Adirondack Forest Preserve Ski Touring Trail Development Guidelines

An important part of trail planning is satisfying the desired trail experience of various users. This document is intended to provide guidance for the development of backcountry ski trails to ensure a variety of experiences while protecting the natural and cultural resources within the Adirondack Forest Preserve.

With significant snowfalls and average winter temperatures well below freezing, finding snow to ski on within the Adirondack Park is rarely difficult. With 2.5 million acres of public land covered by numerous trails, opportunities for backcountry skiing abound.

The Adirondacks have a rich history of backcountry skiing. Backcountry ski trail development in the region started in the late 1920s and continued well into the 1930s. These trails were cut, or improved by the Conservation Department and provided a spectrum of skiing opportunities including down-mountain skiing. With the rise of lift-served ski centers such as Whiteface and Gore Mountain backcountry skiing became less popular and many backcountry ski trails disappeared. The Marcy Ski trail, constructed in 1936, is one of the few remaining ski trails from this era.

Today, the activity has seen a renaissance. The development of lighter equipment, mixing of different techniques and the desire for an experience far from developed ski resorts has generated significant interest and popularity in backcountry skiing.

Existing, non-motorized trails within the Adirondack Forest Preserve provide over 1,000 miles of trails for use by backcountry skiers. Some trails are more popular than others. Trails such as the Whiteface Landing Trail or the Marcy Trail will have ski tracks from the first snowfall to the last fleeting cold temperatures of spring. For land managers, hoping to encourage use and provide a rewarding trail experience, the question of why some trails experience high levels of use and others don't is an important design principle question. A trail's recreational value is one of the most important factors determining its potential level of use (State of Minnesota, Department of Natural Resources, 2007). Trails that have high recreational value are those that include:

- scenery,
- natural, open space
- continuity
- variety, and
- limited impediments (State of Minnesota, Department of Natural Resources, 2007).

Many trails provide these elements to hikers and snowshoers. However, for backcountry skiers few trails offer all these elements and therefor do not satisfy many users. Much can be done to facilitate backcountry skiing on existing trails, but not all trails lend themselves to ski trail management due to terrain constraints, regulatory prohibitions, or other limitations. As has always been the case, skiing is allowed on all trails within the Forest Preserve whether they are managed specifically for skiing, or not.

Ski Trail Development

The following are guidelines for the development of backcountry ski trails that will provide a more desirable experience and facilitate an increase in use. They provide additional guidance to Cross Country Ski Trails, as defined in the Adirondack Park State Land Master Plan (APSLMP), in all Adirondack Forest Preserve land classifications (i.e. Wilderness, Primitive, Canoe, Wild Forest, Intensive Use, Historic). These guidelines include three trail classifications: Nordic Ski Trails, Backcountry Ski Trails and Skin Tracks. The guidance that follows each ski trail classification describes appropriate construction standards.

1. Nordic Ski Trail

The following applies to new ski trail construction. These guidelines should also be utilized in identifying the classification of existing trails suitable for skiing. In addition, the following should be utilized as guidance in the management of multiple use trails utilized for skiing.

Several existing trails exemplify this trail category, including: the Hays Brook Trail (Debar Wild Forest) and the Old Farm Clearing Trail (Siamese Ponds Wilderness). They were not constructed utilizing this ski trail construction guidance, however, they demonstrate the character of a Nordic Ski Trail

Goal
The following design standards are for the purpose of developing trails that provide skiers of any ability or skill level a wide range of opportunities to enjoy skiing in a wild forest setting. The experiences that these trails will create include opportunities for exercise, solitude and camaraderie, experiencing nature, and having fun in a setting that is not overly challenging. These trails include limited obstacles to negotiate. The trails will be designed with speeds associated with beginner skiing as a distinguishing characteristic. Gentle curves and mild slopes will require a limited ability to control speed and navigate variable terrain.

Trail Layout
Trail layout should favor loop trails over linear trails; loops with a single access point are preferable. Two-way traffic will be allowed on access trails. Loop trails with a single direction of traffic are preferred. Single direction trails are preferred to prevent potential collisions with uphill and downhill users.

When selecting trail routes, favor north or northeast-facing slopes, or protected or leeward facing basins where snow settles and cover is generally greatest.

Hardwood forests are the preferred location for trails. Alpine Krummholz, which usually occurs at elevations above 3,300 feet, will be avoided.

Newly constructed trails will be laid out to avoid rocky areas and drainage features such as wetlands and streams to the greatest possible extent.

The trail layout should utilize terrain to avoid extended fall lines.

