

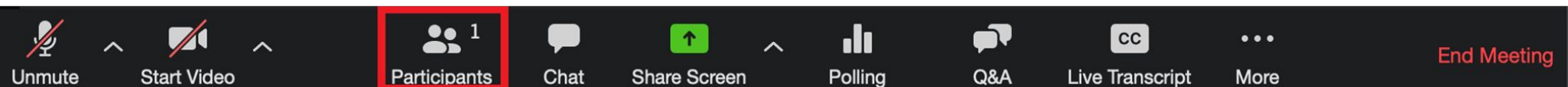
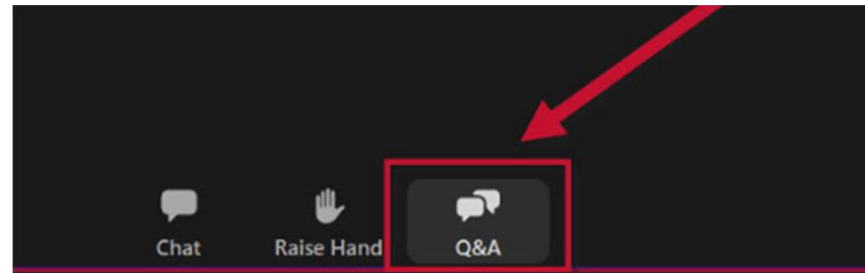
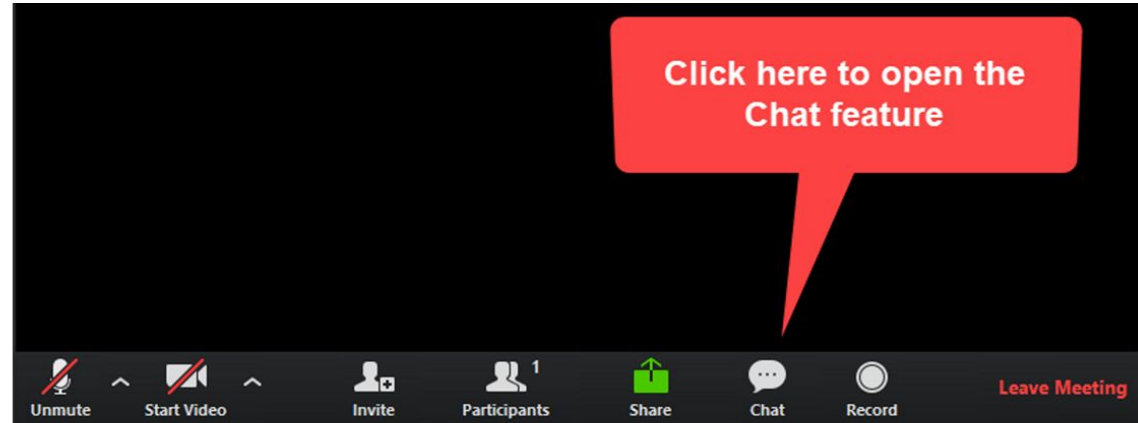
Trail Management 101

