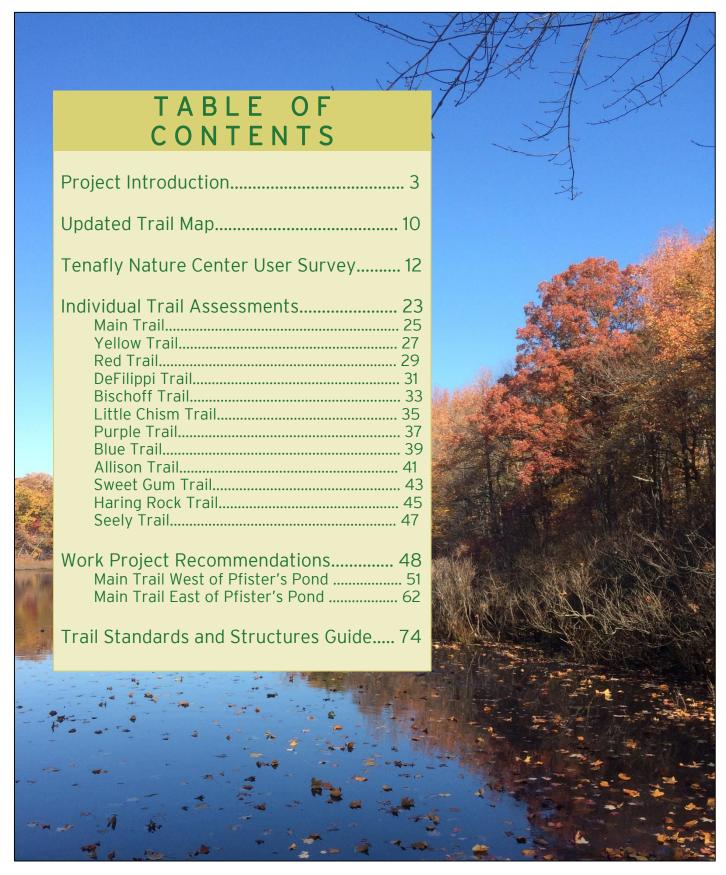


# Tenafly Nature Center Trail Master Plan

# February 2016

Prepared by New York-New Jersey Trail Conference



Pfister's Pond as seen from the Main Trail.

# **Project Introduction**

## Summary

This Trail Plan is comprised of an assessment, analysis, and set of recommendations with the goal of improving the woodland trails in Tenafly Nature Center (TNC). The purpose of this Trail Plan is to provide an overview of the existing trail system, identify potential deficiencies, and use input from TNC staff and users to craft recommendations for future trail improvements.

This planning process included a thorough on-foot trails assessment of all woodland trails at TNC. GPS inventory and assessment data was collected for all 7 miles of existing trails and included signage, structures, deficiencies, points of interest, and more. The resulting Inventory and Assessment Summary Report included a full map indicating these data points and accompanying photographs, producing a digital walkthrough of the trails.

On November 17<sup>th</sup> 2015, the Trail Conference sent a TNC user survey to its Bergen County members. In 2016 TNC posted the survey to its Facebook page on January 4<sup>th</sup>, published a link in the winter 2016 issue of Nature & News, and it was included in a North Jersey article on February 2<sup>nd</sup>. The results of this survey are included and discussed in this document, and the data it provides is used as a frame of reference when proposing improvements to best serve TNC's users.

Based on the deficiencies noted in the Inventory and Assessment Summary Report, professional trailbuilding staff from the Trail Conference visited the most pressing trail concerns on the Main Trail and did a thorough technical assessment of conditions and possible solutions. Their recommendations are included in this document.

A reference section is incorporated into this document to offer background information on technical trailbuilding and clarify some terminology used in the recommendations section.

This plan illustrates opportunities for Tenafly Nature Center to improve their trail system. Opportunities include: highlighting while at the same time protecting the trails' unique natural features, identifying projects to rectify key deficiencies, engaging more of the community in positive use of the trails, and enhancing the interpretive and educational components of the trails.



# **Project Introduction (continued)**

## Access to Trails

Surrounded by residential neighborhoods on its northern and western borders, Tenafly Nature Center has a relatively porous trail system with several entry points. The most popular entry point is the Nature Center itself. The access points from the surrounding neighborhoods create a management challenge in educating park users about navigation and proper trail etiquette.

The surrounding boroughs of Tenafly, Cresskill, Alpine, and Closter boast a combined population of over 30,000, making TNC's trails accessible to a large number of people in the immediate vicinity.



## Recreational Trail User Groups

From speaking with users and observing on the ground, the majority of Tenafly Nature Center's users fall into one of three groups:

#### Casual "Front-Country" Hikers

Users in this category typically expect trails that are maintained and easy to follow, walking conditions that incorporate moderate climbs, descents and uneven footing, and hikes that can be completed within 2-4 hours. These users are comfortable using simple maps and often expect them to be readily available. Footwear is typically appropriate for walking, and minor wet or muddy patches are not a concern. The walk from the parking area, along the path, and back to the parking area should be no more than five miles.

All of the trails in Tenafly Nature Center are suitable for this demographic.

#### Older Walkers

Trails suitable for older users should incorporate gentle grades, even walking surfaces, and minimize the use of steps in favor of climbing turns and ramps. Where possible, trails designed for these users should be simple loops which return the walker to their starting point without relying on maps for navigation and should be wheelchair accessible. Clear directional signage should be in place to assuage any confusion or doubt at intersections. Resting spots, such as benches, should occur at regular intervals. Interpretive signage should incorporate pictures and fonts which are large and clear for easy reading. The walk from the parking area, along the path, and back to the parking area should be no more than one mile.

The Main Trail, Yellow Trail, and portions of the DeFilippi Trail are best suited for this demographic.

#### **Educational and School Groups**

Whether these groups are organized by a schoolteacher or Nature Center staff and volunteers, groups of children have unique needs on trails. Because students come in all levels of physical ability, trails designed for educational groups should be wheelchair-accessible if possible. For most groups, however, intermittent "challenges" such as steps, bridges, stepping stones, etc. are appreciated and add to the sense of adventure on the trail. Trails with this use in mind should incorporate at least one teaching area immediately off the trail, consisting of a circular clearing with room for 10-20 students comfortably standing shoulder-to-shoulder. Benches or sit-down logs around the periphery are ideal but not necessary, as are interpretive signage components along the trail. The trail corridor should be wide enough to comfortably walk two abreast (6' or more) so that students can walk side-by-side and hikers can pass by stopped groups without having to walk off-trail. The walk from the parking area, along the path, and back to the parking area should be no more than one mile.

The Yellow Trail, Red Trail and DeFilippi Trail are best suited for this demographic.



An example of the Red Trail being used for a storytelling activity.

# **Project Introduction (continued)**

#### Natural Resource Issues

There are three major natural resource management challenges on the trails at Tenafly Nature Center: trail erosion, wet tread, and invasive plant species encroachment.

#### Trail Erosion



Trail erosion is primarily the result of unsustainable trail design and maintenance. When water has no opportunity to leave the trail tread it will continue to flow down the tread. causing erosion in the process. Typically, effective drainage of water from a trail's surface is dealt with by a wide range of trail features. Some are designed into a trail's alignment like dips and grade reversals. Other drainage features are built into the trail; these include side swales, waterbars, and drainage ditches (refer to the Trail Standards and Structures Guide for more information). Constructed drainage features often require more maintenance than a trail with drainage opportunities designed into its alignment.

Soil displacement is caused when natural or user created forces move soils away from the trail surface. Soil displacement due to erosion is dealt with through the installation of drainage structures or through trail realignment as mentioned above. Soil displacement caused by the impact of trail users can be dealt with by hardening the tread surface and minimizing trail grades. Tread hardening is accomplished with the installation of stone or timber steps (stones being preferred due to their durability).

At Tenafly Nature Center, erosion and displacement are most evident on the Main Trail. Due to TNC's moderate grades, erosion is not a significant issue through much of the trail network.

#### Wet Tread

Many stretches of trail at Tenafly Nature Center are flat and provide no opportunities to shed water. In these locations erosion does not occur but severe water saturation or flooding causes an undesirable trail surface. In an attempt to avoid these sections trail users walk off the trail and impact surrounding areas, which in turn widens the

tread. The muddy area also often grows as well, as users trample the ground around it to circumvent the issue.

On many trail systems, rolling trail layout and drainage structures serve to shed water off the trail – however, this only works if there is significant slope in the landscape for water to flow. Along flat trails like those at Tenafly Nature Center, the best option is to use structures and construction techniques like turnpiking, bog bridging, or crushed stone surfacing to either elevate or harden the walking surface and alleviate pooling water (refer to the Trail Standards and Structures Guide for more information).

#### **Invasive Species**

Although a comprehensive natural resource management plan to address targeted removals is beyond the scope of this document, it should be noted that invasive species have been observed in abundance along the trail system at Tenafly Nature Center. At the time of this document's completion, invasive species encroachment into the trail corridor was being successfully managed by volunteer trail maintainers organized, trained and deployed by the New York-New Jersey Trail Conference. Maintainers visit their assigned trail segments to conduct maintenance and report on conditions a minimum of twice annually, ensuring that new invasive growth is clipped back and does not close off the trail corridor despite its rapid growth.

The New York-New Jersey Trail Conference also has an on-staff PhD ecologist who organizes an Invasive Species Strikeforce, which can provide training on invasive species identification and organize targeted surveys or removals.



Invasive wineberry (Rubus phoenicolasius) along the Main Trail.

# **Project Introduction (continued)**

## Navigation and Signage

Signage is an important tool for educating trail users about risk, proper behavior, designated uses, and natural resources. Signs are recommended at all trail access points as well as key intersections. In addition, wayfinding signs add to user satisfaction. Many park users won't venture beyond the areas they are familiar because of a fear of becoming lost. A comprehensive system of trail wayfinding and directional trail signage helps disperse users throughout the trail system and enables users to more fully appreciate everything Tenafly Nature Center has to offer. Furthermore, a wayfinding system enhances the ability of park users, managers, enforcement, and emergency responders to communicate locations to each other.

Trailhead signs should inform users about permitted trail uses and behaviors as well as the character of the trails accessed from that point. By providing clear objective information, users can decide whether a particular trail matches their abilities. Additionally, because of its front-country nature and emphasis on groups and educational activities, TNC incorporates interpretive signage which has potential to be greatly expanded.





Existing map and regulatory signage at the main trailhead by the parking lot.

#### **Accessible Trails**

Increasingly popularized over the past several years, "Accessible Trail", "ADA Trail", and "Universal Access Trail" refer to a trail standard that meets current United States Forest Service Trail Accessibility Guidelines (FSTAG). The FSTAG is used as the typical ADA standard for trails by Federal Agencies as well as most state, local and private land management agencies. The FSTAG details minimum design and construction requirements necessary for accessible trails. These requirements include specific provisions for trail grade (steepness), cross slope (or outslope), resting intervals, surface firmness, clear tread width, passing spaces, tread obstacles, protruding objects, openings, edge protection, and signs. In addition to providing for access for persons with disabilities, these standards also create trails that are easier for a wider range of the public to use and are, by design, most sustainable.

There are currently no designated Accessible Trails in any part of TNC's trail system. The design and construction of Accessible Trails is a large undertaking, and converting an existing trail to be accessible almost always fundamentally alters the character of the trail in question. This Master Plan only touches lightly on the issue of Accessible Trails, as they require an enormous planning process in their own right, but it does identify one or two areas to investigate Accessible Trail implementation in the future.



An accessible trail being enjoyed by a variety of users.

# **Updated Trail Map**

#### Existing Map

Tenafly Nature Center appears as part of the Hudson Palisades map set produced by the New York-New Jersey Trail Conference, on Trail Map 108. The map set is currently in its Fifth Edition, which was released in 2014.

## **Updated Map**

The updated map was produced as part of this Trail Master Plan document, and developed with input from Nature Center staff and volunteers. Its updated features include:

- Reformatted to fit on standard 8.5" x 11" paper to print as handouts.
- Updated trail routes based upon most recent GPS data.
- Arrows indicating trail start and end points.
- An inset box with individual trail mileages.
- Name, blaze colors and full length of the Sweet Gum Trail.
- "White Trail" name updated to "DeFilippi Trail."
- Additional landmarks.
- A QR Code for free digital download on smartphones.
- Assorted other changes.

#### Recommendations for Use

The updated trail map can be used in a variety of ways to educate users about Tenafly Nature Center's trail system. Below are some ideas for how to best utilize the map and make it accessible to all users.

- Print the map on durable, water/fade-proof materials (metal-backed laminate or PVC plastic) and post in kiosks by the main Nature Center parking area.
- Have printouts of the map readily available in the Nature Center. The map is suitable for color or black-and-white printing.
- Mount plastic dispensers at kiosks and trailheads so that hikers can pick up folded maps when the Nature Center is closed.
- Print the map on corrugated weatherproof PVC "lawn sign"-style material, and post at critical trail intersections with "you are here" indicators.
- Post the map as a PDF on the TNC website so that users can access from home computers.
- Use QR codes on TNC signage so that users with smartphones can download the PDF directly onto their phones to take with them as they hike.
- Publicize and share through social media and printed articles.

As part of this Trail Master Plan, the map is available to share freely as TNC sees fit. For a rugged weatherproof and more detailed map which shows TNC's connectivity to other local neighborhoods and trail systems, users are encouraged to purchase the full Hudson Palisades map set produced by the Trail Conference.

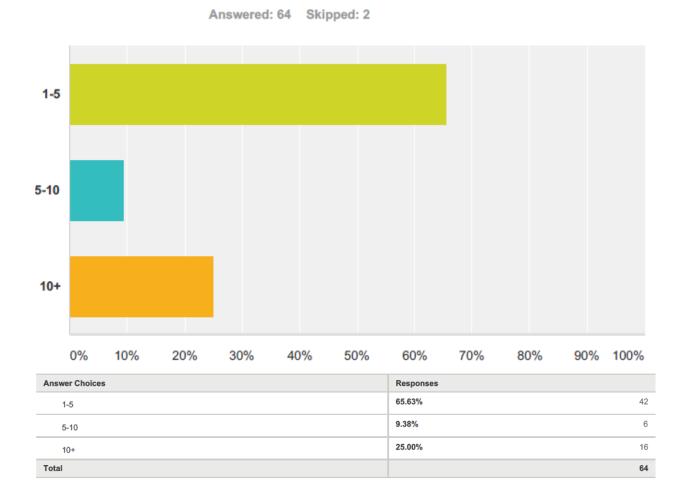


# **Tenafly Nature Center User Survey**

On November 17<sup>th</sup> 2015, the Trail Conference sent a Tenafly Nature Center user survey to its Bergen County members. In 2016 TNC posted the survey to its Facebook page on January  $4^{th}$ , published a link in the winter 2016 issue of Nature & News, and it was included in a North Jersey article on February  $2^{nd}$ . The results of this survey are included below, and the data they provide has used as a frame of reference when proposing improvements to best serve TNC's users.

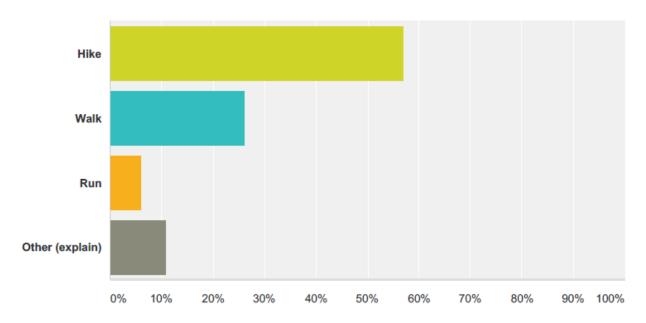
When reviewing the data, please keep in mind that respondents were primarily Trail Conference members. 55 people completed the survey immediately after the initial Trail Conference email. After the subsequent TNC Facebook post, periodical piece, and newspaper article, the number climbed to 66.

# Q1 How many times a year do you hike/walk/run at TNC?



## Q2 What do you most often do on Tenafly **Nature Center trails?**

Answered: 65 Skipped: 1

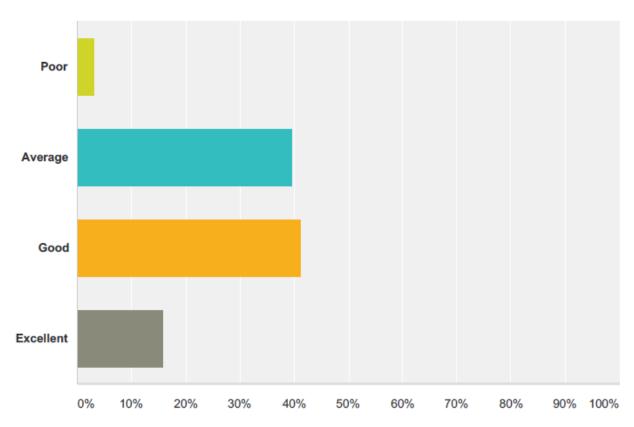


Answer Choices	Responses
Hike	<b>56.92%</b> 37
Walk	<b>26.15</b> % 17
Run	6.15% 4
Other (explain)	<b>10.77%</b> 7
Total	65

#	Other (explain)	Date
1	Take pictures	11/18/2015 12:36 PM
2	Observe, track and enjoy the wildlife. Forage the days meal and or snacks. That area has changed so much since I was a boy!	11/18/2015 6:30 AM
3	I used to walk or hike very often but then I moved to NYC	11/18/2015 5:34 AM
4	Access long path from home on east hill	11/17/2015 9:58 PM
5	In the 3 years of living in a town nearby, I have gone to TNC three times.	11/17/2015 8:46 PM
6	Would mtn bike if it were allowed	11/17/2015 7:42 PM
7	Maintenance	11/17/2015 6:09 PM

## Q3 Overall, how would you rate TNC's trails?

Answered: 63 Skipped: 3

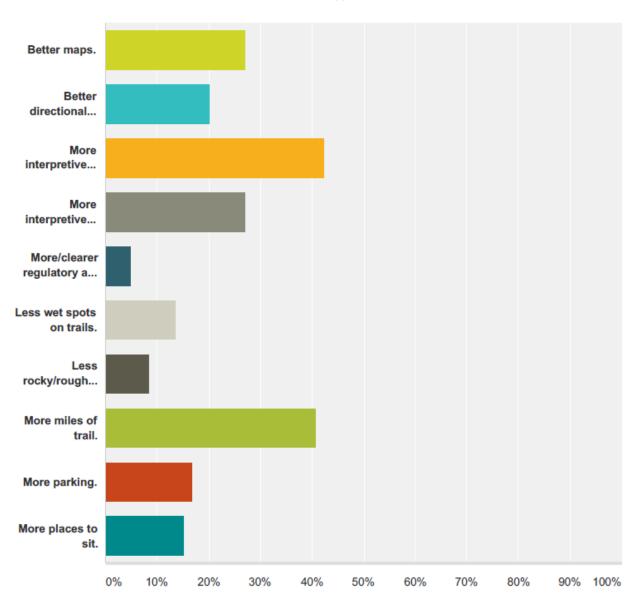


Answer Choices	Responses	
Poor	3.17%	2
Average	39.68%	25
Good	41.27%	26
Excellent	15.87%	10
Total		63