Clearing Width
As ski trail surfaces will generally follow the existing contours of the natural forest floor and not be graded flat, trail clearing may have the greatest impact on a trail's dimensions and character. The extent of clearing should be limited to minimize effects on the surrounding environment and provide a high quality recreation experience. For example, wider widths may be necessary on steep up hills to allow skiers to herringbone up or on two-way traffic trails to provide skiers space to pass each other. However, wider widths are not necessary on trails with low average grades and minimal elevation changes or on one-way traffic trails where skiers do not need additional space to pass each other.

One-way traffic trails will be maintained to 6 feet except on steep slopes and sharp turns. Two-way traffic trails will be maintained to 8 feet except on steep slopes and sharp turns.

Where the running grade of the trails exceeds 10%, the section of trail with running grade exceeding 10% can be cleared up to 12 feet wide and should allow for appropriate site distance. As the trail grade lessens, the trail width should decrease.

Clearing Height
All trails may be kept clear to a maximum height of 12 feet, as measured from ground level. In cases where snow pack requires additional clearing height, cutting beyond the maximum height may be performed after documentation of the need for additional clearing height by DEC staff.

Trail Surface
Drainage
Drainage management should rely on grade reversals, rolling grade dips, and outsloping. These features are to be used to allow water to drain in non-erosive sheet flows. Construction of water bars should be avoided; if they are constructed, they should not feature exposed rocks and have the lowest profile as possible while still being able to function properly.

Grading
Trail surfaces will generally follow the existing contours of the natural forest floor and not be graded flat. Limited leveling and grading may be undertaken.

Woody Debris
Remove logs and other woody debris from the trail surface. Downed logs will be cleared beyond the trail's edge.

Rock Removal

Removal of boulders and rocks from trail surfaces will be minimized to the greatest extent possible. Any removal will be pursuant to an approved Work Plan.

Rock removal on trails will be primarily limited to uncommon, major obstacles that present demonstrable safety hazards to skiers and which cannot be avoided by appropriate trail layout or rerouting.

No boulders or rocks will be removed outside the cleared trail width.

Alternatives to rock removal should be considered to minimize the need for disturbance of the ground, to reduce the likelihood of creating drainage problems and to reduce the potential need for fill. Such alternatives may include covering or minor relocation of the trail where a boulder or rock may be too large or the number of rocks too great to deal with by any other method.

When rocks for tread development are used, there should be zero vertical presentation.

Side Slope Management
Trail surfaces should generally be the natural forest floor. Any elimination or reduction of side slopes by means of bench cuts will be accomplished exclusively using hand tools. All bench cuts should be full bench cut that establish the desired tread width with the soil removed from the backslope. The maximum amount of cut, measured vertically, will be 20% of the tread width.

Turning Radius
Provide gradual curves.
Minimum: Inside turning radius of 30 feet

Trail Grade
Average: 4%-10% (2.3 – 5.7 degrees)
Maximum: 20% (11.3 degrees)

Outslope:
Maximum: 10% (5.7 degrees)

Sight Distance
Forward sight distances are not as critical on Nordic ski trails except on steep downhill runs or where the trail crosses motorized roads, waterways, other trails, or other potential hazards. In these cases, gentle approaches (less than 5 percent grade) with forward sight distances of at least 50 feet should be used.

Tree Cutting
Cutting of overstory trees will be avoided in order to maintain a closed canopy wherever possible.

Cutting trees to create new trails, expand a trail from its current width or otherwise improve a trail will be carried out pursuant to LF-91-2 Tree Cutting Policy and an approved Work Plan.

No trees, except trees that due to structural problems or fallen/tipped conditions present an immediate hazard to the safe use of the trail, will be cut outside the cleared trail width.

Trees should be felled away from the trail, if possible, to minimize the amount of material that needs to be moved. Felled trees should be delimbed and cut to lie flat on the ground. Material cut out of the trail width should be dispersed off trail and not piled along the sides of the trail. If the tree trunks are used to help delineate the trail, the cut ends of the trunks should be located well outside the intended edge of the trail for safety reasons.

Woody vegetation on the treadway will be cut flush with the ground. Root masses will be left in place.

No brushing may occur outside the cleared trail width of any trail.

Runouts on downhill sections
Runouts may be included in the trail's design after steep downhill slopes to allow skiers to regain control. Runouts to reduce speed may include a trail perpendicular to the slope and grade reversals. The runout length and turning radius should increase as the slope becomes steeper.

Wetlands
Wetlands will be avoided to the greatest extent possible.

