



**Department of  
Environmental  
Conservation**

August 2017

## **MANAGEMENT GUIDANCE**

**SITING, CONSTRUCTION AND MAINTENANCE OF SINGLETRACK BIKE TRAILS  
ON FOREST PRESERVE LANDS IN THE ADIRONDACK AND CATSKILL PARKS**

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## **I. Statement of Purpose and History of Bike Trails on the Forest Preserve**

New York's Forest Preserve is a destination for various road and trail based cycling opportunities. This document provides guidelines solely for the management of Department of Environmental Conservation (DEC or Department) singletrack bicycle trails ("bike trails") on Forest Preserve lands. It is intended to help land managers consistently design, construct and maintain bike trails and bike trail networks that protect natural resources and wild forest character while also providing a valuable recreational opportunity.

Mountain biking opportunities on Forest Preserve lands have historically been offered on former woods roads and existing trails designed for other modes of travel. Mountain bikers generally prefer riding on singletrack trails designed specifically for mountain biking<sup>1</sup>. Former woods roads and multiple use trails will continue to be an important part of the Forest Preserve trail network open to bikes. However, singletrack trails designed and built for mountain biking is the focus of this guidance.

## **II. Definitions**

The following definitions apply to this guidance. The term "rider" will be used interchangeably with "cyclist" throughout the document. If another recreational pursuit is being described other than biking, it will be clarified accordingly. Every effort has been made to use language in this document that is consistent with modern trail design and management terminology, while also being consistent with the respective Master Plans for the Adirondack and Catskill Forest Preserves.

"Bicycle": A non-motorized, human-powered, cycle designed or used for cross country travel on roads or trails.

"Bicycle Trail (Bike Trail)": a marked trail, designated for travel by bicycles, located and designed to provide access in a manner causing the least effect on the local environment.

"Braiding": Multiple trail treads within a single trail corridor.

"Designed Use": The managed use of a trail that requires the most demanding design, construction, and maintenance.

"Doubletrack": A trail that allows for two users to travel side by side or to pass without one user having to yield the trail. Doubletrack trails are often former woods roads.

"Managed Use": A mode of travel that is actively managed and appropriate on a trail, based on its design and management.

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<sup>1</sup> Webber, Pete. (ED.). (2007). Managing Mountain Biking. 1<sup>st</sup> ed. Boulder, CO: International Mountain Bicycling Association. Pp. 18

Webber, Pete. (ED.) (2004). Trail Solutions. 1st ed. Boulder, CO: International Mountain Bicycling Association. Pp. 48

“Multiple (shared) use”: A trail that permits more than one type of use. These trails are designed for one use and managed for other uses, or are designed for several uses.

“Parallel Feature Trail (PFT)”: A side trail that leaves and returns to the main bike trail and includes a natural terrain feature that is uniquely challenging to ride.

“Singletrack trail”: A trail so narrow that users must generally travel in single file.

“Stacked Loop”: A trail system designed with several different loop trails knitted together to provide for a wide range of experiences and difficulties within a given area.

“Trail Corridor”: The area within which vegetation is managed and trail tread is established for a particular type of trail use or uses.

“Trail Tread”: The travelled ground surface within the trail corridor.

### III. Planning the Trail Network

Protection of the Wild Forest setting and minimization of impacts to natural resources form the foundation for planning bike trail networks on Forest Preserve lands. The “trail styles” and “riding opportunities” described in this section reflect the interests of mountain bikers and how they can be accommodated in a way that upholds the fundamental values of the Forest Preserve. High quality mountain biking experiences are created through the development of riding opportunities that incorporate trail styles appealing to mountain bikers.

Riders routinely travel 15-30+ miles in a day with a preference for loop rides or long distance routes having minimal trail overlap. Mountain bikers generally prefer trail networks that begin and end within community areas such as Hamlets or at locations with some basic services. The point of entry into a trail network that is the closest to the community center is commonly a shared use trail.

Consider the following questions when evaluating a single trail or a network of trails for shared use suitability:

**Who** is the trail designed for and who will be sharing it? E.g., cyclists, hikers, trail runners, equestrians, snowmobiles or skiers.

**What** is the character of the trail? I.e. Are soils on the trail particularly sensitive? How are the sight lines? How fast will users typically be travelling along the trail? Are trail users all travelling in the same direction? How rough is the tread surface? Is it especially difficult for trail users to pass each other due to the terrain?