#	Why?	Date
1	Almost perfect. Directions not always visible. Trail gets blocked when large trees fall, but it takes a long time for them to be cleared.	2/4/2016 9:43 AM
2	Rocky, rooty, and poorly blazed.	1/19/2016 10:35 AM
3	Its marked fairly well	11/28/2015 9:25 AM
4	Well blazed, issued like downed trees quickly addressed.	11/24/2015 10:35 AM
5	fairly well marked. Easy walking. Buggy.	11/20/2015 9:12 PM
6	they are well marked, the signs leading back to the visitors center or nearby highway are clear. you have a great team keeping the trails clear.	11/18/2015 2:33 PM
7	You are limited by the amount of space you have.	11/18/2015 11:01 AM
8	I prefer natural over groomed and like trail running because it is NOT road running. Obviously, answers to this question will depend on the responder's type of use of the trails and personal preference for an experience in the woods. Given the large number of people who supported the building of the new center off Clinton Ave., including many who made it clear in public meetings that they have no interest in walking very far into the woods on "unpaved trails", I am sure that you will get answers across the spectrum.	11/18/2015 10:55 AM
9	The trail system contains an extreme amount of exposed roots and roots. Also, the trails offer little in overall diversity as far as elevation change, scenic views, points of interest, etc.	11/18/2015 9:43 AM
10	Some of the areas have a lot of rocks and not good for a runeven a bit tricky for hiking.	11/18/2015 8:50 AM
11	Easy to use	11/18/2015 6:55 AM
12	some spots roo rocky, some spots encroached on by tenafly town dumping sand and gravel (near 9W)	11/18/2015 5:34 AM
13	Generally clear and maintained.	11/18/2015 12:04 AM
14	Well maintained and generally well routed to minimize problems.	11/17/2015 9:58 PM
15	I think there was a map copy I could take along on the walk, always a good idea.	11/17/2015 8:22 PM
16	Nice change of terrain. I like the steam.	11/17/2015 7:49 PM
17	clearly marked and clear of brush and shrubs, and debris	11/17/2015 6:28 PM
18	Well-marked and well-maintained.	11/17/2015 5:42 PM
19	They are well blazed, not overdeveloped, and not littered.	11/17/2015 5:39 PM
20	The trails are generally maintained well, but they are relatively boring, as the Tenafly Nature Center has relatively few features of interest.	11/17/2015 5:38 PM
21	Small area close to homes and highway.	11/17/2015 5:35 PM
22	Not exciting	11/17/2015 5:33 PM
23	nothing really stands out view wise	11/17/2015 5:33 PM
24	The trails are well-maintained and clearly marked, but there are not many "points of interest" along the trails. That is not the fault of the Center—simply a function of geography. That's why I rated the trails "good," and not "excellent."	11/17/2015 5:32 PM
25	Well-marked and maintained	11/17/2015 5:29 PM
26	well marked. able to get away from civilization and noise very quickly	11/17/2015 5:27 PM
27	WHy are you doing this survey? Is it about money??? Margo Moss	11/17/2015 5:25 PM
28	Good network and mileage, structures where critically needed. Minor erosion and standing water issues.	11/17/2015 10:35 AM

# Q4 What would you like to see TNC do to improve your trail experience? Check all that apply.

Answered: 59 Skipped: 7



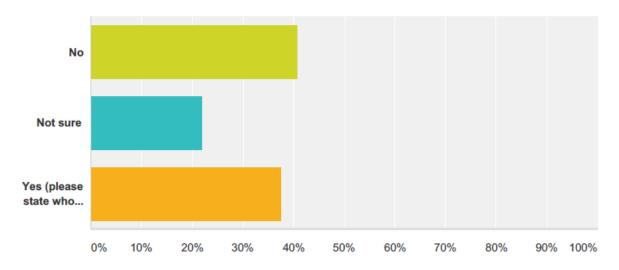
	27.12%	
Better maps.	27.12/0	16
Better directional signage/blazing.	20.34%	12
More interpretive/educational signs about nature.	42.37%	25
More interpretive/educational signs about history.	27.12%	16
More/clearer regulatory and rules signs.	5.08%	3
Less wet spots on trails.	13.56%	8
Less rocky/rough trails.	8.47%	5
More miles of trail.	40.68%	24
More parking.	16.95%	10
More places to sit.	15.25%	9

Total Respondents: 59	
Total Respondents. 33	

#	Other (please specify)	Date
1	I'd like a short walk from the East end to see the rock standing on its tip.	1/10/2016 2:14 PM
2	The main trail changes to a road at the east end . This is not indicated on their map and is confusing when you enter (it at that poin) for the first time .	11/28/2015 9:25 AM
3	On two occasions I got lost heading north on the red trail at the point where it approaches 9w. Each time I had to return by the direction I came. I'm guessing that the signage might not be distinct enough.	11/18/2015 1:54 PM
4	I don't find the nature center particularly scenic. As a hiker, one likes to hike to see something scenic or of interest or unique to that location. The TNC doesn't offer much of that.	11/18/2015 1:40 PM
5	It's a NATURE center, not a wilderness experience. Treat it as such.	11/18/2015 11:01 AM
6	PLEASEno more signs, parking, miles, etc!	11/18/2015 10:55 AM
7	Trail mileage seems off - I would double check them.	11/18/2015 8:50 AM
8	I think signage for the edible species is important for our younger generation, there is something exciting about being able to identify and eat what's so abundant. The trails are great I sometimes wear a Ghille suit and watch game and people walk by me, I love observing people and wild life in natures setting	11/18/2015 6:30 AM
9	no idea	11/17/2015 9:58 PM
10	Think your map was fine. Good directional signage important, but yours was good enough for me to find my way around (I am a regular hiker elsewhere), I disagree about interpretive signs; they can distract from the nature experience and be intrusive; Ditto for the rules/regulations. Part of the reason you go walking/hiking is to get exercise-wet spots on trails, rocky/rough trailsare part of the experience of hiking. There are already a few commemorative benches in the scenic spots The trail mileage seems adequate for the size of the nature center compared to, say, Ramapo Reservationparking is rarely an issue unless there's an event on	11/17/2015 8:22 PM
11	allow dogs on leash	11/17/2015 7:26 PM
12	They are perfect for me but I have marked what I think might improve the experience for others.	11/17/2015 6:28 PM
13	They are fine as they are.	11/17/2015 5:39 PM
14	I think the trails are really good	11/17/2015 5:27 PM

# Q5 Do you know who maintains TNC's trails?

Answered: 64 Skipped: 2



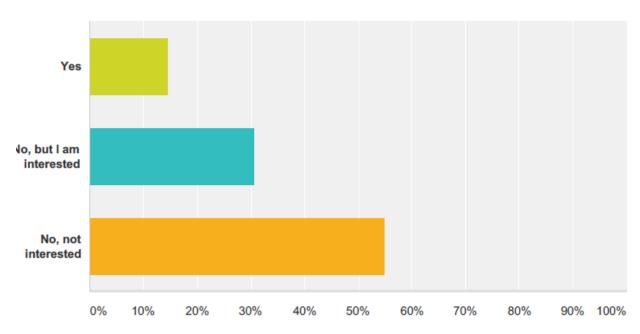
Answer Choices	Responses	
No	40.63%	26
Not sure	21.88%	14
Yes (please state who below)	37.50%	24
Total		64

#	Yes (please state who below)	Date
1	Tenafly Nature Center	2/3/2016 11:45 AM
2	NY/NJTC	1/19/2016 10:35 AM
3	TNC? Boyscouts (special projects)	1/10/2016 2:14 PM
4	NJ/NY Trail Conference	12/8/2015 10:19 AM
5	Peter Tilgner, Karl Soehnlein	11/24/2015 10:35 AM
6	i was involved for awhile	11/18/2015 2:33 PM
7	Njtc	11/18/2015 1:54 PM
8	NYNJ Trail Conference	11/18/2015 1:40 PM
9	NY/NJ TC	11/18/2015 9:43 AM
10	Volunteers	11/18/2015 6:30 AM
11	TNC volunteers	11/18/2015 5:34 AM
12	NY/NJ trail conference	11/17/2015 9:58 PM
13	Trail Conf., volunteers, and staff	11/17/2015 9:13 PM
14	Private citizens	11/17/2015 8:32 PM
15	NYNJTC?	11/17/2015 7:26 PM
16	tenafly nature center i think	11/17/2015 6:32 PM
17	Combination of TNC staff, volunteers and NYNJ Trail Conference	11/17/2015 6:28 PM
18	Trail Conf?	11/17/2015 6:22 PM

19	Trail Conference	11/17/2015 5:38 PM
20	Volunteers	11/17/2015 5:33 PM
21	volunteers	11/17/2015 5:33 PM
22	TNC Volunteers	11/17/2015 5:29 PM
23	Volunteers	11/17/2015 5:28 PM
24	NYNJTC	11/17/2015 10:35 AM

## Q6 Have you ever volunteered on TNC's trails?

Answered: 62 Skipped: 4



Answer Choices	Responses
Yes	14.52%
No, but I am interested	<b>30.65%</b> 19
No, not interested	<b>54.84%</b> 34
Total	62

# **Tenafly Nature Center User Survey (continued)**

## Major Takeaways

From the survey data presented previously, the most notable points are discussed below along with their implications for future projects at Tenafly Nature Center.

## Q1: How many times a year do you hike/walk/run at TNC?

The results showed that most visitors were only sporadic (1-5 times a year), very few were regular (5-10 times a year), and about a quarter were frequent (10+ times a year). In order to better engage that largest group of sporadic hikers, TNC needs to present more engaging "destinations" worth returning to or seeking out. Because scenic and natural destinations are limited by the topography of the trail system, the best way to do this is through interpretive components or interactive features like exercise equipment along paths.

## Q2: What do you most often do on TNC trails?

Most visitors surveyed (over 80%) visit TNC to hike or walk. Photography and nature observation were also mentioned in the submitted comments. The significant number of users who chose "walk" instead of "hike" implies that they are seeking a less rugged experience, so continuing to improve trail conditions near the Nature Center for casual users should be a priority.

## Q3: Overall, how would you rate TNC's trails?

The vast majority of respondents rated the trails at TNC as either "Average" or "Good." The majority of concerns in the submitted comments were with regard to exposed roots or rocks on trails - the trail corridor was mostly said to be well-marked and maintained, with issues such as downed trees handled quickly. The other major complaint was the lack of destinations and vistas, which is a problem with the topography of the land more than an issue with the trails themselves. Interpretive trail signage would help draw attention to the notable features that do exist, which might otherwise be missed by hikers.

# Q4: What would you like to see TNC do to improve your trail experience? Check all that apply.

The most popular option here was "More interpretive/educational signs about nature." The option for "More interpretive/educational signs about history" followed shortly after in popularity. The individual trail assessments which follow in this document make note of suggested locations for interpretive signage to help meet this demand. "Better maps" was also a popular option, and the suggestions put forth in the "Updated Trail Map" section of this document should offer some guidance on how to implement and publicize the new map.

The second most popular option, "more miles of trail," will have to be carefully considered as the existing system is already dense and potentially confusing for new hikers to navigate. The best option may be to publicize TNC's connectivity to the

Hudson Palisades via the Sweet Gum Trail, which opens up theoretically hundreds of additional trail miles connected directly to TNC.

Surprisingly, despite earlier comments, "Less rocky/rough trails" was the second least-popular option. This reinforces the findings of this Trail Plan that, overall, the trail conditions at TNC are very good and that the trails are comfortable for most new and inexperienced hikers. It's also possible, however, that the respondents to this survey were skewed towards Trail Conference members who do not mind such conditions. With a larger sample size of casual visitors, this option may have been more popular.

Votes for options such as more parking, seating, directional signage, and structures to cross wet spots also deserve consideration and prioritization based on TNC's resources and the individual trails in question. The individual trail assessments in this document should provide some guidance as to where these improvements would be best implemented.

#### Q5: Do you know who maintains TNC's trails?

Many members of the hiking public assume that landowners/mangers and their staff are the sole people responsible for trail construction and maintenance, and do not realize that members of the public like themselves often play an active roles in this work. Over 60% or respondents to this survey responded with "No" or "Not sure," despite the fact that most came from a Trail Conference mailing list. By further promoting volunteer workshops and opportunities, TNC may be able to recruit more volunteers to help work on improving their trail system.

## Q6: Have you ever volunteered on TNC's trails?

Nearly one third of respondents (over 30%) indicated that they had never before volunteered on TNC's trails, but that they are interested in doing so. Although people are wont to over-report their willingness to volunteer when asked from behind a screen, the implication is still that TNC could recruit more volunteers simply by spreading word of existing opportunities. Even without trail maintainer vacancies, opportunities might exist for one-off events like installing signage, building bog bridges, or improving tread conditions.



Volunteer Trail Maintainers hard at work.



An example of Tenafly Nature Center's clear, neat trail blazes.



A model for interpretive signage which could be implemented more widely across Tenafly Nature Center's trail system.

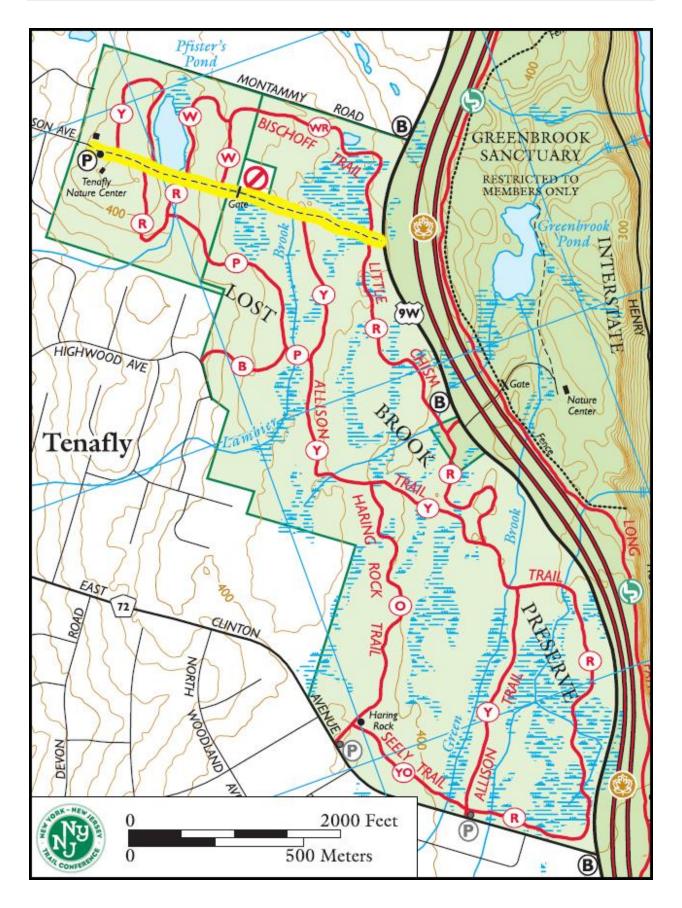
## Individual Trail Assessments

## Study Area

The scope of this plan focuses on the following formal woodland trails in Tenafly Nature Center, offering an overall assessment and recommendations for each:

- 1. The 0.6 mile Main Trail: This trail continues along the line of Hudson Ave, intersecting with several other trails and Pfister's Pond. This trail sees some of the heaviest use in the trail system.
- 2. The 0.4 mile Yellow Trail: This short trail begins close to the parking lot, swinging by the west side of Pfister's Pond. It begins and ends on the Hudson Ave Woods Road.
- 3. The 0.3 mile Red Trail: This short trail loops south of the Nature Center. It begins and ends on the Hudson Ave Woods Road, close to Pfister's Pond.
- 4. The 0.4 mile DeFilippi Trail: This trail begins on the Main Trail, follows the east shore of Pfister's Pond, and loops back to rejoin the Main Trail.
- 5. The 0.5 mile Bischoff Trail: This trail leaves the DeFilippi Trail and follows the northern margin of Lost Brook Preserve before becoming the Little Chism Trail.
- 6. The 1.9 mile Little Chism Trail: This trail picks up the path of the Bischoff Trail south of the Main Trail, briefly co-aligning with the Allison Trail before leaving and continuing until it ends at the Allison Trail.
- 7. The 0.5 mile Purple Trail: This trail connects the Red Trail to the Allison Trail.
- 8. The 0.2 mile Blue Trail: This short trail connects Highwood Avenue to the Purple Trail, close to its intersection with the Allison Trail.
- 9. The 1.4 mile Allison Trail: The Allison Trail is one of TNC's main trails, connecting the Main Trail to the eastern roadside parking area off East Clinton Avenue.
- 10. 0.05 miles of the Sweet Gum Trail: Only a tiny portion of this trail exists as part of TNC, and the rest serves to connect TNC's trails to the Long Path across 9W.
- 11. The 0.5 mile Haring Rock Trail: This trail connects the western roadside parking on East Clinton Avenue with the Allison Trail.
- 12. The 0.3 mile Seely Trail: This trail begins off the Haring Rock Trail shortly before it connects with the western roadside parking, and travels to the eastern roadside parking and Allison Trail.





**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## Main Trail: From Nature Center, heading in a straight line east until it hits 9W.

**Description and Location:** This trail is more of an access road which serves as the main "spine" from the Nature Center, from which the rest of the trail system can be reached. Though not a recreational destination, the Main Trail has serious structure and drainage issues which need to be addressed before they worsen.

Blaze Color: None

**Trail Surface:** Woodchips, natural, bedrock

Trail Length: 0.6 mile Tread Width: 6'+ Trail Corridor Width: 8'+

Grades: 0-12 degrees

**Typical Users:** Casual "front-country" hikers, older walkers, educational groups

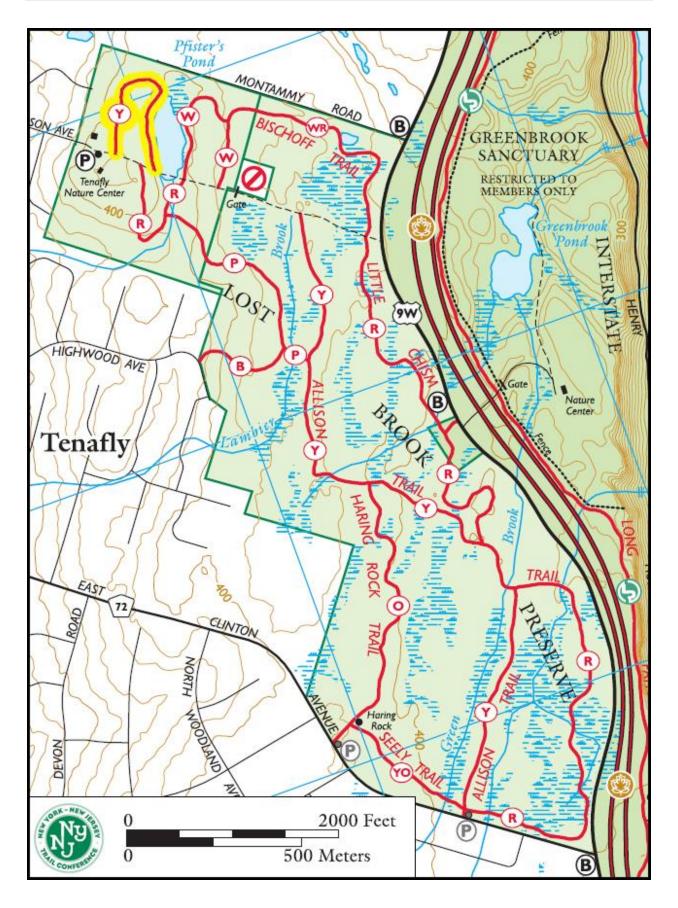
#### Issues:

- 1. Inadequate signage at trailhead kiosks.
- 2. Tread surface muddy in areas.
- 3. Damaged and non-functional check dams/steps and water bars, leading to poor drainage and unpleasant footing.
- 4. Eroded trail tread, resulting in areas of exposed bedrock and small rolling rocks.
- 5. Weathered/damaged signage nearly illegible at points.
- 6. Check steps cut into fallen trees by chainsawyers introduce high, narrow steps into an otherwise graded trail.
- 7. Some directional signage shows weathering inconsistent with directional signage on other trails.
- 8. Brian Moscatello memorial bench has muddy footing and seating area, discouraging use in wet weather.

