at every major intersection to help users stay on track. Signs should meet the needs of all users, from the daily trail user to someone who is experiencing the trails for the first time. In order to serve the variety of visitors, sign placement should be strategic and frequent. Because signs can intrude on the natural outdoor experience, too much signage can be unsightly. Balancing competing interests is key to developing a successful signage program.

Sign Types

A variety of signs can be created to help users identify trails and their location, select routes, remain confident in their trail choices, find destinations and key points of interest, and understand regulations and allowed uses. Signage can also be interpretive, helping visitors learn about responsible recreation, trail etiquette, and resource protection, as well as how to reduce risk and hazards.

Informational signs

Usually positioned at the trailhead and major intersections, informational signs provide details such as trail length and difficulty. These include signs that identify a trailhead from a road, signs at a trailhead kiosk, trail intersection signs, waymarks, difficulty rating signs, and trail length or elevation gain and loss signs.

Regulatory signs

These types of signs delineate rules, such as prohibited activities, direction of travel, or other restrictions.

Directional signs

Directional signs provide navigational information.

Warning signs

Often incorporating highly visible designs, these signs warn trail users of upcoming hazards or risks. These include visitor rules and regulations, allowed activities, road and trail intersections, and emergency signs.

Educational signs

Educational signs can provide a variety of information for trail users, such as guidelines for responsible recreation, descriptions of natural or cultural resources, trail etiquette, and bike skills

APPENDIX C: BENEFITS OF MOUNTAIN BICYCLING TRAILS

therefore be healthier. Physical health and exposure to nature also benefit mental health, reducing stress and increasing happiness. In addition, individual and community health translate to economic benefits by decreasing health care costs.

Promoting Active and Healthy Lifestyles

The benefits of mountain biking may start on the trails, but they don't end there. Learning to ride a bike is a rite of passage. Bikes and the sport of mountain biking provide a multitude of opportunities to teach children valuable lessons that will carry into adulthood.

Obesity is at a high, while activity levels among Americans are plummeting. With its progressive nature and way of stimulating the senses, mountain biking is appealing, especially to youth, and provides an excellent form of recreation for reversing the trend toward poor health. Since riding a bike provides excellent cardio conditioning, improves strength and coordination, and burns several hundred calories an hour, it is an activity as appealing to parents as it is to kids.

The unstructured play that mountain biking provides inspires people to explore and appreciate the natural world, leading to positive associations with outdoor activities and exercise.

Mountain biking allows individuals to advance at their own pace, so kids looking for a challenge can have just as much fun as children who are more interested in exploring the scenery. Riding in nature provides an environment where children can work on their skills, have fun, and pedal their bikes without parents having to worry. Mountain biking is a cross-generational endeavor, accessible to all ages and levels of physical fitness. Going for a trail ride is an excellent way for parents to do more than support their children's activities, it's a way to share the experience. Every ride is an opportunity to create a healthy lifestyle and pass on lessons that are best learned through experience.

Several studies on physical activity have indicated that proximity to recreational facilities, such as trails, is a predictor for physical activity. Simply put, if there are walking and biking trails nearby, then residents are more likely to use them and

Contributing to Economic Growth

A well-designed trail system can stimulate economic growth by increasing activity within the local population as well as attracting visitors from outside. Trails can generate business in retail sales and services, support jobs, provide sustainable growth in rural communities, and produce tax revenue. Access to trails also correlates to a higher quality of life, thus making the community more desirable and capable of attracting new businesses and workers to an area.

IMBA assists local communities in increasing mountain bicycling tourism as a sustainable, renewable source of economic development. A mountain biking destination is one that attracts tourists to an area for the benefits of the mountain biking experience; provides visitors with all of the amenities needed to compliment, ease, and enhance their visit; and in turn creates word of mouth about the community that will draw new and repeat visits.

According to the Outdoor Industry Alliance, mountain bicyclists represent approximately 3.4% of the U.S. population, or nearly 10.6 million participants. IMBA's own research indicates that enthusiasts, who represent a portion of this overall number, travel extensively within a four-hour range and will typically devote one week per year specifically to travel to reach mountain bicycling destinations. Same-day visitors spend approximately $35 per day in local communities while destination visitors spend closer to $193 per day (due in part to lodging and increased meal purchases).