Managing a Natural-Surface Hiking Trail



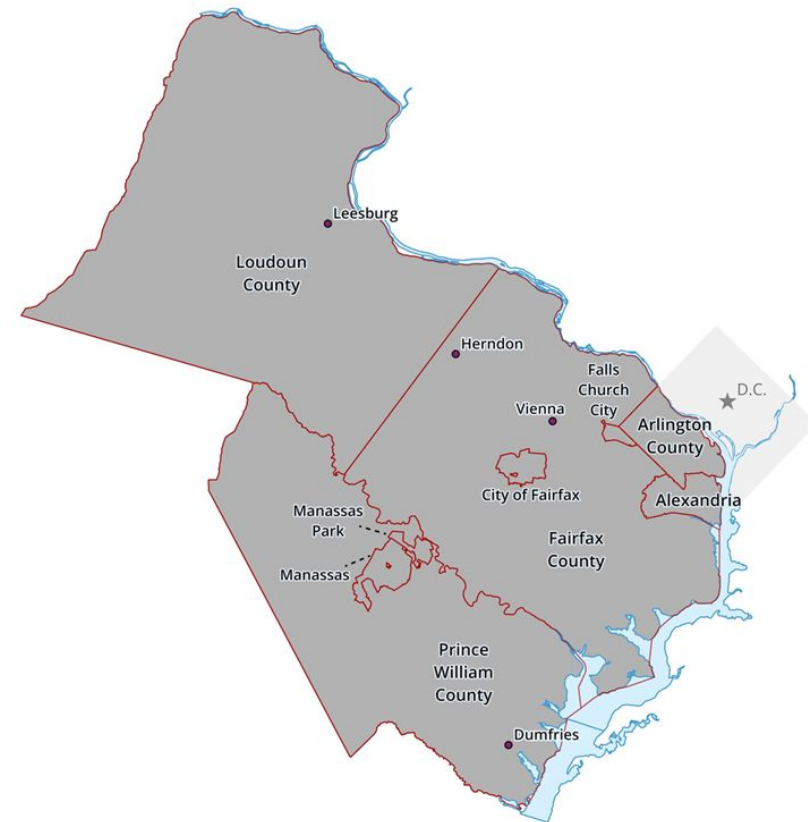
Zoom Webinar Functions

- Use the "Chat" to input your name/affiliation and any commentary
- Put any questions you have into the "Q&A"



About The Northern Virginia Regional Commission

- The Northern Virginia Regional Commission (NVRC) is a regional council of 13 local governments in the Northern Virginia suburbs of Washington D.C.
- Represents one of 21 planning districts that serve the Commonwealth of Virginia.
- NVRC is a political subdivision (a government agency) within the Commonwealth
- Commissioners are appointed by and from the governing bodies of NVRC's member localities on a population-based representation formula



NVRC & The Potomac Heritage National Scenic Trail (PHNST)

A 1983 amendment to the National Trail System Act of 1968 designated the Potomac Heritage National Scenic Trail ("the Trail" or PHNST) as a component of the National Trails System:

- Spans close to 900 miles from the Laurel Hills Highlands Trail in western Pennsylvania to the mouth of the Potomac River in Maryland and Virginia.
- Represents a braided trail network with a primary trail path with loops and spurs
- Non-motorized trail path (walking/hiking, biking, & equestrian)



NVRC & The Potomac Heritage National Scenic Trail (PHNST)

- Partnerships are at the heart of the PHNST concept, creating a locally-managed trail network for outdoor recreation, education, transportation, health and heritage tourism
- NVRC is designated by NPS through cooperative agreements to coordinate the Northern Virginia section of the PHNST (and have done so since the 1980s)
- Conducts special projects and studies for the PHNST to support trail accessibility, connectivity, and safety



2025 Trail Care Academy Program

New education series to help Northern Virginia's parks and trail managers to better plan for and implement trail maintenance projects, promote more sustainable trail use, and foster a stronger culture of stewardship within their communities.

Consists of webinar events as well as in-person trainings that center around key maintenance topics, including:

- Securing funding
- Labor and volunteer management
- Invasive plant ID and removals
- Trail sustainability
- and more!

Program stemmed from feedback from 2022 Corridor Analysis as well as previous Northern Virginia Recreational Trails Summits.



2025 Trail Care Academy Program: Upcoming Events

Invasives Identification & Management: April 29th | 1 - 2:30 pm | **Register Now!**

Maintenance Funding 101: July 2025

Half-Day Training Sessions:

- **Session 1:** June 1st | Bazil Newman Park | 8:30 am - 12:30 pm | **Registration opens soon!**
- **Session 2:** July 2025