## Recommendations for Improvement:

- 1. Change kiosks to replace weathered signs, incorporate a Trail Conference map and print as many new materials as possible on PVC, aluminum or other fade-resistant materials to minimize future maintenance (versus relying on paper signage).
- 2. Replace woodchips with stone crush mix or non-organic surfacing.
- 3. See "suggested work" section.
- 4. See "suggested work" section.
- 5. Replace weathered/damaged signage, such as the "Nature Center Regulations" sign with missing text.
- 6. Improve check steps cut into fallen trees by cutting them wider and deeper. Where the loss of the tree would not worsen erosion, remove fallen trees completely.
- 7. Replace weathered directional signs with fresh signs matching the color and style of newer directional signs on other trails (such as the Allison).
- 8. Install flat pavers immediately surrounding bench.

**Suggestion:** Use the view of the pond as the location for an interpretive panel, perhaps describing the visible nesting box or other pond wildlife.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## Yellow Trail: Begins at first left off Main Trail, loops off before rejoining Main.

**Description and Location:** The Yellow Trail is the closest trail to the Nature Center and it swings down beside Pfister's Pond, making it an ideal location for interpretive signage. It also features a small dock/viewing platform which extends into the pond for wildlife observation.

Blaze Color: Yellow (Y)
Trail Surface: Natural
Trail Length: 0.4 miles
Tread Width: 4'-6'
Trail Corridor Width: 6'-8

Trail Corridor Width: 6'-8' Grades: 0-10 degrees

Typical Users: Casual "front-country" hikers, older walkers, educational groups

#### Issues:

1. A wet "social trail" extends south of the Harry and Carol Kutik dock platform along the shore of Pfister's Pond, following a defunct older trail route. The trail is partially submerged and is unsuitable for walking.

## Recommendations for Improvement:

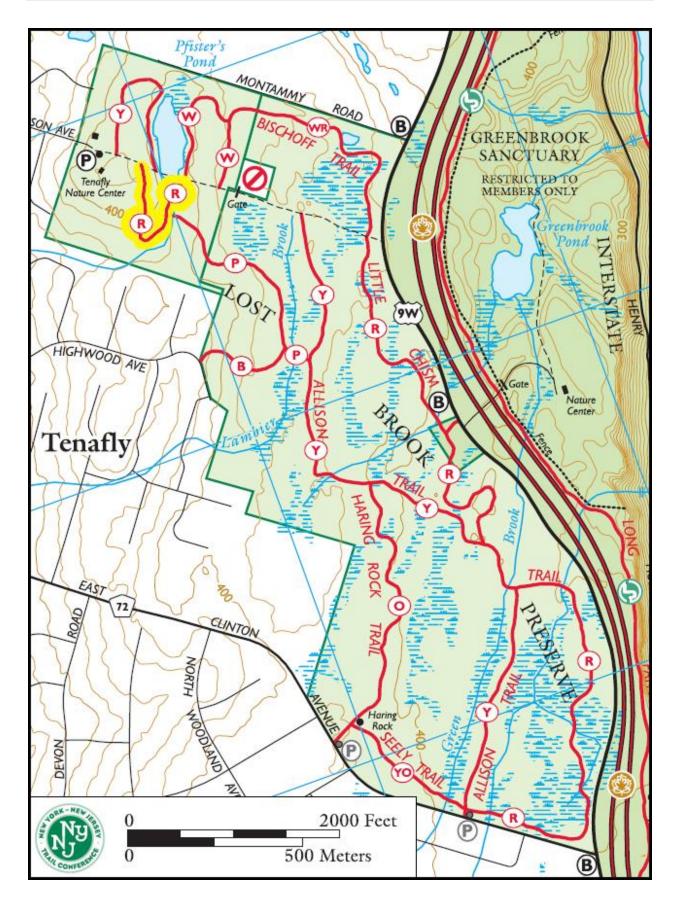
1. The social trail should be dismantled and the start of it blocked off with branches and fallen foliage to discourage use. If the decision is made to keep this trail open, it should be examined for additional work (such as bog/plank bridging or boardwalk).

**Suggestion:** Use the dock platform as the location for an interpretive panel on local wildlife, particularly water-dwelling birds.

If the Main Trail is maintained to Accessible Trail standards up to both points where the Yellow Trail joins it, the Yellow Trail could be considered for upgrades to make it accessible as well. This would be a large dedicated undertaking, and is far beyond the scope of this document, but should be considered if resources become available for such work to be done.



Functioning check steps on the Yellow Trail help minimize erosion.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## Red Trail: Begins at first right off Main Trail, loops off before rejoining Main.

**Description and Location:** The Red Trail is close to the Nature Center and includes a circular clearing off the trail, making it a good choice for educational group excursions. It does feature some significant grades with check-steps, however, making it less suited to older hikers who may have knee/joint troubles.

Blaze Color: Red (R)
Trail Surface: Natural
Trail Length: 0.3 miles
Tread Width: 4'-6'
Trail Corridor Width: 6'-8'
Grades: 0-10 degrees

**Typical Users:** Casual "front-country" hikers, educational groups

#### Issues:

1. One steep section of the trail, with multiple check steps, may not be suitable on a trail intended for younger or older hikers.

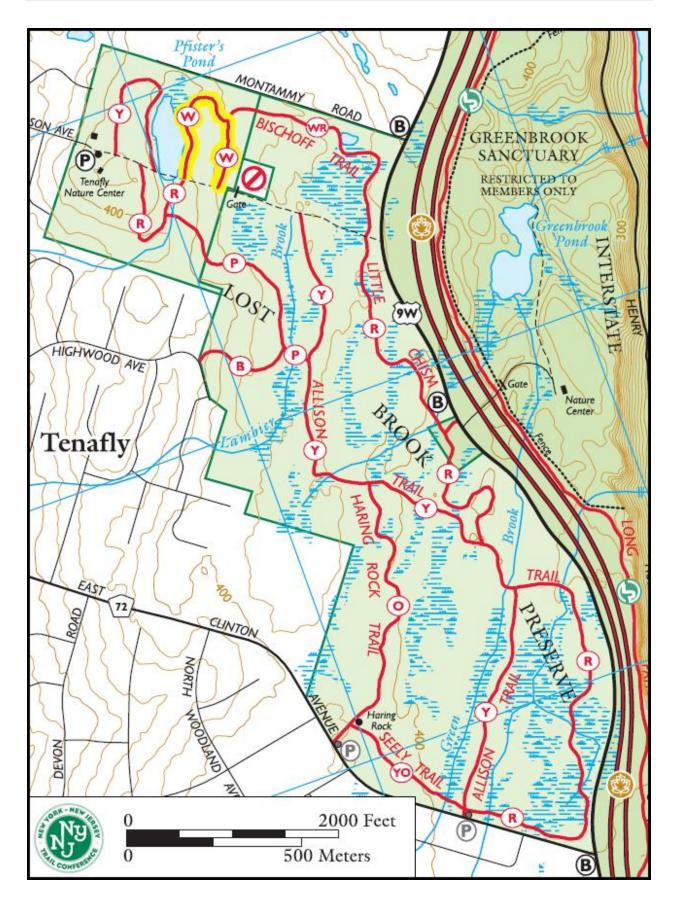
## Recommendations for Improvement:

1. With some re-routing the trail could potentially be extended out into a gentler climbing turn, making it slightly longer but eliminating the steep section.

**Suggestion:** Several trees throughout the TNC trail system have labels or interpretive plaques naming their species. If that idea is to be implemented permanently and consistently, the Red Trail is a good location to do so.



Clear blazing and signage on the Red Trail.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## **DeFilippi Trail:** North of Main Trail, looping back and reconnecting further down.

**Description and Location:** One of the most potentially versatile trails in the system, the DeFilippi Trail has several important features. It connects directly to the Main Trail close to the Nature Center, has boardwalk adjacent to Pfister's Pond, and passes a shelter with seating for groups.

Blaze Color: White (W)

Trail Surface: Natural, boardwalk

Trail Length: 0.4 miles Tread Width: 4'-6' Trail Corridor Width: 6'-8'

Grades: 0-5 degrees

Typical Users: Casual "front-country" hikers, older walkers, educational groups

#### Issues:

1. The eastern connection to the Main Trail is very muddy.

## Recommendations for Improvement:

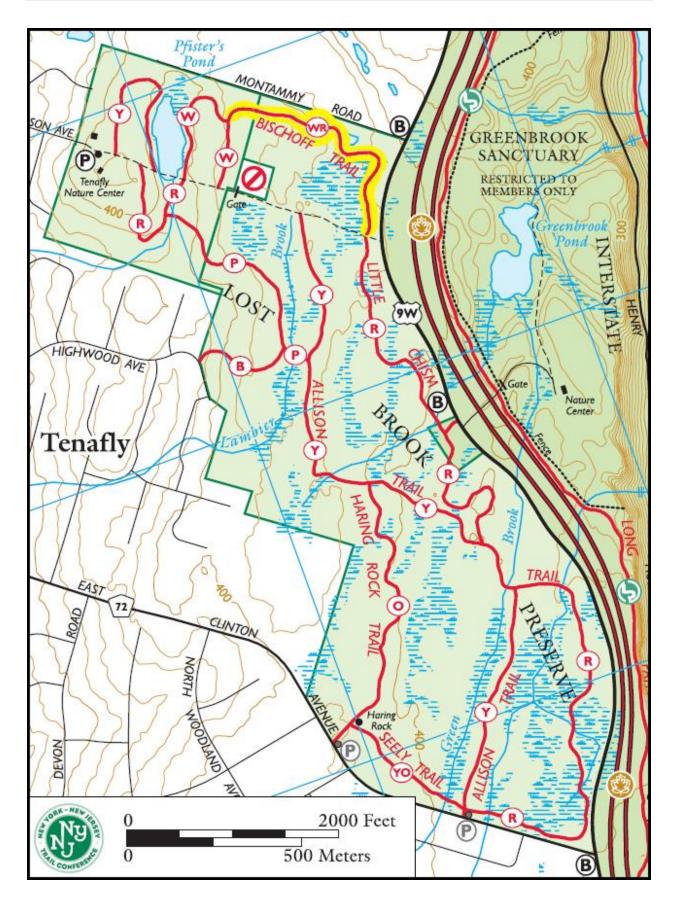
1. Existing plank structures should be extended with bog bridging to cover muddy areas. Alternatively, plat paving stones could be set into areas where mud is less deep.

**Suggestion:** The eastern boardwalk section of the DeFilippi Trail's proximity to Nature Center building and Main Trail, as well as its easy walking surface, makes it an ideal location for interpretive signage and kiosks. Its views of Pfister's Pond also make it well-suited for displays about freshwater ecology or local wildlife.

The shelter also has potential for interpretive components; for example its external bat house, or the display area presented by the bare wall inside. The bare wall could host material relevant to grade-school science curricula such as the water cycle, food webs, or amphibian metamorphosis.



The DeFilippi Shelter is a potential location for interpretive materials.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

# Bischoff Trail: Connects to the White Trail, looping east to join the Main Trail.

**Description and Location:** The Bischoff Trail passes through some wet areas and features of uneven, rocky tread. It is the most rugged of the trails north of the Main Trail, and the furthest from the Nature Center.

Blaze Color: White/Red (WR)

Trail Surface: Natural Trail Length: 0.5 miles Tread Width: 4'-6' Trail Corridor Width: 6'-8'

Trail Corridor Width: 6'-8' Grades: 0-10 degrees

Typical Users: Casual "front-country" hikers

#### Issues:

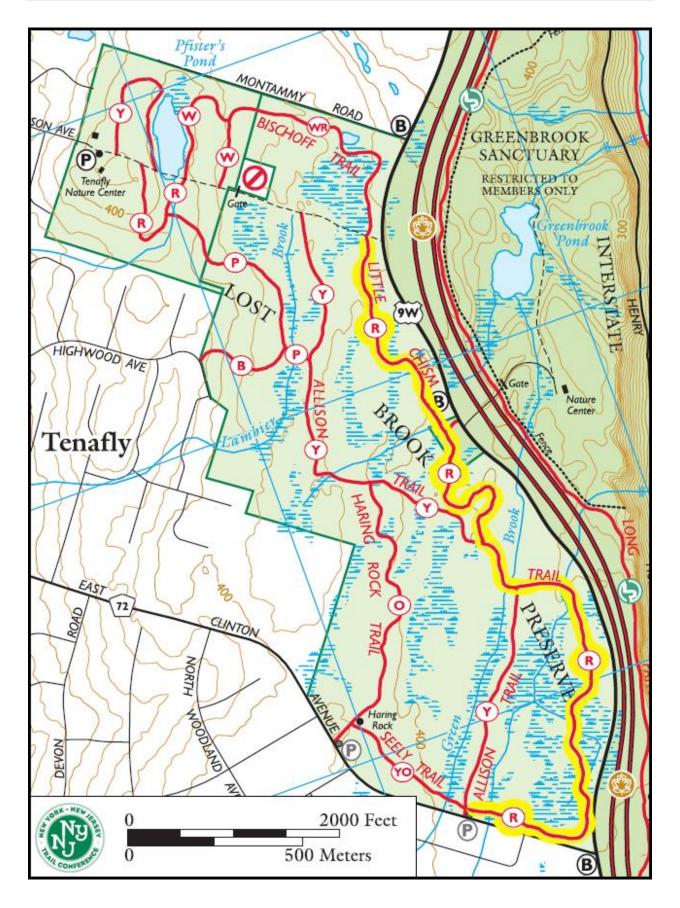
- 1. Pronounced wet and muddy areas, as well as intermittent seasonal water crossings which create potential for slips and wet feet.
- 2. Stepping stones set inadequately.
- 3. Several areas close to the Main Trail by 9W have "ankle-roller" rocks in the tread which cause poor footing.

## Recommendations for Improvement:

- 1. Walk trail in wet weather and assess if stepping stones, puncheon or bog bridging may be worth considering for user comfort.
- 2. Replace current stepping stones with larger, better-set stones to ensure stability and safety.
- 3. Rocks can be removed and re-set more level, or crushed and surfaced for even footing. Trail Conference "Tread and Surfacing" volunteer workshops can teach these skills and recruit volunteers.

**Suggestion:** The Bischoff Trail would be an ideal site for installation of exercise stations. The Trail is far enough from the Nature Center that it is not well-suited for school groups or older walkers, but it is close enough to inspect regularly for signs of tampering or vandalism. Because of the trail's location in the northeast corner of the trail system it is not an integral part of any larger hikes or loops, making it easy to bypass for hikers who want a "natural" experience without having to see exercise equipment. Its direct connection to the Main Trail off 9W would also facilitate installation and construction of the stations without having to hike in materials far.





**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

# **Little Chism Trail:** From Main Trail, hugs eastern margin of preserve south until reaching roadside parking.

**Description and Location:** The Little Chism Trail is the longest at Tenafly Nature Center, traversing a variety of environments. It passes through wet areas, a pine stand, past a man-made stone dam, and alongside/over an attractive stream.

Blaze Color: Red (R) Trail Surface: Natural Trail Length: 1.9 miles Tread Width: 4'-6' Trail Corridor Width: 6'-8'

**Grades:** 0-7 degrees

Typical Users: Casual "front-country" hikers

#### Issues:

- 1. Wet, muddy areas force people around them, widening the area of disturbance and increasing the scope of the problem.
- 2. Significant portion of the trail is routed alongside 9W, following blazes on roadside signs. This allows the trail to bypass some very wet areas, but ruins the experience of being in the woods.

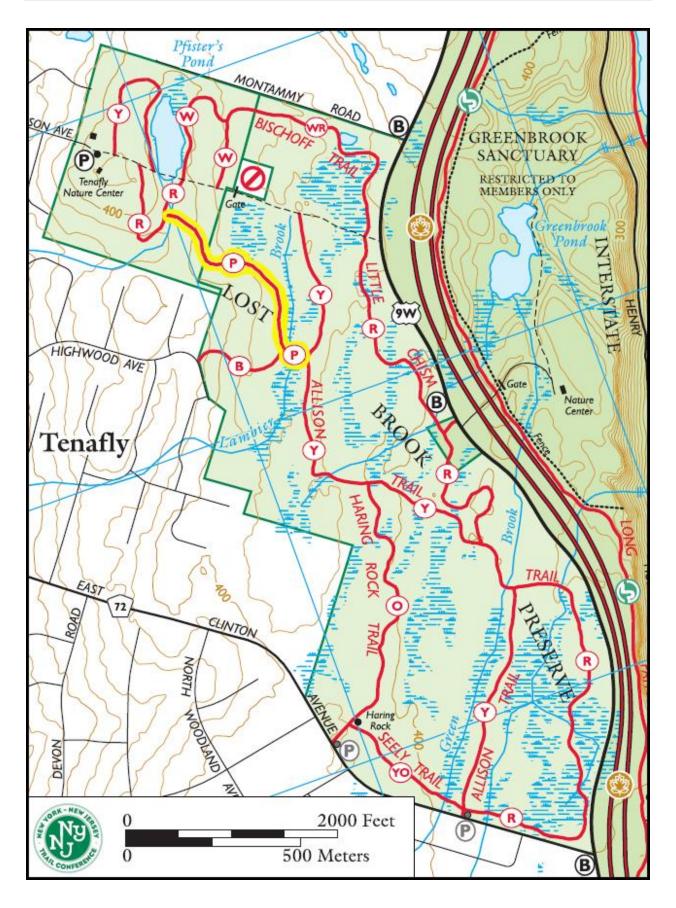
## Recommendations for Improvement:

- 1. Install more bridges, puncheon or bog bridging to traverse the remaining muddy areas. The bog bridging at the south end, by the Yellow Trail, is a good model to follow.
- 2. Routing the trail through the woods is not a major priority, especially if it requires extensive construction or risks wet tread. Alternatives should be examined, but most likely the advised course of action is to leave the trail as it is.

**Suggestion:** The Little Chism Trail contains some very nice examples of trail structures – namely the length of bog bridging and the bridge with guard rails alongside Clinton Avenue. These structures should be used as models for future projects throughout the trail system.



Road walk portion of the Little Chism Trail.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## Purple Trail: Branches off the Red Trail via bridge, terminating at Allison Trail.

Description and Location: The Purple Trail is a fairly straightforward connector trail, serving as the most direct route between the Nature Center and the short Blue Trail to Highwood Avenue.