**When** will the users be on the trail? E.g., at the same time, during different seasons.

**Where** is the trail located? E.g., frontcountry, backcountry, Wild Forest, Intensive Use, etc.

**How** often will encounters between different trail users occur, and are these encounters likely to have a negative impact on the experience that trail users expect to have?

Accommodating more than one recreational use on a trail can help accomplish resource protection goals by reducing trail development and environmental impacts. Forest Preserve trails are typically designed and maintained for hiking or snowmobiling. Less common are ski trails, horse trails, and accessible trails. The suitability of a given trail for users other than the designed use is determined by considering the criteria above. Trail design is consistent with the State Land Master Plan (Catskill or Adirondack), the approved DEC trail guidance/policies, and the Unit Management Plan's objectives.

Not everyone experiences conflict in the same way. An inconsequential encounter along the trail for one person may be a significantly negative experience for someone else. Land managers cannot control how individuals experience conflict, but they can inform trail users when a trail is shared with other modes of travel. When trail users know what kinds of recreational activities to expect along the trail, they are more likely to make informed decisions about where to visit and can avoid circumstances that conflict with their recreational or experiential goals. Positive plain language (not just regulatory) signage at trailheads and in public communications materials should be used to explain when trails are shared and what is appropriate etiquette in those circumstances. The following sign is a good example of how trail users can be informed that a trail is shared.



Seemingly incompatible uses can share trails successfully under suitable conditions. Determining when and where those circumstances exist may not be immediately obvious. When high quality objective data on usage and conflict is limited or unreliable

(i.e. a single anecdotal complaint), allowing for some sharing of trails with a plan for monitoring and data gathering is a sensible strategy that does not immediately require new trail construction or trail closures. Some trails can be shared successfully until a certain threshold in the number of users is reached. Alternatively, some trails are almost impossible to share due to the character of the trail, it's location, and the type of use. The decision for a trail to be shared with cyclists (or not) should carefully balance land management goals, local community interests, and resource protection.

## A. Trail Style

“Trail style” refers to Singletrack or Doubletrack. The distinctions between Singletrack and Doubletrack most important to mountain bikers are described in more detail below. Each trail style may be present in various forms throughout a trail network open to bicycles. The style of the trail does not indicate the degree of difficulty. Certain singletrack trails may be very easy to navigate on a bicycle while some doubletrack trails are exceedingly difficult, and vice-versa.

### 1.) Singletrack

Singletrack is the most popular trail style for mountain bike riding. Singletrack offers an intimate and engaging riding experience in a Wild Forest setting. Accordingly, Singletrack is the focus of this guidance. The following chart describes a spectrum of different kinds of singletrack and assigns a difficulty rating based upon trail characteristics.

#### Singletrack Trail Rating System and Characteristics<sup>2</sup>

	Easiest	Easy	More Difficult	Very Difficult	Extremely Difficult
Tread Width	36" or less	24"-36"	18"-24"	12"-18"	12" or less
Corridor Width	6-8'	6'	4'	4'	4'
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

<sup>2</sup> Adapted from *Trail Solutions: IMBA's Guide to Building Sweet Singletrack*, International Mountain Bicycling Association, 2004.

Maximum <sup>1</sup> Trail Grade	10%	15%	15% or greater	15% or greater	15% or greater
Obstacles	None	Unavoidable obstacles 2" tall or less	Unavoidable obstacles 8" tall or less	Unavoidable obstacles 15" tall or less	Unavoidable obstacles 15" tall or less
Bridges	bridges 48" or wider	bridges 36" or wider	bridges 24" or wider	bridges 24" or wider	bridges 24" or narrower
				Short sections may exceed criteria	Short sections may exceed criteria
<sup>1</sup> 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.					

## 2.) Doubletrack

Guidance for the development of new doubletrack trails is not addressed in this document.

Former woods roads are found throughout the Forest Preserve. The history of these roads is typically associated with logging activities, prior habitation, or another purpose that may not necessarily be associated with recreational access. Repurposing certain sections of former woods roads as trails may occasionally serve as the most low impact way to have a hardened trail through an area with poor soils or sensitive resources. However, converting existing doubletrack to singletrack or just maintaining doubletrack in its existing condition can require more extensive trail construction than building a new singletrack trail and decommissioning the doubletrack. This may seem counterintuitive, but when the existing doubletrack trail has a poor alignment, drainage problems, washouts, or other problems commonly encountered along former woods roads, the work required to make doubletrack sustainable can be intensive. For these reasons, using former woods roads as doubletrack bike trails requires careful evaluation of the existing conditions before opening the trail to bike use. Additionally, doubletrack is generally less desirable to mountain bikers seeking a more intimate and engaging experience along a narrow trail. The following diagram exhibits how a meandering singletrack is preferable to relatively straight and unchanging doubletrack.