While mountain bicyclists are certainly willing to travel to ride, they will only do so if their destination contains a key ingredient: high-quality trails. These trails must be of a sufficient length and contain a variety of experiences, such as traditional singletrack, bike-optimized singletrack, bike parks, and shuttle options. The competition for these destination-quality locations is slowly increasing over time

A case study in Cable, Wisconsin, clearly illustrates how a community can benefit from offering a world-class bicycling experience. Construction of new bicycle trails in Cable resulted in:

- Increased property values.
- Increased spending on bicycle related goods.
- 35 jobs created annually, adding $523,000 to total employee compensation.
- Nearly $1.3 million impact related to spending from mountain bicyclists.

Fostering Community Pride and Identity

Involving community members in the planning, building, and maintaining of trails fosters community pride. In order to maintain sustainable trails, care of the trail system should be managed by local enthusiasts and rely on an organized membership base. Volunteering to help with trails provides an opportunity for area residents to connect with each other and with the terrain and land that surround them. IMBA members donate nearly one million volunteer hours to trails throughout North America every year, making volunteerism a large part of mountain bike culture.

Trails and parks also provide informal opportunities for people to meet and interact with others in a natural setting. Connection to nature is paramount to maintaining the health of the environment and making the outdoors relevant and accessible to all. Trails serve a diverse population and cultivate unity and stewardship in the community. Trails can even revitalize blighted areas, for example, turning landfills into bike parks or gravel pits into trailheads.

Preserving Open Space

Trails make communities better places to live by preserving and creating open spaces for recreation. Greenways function as hands-on environmental classrooms for people of all ages, providing opportunities to enjoy nature close up. With its abundant plant life, open spaces can decrease pollution, protect water quality, and reduce soil erosion. Economic growth and property values are also tied to open space as buyers are generally willing to pay more for property located close to parks and open space. The recreation, health, economic, and environmental benefits of trails can contribute to an overall enhanced quality of life in nearby communities.