Blaze Color: Purple (P) Trail Surface: Natural Trail Length: 0.5 miles Tread Width: 4'-6'

Trail Corridor Width: 6'-8' **Grades:** 0-10 degrees

Typical Users: Casual "front-country" hikers

#### Issues:

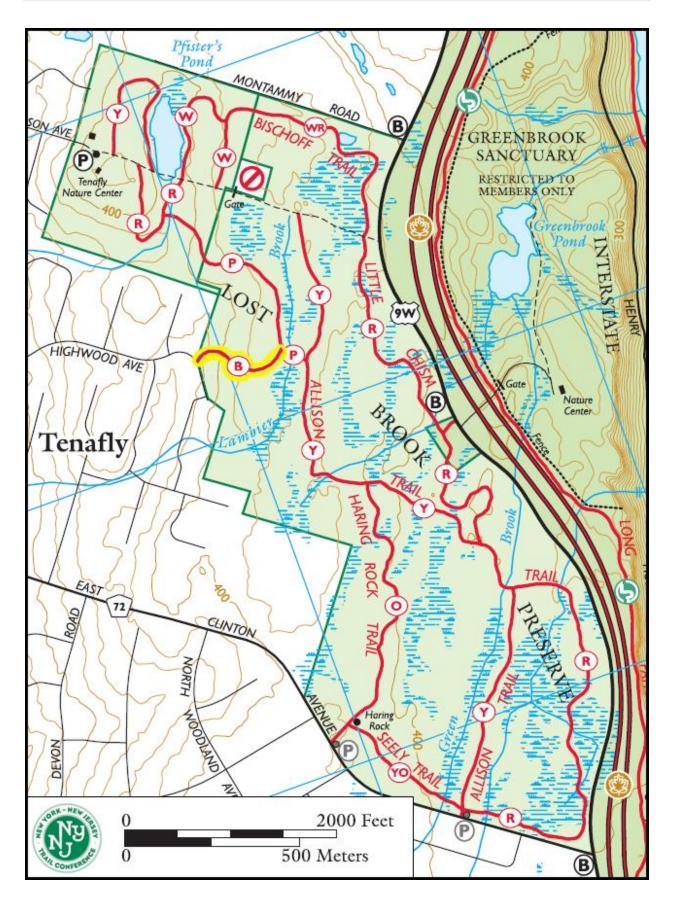
1. The bridge which connects the Purple Trail to the Red Trail has a large step up from the trail tread to the bridge decking.

### Recommendations for Improvement:

1. With some stone cribbing, a graded earth ramp could be made from the trail tread up to the bridge deck. A timber or stone step would also work.



Large step to bridge decking, with pen for scale.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## Blue Trail: Connects Highwood Ave to the Purple Trail.

Description and Location: The Blue Trail is a simple, functional trail connecting the Tenafly Nature Center trail system to Highwood Avenue. The trail is in excellent condition and little to no work is needed.

Blaze Color: Blue (B) Trail Surface: Natural Trail Length: 0.2 miles Tread Width: 4'-6'

Trail Corridor Width: 6'-8' **Grades:** 0-13 degrees

**Typical Users:** Casual "front-country" hikers

#### Issues:

1. The trail connects to Highwood Avenue with little identifying signage. It is unclear whether or not parking is allowed, there is no map of the trail system, and there is nothing to state the connection of the trailhead to Tenafly Nature Center.

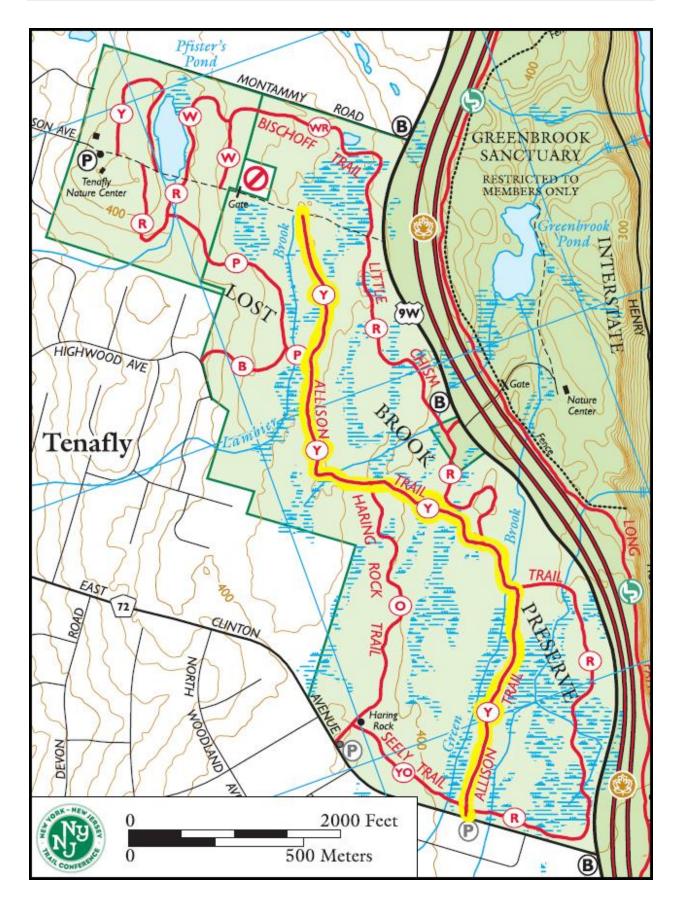
## Recommendations for Improvement:

1. The trailhead would benefit from a sign indicating whether or not parking is allowed. A kiosk panel with a map of the trail system could be posted, including a QR code for download. This would also be an ideal location to have a small blurb about Tenafly Nature Center. including hours and contact information.



On right; existing trailhead signage and blazing.





**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## Allison Trail: Main Trail south to end of the trail system at Clinton Avenue.

**Description and Location:** The second-longest trail after the Little Chism, the Allison Trail forms the backbone of the trails south of the Main Trail.

Blaze Color: Yellow (Y)
Trail Surface: Natural
Trail Length: 1.4 miles
Tread Width: 4'-6'

Trail Corridor Width: 6'-8' Grades: 0-7 degrees

**Typical Users:** Casual "front-country" hikers

#### Issues:

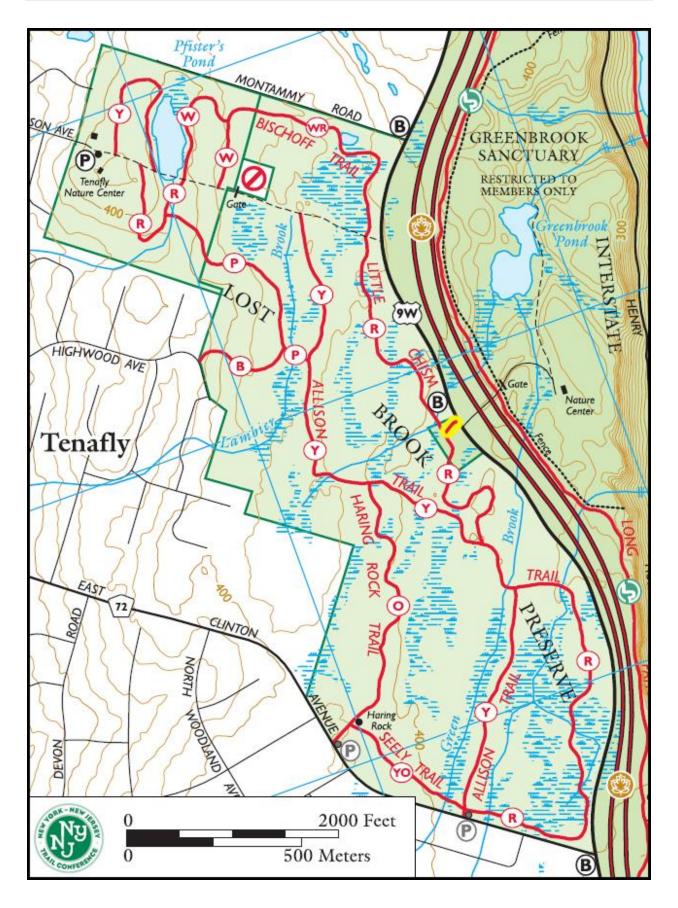
- 1. A bridge on the Allison Trail has a narrow ramped approach composed of two planks, which may become slick or unstable.
- 2. Minor tread and drainage issues resulting in mud and some standing water.
- 3. The trail connects to Clinton Avenue with little identifying signage. It is unclear whether or not parking is allowed, there is no map of the trail system, and there is nothing to state the connection of the trailhead to Tenafly Nature Center.
- 4. Several stone cairns appear at intersections along the trail, but they are relatively small and haphazard. They could stand to be built larger and more robust.

### Recommendations for Improvement:

- 1. With some stone cribbing, a graded earthen ramp could be made to replace the existing planks up to the bridge deck. A timber or stone step would also work. This will be safer, more inviting, and more comfortable to walk on. If built properly it will also last far longer.
- 2. Walk trail in wet weather and assess if stepping stones, puncheon or bog bridging may be worth considering for user comfort.
- 3. The trailhead would benefit from a sign indicating whether or not parking is allowed. A kiosk panel with a map of the trail system could be posted, including a QR code for download. This would also be an ideal location to have a small blurb about Tenafly Nature Center, including hours and contact information.
- 4. Improving cairns is not a high priority, as they do not impact walking conditions, but they are useful navigational aids at trail intersections. The Allison Trail cairns could be disassembled and rebuilt, using larger stones as the foundations, by someone with basic knowledge of dry-stack stonework.

**Suggestion:** The Allison Trail features dramatic rock formations, which may be good site locations for interpretive signage about local history or geology.





**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

# Sweet Gum Trail: Little Chism, across 9W towards the Palisades.

**Description and Location:** By far the smallest trail in the system, the Sweet Gum Trail serves to connect Tenafly Nature Center hikers to the Long Path on the Palisades.

Blaze Color: Red/Yellow (RY)

Trail Surface: Natural Trail Length: 0.05 miles Tread Width: 4'-6'

Trail Corridor Width: 6'-8' Grades: 0-5 degrees

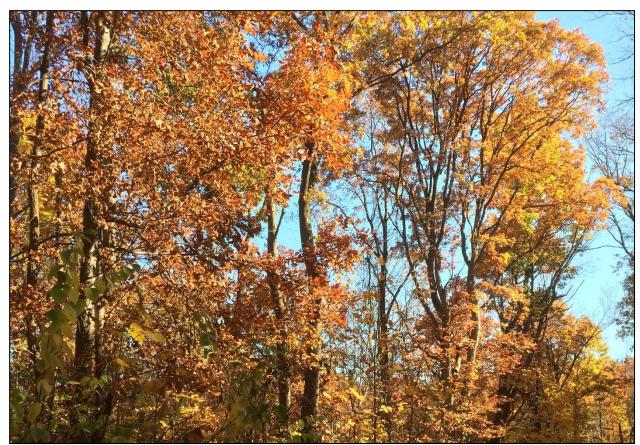
Typical Users: Casual "front-country" hikers

#### Issues:

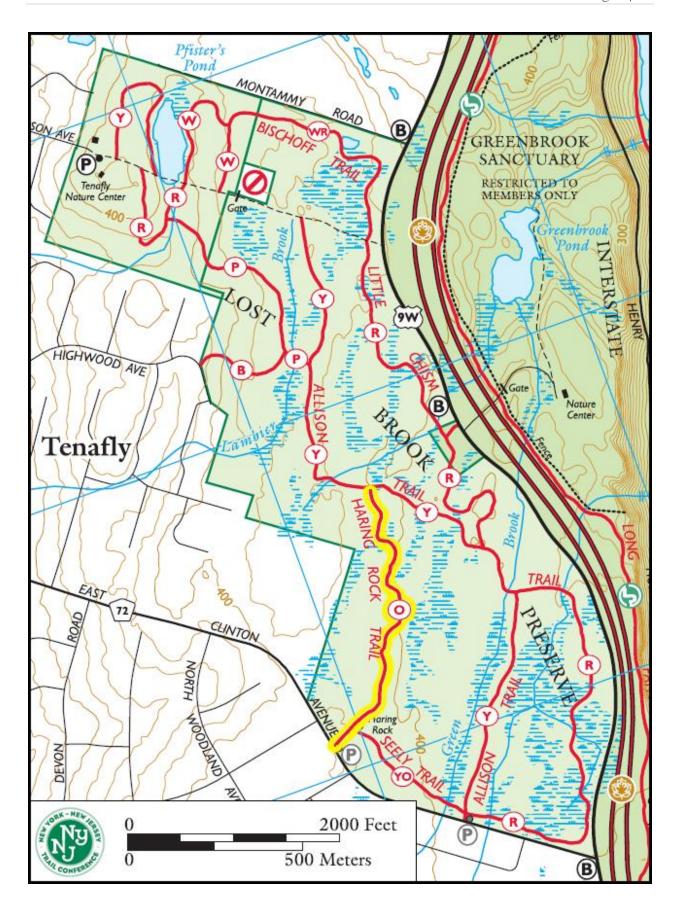
1. NONE.

### Recommendations for Improvement:

#### 1. NONE.



Fall foliage on the trails.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## Haring Rock Trail: From Allison Trail south to roadside parking off Clinton Ave.

**Description and Location:** In addition to the eponymous Haring Rock, the Haring Rock Trail's most notable feature is an impressive stand of beech trees along one portion's eastern side.

Blaze Color: Orange (O) Trail Surface: Natural Trail Length: 0.5 Tread Width: 4'-6'

Trail Corridor Width: 6'-8' Grades: 0-10 degrees

Typical Users: Casual "front-country" hikers

#### Issues:

- 1. Significant tread and drainage deficiencies.
- 2. The trail connects to Clinton Avenue with little identifying signage. It is unclear whether or not parking is allowed, there is no map of the trail system, and there is nothing to state the connection of the trailhead to Tenafly Nature Center.
- 3. The cleared parking area is a small distance from the trailhead, and may cause users to briefly walk in the road as they approach from their cars.

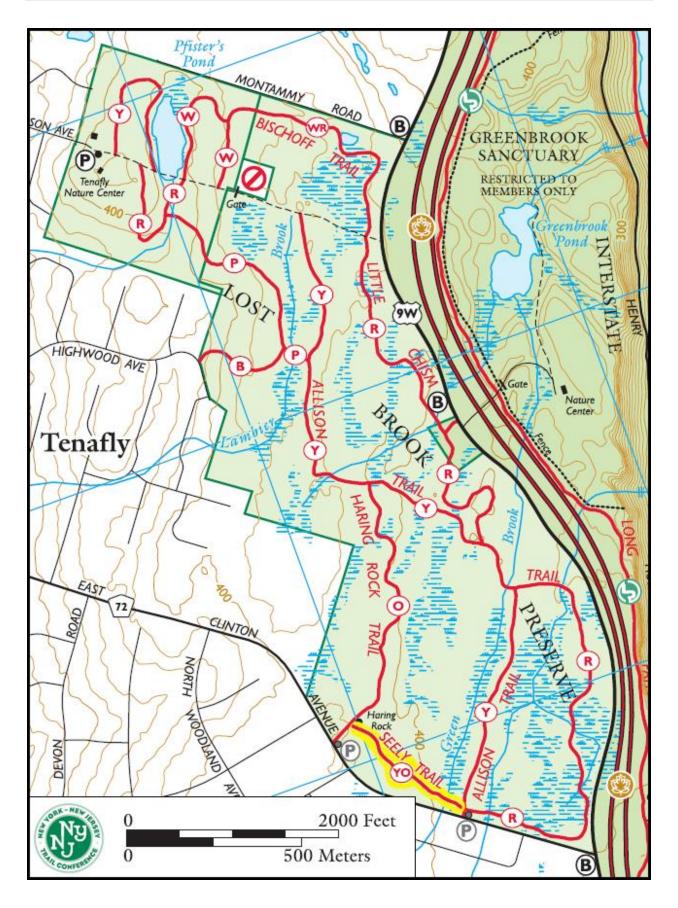
### Recommendations for Improvement:

- 1. Walk trail in wet conditions and assess if stepping stones, puncheon or bog bridging may be worth considering for user comfort. Consider re-routing the wettest portion of the trail.
- 2. The trailhead would benefit from a sign indicating whether or not parking is allowed. A kiosk panel with a map of the trail system could be posted, including a QR code for download. This would also be an ideal location to have a small blurb about Tenafly Nature Center, including hours and contact information.
- 3. A short footpath should be cleared to ensure that a defined walking surface exists between the parking area and the trailhead, keeping users safely off the road.

**Suggestion:** Location of Haring Rock, the trail's namesake, might make for a relevant point of signage and interpretation.



The parking area should have a cleared footpath for safer hiking access.



**Tenafly Nature Center Trail Master Plan** • Prepared by New York-New Jersey Trail Conference

## **Seely Trail:** From the Haring Rock Trail east to Allison and Little Chism junction.

**Description and Location:** A short trail without any notable landmarks, the Seely Trail serves to improve connectivity and create a loop by the trail system's southern margin.

Blaze Color: Yellow/Orange (YO)

Trail Surface: Natural Trail Length: 0.3 miles Tread Width: 4'-6'

Trail Corridor Width: 6'-8' Grades: 0-5 degrees

Typical Users: Casual "front-country" hikers

#### Issues:

1. NONE.

## Recommendations for Improvement:

#### 1. NONE.



Haring Rock, near the junction of the Seely Trail and Haring Rock Trail.

# **Work Project Recommendations**

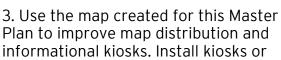
Based on feedback from the user survey and on-the-ground assessment of each trail's condition, several major recommendations are presented below.

1. Establish preferred models for structures such as bog bridging and stream crossing bridges. This will not only allow projects to be more easily tackled in the future with pre-approved plans, but will improve the consistency and aesthetics throughout the trail system. The recommended model for bog bridging would be that depicted in Fig. 3.3 of the included Trail Standards and Structures Guide, but modified to be three planks wide to accommodate TNC's hikers and groups which may be less comfortable with the narrow "back-country" design presented.



Examples of existing structures. Bottom center is the recommended model.

2. Though limited by the location and topography of Tenafly Nature Center and Lost Brook Preserve, there should be a focus on creating "destinations" via informational signage along the trails. By drawing attention to natural features, wildlife viewing opportunities, historical structures, and plant biodiversity, the sense of TNC's trails being meandering and without destination will be alleviated.





- some form of signage wherever a trail exits/enters the larger trail network (along Highwood and Clinton Avenues, as indicated in the individual trail assessments).
- 4. Examine the Yellow Trail for potential improvements to bring it in line with Federal Accessibility Standards. Of all the trails in TNC's system, the Yellow Trail exhibits the most potential to be developed into a wheelchair-accessible trail. This would be a time-intensive and expensive process, however, and is outside the scope of this document.
- 5. The major trail work which should be undertaken is the improvement of the Main Trail, which suffers from severe erosion issues and defective trail structures. A detailed assessment of the trail, along with recommended options, follows.



Example of damaged trail structure on the Main Trail.

# Work Project Recommendations (continued)

## Main Trail Improvements

As the main identified deficiency in Tenafly Nature Center's trail system, the erosion and decaying trail structures along the Main Trail were chosen as the focus of a targeted assessment and series of recommendations. The Trail Conference Field Manager, who handles professional trail layout, design and construction, spent two days in the field collecting measurements and photographs to create a comprehensive look at the Main Trail and offer a series of options to address the issues.

What follows is an assessment of the existing conditions, technical measurements, drawings of the trail as seen in profile, photographs of the trail with recommended improvements, and a summary of work options and relative costs. Final work in executing such a project might differ slightly based on who is overseeing the project, but the information and work plans which follow should give TNC an excellent head-start in planning, budgeting, and directing such work. For both east and west trail segments the last option is the preferred one - while the cost is highest for these final options, the fact that they incorporate structural improvements along with more durable surfacing will make them the longest-lasting and highest-quality options.

Any questions about the information which follows should be directed to the Trail Conference office, where you will be put in touch with the Field Manager.



Example of drainage problems on the Main Trail.