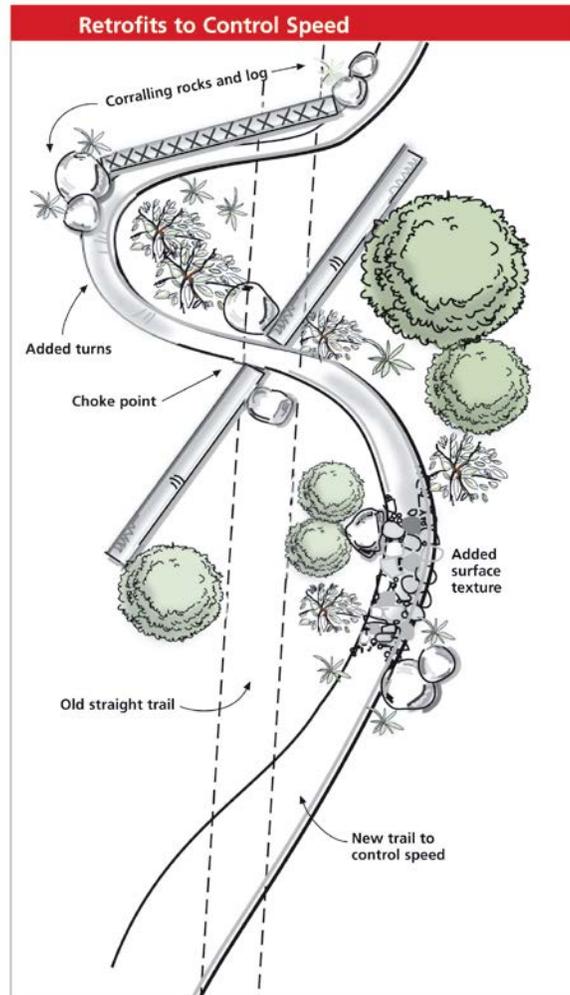


Diagram Courtesy of IMBA from Guidebook *Managing Mountain Biking* Copyright 2007

## B. Riding Opportunities

Mountain bikers have diverse recreational and experiential goals associated with cycling. The riding opportunities described below reflect the different kinds of riding experiences that are available in the Forest Preserve. Riding opportunities that have been successfully implemented on Forest Preserve lands have informed these guidelines. Proposals to create new riding opportunities will be assessed by how well they can meet the criteria described in each of the sections below. No proposal for a new riding opportunity is perfect. However, recognizing the unique challenges associated with a proposal prior to implementation will increase the likelihood of success.

### 1.) Stacked Loop Network

Stacked loop trail systems are comprised of several different loop trails knitted together to provide for a range of experiences and levels of difficulty. Opportunities to experience

a variety of terrain while exploring the landscape is what makes stacked loop trail networks appealing to riders of all abilities. Stacked loop trail networks may be appropriate where the conditions described below are present.

**Environmental:** Locations below 2,500 feet in elevation with well drained soils, moderate slopes, and commonly occurring forest types. Wetlands, sensitive ecological sites identified by the New York Natural Heritage program, and deer wintering yards will be avoided whenever possible.

**Local Support:** A local organization, municipality, or combination that is prepared to assist with trail maintenance and construction activities is particularly important for stacked loop trail networks. Resources required for trail construction and maintenance dictate that the capacity of the local community to assist in maintaining the trails on Forest Preserve lands is considered.

**Location:** Stacked loop trail networks are most appropriate where Forest Preserve lands abut municipal lands or publically accessible private lands, generally within two miles of hamlet boundaries or one mile from Intensive Use areas.

**Trail Density:** Stacked Loop trail networks outside of Intensive Use areas will be laid out to provide a buffer of vegetation, terrain, distance, or a sufficient combination thereof to minimize the view and filter out the sound of users on separate trails. Trails that have been laid out too close to each other may develop unplanned informal trails when users short-cut between separate trails. Planning a sufficient separation distance between trails prevents this problem from occurring. Individual trails of less than ½ mile in length should be avoided. The higher density of trails in a stacked loop network is acceptable when the wild forest character is retained.