Any activity in a wetland or that may impact a wetland will be undertaken with prior consultation with the APA and with recognition of Army Corps of Engineers' permit requirements.

Water Crossings
Bridges and boardwalks should be utilized at water crossings to prevent exposure to water and ice buildup on the bottom of skis. Use straight, level (less than 5 % grade) approaches that allow skiers to stop prior to crossings. Approaches to bridges and boardwalks should be straight. Trails should not cross frozen lakes or rivers.

Bridges
Must be located above the ordinary high water mark.

Bridge decking should have narrow gaps, or no gaps, between boards to allow for snow accumulation and compaction.

Maximum Width: 6 feet

Compatible Uses
Winter: None –Restricted to skiers only.
Summer: None –Restricted to skiers only. These trails will be restricted to winter use to prevent the need for erosion management associated with summer time use that can accelerate erosion. Trail tread will remain vegetated and limit the need for erosion management structures.

2. Backcountry Ski Trail

The following applies to new ski trail construction. These guidelines should also be utilized in identifying the classification of existing trails that are suitable for skiing. In addition, the following should be utilized as guidance in the management of multiple use trails utilized for skiing.

Several existing trails exemplify this trail category, including: the Mr. Van Trail (HPW), the Avalanche Lake Trail (HPW), and the Wright Peak Ski Trail (HPW). They were not constructed utilizing this ski trail construction guidance, however, they demonstrate the character of a Backcountry Ski Trail.

Goal
The following design standards are for the purpose of developing trails that provide skiers with an intermediate to advanced skill level an opportunity to enjoy skiing in a wild forest setting. The experiences that these trails will create include opportunities for exercise, solitude and camaraderie, experiencing nature, and having fun in a setting that provides challenges and utilizes a setting that offers a variety of terrain. These trails will have limited obstacles to negotiate and fast cruiser sections. The trails will be designed with speeds and challenges associated with advanced level skiing as a distinguishing characteristic. Curves and slopes on the trails will require an ability to control speed and navigate variable terrain.

Although a variety of conditions may occur within backcountry ski trails, the trails should provide consistent experiences. Managers need to determine the level of skill necessary for the proposed trail and maintain the skill level necessary throughout the entire trail.

Trail Layout

Trail layout should favor loop trails over linear trails; loops with a single access point are preferable. Two-way traffic will be allowed on access trails. Loop trails with a single direction of traffic are preferred. Single direction trails are preferred to prevent the creation of troughs in snow that develop from uphill (or skinning) travel and provide more predictable ski conditions that limit potential collisions with uphill and downhill users.

When selecting trail routes, favor north or northeast-facing slopes, or protected or leeward facing basins where snow settles and cover is generally greatest.

Hardwood forests are the preferred location for trails. Alpine Krummholz, which usually occurs at elevations above 3,300 feet should be avoided.

Newly constructed trails will be laid out to avoid rocky areas and drainage features such as wetlands and streams to the greatest possible extent.

The trail layout should utilize terrain to avoid extended fall lines.

Clearing Width
As ski trail surfaces will generally follow the existing contours of the natural forest floor and not be graded flat, trail clearing may have the greatest impact on a trail's dimensions and character. The extent of clearing should be limited to minimize effects on the surrounding environment and provide a high quality recreation experience. For example, wider widths may be necessary on steep up hills to allow skiers to herringbone up or on two-way traffic trails to provide skiers space to pass each other. However, wider widths are not necessary on trails with low average grades and minimal elevation changes or on one-way traffic trails where skiers do not need additional space to pass each other.

One-way traffic trails will be maintained to 8 feet except on steep slopes and sharp turns. Two-way traffic trails will be maintained to 10 feet except on steep slopes and sharp turns.

Where the running grade of the trails exceeds 10%, the section of trail with running grade exceeding 10% can be cleared up to 12 feet wide and should allow for appropriate site distance. As the trail grade lessens, the trail width should decrease.

Clearing Height
Same as Nordic trail guidelines.

Trail Surface
Drainage
Same as Nordic trail guidelines.

Grading
Same as Nordic trail guidelines.

Woody Debris
Same as Nordic trail guidelines.

Rock Removal
Same as Nordic trail guidelines.

Side Slope Management
Same as Nordic trail guidelines.

Turning Radius
Minimum: Inside turning radius of 20 feet

Trail Grade
Average: 10%-30% (5.71 – 16.7 degrees)
Maximum: 40% (21.8 degrees)

Outslope
Maximum: 20% (11.31 degrees)

Sight Distance
Forward sight distances are important on Backcountry ski trails especially on steep downhill runs or where the trail crosses waterways, or other potential hazards. In these cases, forward sight distances of at least 100 feet are needed.