# Options for Main Trail West of Pfister's Pond

#### **Definitions**

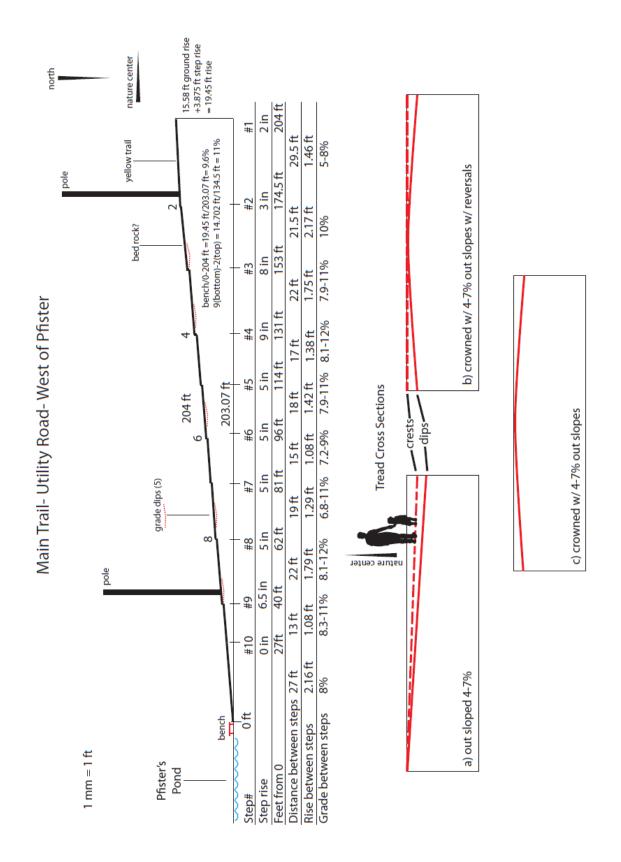
- -De-berm: Remove mound on trail edge so water can escape trail see Trail Standards and Structures Guide Figure 1.2.
- -Out Slope: See Trail Standards and Structures Guide Figure 2.1, also West Drawing Figure "a."
- -Grade Dip: See Trail Standards and Structures Guide Figure 1.1.
- -TSA 1: Trail Surface Aggregate 1 by Pennsylvania DOT, or similar gradation suggested.
- **-DSA:** Penn DOT Driving Surface Aggregate, or similar gradation suggested.

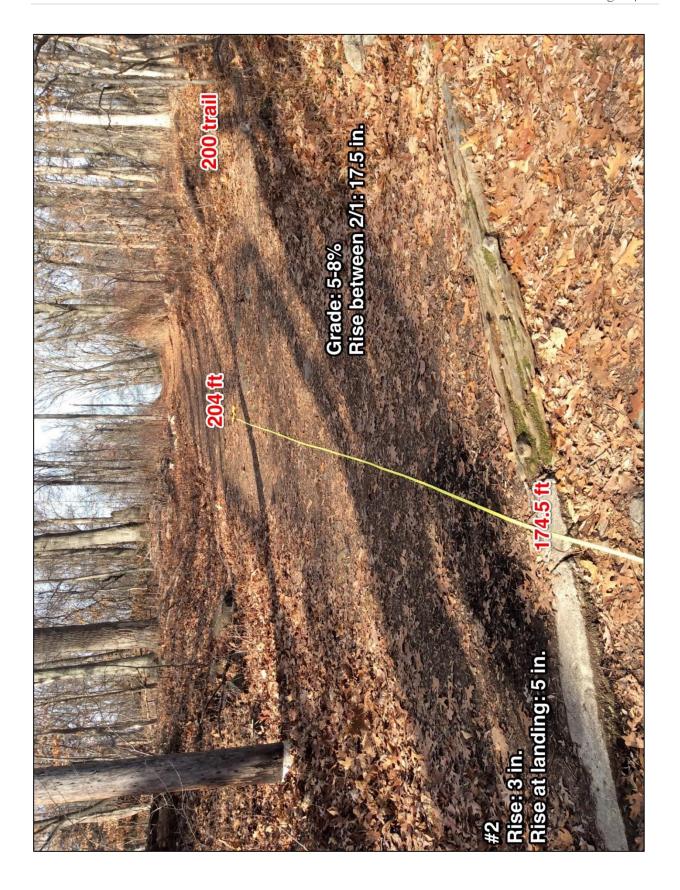
### Seven options possible:

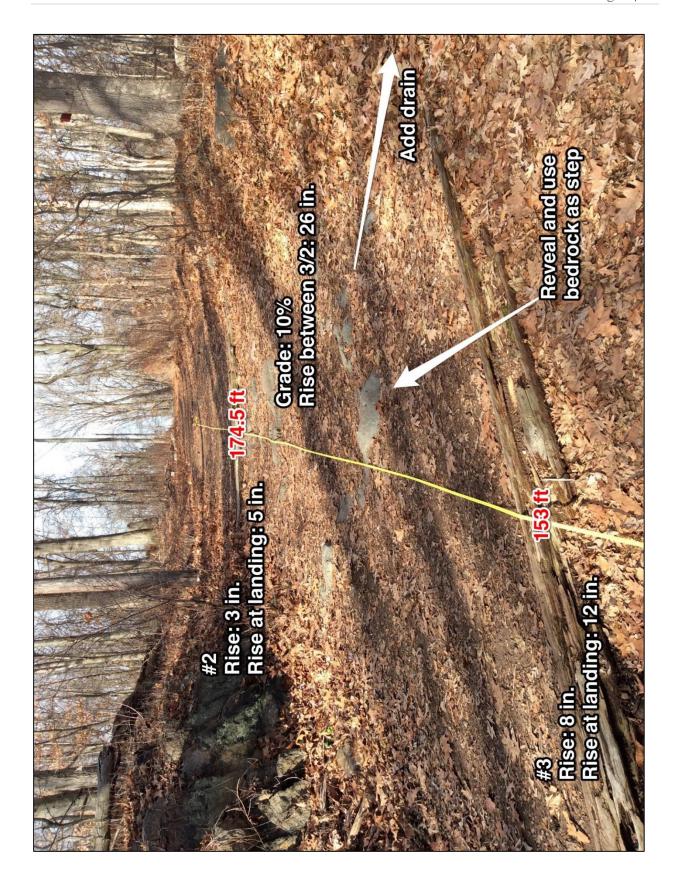
- 1. Do nothing, plan to replace steps as needed, remove step #10 at bottom (broken at side of trail)
- 2. Keep all steps except #3 where bed rock may provide the step
  - a. De-berm north edge
  - b. Out slope 4-7%
  - c. Add 5 grade dips behind step #3, 4, 6, 8, 9
- 3. Remove all steps except #4 and 8
  - a. De-berm north edge
  - b. Out slope 4-7%
  - c. Add 5-6 grade dips
- 4. Remove all steps
  - a. De-berm north edge
  - b. Out slope 4-7%
  - c. Add 5-6 grade dips
- 5. Remove all steps
  - a. De-berm north and south edges (West Drawing Figure b or c)
  - b. Out slopes 4-7%
- 6. Remove all steps
  - a. De-berm north and south edges (West Drawing Figure b or c)
  - b. Out slopes 4-7%
  - c. Add 5-6 grade dips
- 7. #4, 5, or 6 plus top with 4-6 inches of TSA1 or DSA. Material cost: approximately \$1200-1500 at 10 feet wide.

Costs for replacing the steps with wood vary greatly with wood size, cut, and species, anywhere from \$100 to \$400 for an 8 ft segment. Granite slabs at 5 ft x 18 in x 8 in cost about \$250 each.

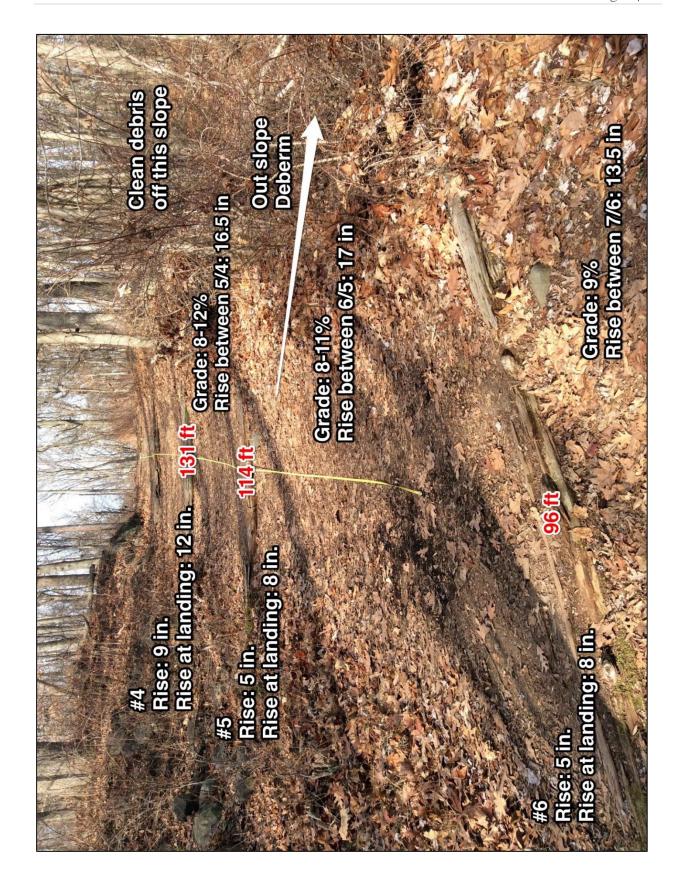


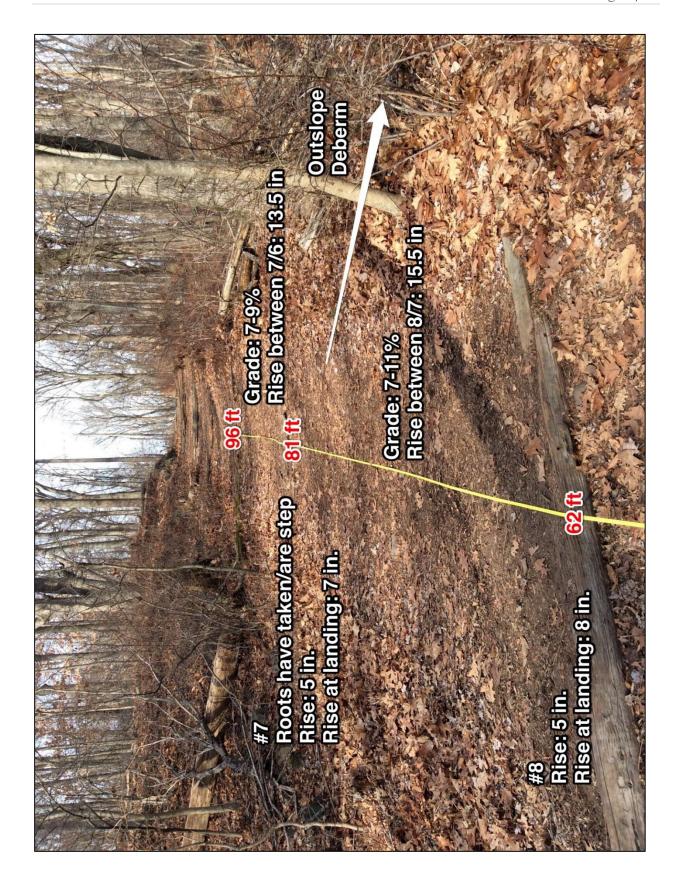




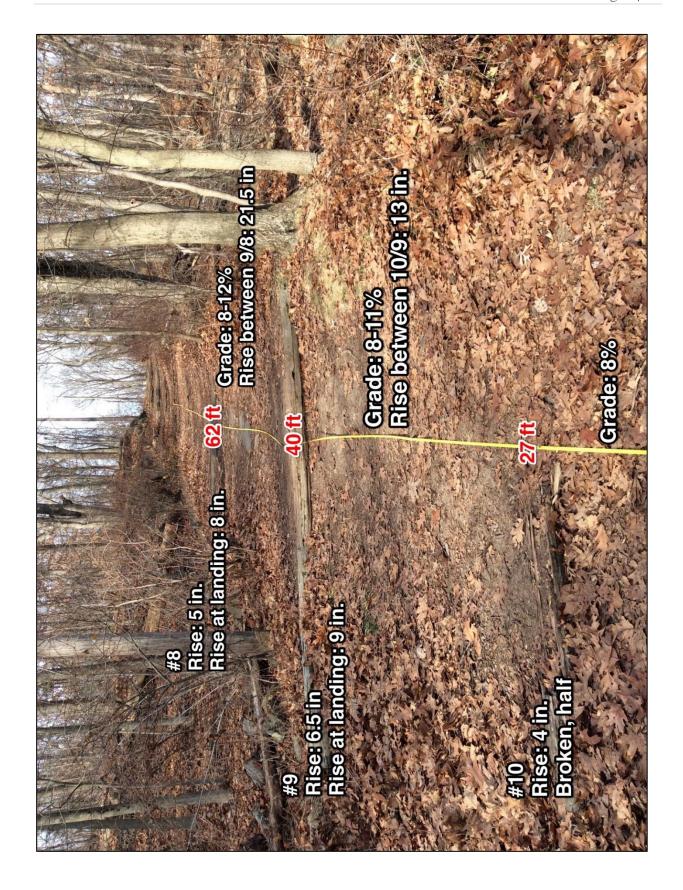




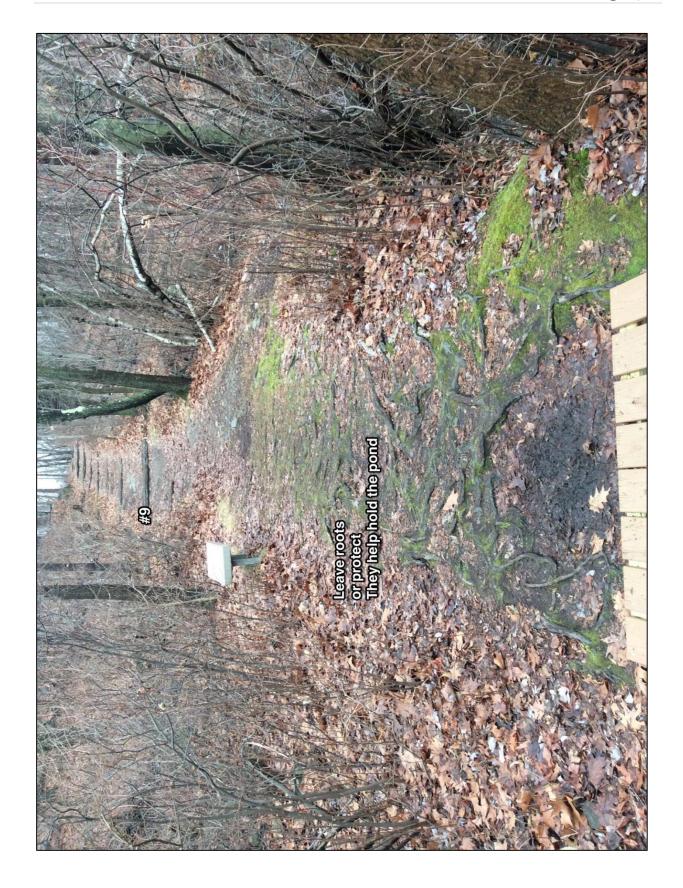












## Options for Main Trail East of Pfister's Pond

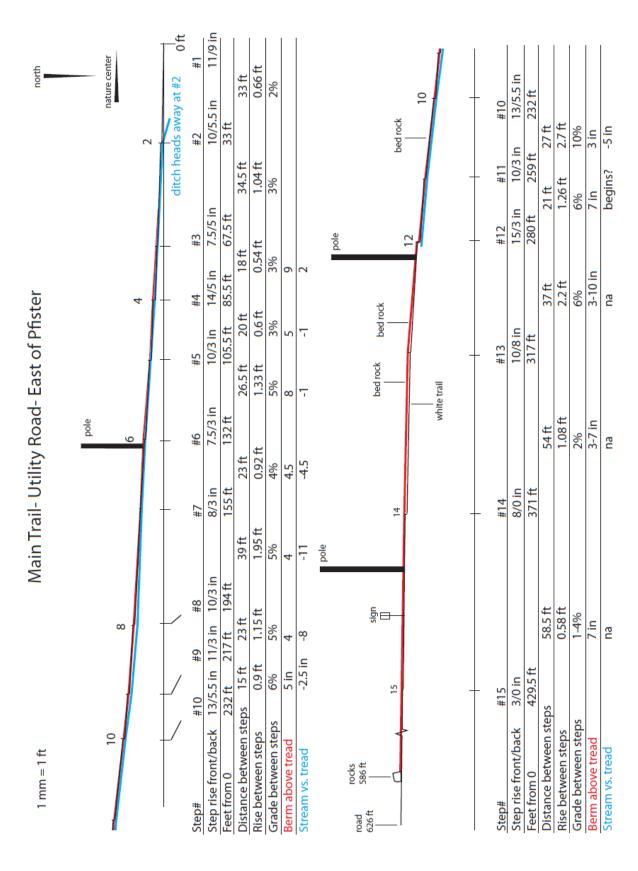
#### **Definitions**

- **De-berm:** Remove mound on trail edge so water can escape trail see Trail Standards and Structures Guide Figure 1.2.
- Out Slope: See Trail Standards and Structures Guide Figure 2.1, also West Drawing Figure "a."
- Grade Dip: See Trail Standards and Structures Guide Figure 1.1.
- TSA 1: Trail Surface Aggregate 1 by Pennsylvania DOT, or similar gradation suggested.
- DSA: Penn DOT Driving Surface Aggregate, or similar gradation suggested.
- 2A: Penn Dot 2A gravel base.

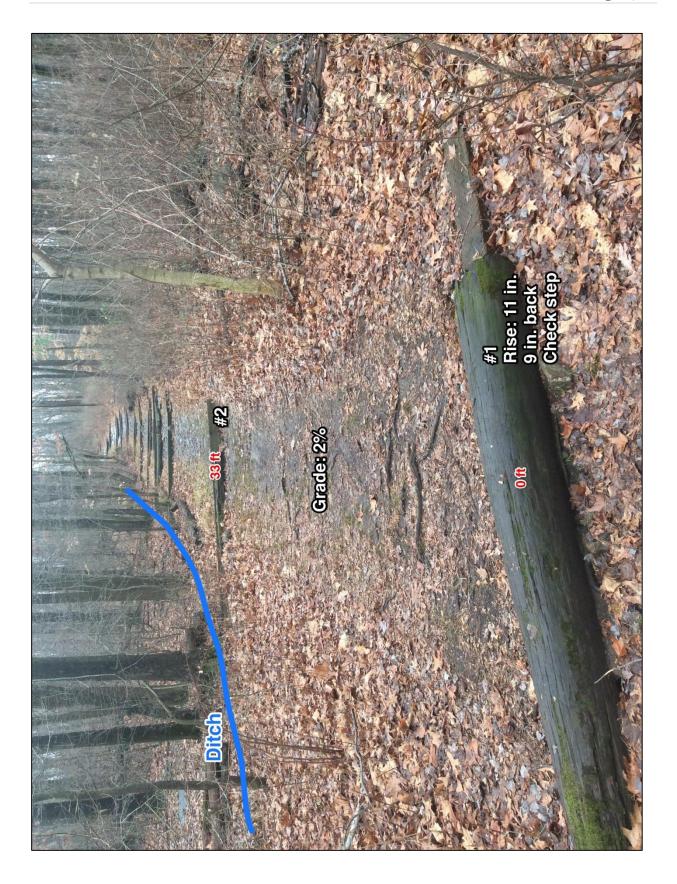
#### Four options possible:

- 1. Do nothing, plan to replace steps as needed, fix #11 (broken), remove #13
- 2. Keep all steps except #10-13 where bed rock may provide the steps
  - a. De-berm north edge from step #2-12
  - b. De-berm south edge above step #14 to road
  - c. Out slope 4-7% to north/ditch from step #2-12, and south above #14
  - d. Lower ditch 6-12 in. below tread level, or the subgrade for option 3 below
    - i. Between step 3 and 4 the trail is ~2 in. lower than the ditch/stream bed and may be the reason the trail is so wet at that location
    - ii. Just above, from step #4 to 6, the ditch/stream is similarly close to tread level, and only about 1 in. lower than the tread
  - e. Add grade dips (or French drains) to drain behind steps #2-12, 14, 15 (and into the ditch on 1-10)
- 3. Same as option 2 above and (except over the bedrock sections): Add 4-6 in. of 2A Base over the fixed subgrade, cap with 4-6 in. of TSA1. Or add 6-8 in. of DSA alone. Materials to do this from step #1 to 15 at 10 ft wide will cost about \$4500.
- 4. Remove all steps
  - a. De-berm north edge from #2-12
  - b. De-berm south edge above #14 to road
  - c. Out slope 4-7% to north/ditch from step #2-12, and south above #14
  - d. Lower ditch 6-12 inches below the subgrade (native grade or base on which surfacing will be added)
  - e. Add 5 grade dips #2-10, 1 dip and a drain sump (gravel pit) between 11 and 12, and 3-4 drains from #14 to road
  - f. Add 4-6 inches of 2A Base over the fixed subgrade, cap with 4-6 inches of TSA1. Or add 6-8 inches of DSA alone, adding grade dips per East Drawing Figure 4e. Materials cost from step #1 to 15 at 10 ft wide ~\$4500.