Encouraging Positive Recreation Use to Displace Negative Use

Without a plan, undeveloped areas are often haphazardly transformed by users creating unauthorized sites to suit their personal wants. Purposefully designing trail systems can help create diverse recreational opportunities, encourage safe use, and meet the needs of the entire community. Unauthorized trail building and dumping or other unacceptable activities can damage ecology, cause safety hazards, and leave behind debris that is both unsightly and illegal. The best way to encourage positive use is to displace negative use. A well-planned trail system can discourage and displace destructive activities with healthy recreational use that attracts visitors of all ages.
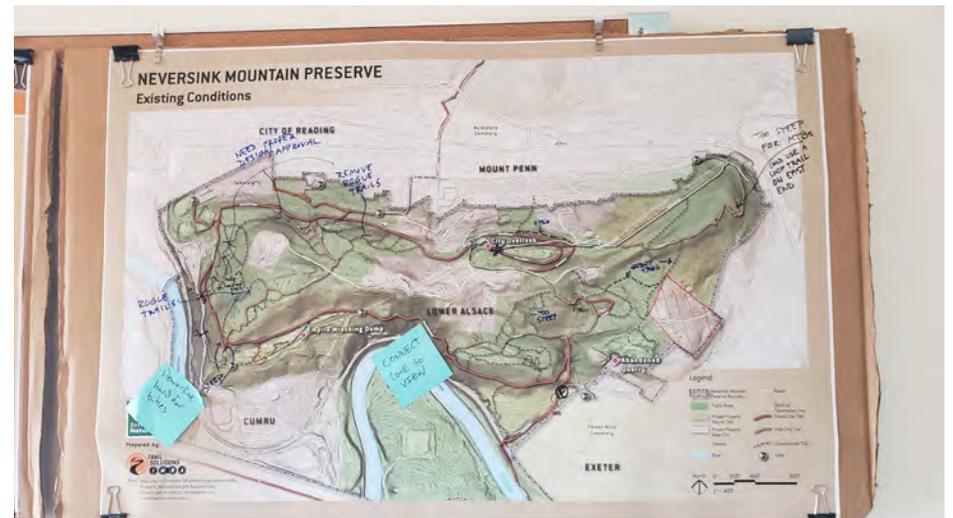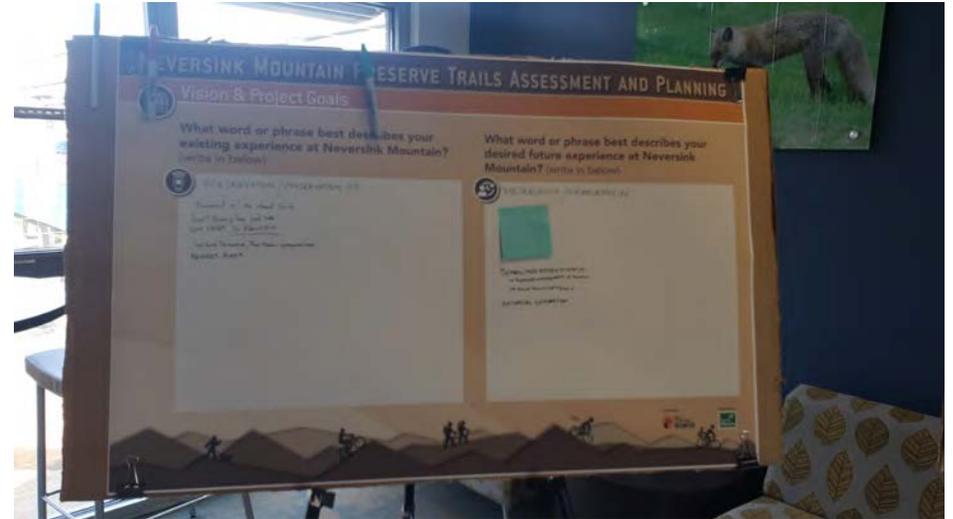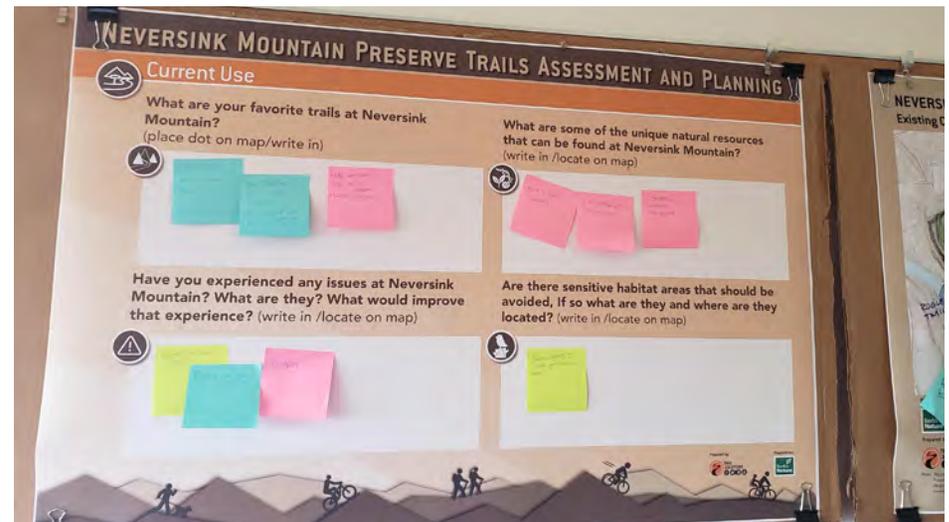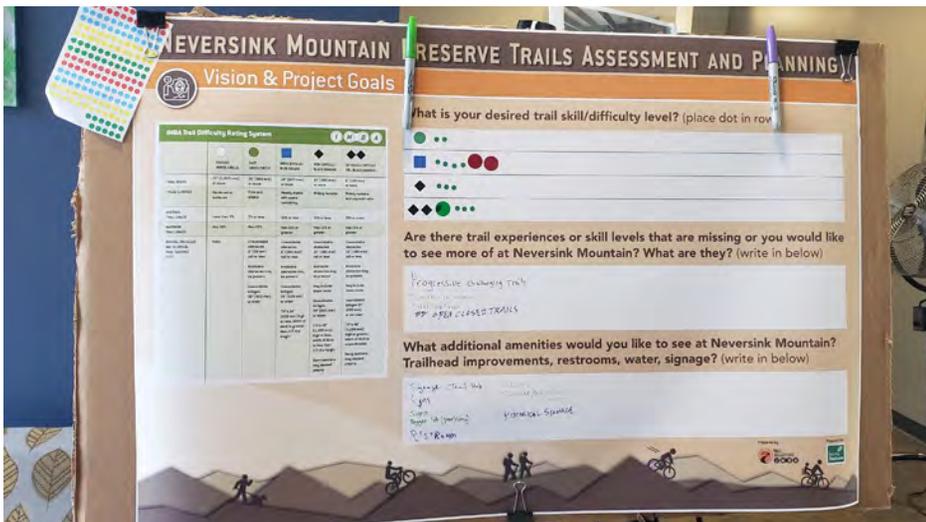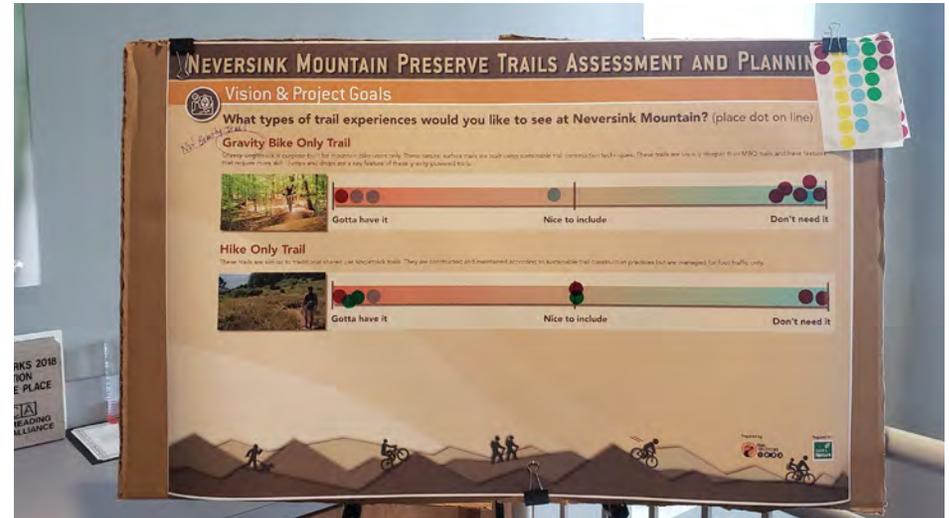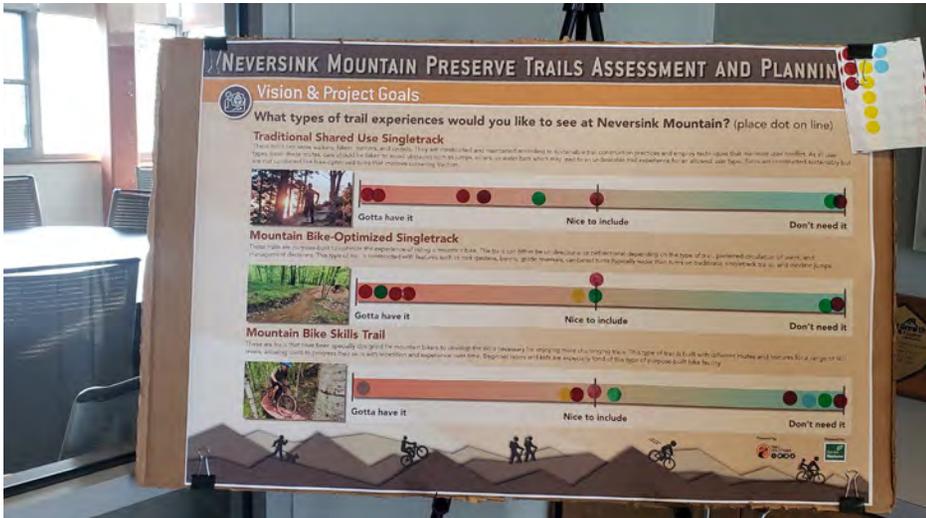
Q1 Do you currently use the trail system at Neversink Mountain?