In a stacked loop trail network, easier trails are typically closer to the trailhead and the more advanced trails are further afield, requiring more time and effort to access. Advanced riders are willing to cover more ground to reach trails that will challenge them.

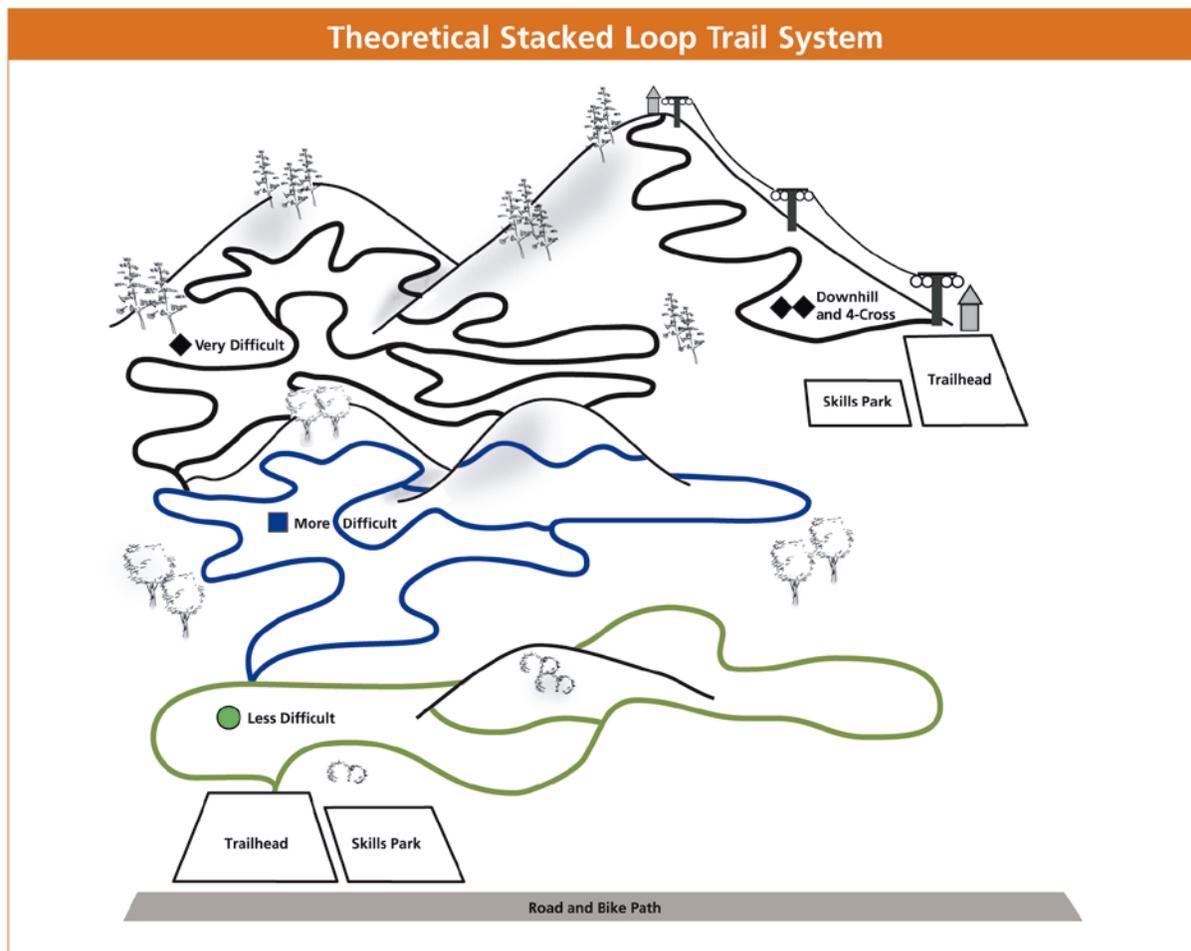


Diagram Courtesy of IMBA from Guidebook *Managing Mountain Biking* Copyright 2007.

## 2.) Long Distance Tour

Long distance routes that connect Hamlets and visit compelling natural features will be planned on a regional scale by incorporating multiple communities and UMPs in complex planning initiatives. A cycling experience that offers a sense of solitude, remoteness, and self-reliance is a unique opportunity in the Northeastern United States that deserves special consideration. Newly developed remote bike trails will be “More Difficult”, “Very Difficult”, or “Extremely Difficult” according to the trail ratings defined in this guidance. Planning a remote riding opportunity requires careful consideration of the environmental factors described in the Stacked Loop riding opportunity section of this guidance. Remote Bike trails that connect Stacked Loop bike trail networks or Hamlets will be prioritized during bike trail planning.