Tree Cutting
Same as Nordic trail guidelines.

Runouts on downhill sections
Same as Nordic trail guidelines.

Wetlands
Same as Nordic trail guidelines.

Water Crossings
Same as Nordic trail guidelines.

Bridges
Same as Nordic trail guidelines.

Compatible Uses
Same as Nordic trail guidelines.

3. Skintrack

To access slides or other skiing opportunities, skintrack slopes will be developed with a steady climb that enables skiers to gain elevation at a sustainable pace. Skin tracks should provide skiers with long, smooth routes. Kick turns should be developed where features, like tops of rocks and buried stumps, create benches and flat terrain, exist. The width of vegetative clearing for skin tracks will be limited to 4 feet. Direction of travel will be one way—uphill.

Multiple Use-Existing trails

Although many Forest Preserve trails are not designed, built, or maintained primarily for skiing, skiers still utilize these trails. Existing trails designed primarily for other uses (e.g. snowshoeing and snowmobiles in winter, and hiking and mountain biking in summer) often include structures that present undesirable challenges for backcountry skiing. For example, an optimal trail tread for backcountry skiing has limited surface obstructions. Hiking trail water management features, such as rock waterbars, present obstacles that require careful navigation by skiers. To create conducive facilities for backcountry skiing, the needs of skiers must be considered throughout trail planning and management process. Although there are many options for making existing trails more conducive for backcountry skiing, not every trail will be managed for this use. Trails managed for backcountry skiing will be designated within a Unit Management Plan (UMP). Management, e.g. signage, drainage and bridging, will reflect skiing as a use for designated trails.

The following is guidance to enhance existing trails for backcountry skiers.

Alternatives

From bog bridging to rock waterbars, one can find many different structures on trails built to protect the resource and help provide an enjoyable experience. For backcountry skiers, some of these structures create hazards or obstacles that inhibit the flow that makes skiing so enjoyable.

Management of the Forest Preserve is an effort to maintain the biological and social resources (e.g. wild forest character) while allowing for recreational use. As decisions are made regarding making existing trails more conducive to skiers, alternatives must be considered to evaluate and manage for acceptable levels of change to the Forest Preserve. The following is a process designed to assist managers in making management decisions regarding skiing on the Forest Preserve.

Skiing Management Decision Guide

Step 1: Determine if any administrative action is necessary
Step 2: Determine the minimum activity-What is the least intrusive tool, equipment, device, force, regulation, or practice that will achieve the objective of providing access for skiers and conforms to the Adirondack Park State Land Master Plan?

Trail Development Guidance Background

The Backcountry Ski Trail Development Guidelines and the management it proposes for developing backcountry ski trails was developed utilizing existing restrictions and guidance for the development of trails on the Adirondack Forest Preserve. The following are the basis utilized in developing the trail standards within this document.

Adirondack Park State Land Master Plan (APSLMP)

The APSLMP defines improvements[1], such as cross country ski trails. The definition of a cross country ski trail[2] describes the trail as having "the same dimensions and character and may also serve as a foot trail…" Cross country ski trails are included in the list of permitted improvements conforming to Wilderness, Primitive, Canoe and Wild Forest guidelines. The APSLMP defines a foot trail as "*a marked and maintained path or way for foot travel located and designed to provide for reasonable access in a manner causing the least effect on the surrounding environment.*" Cross country ski trails should be "located and designed" in essentially the same manner and they are to have the same dimensions and character. The APSLMP also provides guidance regarding snowmobile trail development. The APSLMP states a snowmobile trail[3] is "a marked trail of essentially the same character as a foot trail…"

Trail Construction and Maintenance Manual by NYSDEC Division of Operations

The Trail Construction and Maintenance Manual by NYSDEC Division of Operations list the following dimensions for trails:

Hiking
- Clearances:
  - Width: 4 – 8',
  - Overhead: 10'
  - Bridge: width 5-6 '

Snowmobile
- Clearances:
  - Width: 8' maximum
  - Overhead: 10'
  - Bridge: width 8' maximum

[1] **Improvement**--any change in or addition to land, which materially affects the existing use, condition or appearance of the land or any vegetation thereon, including but not limited to foot and horse trails, roads, jeep trails, state truck trails, snow-mobile trails, cross country ski trails, improved cross country ski trails, trail heads, picnic areas and individual primitive tent sites. (APSLMP)