Answered: 15   Skipped: 0

#	RESPONSES	DATE
1	yes	12/13/2021 2:01 PM
2	Yes	12/12/2021 5:20 PM
3	Occasionally	12/12/2021 8:07 AM
4	yes, occasionally; only with the Strollers Community Hiking Club	12/10/2021 4:59 PM
5	Yes	12/9/2021 10:42 PM
6	yes	12/9/2021 6:16 PM
7	Yes	12/9/2021 3:58 PM
8	Yes	12/9/2021 3:41 PM
9	yes	12/9/2021 3:08 PM
10	No	12/9/2021 1:52 PM
11	Yes	12/9/2021 1:24 PM
12	I am not currently using this mountain	12/9/2021 12:47 PM
13	yes	12/8/2021 5:46 PM
14	No	12/8/2021 4:53 PM
15	Yes	12/8/2021 11:10 AM

Q2 What trail activities do you engage in at Neversink Mountain?

Answered: 15   Skipped: 0
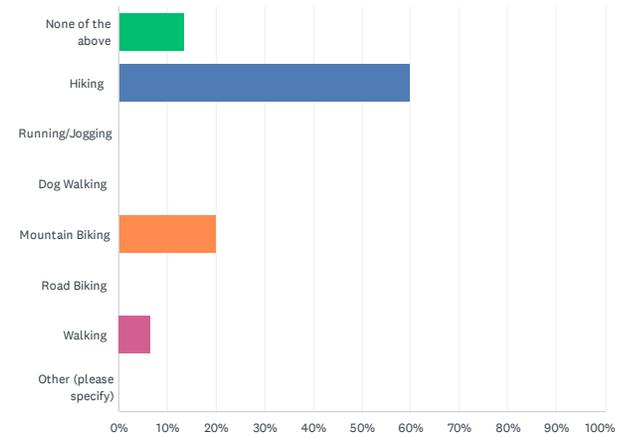
ANSWER CHOICES	RESPONSES	
None of the above	13.33%	2
Hiking	60.00%	9
Running/Jogging	0.00%	0
Dog Walking	0.00%	0
Mountain Biking	20.00%	3
Road Biking	0.00%	0
Walking	6.67%	1
Other (please specify)	0.00%	0
TOTAL		15

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Q3 What are your favorite trails at Neversink?

Answered: 13   Skipped: 2

#	RESPONSES	DATE
1	all	12/13/2021 2:01 PM
2	Trail toward the overlook and the witches hat	12/12/2021 5:20 PM
3	All	12/12/2021 8:07 AM
4	I don't know them well enough to name them.	12/10/2021 4:59 PM
5	All of them	12/9/2021 10:42 PM
6	Neversink Trail, Cove Trail, all trails	12/9/2021 6:16 PM
7	Neversink South, Neversink North, Upper Glen, Promenade	12/9/2021 3:58 PM
8	Main loop	12/9/2021 3:41 PM
9	following the old narrow rail bed.	12/9/2021 3:08 PM
10	All the trails	12/9/2021 1:24 PM
11	do not know	12/9/2021 12:47 PM
12	It's hard to choose! But I would have to say Upper Glen and Cove Trails.	12/8/2021 5:46 PM
13	I love the Klapperthal Glen and all the beautiful lookouts.	12/8/2021 11:10 AM

Q4 Have you experienced any issues at Neversink? What are they? What would improve that experience?