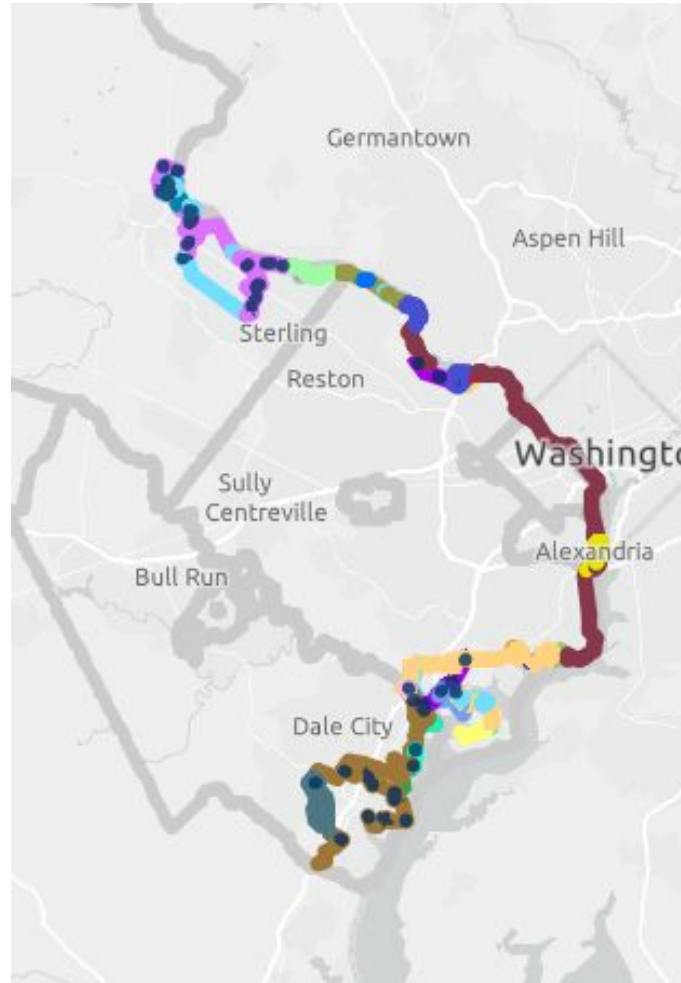
Viewshed Training & Inventorying: September 2025

**To learn more, visit potomacheritagenoVA.com
or scan the QR code below:**



Potomac Heritage National Scenic Trail

Many different land managers in our area.



- ALX, Alexandria, City of
- DMF, Dumfries, Town of
- FCCA, Fairfax County Park Authority
- FCDPWES, Fairfax County Department of Public Works and Environmental Services
- FCT, Fairfax County Transportation
- FWS, U.S. Fish & Wildlife Service
- GIF, Virginia Dept. Game & Inland Fisheries
- GW, George Washington Memorial Parkway
- LCPR, Loudoun County Parks and Rec
- LSB, Leesburg Parks and Rec
- LSY, Leesylvania State Park
- MN, Mason Neck State Park