### **3.) Winter Cycling**

Bicycles with oversized low pressure tires (“fat bikes”) are well suited for travelling over packed snow surfaces. Fat bikes have established mountain biking as a 4-season activity. As one of the many variants of bicycles, fat bikes are subject to the DEC regulations specifying where bicycles are allowed on the Forest Preserve (6 NYCRR § 190.8(s) and 196.7). The popularity of fat biking in the winter months is growing, and the importance of planning and managing for it will increase accordingly. The guidance in section III of this document provides a framework for planning a winter cycling riding opportunity.

### **4.) Downhill/Freeride (DH/FR)**

DH/FR Bike trails on the Forest Preserve are only appropriate in Intensive Use areas. DH/FR Bike trails are exclusively one way directional downhill, and contain multiple bike-specific features and obstacles such as table-top jumps, gap jumps, and ladder bridge drops. Typically a ski lift or shuttle road brings riders back to the top of this type of trail, but a designated climbing trail may also be available. Specific design considerations for DH/FR trails are outside the scope of this guidance. Proposals for this type of trail will be considered on a case by case basis during the review of a UMP or UMP amendment. Newly proposed trails of this type will require consultation with a trail design professional having experience in this type of trail construction.

## **IV. Guidelines for Bike Trail Design and Construction on the Forest Preserve**

Bike trail design, construction and non-ordinary maintenance activities<sup>3</sup> will be carried out pursuant to a Work Plan developed by DEC staff. APA staff may be consulted for projects located within the Adirondack Park. The following guidelines will be followed and reflected in the development of Work Plans.

### **A. Trail Alignment**

Trails will follow the natural contours of the terrain as much as possible and will be laid out to balance and minimize necessary tree cutting, rock removal and terrain alteration. Maintaining appropriate grades in the trail alignment is critically important to assuring a stable tread surface resistant to the forces of erosion. Soil conditions should be evaluated to determine appropriate grades for the site. Planning trail alignments with the assistance of riders is highly recommended.

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<sup>3</sup> Ordinary maintenance activities in the Adirondack Park are defined in the “Memorandum of Understanding between the Adirondack Park Agency and the Department of Environmental Conservation Concerning Implementation of the State Land Master Plan for the Adirondack Park” (APA/DEC MOU).

## **B. Tree Cutting**

DEC policy requires that cutting trees should be minimized, but where cutting is required, trees must be identified, tallied and included in a Work Plan in accordance with DEC Program Policy LF 91-2 *Cutting and Removal of Trees in the Forest Preserve*.

1. Cutting of overstory trees will be avoided in order to maintain a closed canopy wherever possible. Large and old growth trees should be protected.
2. Cutting trees to expand a trail from its current width or otherwise improve a trail will be carried out only pursuant to a Work Plan.
3. All bike trails may be kept clear to a height of 8 feet, as measured from ground level.
4. No trees, except trees that due to structural problems or fallen/tipped conditions presenting an immediate hazard to the safe use of the trail will be cut outside the trail width.
5. Trees should be felled away from the trail to minimize the amount of material that needs to be moved. Felled trees should be delimbed and cut into short enough lengths to lie flat on the ground. Once delimbed and cut up, the short lengths should be dispersed and not left in piles next to the trail.
6. Trees removed from the cleared trail corridor that are not located in the tread surface will be cut flush to the ground.
7. No brushing will occur outside the cleared width of the trail corridor. Cleared tree trunks and limbs must not hinder trail drainage.

## **C. Grading**

The trail tread surface should generally follow the existing contours of the natural forest floor whenever possible. Grading may be undertaken to facilitate natural drainage without water bars. Grade reversals, dip drains, and trail alignments that facilitate drainage and tread stability are encouraged. Stone or log staircases, log ladders, or other trail structures suitable solely for hiking are inappropriate for bike trails.

## **D. Cross Drainage**

Grade reversals, broad based dips, and earthen berm water bars are preferable to log and rock water bars. The catchment area for an earthen berm or broad based dip must be broad, gently sloping, and designed to capture water from the entire tread surface of the trail without obstructions. Similarly, the drainage ditch associated with the berm or dip must be broad (18" minimum width), gently and continuously sloped away from the trail, and devoid of obstructions. Debris (leaves, sticks, accumulated soil, etc.) should be cleared from drainage ditches to the extent necessary for functionality. The character of the surrounding landscape dictates the distance the drain must extend outside the trail corridor. When scouring or muddy conditions are present, the drain and catchment area may need to be armored with stone to assure the drainage remains functional. Earthen berms should only be constructed with compactable mineral soil.