Answered: 13   Skipped: 2

#	RESPONSES	DATE
1	Just dog droppings not being collected	12/13/2021 2:01 PM
2	No issues	12/12/2021 8:07 AM
3	No; haven't been there in past few years.	12/10/2021 4:59 PM
4	Dogs off leash, loose dogs	12/9/2021 10:42 PM
5	Rude bikers	12/9/2021 6:16 PM
6	Parking at Klapperthal is difficult at times. Overgrown Invasive plants on South trail can be a problem in summer. Trail signage could be improved.	12/9/2021 3:58 PM
7	Washed out trails, improve drainage	12/9/2021 3:41 PM
8	no	12/9/2021 3:08 PM
9	Dangerous situation with a mountain biker majorly FLYING down a steep rocky trail- he couldn't stop, and came VERY CLOSE to hitting me. I think bike trails should be separated from those for hiking. With my scary experience, the biker was on a steep wooded intersecting trail	12/9/2021 1:24 PM
10	no	12/9/2021 12:47 PM
11	Sometimes I've gotten lost so trail signage would be very much appreciated.	12/8/2021 5:46 PM
12	N/A	12/8/2021 4:53 PM
13	The connectivity of the trails and an easier climbing trail on the Klapperthal side would be great.	12/8/2021 11:10 AM

Q5 What word or phrase best describes your existing experience at Neversink Mountain?

Answered: 15   Skipped: 0

#	RESPONSES	DATE
1	peaceful	12/13/2021 2:01 PM
2	The trails provide a view of the plants and trees up close	12/12/2021 5:20 PM
3	Beautiful and Historical	12/12/2021 8:07 AM
4	steep	12/10/2021 4:59 PM
5	A rustic haven close to civilization	12/9/2021 10:42 PM
6	Just enjoying nature, the Lookout	12/9/2021 6:16 PM
7	Gratitude that the trails on the mountain are available.	12/9/2021 3:58 PM
8	Diversity	12/9/2021 3:41 PM
9	pleasant	12/9/2021 3:08 PM
10	I would walk neversink as a little girl with my cousin.	12/9/2021 1:52 PM
11	Wonderful, magical. Great views and history.	12/9/2021 1:24 PM
12	none	12/9/2021 12:47 PM
13	It's one of my favorite places to go.	12/8/2021 5:46 PM
14	Haven't been there	12/8/2021 4:53 PM
15	Raw trails rich with history.	12/8/2021 11:10 AM

## Q6 What word or phrase best describes your desired future experience at Neversink?

Answered: 15   Skipped: 0

#	RESPONSES	DATE
1	peaceful	12/13/2021 2:01 PM
2	Same as above	12/12/2021 5:20 PM
3	Beautiful and Historical	12/12/2021 8:07 AM
4	preserve natural beauty; maintain safety of trails	12/10/2021 4:59 PM
5	No dogs—just a peaceful, safe hiking experience	12/9/2021 10:42 PM
6	Hiking on a beautiful day	12/9/2021 6:16 PM
7	Continued maintenance of the trail system	12/9/2021 3:58 PM
8	Diversity	12/9/2021 3:41 PM
9	pleasant	12/9/2021 3:08 PM
10	I would like to get to know the preserve more.	12/9/2021 1:52 PM
11	There's no way of improving parking- not enough room. But I try to go at less crowded times. The biking obviously causes damage and rain erodes the trail. In future, I would want to keep the mountain open to the public, I don't know how to limit the number of people using it. Maybe have bikers only allowed on specific days.	12/9/2021 1:24 PM
12	for it to be available for future use	12/9/2021 12:47 PM
13	Common multi-use trail system with shorter and longer loops.	12/8/2021 5:46 PM
14	Would like to visit	12/8/2021 4:53 PM
15	A more modern trail system layout and build.	12/8/2021 11:10 AM

