

Trails Technical Document #1

Standards and Guidelines for Trails in NYS Parks

Prepared by
NYS Office of Parks, Recreation and
Historic Preservation
Planning Bureau
Albany, NY 12238

April 29, 2010



Standards and Guidelines for Trails in New York State Parks

A primary goal for all New York State Parks Trail Systems is to develop sustainable trails that have minimal impacts on the environment, require little maintenance, and meet the needs of the users. This document is one of a series of technical documents developed by State Parks to provide standards and guidelines for trail design and development, accessibility, and trail assessment and maintenance techniques that help ensure a sustainable trail system. Additional topics include guidelines for trail signage, trail monitoring, and trail closure and restoration. The complete list of technical documents is provided on the web at:

<http://www.nysparks.state.ny.us/recreation/trails/technical-assistance.aspx>.

These documents were designed for use within New York State Parks but can be used as resources for trail projects outside of the Parks. Within State Parks, use of these documents for implementation of trail projects will be done in conjunction with a review and approval process as laid out in *Technical Document 7 - Trail Project Approval Process for NYS Parks*. These documents may be updated periodically. Additional documents will be developed in the future as part of this series.

This document provides standards and guidelines for trail development in New York State Parks. It identifies the need for standardized trail signage, provides trail development standards for a variety of trail types including for accessible trails, and includes a list of maintenance responsibilities and available manuals to be used as resources. This document also provides information on trail closure and restoration and trail monitoring.

A. Trailheads, Kiosks, Signage

It is important that trail users have access to information regarding trails to enhance their experience. Trail information can be disseminated in a wide variety of formats, including kiosks, brochures, websites, guidebooks, and on-trail signs and blazes. But even with good trail guides and websites available, trail signage is indispensable. If trail users are uncertain about trail location or direction, they may become disoriented, or they may create new trails that damage the environment and become a challenge to rehabilitate.

A standardized sign system is a means of creating a cohesive and consistent image for the Park, enhancing its overall appearance, and providing simple guidelines that managers can follow to sign trails. The design and usage of all trailhead and kiosk signage and trail markers will be guided by *Technical Document 2: Trail Signage Guidelines for the New York State Park System*. This document includes information on naming and assessing trails, etiquette and safety, materials and techniques, trail symbols, types of signage, kiosks, sign maintenance, and other resources.

B. Trail Development Standards

Trails should be developed using appropriate design standards based on desired uses. Considerations should be made for either a single or multiple treadway, tread width and surface, corridor and vertical clearance, sight distance, grades, and turning radius to provide an appropriate trail experience for expected users and levels of use.

Trail development and maintenance will be guided by design standards as provided in the table below for various types of uses. These standards should be used as a starting point and modified as necessary to address the natural characteristics of the resources and specific needs.

Trail Development Standards

Trail Type	Vertical Clearance	Corridor Clearance	Treadway Width	Surfacing Materials	Trail Length	Sight Distance	Grade	Turning Radius	Users/ Mile
Biking Class I (Greenway Trail)	8-10 feet	10-12 ft. (1 lane) 12-16 ft. (2 lane) 16-20 ft. (2 lane – high volume)	6 ft. (1 lane) 8-10 ft. (2 lane) 12-14 ft. (2 lane – high volume)	Smooth pavement, asphalt, concrete, crushed stone, clay or stabilized earth.	Min. – 5 mi. loop (1.5-2 hour) 15-25 mi. of linear or loop trails (day trip)	Min. of 50 ft. up to 100 ft. on downhill curves or road crossings	0-5%; Max: 5-10% sustained; 15% shorter than 50 yd. Outslope of 2-4%	8-14 feet depending upon speed.	40
Mountain Biking	8-10 feet	1.5 – 6 ft. (1 lane)	Novice-36 in. Intermediate -24-30 in. Advanced-12-18 in.	Firm natural surface including soil, rocks, wood; hardened surface for wet areas.	Min. – 5 mi. loop (1.5-2 hour) 15-25 mi. of linear or loop trails (day trip)	Min. of 100 ft. up to 150 ft. on downhill curves or road crossings	Over all grade not to exceed 10%. Climbing turns not to exceed 7-12%. Out slope of 3-5%	Novice/ Intermediate - 8 ft. min. Advanced – 6 ft min.	10
Cross-country Skiing	8-10 ft. above snow depth. (10-12 ft in summer)	8 ft (1 lane) 10-12 ft. (2 lane)	4-6 ft. (1 lane) 7-8 ft. (2 lane) 8-10 ft. (up hill)	Snow with underlying bare soil, rocks or wood chips. Outsloped underlying material. Can be groomed or ungroomed.	0.5-3 mi. loops up to 4-8 mi. (2-4 hour trip)	Down hill runs, stream or road crossings 50 ft. Otherwise not critical	0-5%; Max – 10% sustained; 15-25% shorter than 50 yd.; 25-40% shorter than 50 yd., experts only. Outslope – 0-2%	Avoid sharp turns. Never locate a turn at the base of a downhill run. Min. - 50 ft. Preferred – 100 ft.	5-30
Hiking (Developed Interpretive, group or connector)	8-10 ft	4 –8 ft	4-6 ft	Bare soil, rocks, stone dust, or wood chips. May have hardened surface (concrete, asphalt or boardwalks) in high use areas.	0.25 – 5 mi. (1/2 day) 5-15 mi. (full day)	Not critical barrier on reverse curves may be used	0-5%; Max – 15% sustained; 40%+ shorter than 50 yd.; Outslope – 4% max	N/A	1-30
Hiking (Primitive Back-packing)	8-10 ft.	4-6 ft.	18 –30 in.	Bare soil, rocks, gravel, wood; hardened surface for wet areas.	Min – 5 mi.; 5-15 mi. (full day); 15 – 25+ mi. (multi-day)	Not critical	1-5%; Max - 15% sustained; 40-50% shorter than 50 yd.	N/A	1-5