Costs for replacing the steps with wood vary greatly with wood size, cut, and species, anywhere from \$100 to \$400 for an 8 ft segment. Granite slabs at 5 ft x 18 in x 8 in cost about \$250 each.



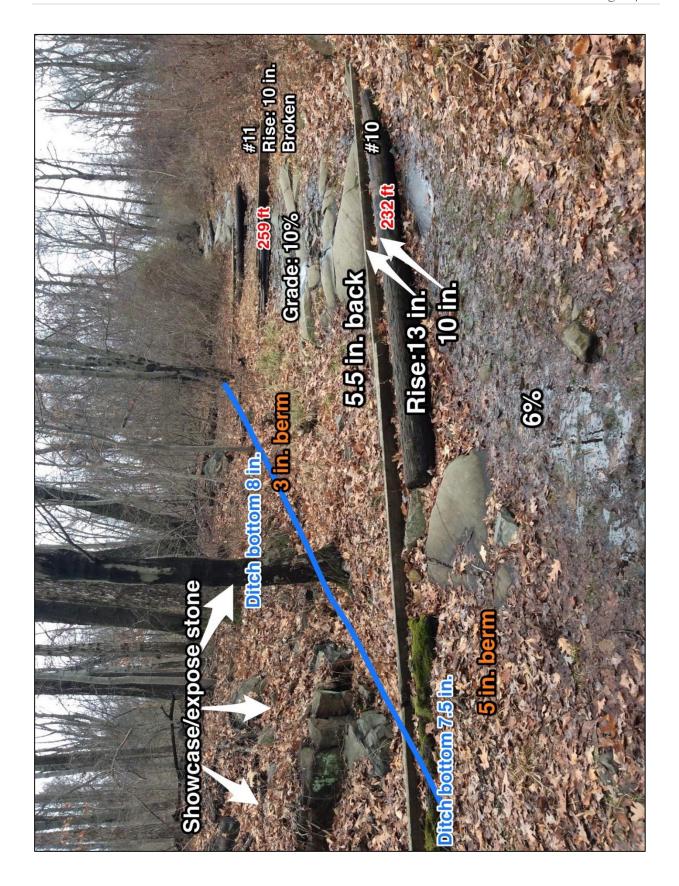
Tenafly Nature Center Trail Master Plan Prepared by New York-New Jersey Trail Conference





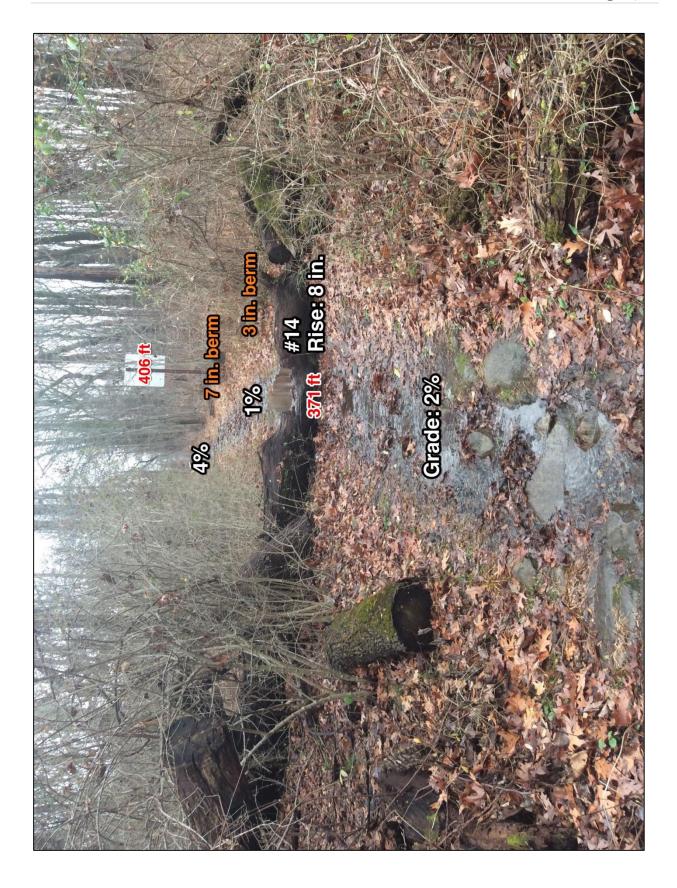


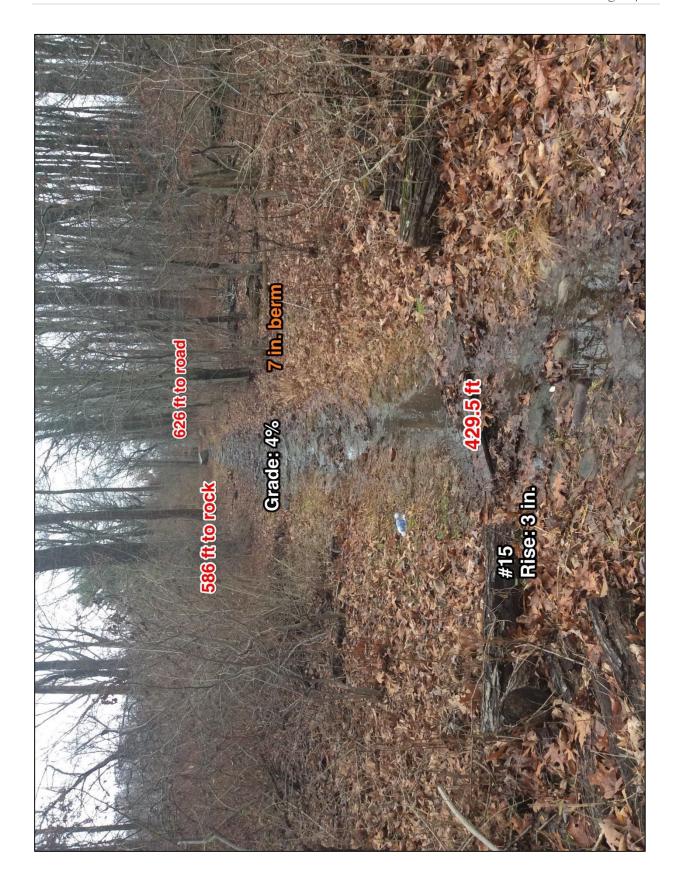












## Trail Standards and Structures Guide

Trails at any site must uniquely suit the site and the trails users. Trail improvements in this plan are guided by that principle. Native materials of stone and timber are included to fit with the historic structures on site as well as to blend the trails into the natural environment. Structures' styles are also chosen based on the various user groups' character and expectations. Stone and earthen treadways are chosen over wooden structures due to the greater potential wooden structures have for vandalism and improved durability of stone and earthen structures. Steps are designed to be comfortable and familiar to the user groups that do not have as much experience with primitive structures while still remaining naturalistic.

This guide is meant to illustrate many of the basic details and components of the major recommended trail structures and improvements. These are meant to be used in combination with trail work plans by an experienced trail builder, or by volunteers trained and supervised by a trail professional.









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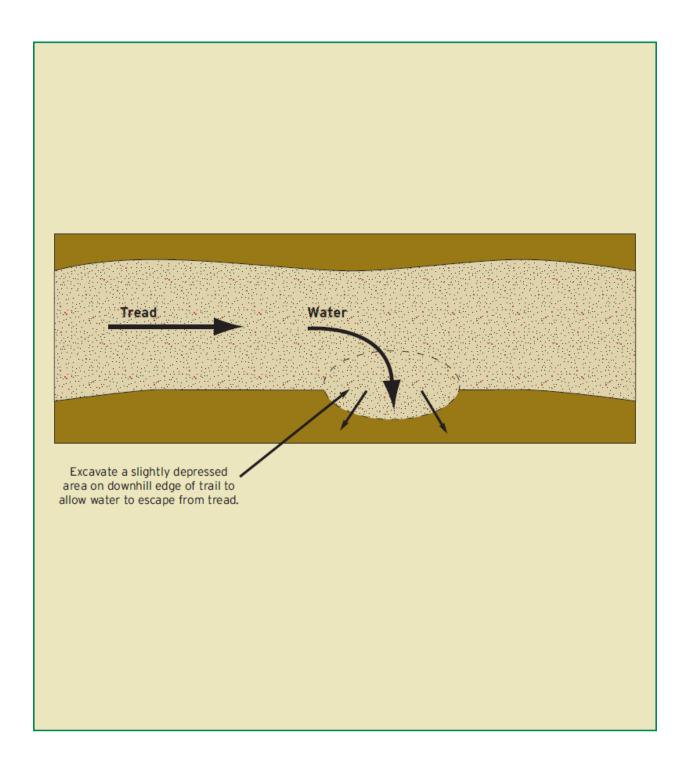
#### 2.0 Tread Construction

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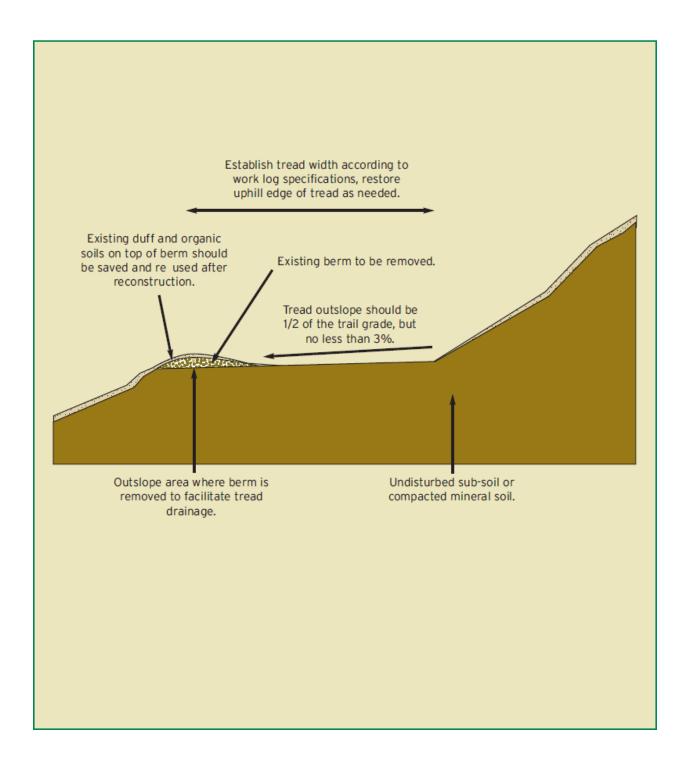
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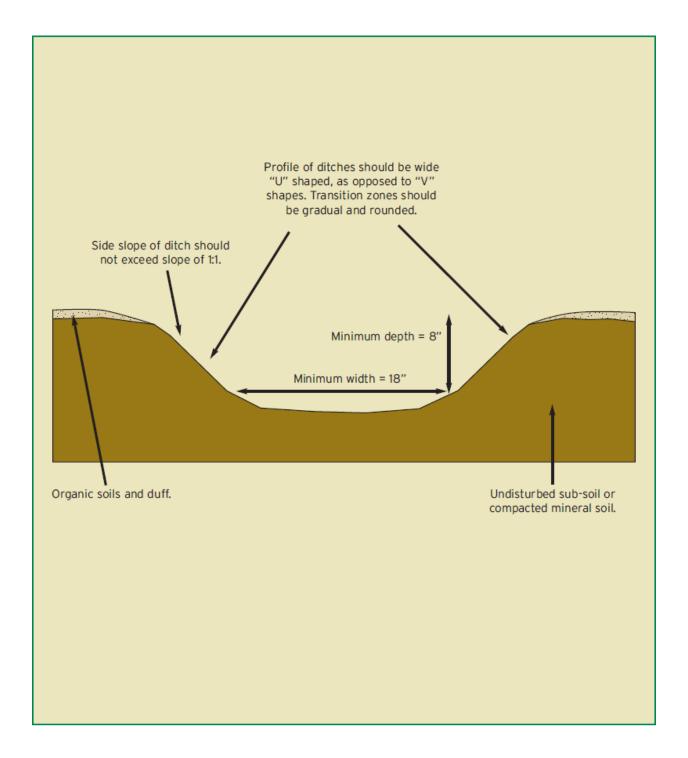
### Tread Drainage: Drainage Dip



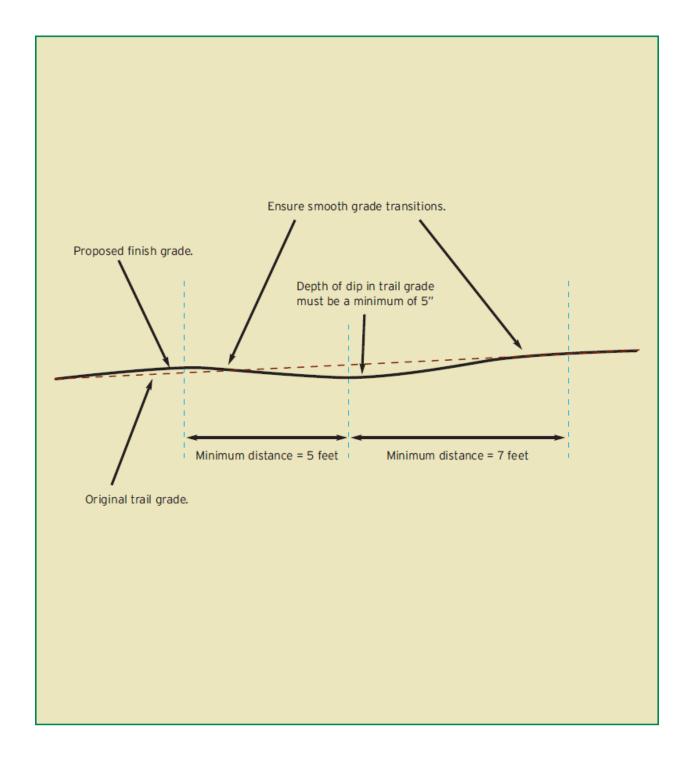
#### **Tread Drainage:** De-Berm (Remove Berm)



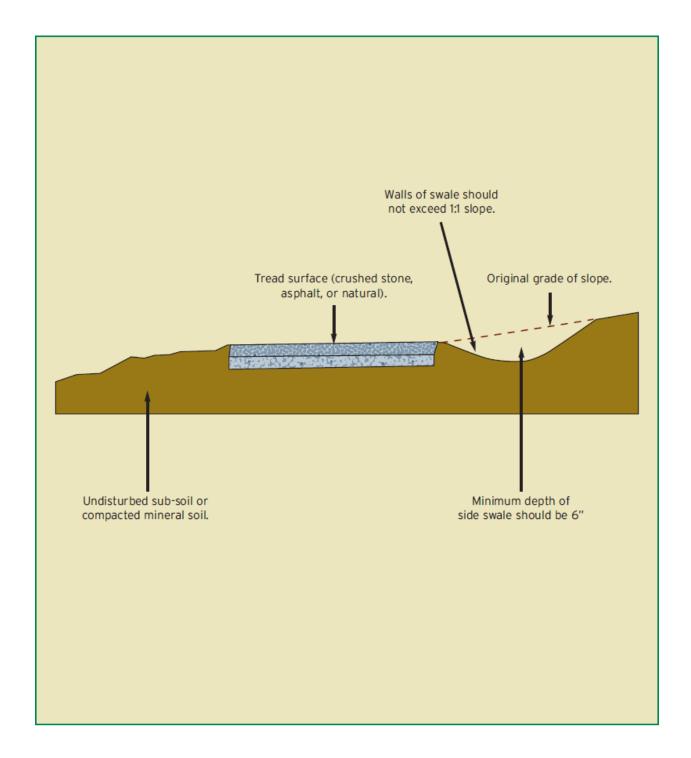
## Tread Drainage: Drainage Dip Section



## Tread Drainage: Grade Reversal



## Tread Drainage: Side Swale

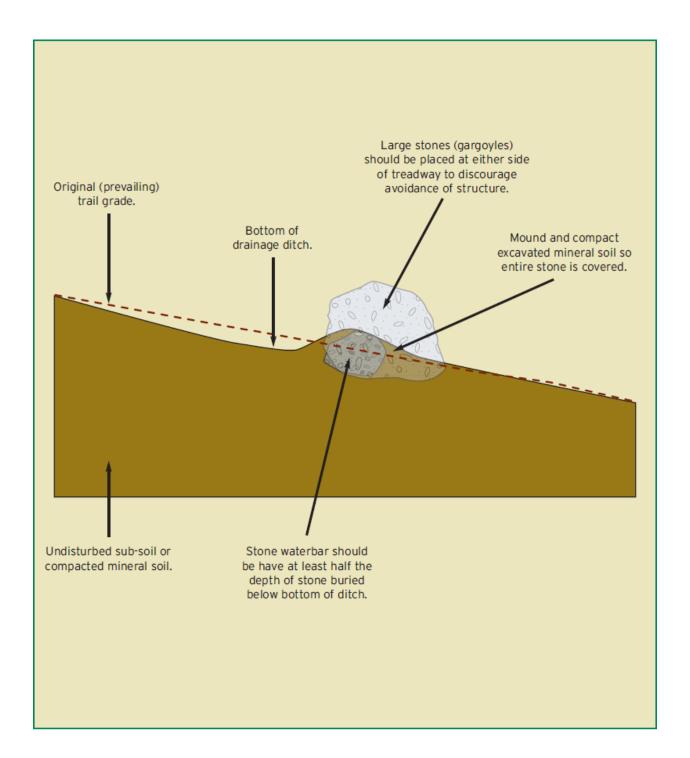


### Tread Drainage: Side Swale



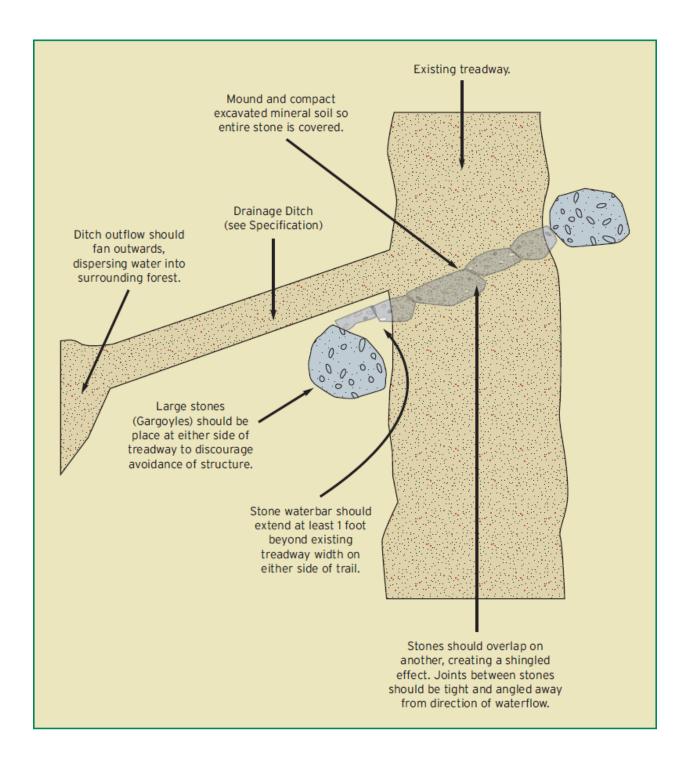
### Tread Drainage: Stone-Reinforced Earthen Waterbar