## E. Parallel Drainage

The character and dimensions of parallel drainage is the same as the drainage ditch associated with an earthen berm described in part D above. Parallel drainage works in combination with one or more cross drainage structures and is typically necessary when the trail is built on cross slopes with ground water close to the surface, or in locations with very little or no cross slope. Areas that will require the use of parallel drainage should be avoided whenever possible.

## F. Rock Removal

Rock removal may occur in the process of bench cutting, drainage construction, tread definition, and tread hardening. Stones may be used to strategically limit braiding, prevent widening and tread creep, and for trail structures such as turnpikes, rock causeways, check dams, and retaining walls. Stones used to narrow and define the tread will be set in a naturally random manner not compromising safe use of the trail. Excavated stones and earth not used for any of the aforementioned purposes will be dispersed outside of wetlands, water courses, and any other sensitive areas in a manner that blends with the surrounding landscape.

## G. Side Slope Management

Soil characteristics will be carefully evaluated for depth to bedrock, depth to water table, and composition before any side slope management is undertaken. The elimination or reduction of side slopes by means of full bench cuts will be done only where soil conditions are deemed to be suitable. On rare occasions, stone or wood cribbing may be necessary to raise the trail tread above side slopes with particularly rugged terrain or poor soil conditions.

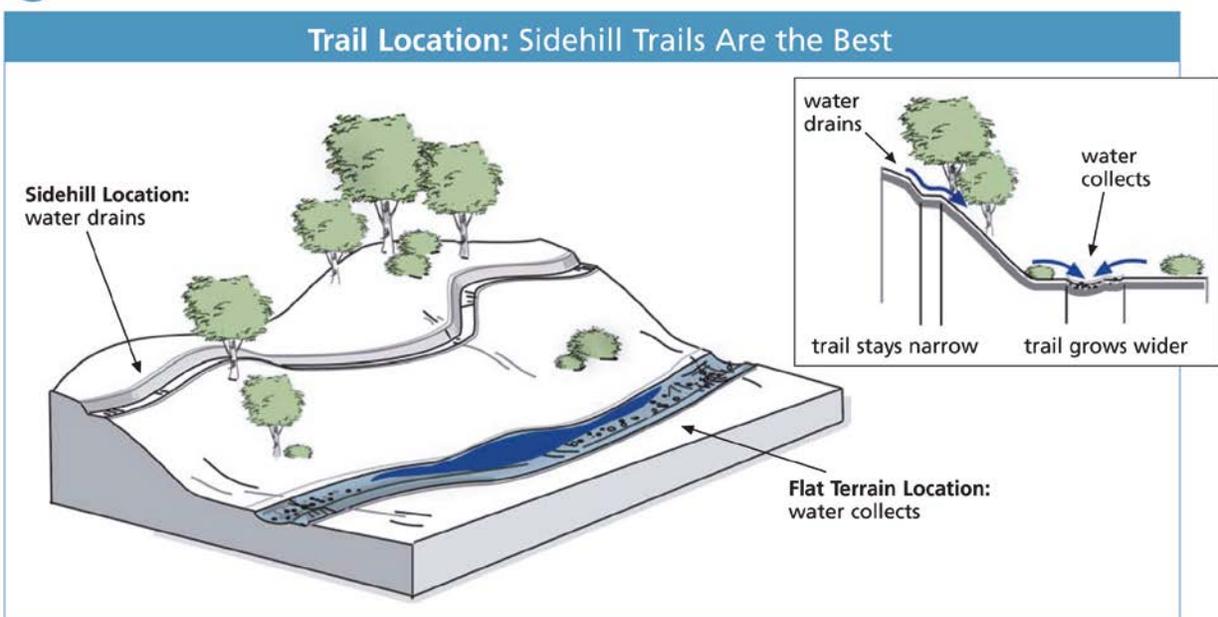


Diagram Courtesy of IMBA from Guidebook *Managing Mountain Biking* Copyright 2007.

## H. Wetlands

Wetlands will be avoided to the greatest extent possible. When wetland crossings or trail locations adjacent to wetlands are proposed, the trail will be designed to minimize potential adverse impacts. Any activity that may impact a wetland will be undertaken following APA (in the Adirondack Park) and Army Corps of Engineers' permit requirements.