Trail Type	Vertical Clearance	Corridor Clearance	Treadway Width	Surfacing Materials	Trail Length	Sight Distance	Grade	Turning Radius	Users/ Mile
Snowshoe	8-10 feet above snow depth (10-12 ft. in summer)	8 ft. (1 Lane) 10-12 ft. (2 Lane)	4-6 ft. (1 Lane) 7-8 ft. (2 Lane) 8-10 ft. up and down hill	Snow with underlying bare soil, rocks or wood chips. Outsloped underlying material. No grooming is needed.	3 mi. loops; 4-8 mi. (2-4 hr. trips)	N/A	0-5%; Max. - 10% sustained; 15-25% shorter than 50 yds. for experienced snowshoers	N/A	5-30
Horse	10-12 ft.	5-6 ft. (1 lane)	18-30 in. (1 lane)	Soils having a large percentage of rocks, clay and/or organic matter. Void of rocks football sized or larger. Little treadway development required if soils are appropriate. In problem areas, water control measures may be installed. Brush and saplings should be cut flush or below ground level. Remove dead or leaning trees.	Min – 5 mi. (1-1.5 hours) 15-25 mi. of looped trails (full day)	Not critical unless 2 way traffic. 50-100 ft. 100-200 ft. at motorized road crossings.	0-10%; Max – 10% sustained; 20% shorter than 50 yd. Outslope 4% max.	Min. 6 ft. Wider turns preferred.	5-15
Snowmobile	8-12 ft. above snow depth (10-12 ft. in summer)	1A- 14-16 ft. 1B- 14-16 ft. C- 8-12 ft. D- 8 ft. min.	1A –12 ft. 1B –8-12 ft. C –4-8 ft. D –4ft. min.	Groomed snow Groomed snow Groomed snow Ungroomed snow	50-80 mi.	Min – 50 ft. 100+ ft.	10 – 15%; Max - 25% sustained; 40% shorter than 50 yd.	Min. 50 ft. 100 ft.	15

C. Accessibility

The Americans with Disabilities Act (ADA) requires public agencies to employ specific guidelines which ensure that buildings, facilities, programs and vehicles addressed by the ADA are accessible in terms of architecture and design, transportation, and communication to individuals with disabilities. A federal agency known as the Access Board has issued the Americans with Disabilities Act Accessibility Guidelines (ADAAG) for this purpose.

Currently adopted ADAAG address the built environment: buildings, ramps, sidewalks, rooms within buildings, etc. In 2007, the Access Board proposed guidelines to expand ADAAG to cover outdoor developed facilities including trails, campgrounds, picnic areas and beaches. The Final Accessibility Guidelines for Outdoor Developed Areas (AGODA) (presently applicable only to the federal government) were published in September 2013 by the Access Board and contain the most recent standards used to design and construct accessible pedestrian trails. <http://www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas>. In addition, in February 2013, the Access Board issued a supplemental notice of proposed rulemaking (SNPRM) proposing specific provisions on shared use paths for inclusion in the

proposed accessibility guidelines for pedestrian facilities in the public right-of-way that were published in the Federal Register on July 26, 2011. <http://www.access-board.gov/guidelines-and-standards/streets-sidewalks>. The proposed accessibility guidelines would apply to the design, construction, and alteration of pedestrian facilities in the public right-of-way, including shared use paths.