1.6a

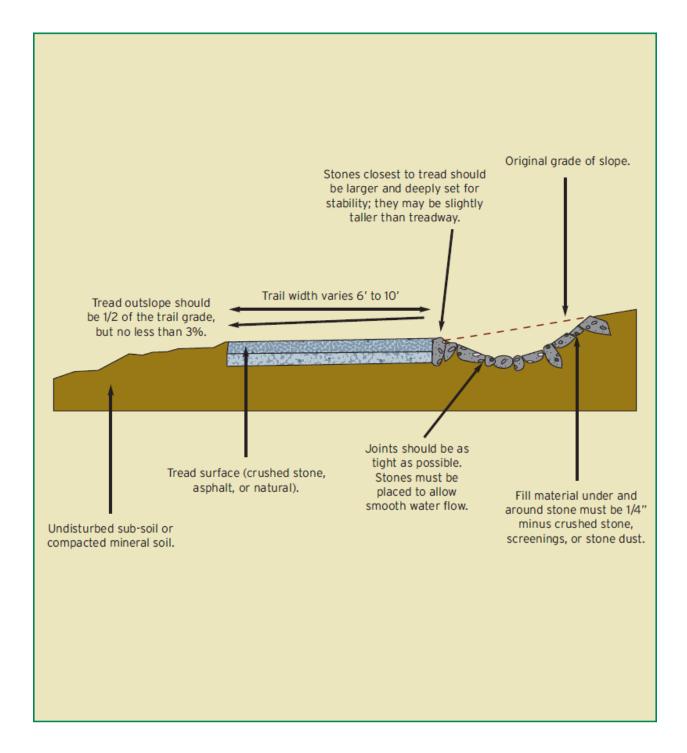


#### Tread Drainage: Stone-Reinforced Earthen Waterbar Plan View

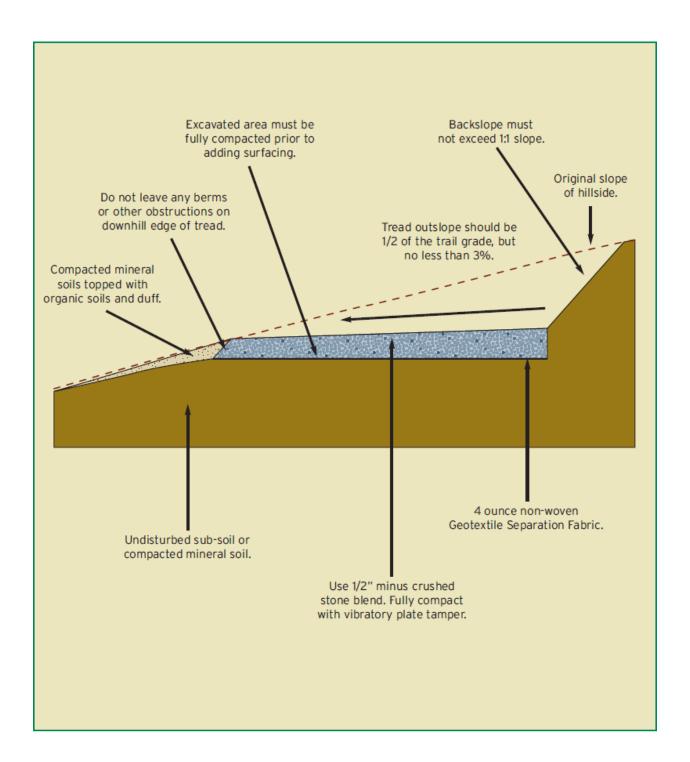
1.6b



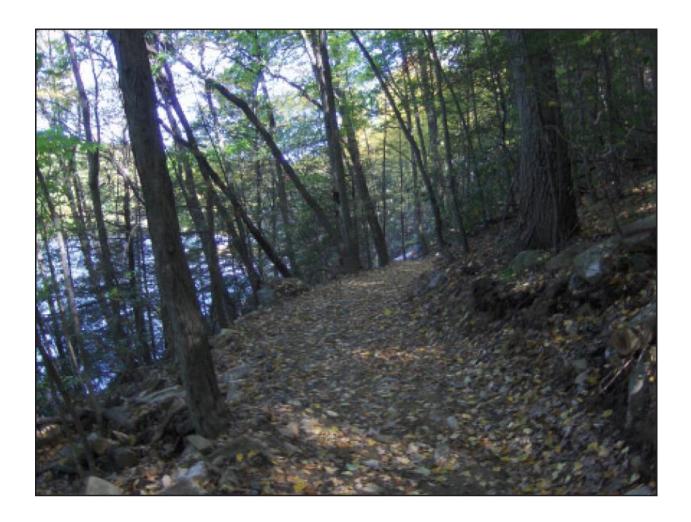
### Tread Drainage: Stone-Paved Side Swale



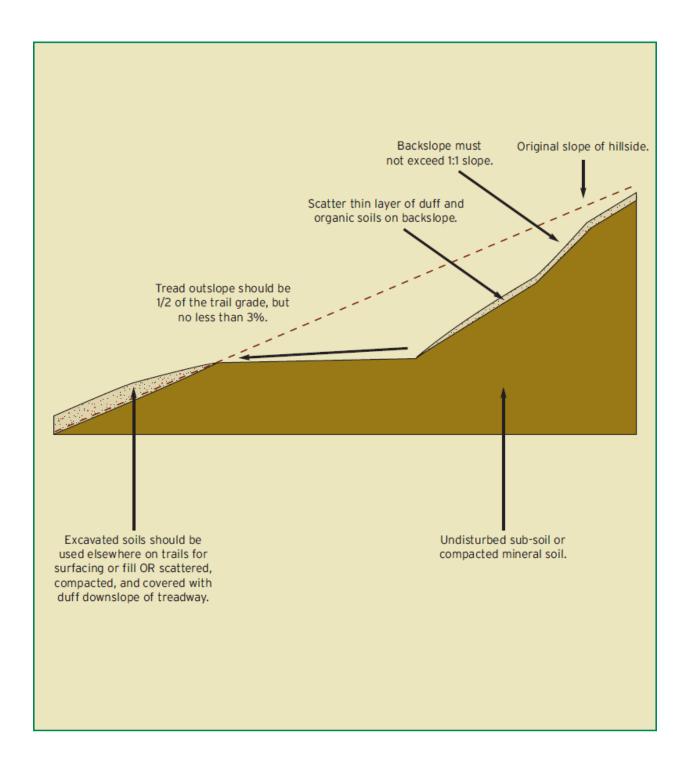
#### **Tread Construction:** Outsloped Accessible Tread



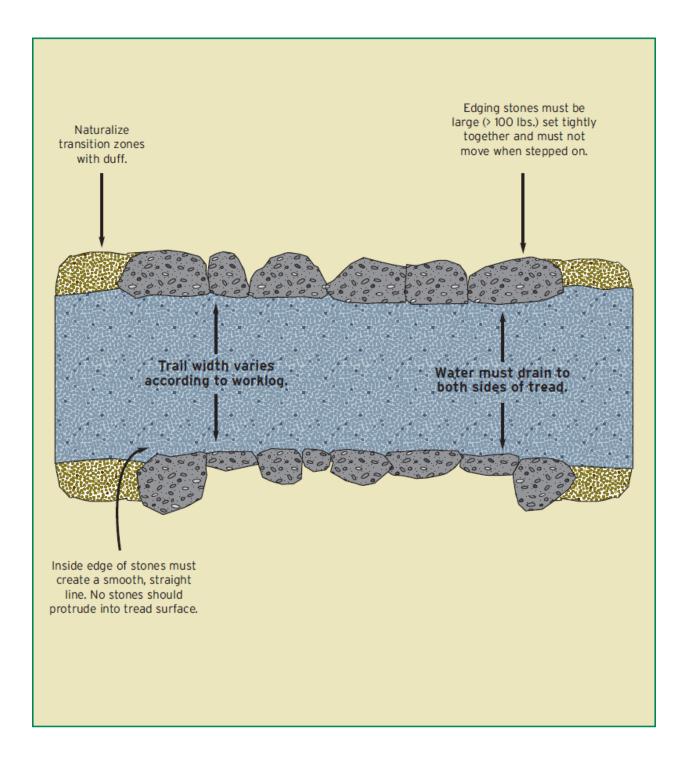
## Tread Construction: Outsloped Accessible Tread



#### Tread Construction: Full Bench Sidehill Construction

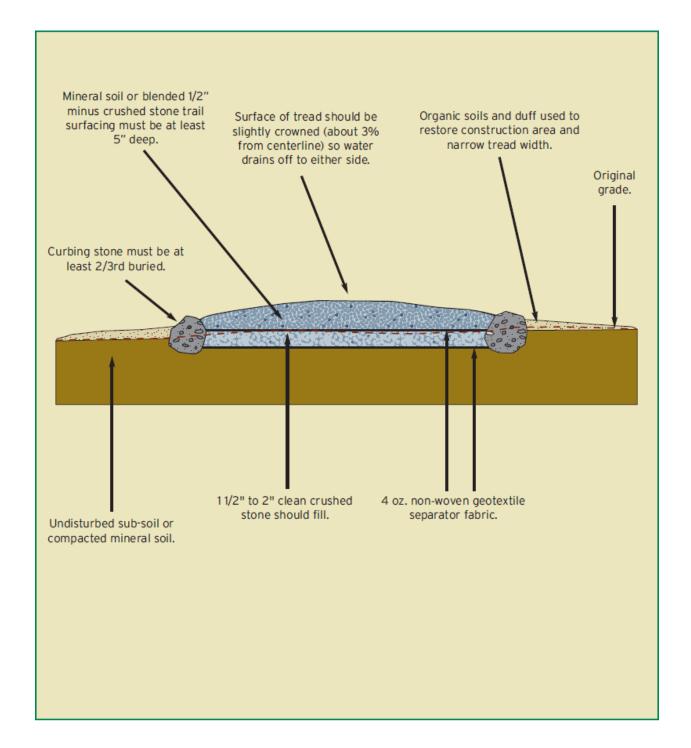


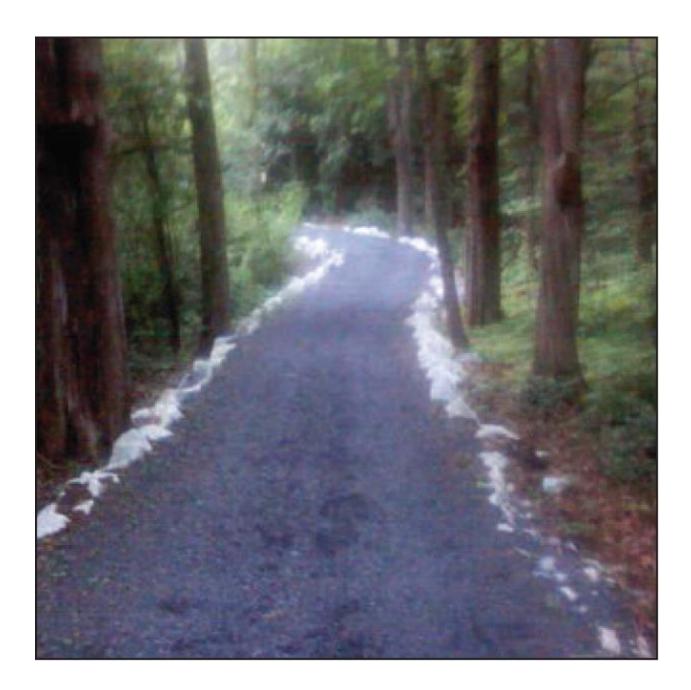
#### Tread Construction: Stone Turnpike



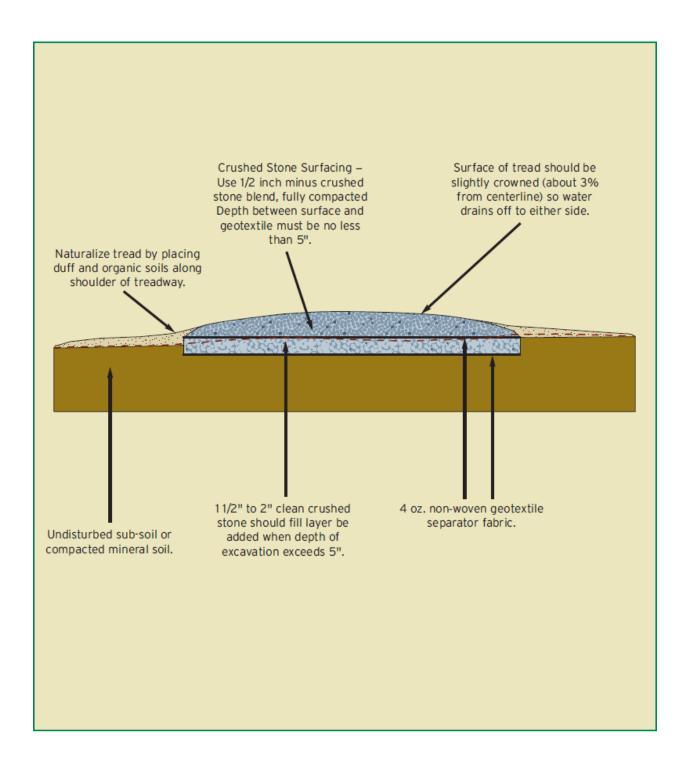
#### **Tread Construction:** Stone Turnpike - Section View

2.3b





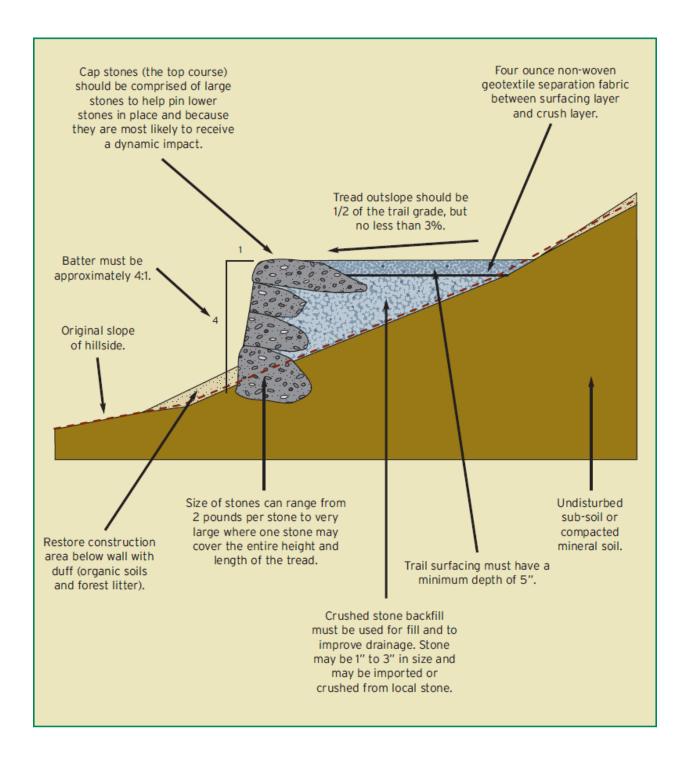
#### Tread Construction: Crowned Accessible Tread