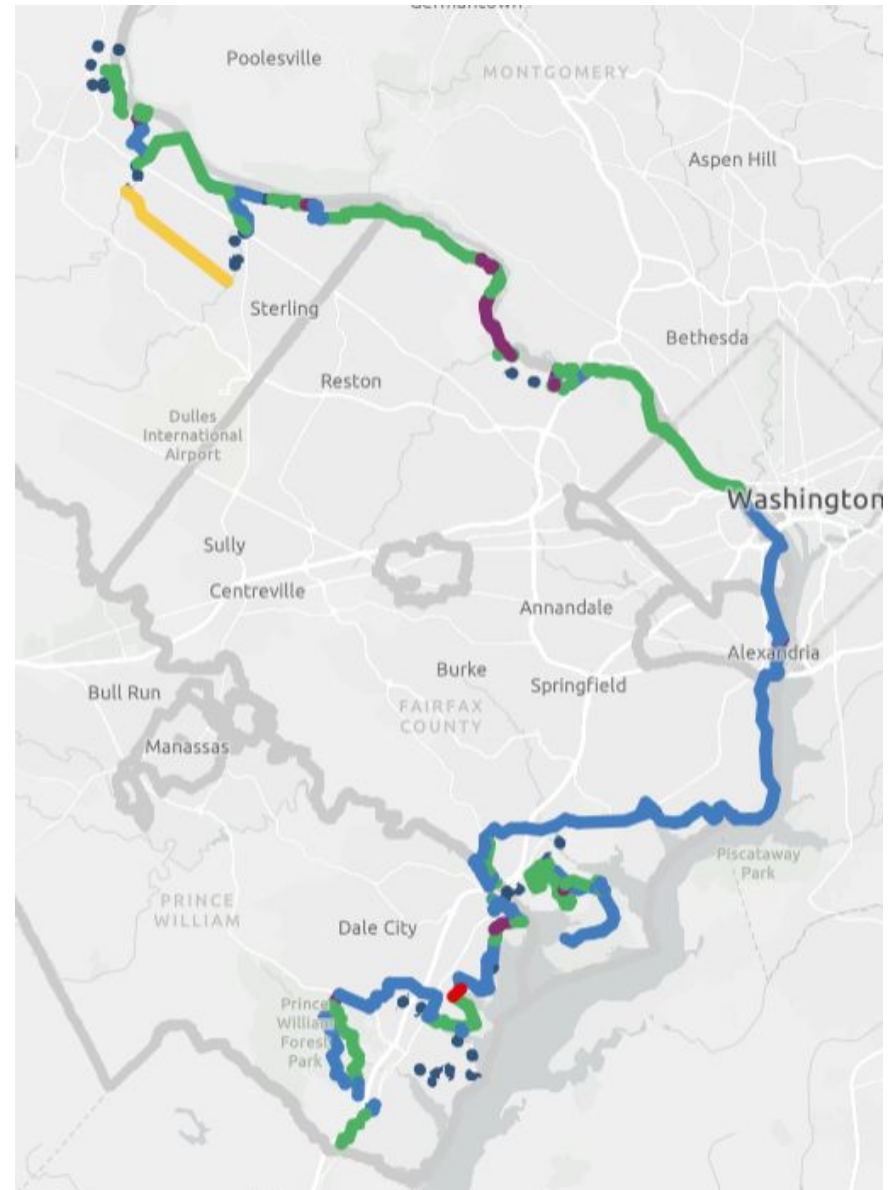
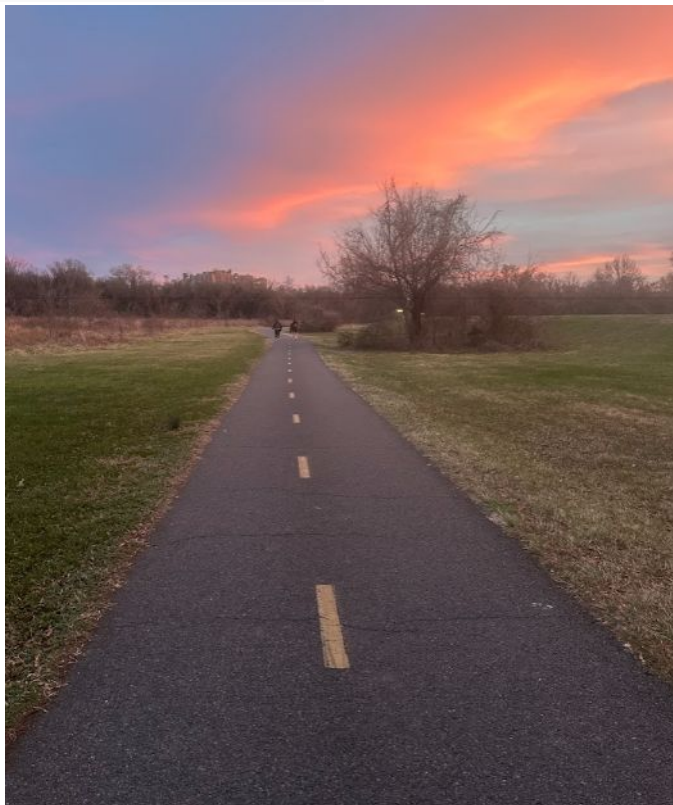
- MV, Mount Vernon
- MW, Meadowood
- NC, Nature Conservancy, The
- NPS, U.S. National Park Service
- NVRPA, NOVA Regional Park Authority
- OCQ, Occoquan, Town of
- ORP, Occoquan Regional Park
- POH, Pohick Bay Regional Park
- PWC, Prince William Parks, Rec, Tourism
- PWFP, Prince William Forest Park
- SN, Seneca Regional Park
- UNK, Unknown
- WDL, Woodlawn and Pope Leighy

Potomac Heritage National Scenic Trail

Surface

Trail Surface Type

- Gravel/Stone
- Natural Surface
- Paved
- Wood Boardwalk
- Wood Mulch
- Multiple surfaces



Trail Management

Nature

- The physical treadway
- Vegetation
- Trees
- Water

Humans

- Behavior
- Information
- Workforce



Natural-Surface Trail

What is Natural-Surface Trail?

Native soil – whatever is naturally there

- Dirt
- Sand
- Gravel
- Stone

Not imported material

- No crushed stone
- No paving



Physical Sustainability

Goals of a Sustainable Trail

- Stable – does not change, erode or migrate
- Minimal tread maintenance
- Minimal environmental impact.

Attributes of Sustainable Trail

- Contour alignment
- Sheds water through:
 - A. Out slope
 - B. Frequent grade reversals
- Mild trail grades: <10%



Physical Sustainability

Water is the main problem contributing to tread maintenance.

Erosion. Water running down the trail removes soil leaving an uneven tread with roots and rocks.



Physical Sustainability

Mud. Water sitting on the trail creates mud. Trail users go around the mud causing **trail widening**.