Q7 What types of trail experiences would you like to see at Neversink Mountain? 1 being your most commonly used type of trail and 3 being your least used type of trail.
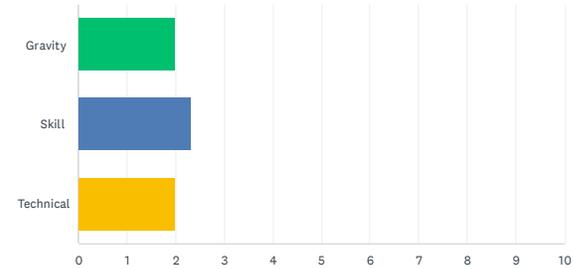
Answered: 15   Skipped: 0
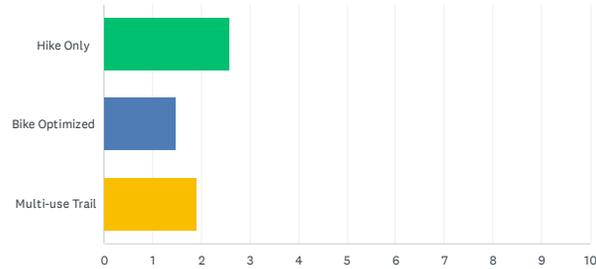
	1	2	3	TOTAL	SCORE
Hike Only	78.57% 11	0.00% 0	21.43% 3	14	2.57
Bike Optimized	8.33% 1	33.33% 4	58.33% 7	12	1.50
Multi-use Trail	15.38% 2	61.54% 8	23.08% 3	13	1.92

Q8 For the previous question, if you chose bike optimized, please rate the type of bike trail you'd most like to see. 1 being your most preferred type and 3 being your least preferred type.

Answered: 12   Skipped: 3

	1	2	3	N/A	TOTAL	SCORE
Gravity	8.33% 1	0.00% 0	8.33% 1	83.33% 10	12	2.00
Skill	8.33% 1	16.67% 2	0.00% 0	75.00% 9	12	2.33
Technical	8.33% 1	8.33% 1	8.33% 1	75.00% 9	12	2.00

Q9 What is your desired trail skill/difficulty level? Scale is based off of IMBA difficulty rating scale with green being the easiest and double black being the hardest.

Answered: 12   Skipped: 3
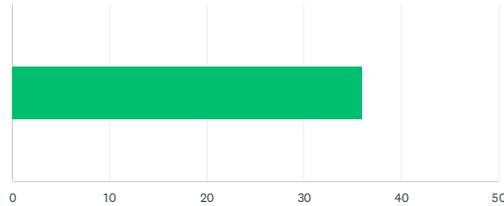
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	36	433	12
Total Respondents: 12			

#			DATE
1	0		12/13/2021 2:01 PM
2	45		12/12/2021 5:20 PM
3	15		12/12/2021 8:07 AM
4	75		12/9/2021 6:16 PM
5	24		12/9/2021 3:41 PM
6	16		12/9/2021 3:08 PM
7	49		12/9/2021 1:52 PM
8	2		12/9/2021 1:24 PM
9	51		12/9/2021 12:47 PM
10	80		12/8/2021 5:46 PM
11	26		12/8/2021 4:53 PM
12	50		12/8/2021 11:10 AM

Q10 Are there trail experiences or skill levels that are missing or you would like to see more of at Neversink Mountain? What are they?

Answered: 11   Skipped: 4

#	RESPONSES	DATE
1	no	12/13/2021 2:01 PM
2	None — beautiful and historical as is	12/12/2021 8:07 AM
3	Only hiking with no pets allowed	12/9/2021 10:42 PM
4	More wildflowers, natural areas	12/9/2021 6:16 PM
5	No, I think	12/9/2021 3:41 PM
6	Loop trails are important for those less mobile.	12/9/2021 1:52 PM
7	This is a natural area and should not be a technical challenge for bikers. Too dangerous for the rest of us!	12/9/2021 1:24 PM
8	all levels	12/9/2021 12:47 PM
9	No, I think there is a good mix of skill levels and experiences. I think it would be a mistake to include gravity trails. They do not belong in a historic nature preserve in my opinion.	12/8/2021 5:46 PM
10	Don't know since I have never hiked there	12/8/2021 4:53 PM
11	Utilize the entire mountain. Right now there's a basic loop with some internal trails. A switchback climb up the Klapperthal side would be great and incorporated shorter loops as opposed to having to commit to the entire loop.	12/8/2021 11:10 AM

Q11 What additional amenities would you like to see at Neversink Mountain? Trailhead improvements, restrooms, water, signage?