## I. Parallel Feature Trail<sup>4</sup> (PFT)

Mountain bike trails may include parallel feature trails (PFTs) that provide a technical element. These trails and associated technical features offer mountain bikers the opportunity to experience riding a challenging natural terrain feature. PFTs will be carefully sited to limit resource impacts while providing terrain and experience diversity within the mountain bike trail network. PFTs also serve to control the development of unsanctioned social trails. PFTs may be significantly more challenging than the trail they are associated with. All PFTs will be consistent with the following criteria:

1. Do not interfere with other types of recreational uses allowed on the trail.
2. Rely upon natural features (boulders, ledges, logs, or other durable terrain features) to provide a uniquely challenging experience.
3. Are designed to minimize erosion and aesthetic impacts.
4. Are no further than 50 feet from the main trail and no more than 150 feet in total length. If any portion of the PFT is further than 50 feet from the main trail or longer than 150 feet in length, it will be considered a separate trail.
5. Are located no closer than 0.25 miles to any other PFT.
6. Consist entirely of hand built trail that does not require tree cutting or elevated wooden structures of any sort. Naturally fallen trees and logs are not considered a wooden structure.
7. Are low-profile in appearance and cannot be mistaken as the main trail.
8. May have minimal signage to alert trail users to their presence and inform users of the uniquely challenging terrain.

The construction of a PFT does not require a UMP or UMP amendment. The construction of all PFT's must conform to the above guidance. If a PFT does not receive necessary routine maintenance it will be closed and rehabilitated. Closure of a PFT will follow best management practices for closure and rehabilitation of trails.

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<sup>4</sup> Parallel Feature Trail guidance is adapted from: "Authorizing Recreational Mountain Bike Trails on Provincial Crown Land, Operational Policy. Updated May 2013 and: "Whistler Trail Standards Environmental and Technical Trail Features, Resort Municipality of Whistler First Edition 2003."

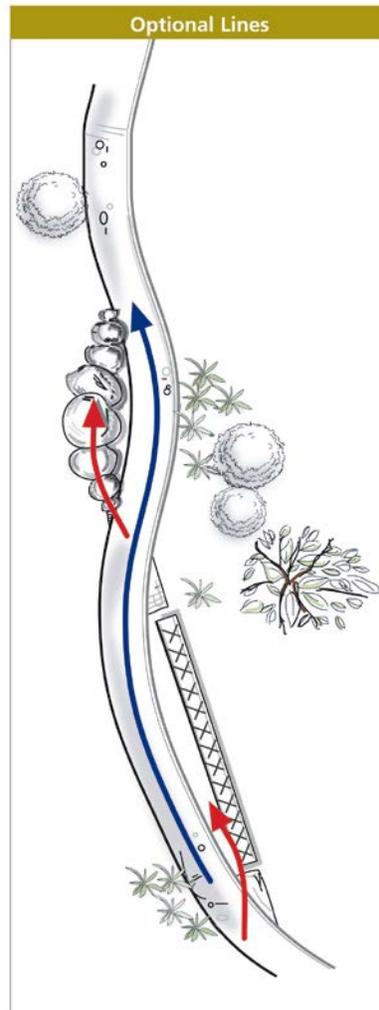


Diagram Courtesy of IMBA from Guidebook *Managing Mountain Biking* Copyright 2007

## J. Insloped corners

Flat or out-sloped corners can be prone to ruts, widening, and tread creep from riders travelling to the outside of the corner and skidding to control speed and change direction. Modest in-sloping of certain corners keeps riders within the trail corridor, reduces skidding, and generally creates a more enjoyable and controlled riding experience. Bike trails may incorporate insloped corners where the aforementioned problems are occurring or are likely to occur. All insloped corners will be consistent with the following criteria:

1. Trail alignments will incorporate naturally existing terrain whenever possible in order to provide the benefit of an in-sloped corner and minimize tread creep without requiring extensive terrain manipulation.
2. The highest point of any berm will not be higher than 2 feet above natural grade.
3. The entrance and exit from the berm will taper gradually back into the surrounding landscape and all portions of the berm that are not a part of the tread surface will be rehabilitated immediately following construction.