Physical Sustainability

Sediment. Soil removed from the trail usually ends up in the local creek or stream degrading water quality and harming aquatic vegetation and animals.



Definitions

Most of the trails in our mid Atlantic region are **Legacy Trails**.

Legacy trails are trails that were built before the concept of **sustainable trail design** was developed. Legacy trails are often old roads or farm tracks, or the shortest distance between two points. No thought was given to water management.

This results in a **fall-line trail**, which goes straight up the slope. Water follows the trail, erosion turns the trail into a gully.

Often the trail is in an old road bed that is already a gully - there is nowhere to drain water but down the trail.



Physical Sustainability

Contour vs. Fall line

Goal is for water to run across trail, not down trail



Physical Sustainability

Two basic problems:

1. **Trail in flat area** - no drainage
2. **Trail too steep** -Fall line, eroding

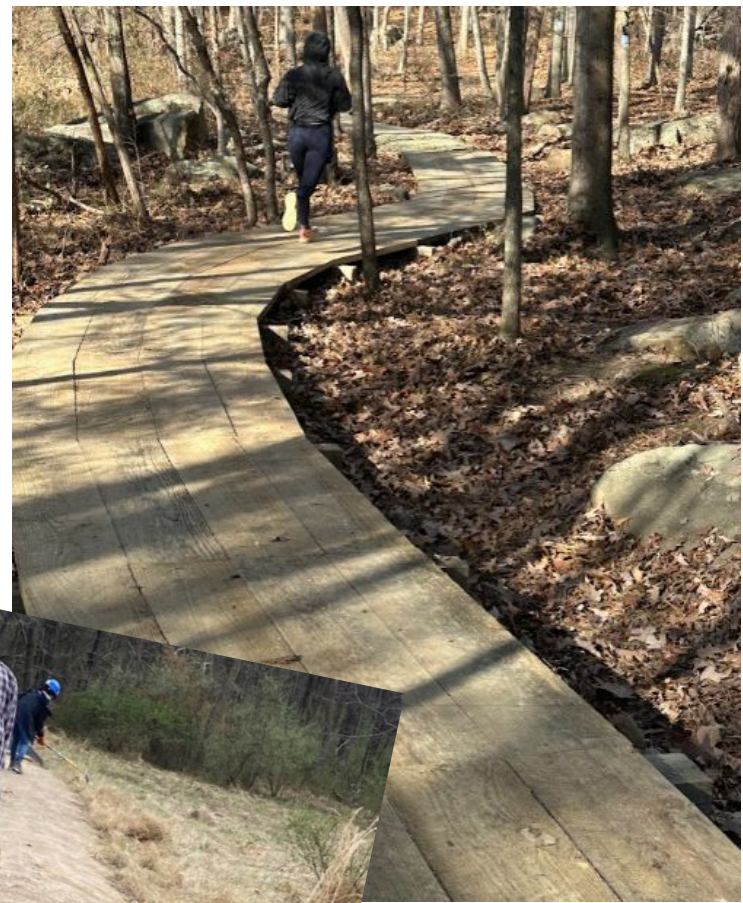


Physical Sustainability

Trail in flat area- no drainage

Solutions

1. Boardwalk
2. Steppingstones
3. Turnpike
4. Reroute



Physical Sustainability

Trail too steep - Fall line, eroding

Add steps



Physical Sustainability

Trail too steep -Fall line, eroding

Relocate trail



Physical Sustainability

Trail too steep -Fall line, eroding

Relocate trail



Physical Sustainability

Other problems

Bank Collapse-