Answered: 15   Skipped: 0

#	RESPONSES	DATE
1	signage, restrooms	12/13/2021 2:01 PM
2	Restrooms and signage	12/12/2021 5:20 PM
3	Signage and porta potty	12/12/2021 8:07 AM
4	restrooms are always a plus! Directional signage/trails helpful.	12/10/2021 4:59 PM
5	Keep the dogs, bikes, ATVs, etc., out, please	12/9/2021 10:42 PM
6	Rest rooms would be nice	12/9/2021 6:16 PM
7	Trailhead improvements and trail signage	12/9/2021 3:58 PM
8	Signage, restrooms	12/9/2021 3:41 PM
9	possibly an occasional bench	12/9/2021 3:08 PM
10	Restrooms are always helpful.	12/9/2021 1:52 PM
11	A restroom would be nice in the area where the radio antenna was.	12/9/2021 1:24 PM
12	restrooms	12/9/2021 12:47 PM
13	Restrooms, signage and more parking	12/8/2021 5:46 PM
14	Restroom at trailhead; interpretive signage	12/8/2021 4:53 PM
15	Better parking, I'm spoiled by being able to ride from home but I know that parking is an issue on Neversink. Restrooms, signage and other amenities would be great too.	12/8/2021 11:10 AM

Q12 What are some of the unique natural resources that can be found at Neversink Mountain?

Answered: 15   Skipped: 0

#	RESPONSES	DATE
1	not sure	12/13/2021 2:01 PM
2	Native plants	12/12/2021 5:20 PM
3	Trees, streams, wildlife	12/12/2021 8:07 AM
4	moutain laurel; the view	12/10/2021 4:59 PM
5	Native plants, geological features, scenery	12/9/2021 10:42 PM
6	Fungi, mosses, liverworts, trees, wildflowers, lookouts	12/9/2021 6:16 PM
7	Local history of trolley and resorts. Interesting geology on mountain. Plant diversity.	12/9/2021 3:58 PM
8	Pine forest	12/9/2021 3:41 PM
9	mountain laurel	12/9/2021 3:08 PM
10	The flora and fauna are all important.	12/9/2021 1:52 PM
11	The stunning natural view of Reading and the Schuylkill River.	12/9/2021 1:24 PM
12	woods and trails	12/9/2021 12:47 PM
13	Besides the amazing historical features, there is a variety of deer, turkeys, amphibians, grasslands, birds and important plants that should be considered and preserved when evaluating the trail system.	12/8/2021 5:46 PM
14	no knowledge	12/8/2021 4:53 PM
15	It's rich with history and beautiful rock outcroppings that make for stunning views of the Schuylkill River and City of Reading skyline.	12/8/2021 11:10 AM

Q13 Are there sensitive habitat areas that should be avoided, If so what are they and where are they located?

Answered: 12   Skipped: 3

#	RESPONSES	DATE
1	I am not sure of.	12/12/2021 5:20 PM
2	Don't know	12/12/2021 8:07 AM
3	I don't know.	12/10/2021 4:59 PM
4	Stream beds & wetlands & rock formations	12/9/2021 10:42 PM
5	n/a	12/9/2021 6:16 PM
6	The steep slopes should be avoided to prevent erosion.	12/9/2021 3:58 PM
7	Not that I am aware.	12/9/2021 3:41 PM
8	Don't know. People need to stay on the trail!	12/9/2021 1:24 PM
9	do not know of any	12/9/2021 12:47 PM
10	I'm not aware of what and where they are, but I do very much agree they should be marked and off limits.	12/8/2021 5:46 PM
11	No knowledge	12/8/2021 4:53 PM
12	The springs that run through the top of the Klapperthal Glen where the boardwalks are right now. It'd be nice to have wetland bridges over those areas.	12/8/2021 11:10 AM

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