[2] **Cross Country Ski Trail**--a marked and maintained path or way for cross country ski or snowshoe travel, which has the same dimensions and character and may also serve as a foot trail, designed to provide reasonable access in a manner causing the least effect on the surrounding environ-ment and not constructed, maintained or groomed with the use of motor vehicles. (APSLMP)

[3] **Snowmobile Trail**--a marked trail of essentially the same character as a foot trail designated by the Department of Environmental Conservation on which, when covered by snow and ice, snowmobiles are allowed to travel and which may double as a foot trail at other times of year. (APSLMP)

Cross-country (Nordic) ski
- Clearances:
  - Wilderness:
    - Width: 4’
    - Overhead: 10’
  - Wild Forest:
    - Width: 8’
    - Overhead: 10”
  - Bridge: 5 – 6’

Canoe
- Clearances
  - Width: 8’ maximum
  - Overhead: 10’
  - Bridge: width 5-6’

Forest Preserve Policy Manual

DEC’s Forest Preserve Policy Manual signed by the Director of Lands and Forest in 1976 classifies foot trails into four categories and provides the following guidance regarding trail management:

1. Trunk trail (Class I)- These must be in accordance with the specifications of the Department’s Trail Construction and Maintenance Manual, which states, in part “…the overhead clearing should be as high as a man can reach with his axe. Width of (clearing is determined)…by removing obstructions that are within a foot of the finger tips when standing in the center of the tread with arms outstretched.” [4]
2. Class II Trail -Class II trails may receive less maintenance than that of trunk trails and clearing width may vary from about a two foot wide wilderness foot path to about four feet. In general, the width and height will be sufficient to allow passage in wet weather or by snowshoe in winter.
3. Path (Class III)-Maintenance and removal of blow downs and other hazards will be at infrequent schedules and only as necessary to prevent the development of herd-paths around obstacles.
4. Wilderness Trails-Wilderness trails, are not constructed, maintained, marked or signed.

The Snowmobile Plan for the Adirondack Park – October 2006

The Snowmobile Plan for the Adirondack Park – October 2006 provides the following standards under trail width.

Class II:

[4] Note: The Trail Construction and Maintenance Manual by NYSDEC Division of Operations does not actually contain this reference.

II-a: May be maintained to an 8-foot maximum cleared trail width and to a 12 foot maximum cleared trail width on curves and steep running slopes.

II-b: May be maintained to an 8-foot maximum cleared trail width.

Class III: May be maintained to a 9-foot maximum cleared trail width and a 12-foot maximum cleared trail width on curves and steep running slopes.

Management Guidance: Snowmobile Trail Siting, Construction and Maintenance on Forest Preserve Lands in the Adirondack Park

> Class I Trails may be maintained to an 8-foot maximum cleared trail width.
> Class II Trails may be maintained to a 9-foot maximum cleared trail width except on sharp curves (inside turning radius of 25-35 feet) and steep running slopes (over 15%) where they may be maintained to a 12-foot maximum cleared trail width.

Definitions

The following are definitions for terms used in this document.

Access trails: trails that provide access to loops and other destinations. No directional restrictions are associated with these trails.

Loop trails: single direction trails that provide a loop. These provide visitors the enjoyment of utilizing one path to without starting and ending the outing on the same path.

Skintrack: a marked and maintained path or way for up-hill ski travel, which has the same character of a herd path, and constructed, designed and maintained for exclusive winter travel on top of snow and ice.

Radius: distance to the center of the arc corresponding to the turn.

Runout: a flat expansive area at the end of run that allows skiers to slow down.

Resources

Felton, Vernon. *Trail Solutions: IMBA's Guide to Building Sweet Singletrack*. Boulder, Colo: IMBA, 2004. Print.

Parker, Troy Scott. *Natural Surface Trails by Design: Physical and Human Design Essentials of Sustainable, Enjoyable Trails*. Boulder, CO: Natureshape, 2004. Print.

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State of Minnesota, Department of Natural Resources, 2007. "Trail Planning, Design, and Devepment Guidelines." Trails & Waterways Division, 500 Lafayette Road, St. Paul MN 55155-4052. 306 pages

Webber, Pete. *Managing Mountain Biking: IMBA's Guide to Providing Great Riding*. Boulder, CO: International Mountain Bicycling Association, 2007. Print.

"British Columbia State Park Trail Design & Construction Standards Manual." *Table of Contents*. Web. 4 Nov. 2015. http://www.trailstobuild.com/Articles/BC%20Trail%20Standards/contents.htm

Grade Conversion Chart

Slope (degrees)	% Grade		
0.57	1		
3	5.24		
5.74	10		
9	15.8		
12	21.3		
14	24.9		
17	30.6		
19	34.4		