## Tread Construction: Crowned Accessible Tread



### Tread Construction: Stone Cribbed Tread

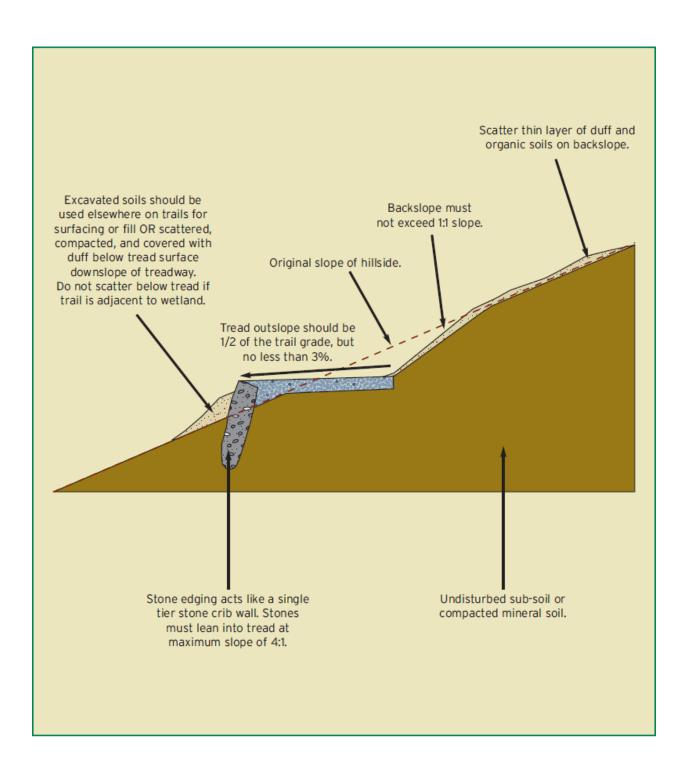


## Tread Construction: Stone Cribbed Tread

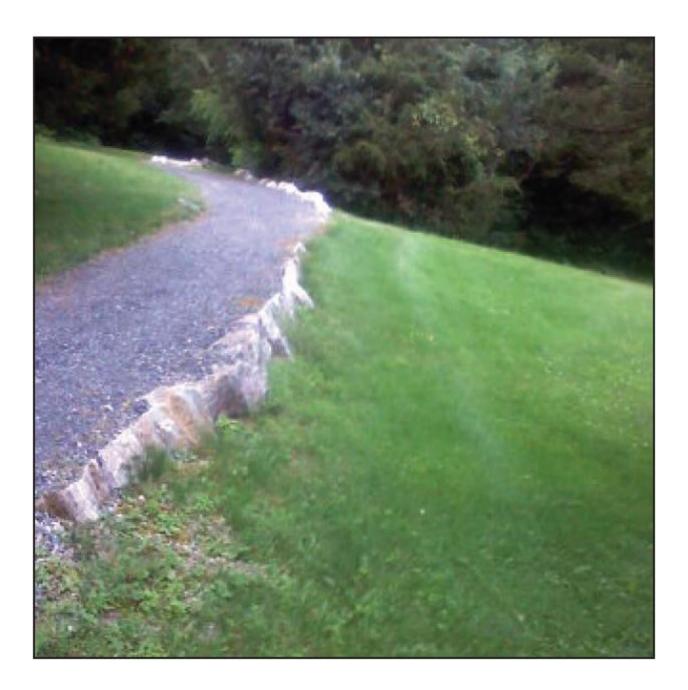




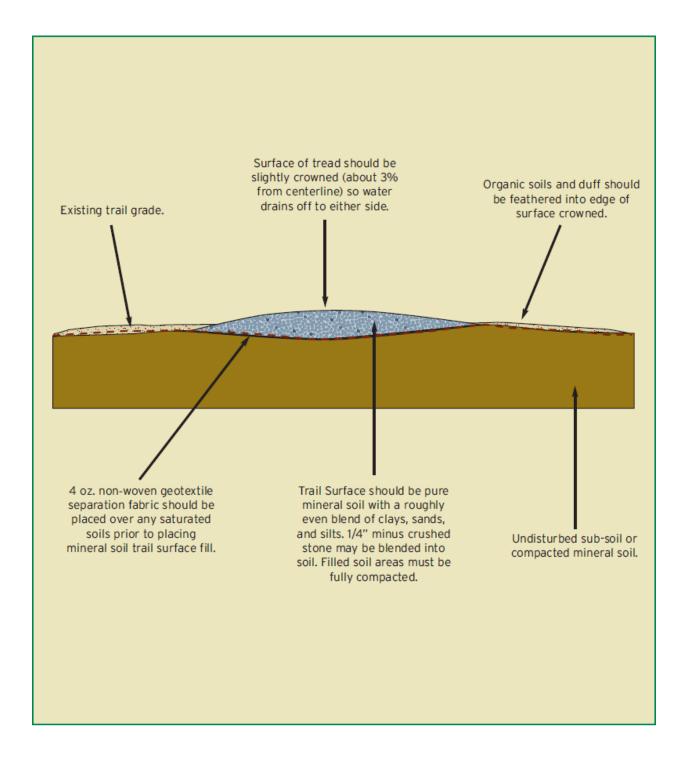
### Tread Construction: Stone Edging



## Tread Construction: Stone Edging

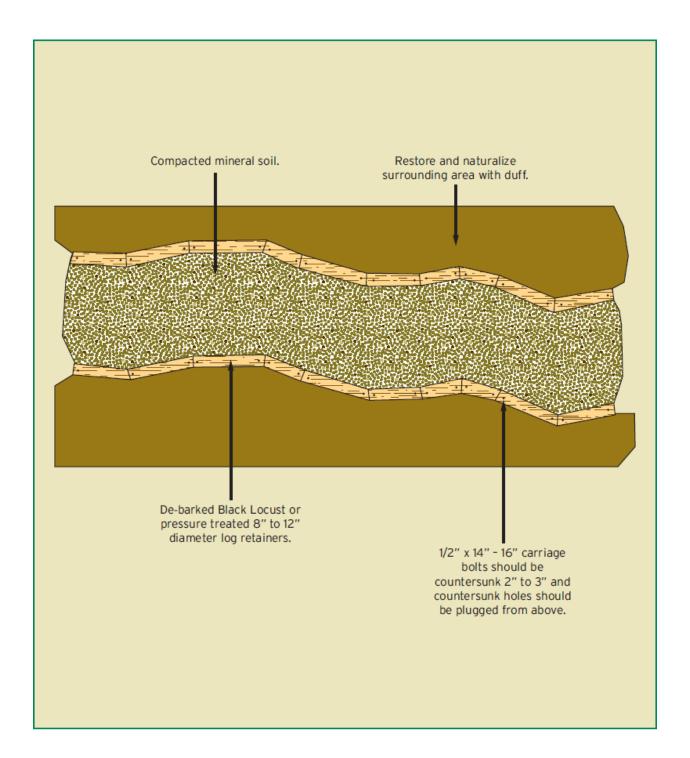


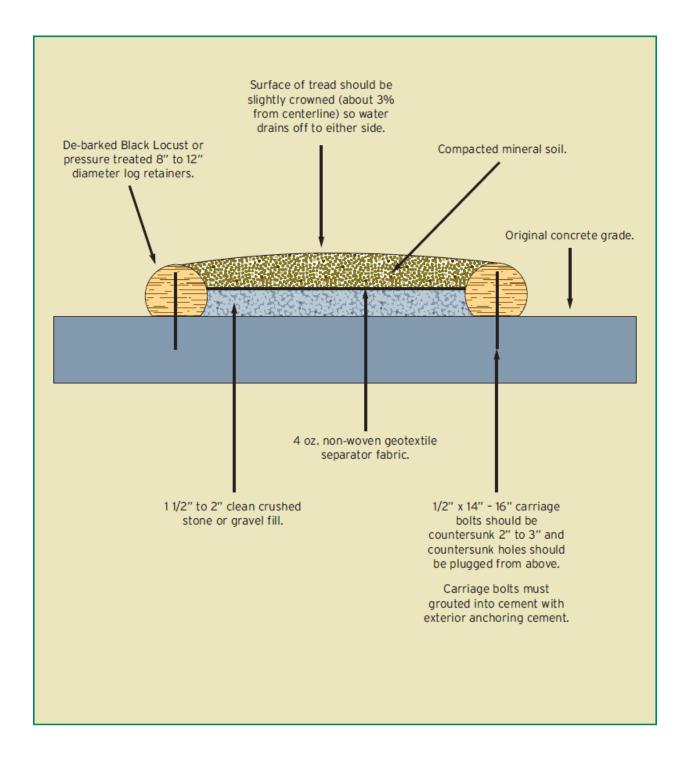
### Tread Construction: Crowned Tread for Non-ADA Trails



# Tread Construction: Crowned Tread for Non-ADA Trails



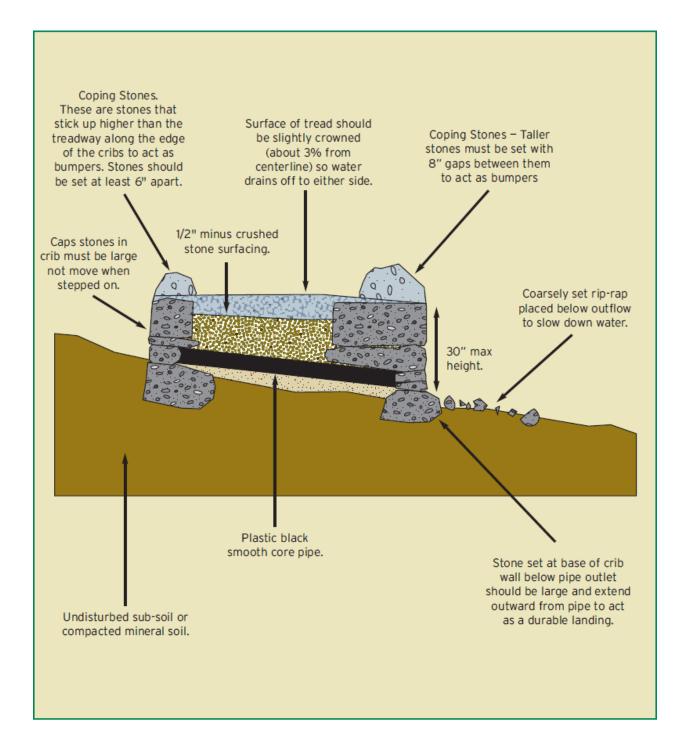


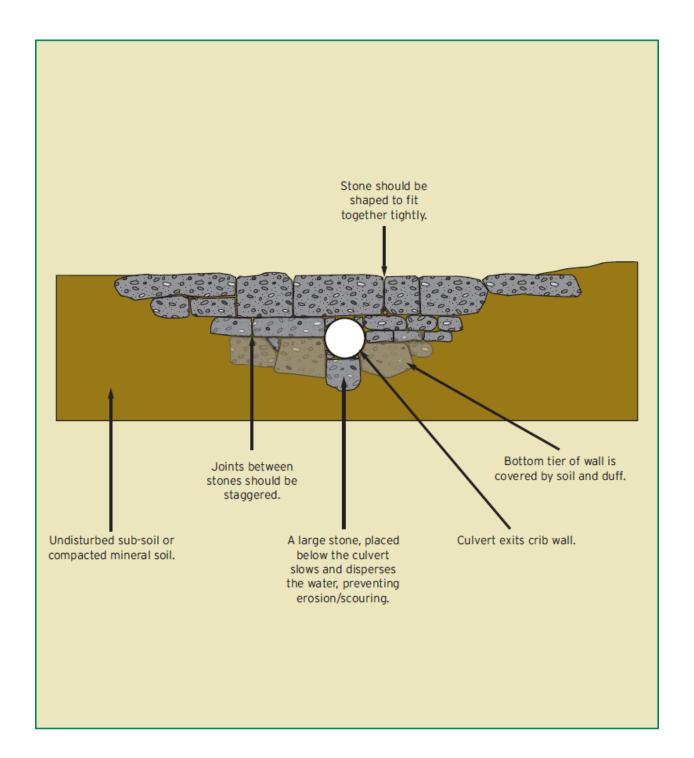


## Tread Construction: Wood Turnpike

2.8a



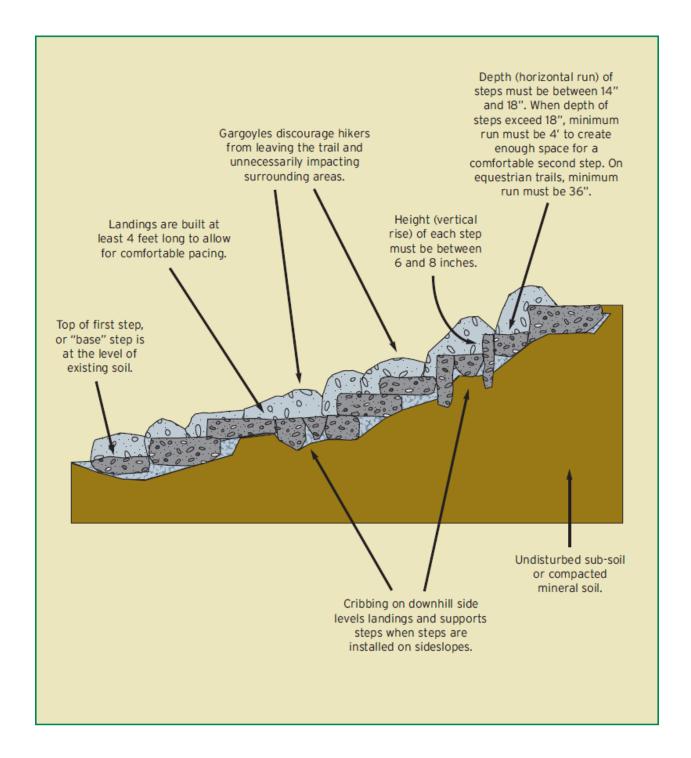


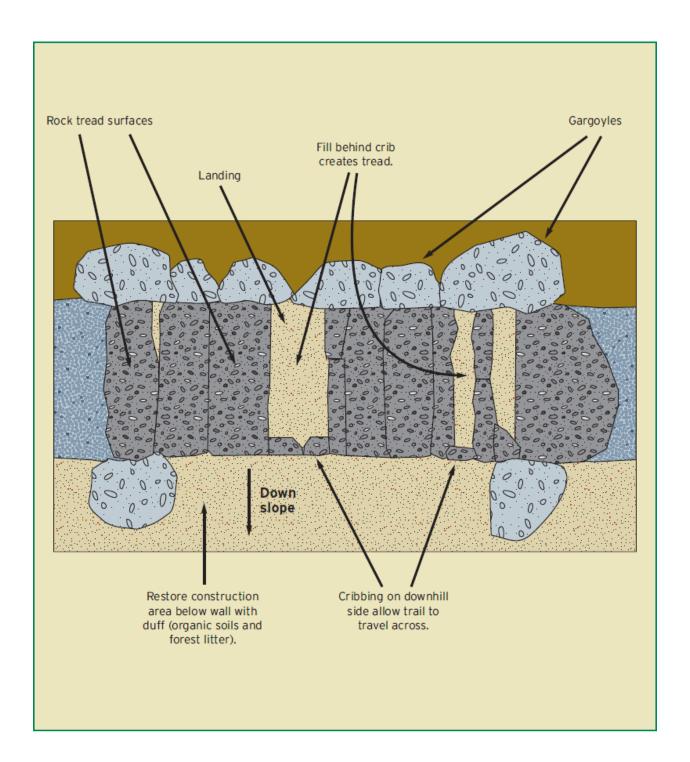


## Tread Construction: Stone-Cribbed Turnpike







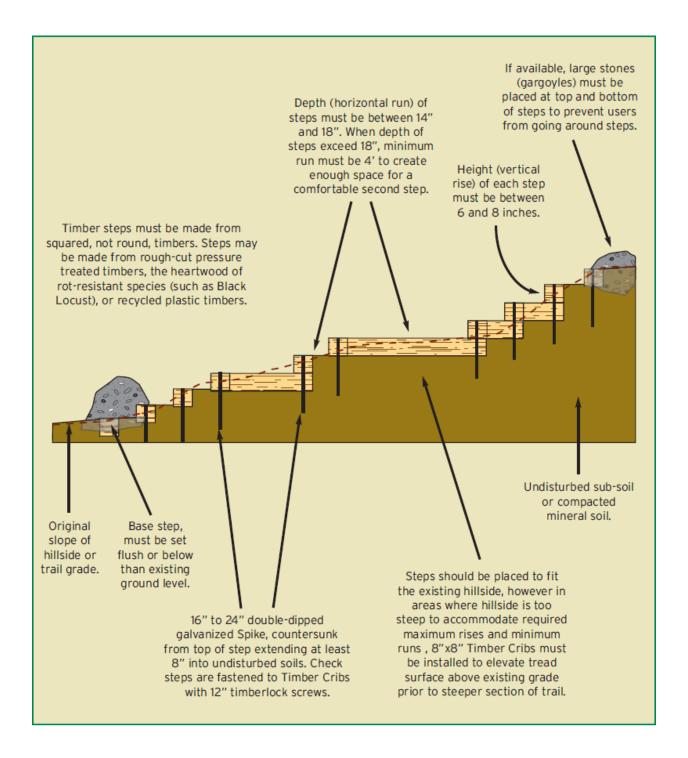


## Tread Hardening Structures: Stone Steps - Section View

3.1a



#### Tread Hardening Structures: Timber Steps

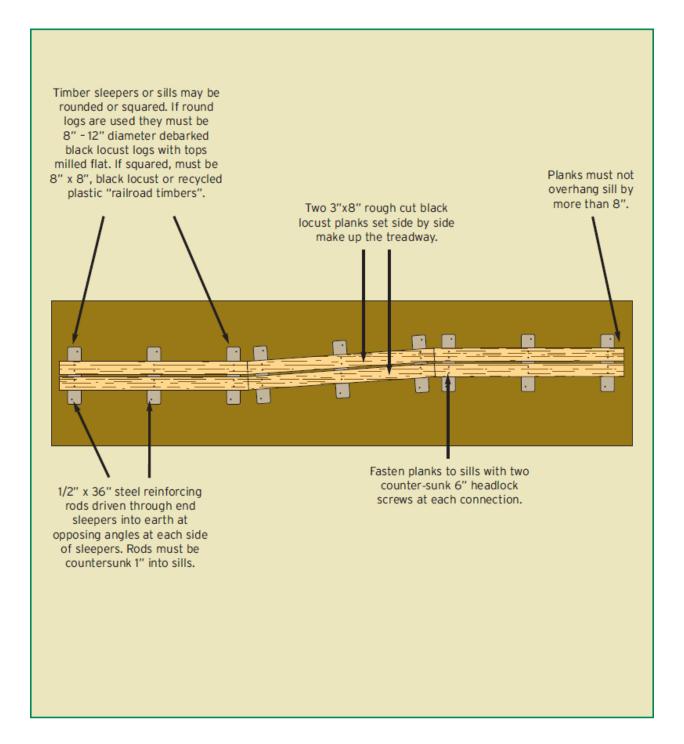


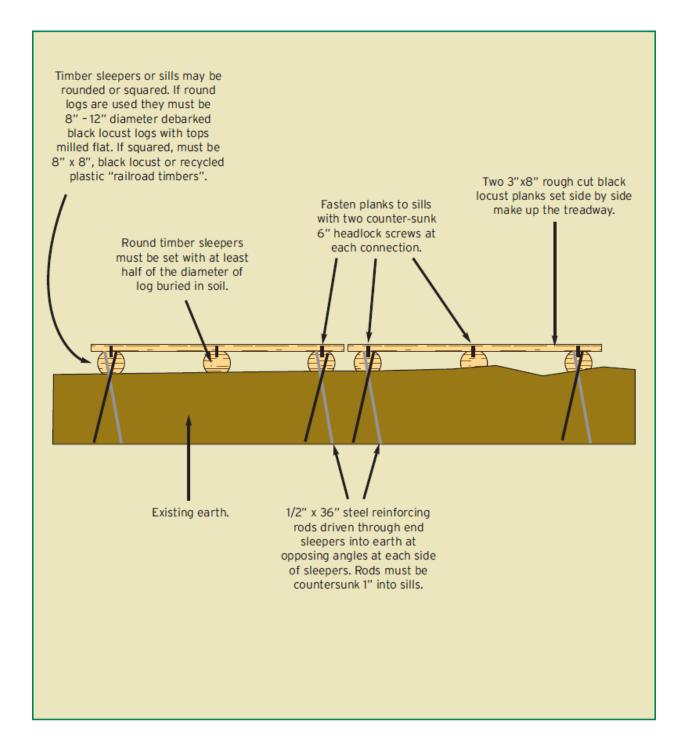
## Tread Hardening Structures: Timber Steps



## Tread Hardening Structures: Bog Bridging/Plank Walkway

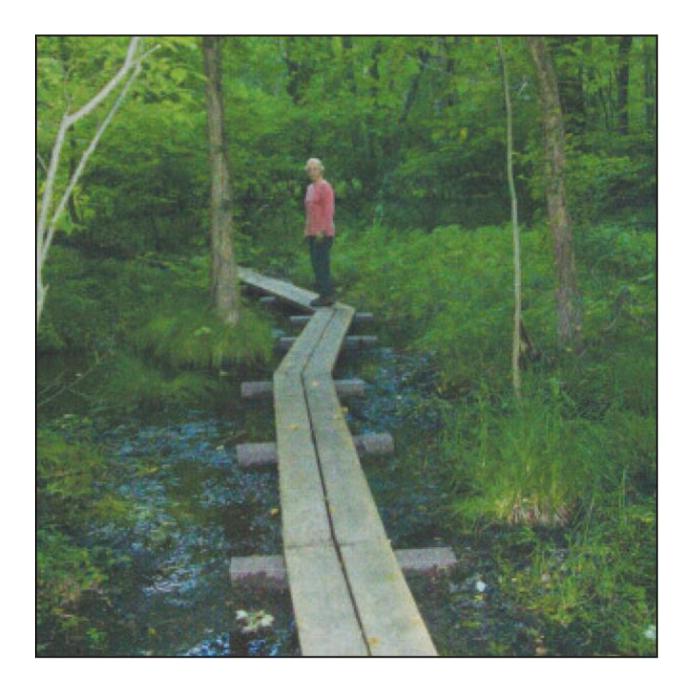
3.3a





## Tread Hardening Structures: Plank Walkway

3.3a



The following specifications are for a ⊕ inch minus crushed stone which compacts very well. These specifications can be applied to different rock types and samples should be compacted and tested for firmness and stability before use.

The key to success of this type of crushed stone material is the gradation of particle sizes and the percentage of fines. The angular nature of the crushed stone is also important to locking the material together.

Sieve Size	% Passing	Acceptable Percentage Range
1/2"	99.5	95 - 100
3/8"	89.0	85 - 95
1/4"	70.2	60 - 75
#4	61.7	
#8	44.8	
#10	41.7	
#16	33.6	35 - 65
#30	26.5	20 - 40
#40	23.8	
#50	21.6	15 - 30
#60	20.6	
#100	17.6	
#200	13.3	10 - 15

The Acceptable Percentage Range provides potential suppliers with some flexibility in providing a viable 1/2 inch minus stone product.