4. Only natural materials such as wood, stone, and soil may be used to construct insloped corners.
5. Stone and soil used to construct insloped corners will not be collected from streams, wetlands and other sensitive resources. Soil borrow pits must be closed and rehabilitated immediately following their use.
6. In-sloped corners will not be built in locations where the cross-slope grade exceeds 10%.
7. Sufficient drainage will be incorporated into the design of the corner so that water pooling on the tread surface does not occur.

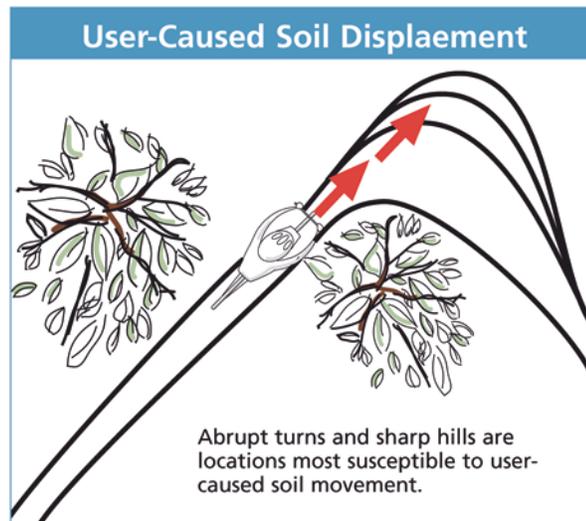


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### Insloped Turn

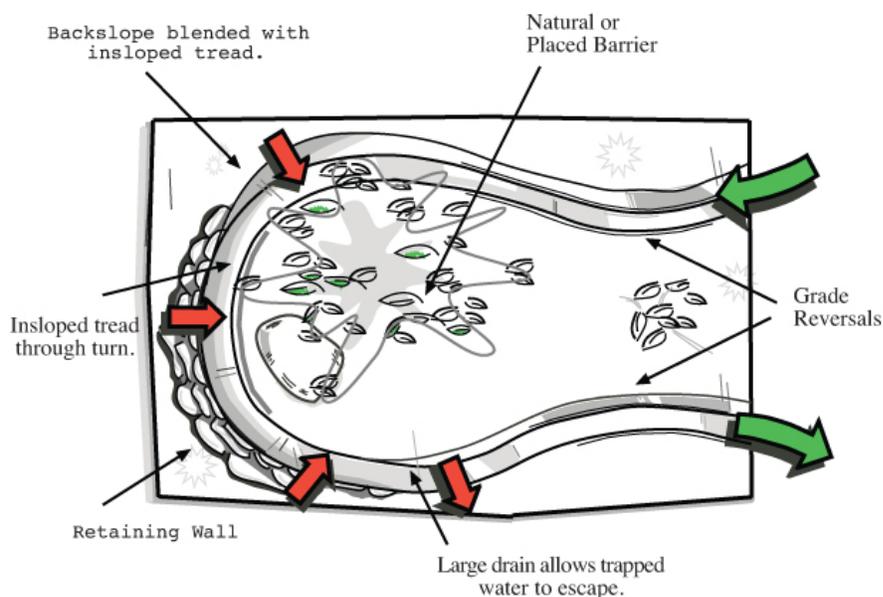


Diagram Courtesy of IMBA from Guidebook *Trail Solutions* Copyright 2004

## **V. Guidelines for Bike Trail Maintenance on the Forest Preserve**

A dry, stable, well defined tread surface is able to provide a high quality experience for trail users while simultaneously protecting natural resources. Maintenance activities on bike trails preserves the tread, controls encroaching vegetation in the trail corridor, and ensures wild forest character.

Trail maintenance may include removal of downed trees, cleaning of ditches and waterbars, clearing of brush, bridge repairs, and trail reconstruction in accordance with annual work plans. Annual work plans may include an annual clearing of loose organic debris (leaves) from the tread surface. Maintenance of Parallel Feature Trails will include mitigation of hazards in fall zones in addition to trail maintenance tasks described above. Trails susceptible to erosion and muddy conditions which cannot be relocated or sufficiently hardened may be closed until soil conditions improve.

Volunteer stewards may enter into agreements with DEC. For more information on formalizing partnerships with trail volunteers, refer to the DEC Policy on Volunteer Stewardship Agreements.

## **VI. Implementation and Review**

Implementation of this Guidance is intended to establish bike trail management practices that conform to the guidelines and criteria of the Adirondack Park State Land Master Plan and the Catskill Park Master Plan. This guidance does not prevent the Department, via individual UMP's or other means, from providing more restrictive management where necessary to protect the character of Forest Preserve lands.