ADAAG apply to newly constructed structures and facilities as well as alterations to existing structures and facilities, including trails. As of now, the ADAAG applies to NYS Parks while the outdoor recreation standards (AGODA) do not yet apply to Parks. Therefore, when the State is planning the construction or alteration of recreational facilities or assets that support them, it must also consider providing access to the facilities or elements for people with disabilities. The standards in ADAAG and AGODA provide guidance for trail modifications that achieve programmatic compliance with the ADA.

New trails and altered trails connected to an accessible trail or designated trailhead should be designed to improve accessibility for persons with disabilities. Trail conditions, including topography, geology, and ecology, and expected experience will limit the number of fully accessible trails. The Final Accessibility Guidelines for Outdoor Developed Areas contains the most recent standards used to design and construct pedestrian accessible trails and to assess accessibility. There are some departures permitted from the technical provisions. Although the AGODA only applies to federal agencies, State Parks will follow the guidelines to the greatest extent practicable and apply standards consistently on all State Park pedestrian trails. For further details, refer to the AGODA at <http://www.access-board.gov/outdoor/index.htm>. The following is an abbreviated listing of the standards without the exceptions:

- Surface – The trail surface shall be firm and stable.
- Clear Tread Width – The clear tread width of the trail shall be 36 inches minimum.
- Openings – Openings in trail surface shall be of a size that does not permit passage of a ½ inch diameter sphere. Elongated openings shall be placed so that the long dimension is perpendicular or diagonal to the dominant direction of travel.
- Protruding Objects – Protruding objects on trails shall have 80 inches minimum clear head room.
- Tread Obstacles – Where tread obstacles exist, for concrete, asphalt or boards (defined to include wood, plastic, metal, and composite products), they shall not exceed ½ inch in height; for all other surfaces, they shall not exceed 2 inches in height.
- Passing Space – Where the clear tread width of the trail is less than 60 inches, passing spaces shall be provided at intervals of 1000 feet maximum. Passing spaces shall be either 60 inches minimum by 60 inches minimum space, or an intersection of two walking surfaces which provide a T-shaped space provided that the arms and stem of the T-shaped extend at least 48 inches beyond the intersection.
- Slopes – Slopes shall comply with the following:
 - Cross Slopes – For concrete, asphalt or boards, the cross slope shall not exceed 1:48; for all other surfaces, the cross slope shall not exceed 1:20.
 - Running Slope – Running slope of trail segments shall comply with one or more of the provisions of this section. No more than 30 percent of the total trail length shall exceed a running slope of 1:12.
 - The running slope of any segment of a trail shall not be steeper than 1:8.

- Where the running slope of a segment of a trail is steeper than 1:20, the maximum length of the segment shall be in accordance with the table below, and a resting interval shall be provided at each end of the segment.

Running Slope of Trail Segment		Maximum Length of Segment
Steeper than	But not Steeper than	
1:20	1:12	200 feet (61 m)
1:12	1:10	30 feet (9 m)
1:10	1:8	10 feet (3050 mm)

- Resting Intervals – Resting intervals shall be 60 inches minimum in length and shall have a width at least as wide as the widest portion of the trail segment leading to the resting interval. Where the surface is concrete, asphalt, or boards, the slope shall not be steeper than 1:48 in any direction; for all other surfaces, the slope shall not exceed 1:20 in any direction.
- Edge Protection – Where edge protection is provided along a trail, the edge protection shall have a height of 3 inches minimum.
- Signs – Newly constructed and altered trails and trail segments that are accessible shall be designated with a symbol at the trail head and all designated access points. Signs identifying accessible trail segments shall include the total distance of the accessible segment and the location of the first point of departure from the technical provisions.
- Where gates or barriers are constructed to control access to trails, gates and barriers shall provide a clear width of 32 inches minimum.

In all cases, it is recommended that basic information about trail characteristics be displayed at the trailhead. This allows the trail user the opportunity to determine if the trail is appropriate for their abilities. This information should be available for all trails regardless of whether they meet the accessible guidelines.

The following is a recommended list of information that should be displayed at the trailhead:

- Trail Symbol
- Total trail length (in linear feet)
- Typical and maximum running slope
- Typical and maximum cross slope
- Typical and minimum clear tread width
- Surface type, firmness, and stability
- Length of trail segments meeting accessible standards (in linear feet)
- Location of the first point of exception to accessible standards
- Tread obstacles that limit accessibility
- Elevation (trailhead, maximum, and minimum)
- Total elevation change

D. Design, Development and Maintenance

Proper trail design, development (construction) and maintenance are essential to creating and maintaining sustainable trails and trail systems. The following manuals are provided as resource guides for trail design, development and maintenance:

- *Trail Planning, Design, & Development Guidelines*. State of Minnesota, Department of Natural Resources, 2007. Trails and Waterways Division.
<http://www.dnr.state.mn.us/index.html>
- *Trail Maintenance Manual, 7th Edition Revised*. 2007. New York-New Jersey Trail Conference, Inc. <http://www.nynjtc.org/volunteers/vresource.html>.
- *Trail Construction and Maintenance Notebook*. 2007 Edition. Forest Service, US Department of Agriculture. <http://www.fhwa.dot.gov/environment/fspubs/07232806/index.htm>.
- *Lightly on the Land: The SCA Trail-Building and Maintenance Manual*. 2006. Robert C. Birkby, The Student Conservation Association. <http://www.thesca.org/about>
- *Trail Solutions: IMBA's Guide to Building Sweet Singletrack*. 2004. International Mountain Bicycling Association. <http://www.imba.com/index.html>
- *Equestrian Design Guidebook for Trails, Trailheads and Campgrounds*. December 2007. US Department of Agriculture, Forest Service - Missoula Technology and Development Center. <http://www.fhwa.dot.gov/environment/Fspubs/07232816/index.htm>
- Guide for the development of Bicycle Facilities. 2012 Fourth Edition. American Association of State Highway and Transportation Officials.
https://bookstore.transportation.org/item_details.aspx?ID=1943
- Designing Sidewalks and Trails for Access, Part II of II: Best Practices Design Guide. 2001. United States Department of Transportation - Federal Highway Administration.
http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/contents.cfm
- Shared use Paths and Greenways. 2006. Massachusetts Highway Department.
http://www.massdot.state.ma.us/Portals/8/docs/designGuide/CH_11_a.pdf
- Trails for the Twenty-First Century, Second Edition, Planning, Design, and Management Manual for Multi-Use Trails. 2001. Rails-to-Trails Conservancy.
<http://www.railstotrails.org/ourwork/trailbuilding/toolbox/informationsummaries/plandesign/build.html>

Maintenance of the trails is conducted by Park staff as well as in partnership with various trail user or Friends groups. Trail maintenance standards will utilize acceptable practices and methods in the maintenance of trails to the particular uses of the trails. Maintenance activities include:

- Maintaining drainage structures
- Water management such as development of knicks, rolling grade dips to divert water off of a trail
- Surface treatment
- Clearing and grubbing to maintain height and width clearances
- Maintaining bridges and other structures
- Maintaining signage
- Invasive species removal
- Using established trail construction and maintenance techniques to control water flow and stabilize trail surfaces.

These activities must be coordinated with the park manager. Activities that go beyond standard maintenance practices (blazing, clearing brush from treadway/tree pruning, maintenance of erosion control structures) will require the approval of the park manager (see *Technical*

Document 7 – Trail Project Approval Process for NYS Parks). Park staff maintain parking lots and support facilities.

E. Trail Closure

Sometimes it is necessary to close or reroute a trail due to poor initial design, overuse, illegal use, or other natural factors having caused some type of degradation. The decision to close a trail or section of a trail can be the result of a trails planning process which considers the trail system as a whole or on a case by case basis. Closure of a trail or trail section will require the approval of the park manager (see *Technical Document 7 – Trail Project Approval Process for NYS Parks*).

Reclamation strategies include closure, stabilization, recontouring, revegetation, and monitoring. Each site should be evaluated individually for its potential to be rehabilitated. Trail restoration needs to be carefully planned, and the consequences of each strategy should be evaluated. Restoration can be as simple as blocking a closed section of trail and passively allowing the vegetation to recover, or include more complex projects, such as removing any trace of the tread, actively planting native vegetation, and constructing check dams to help stop erosion. Careful monitoring of a restored section of trail is then needed to ensure that little evidence remains of the old trail.

All plantings will be with native, non-invasive species. Vegetation should be allowed to grow on the abandoned trail where it intersects with a designated trail. Brush, rocks and other natural material should be placed on the abandoned trail for a distance so the linear characteristic of the trail can not be readily identifiable. These abandoned trails should not be identified on trail maps.

Technical Document 3: OPRHP Guidelines for Closing Trails provides the detailed process to be taken to close trails in state parks.

F. Monitoring Program

A monitoring program should be developed to monitor trail conditions. A monitoring program will include an annual inspection of all trails and periodic inspections of trails throughout the year. Volunteers may aid in this process in many cases. The monitoring program should include:

- Monitoring trail use to avoid user conflicts and to ensure sustainability.
- Monitoring trail conditions, educating trail users, and utilizing other methods to identify and report the locations of invasive species.
- Where overuse is occurring, providing remediation through the use of water control and trail hardening techniques, by relocating sections of trail, and/or by limiting trail use.