- Relocate trail away from bank



Physical Sustainability

Other problems

Trail border - holds water on trail, promotes mud and erosion

- Remove borders



Physical Sustainability

Other problems

Water crossings

tributary creeks



Physical Sustainability

Water crossings

Options

1. Bridges
2. Steppingstones
3. Relocate trail to cross at easier point



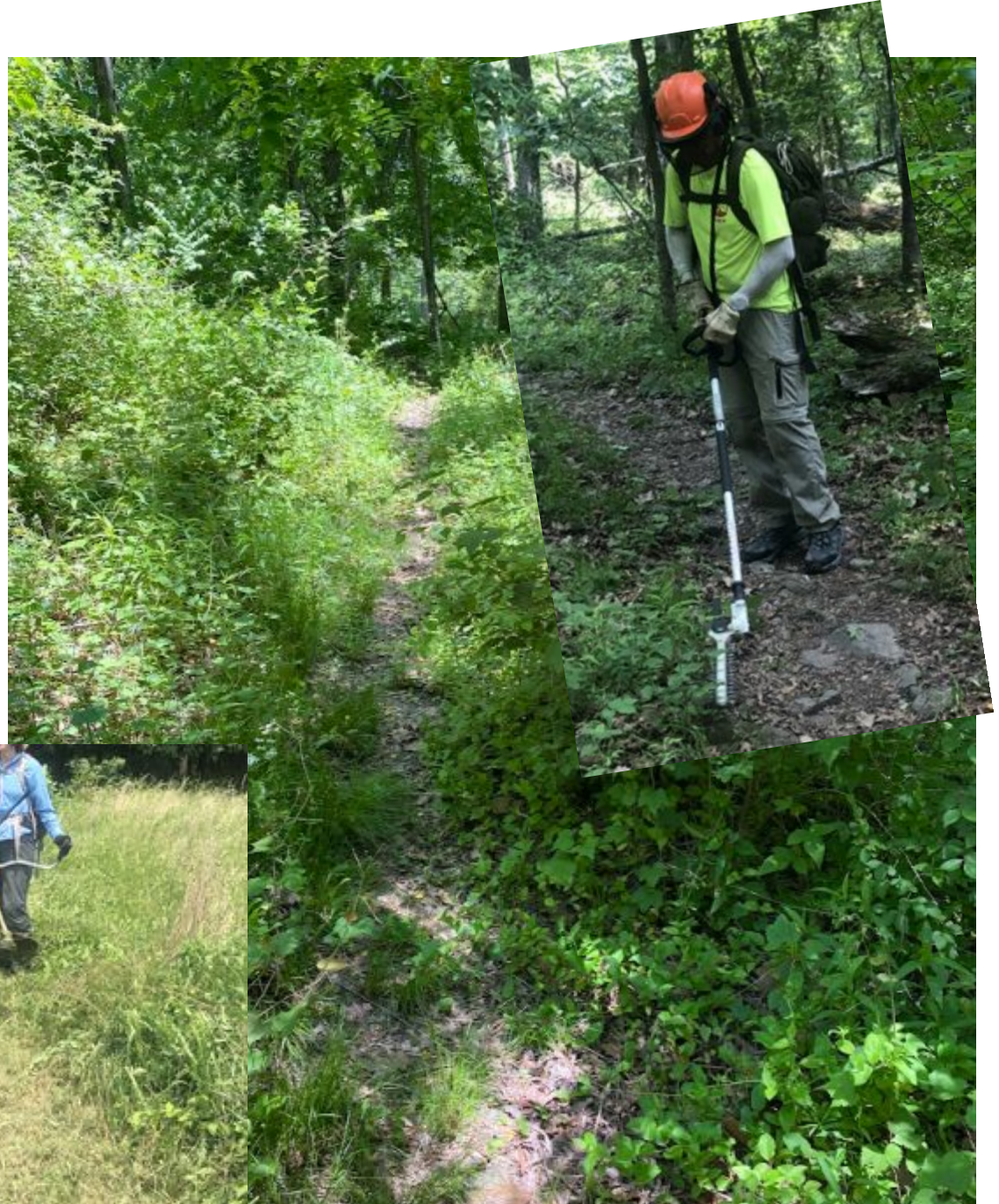
1. Prone to flood damage
2. Expensive



Vegetation

Mowing and clipping

1. Need to be able to see the trail
2. People don't like touching nature
3. Prickers
4. Snakes
5. Ticks
6. Train operators



Schedule for
mowing/clipping

Storm damage/blowdowns

Blowdowns

1. Block trails, inconvenient
2. Social trail created to go around
3. Can be easy to remove, or quite difficult



Process for reporting or inspection, removal

Storm damage/blowdowns

Reporting

1. Posted number or website for user to send information
2. App
3. Frequent users as inspectors
4. Trail maintainers



- Location
- Photos

Vegetation

Hazard trees



Any tree with a defect and a target

Inspection generally requires trained personnel

Policy

1. Remove
2. Let fall

Vegetation

Invasives

- Out compete native plants
- Separate webinar



Infrastructure

Parking

- Is there enough space?
- Encroachment on highway, neighbors.



Maintenance

1. Inspection
2. Repair
3. Budget

Infrastructure

Trail structures

- Inspection
- Maintenance
- Budget



Infrastructure

Restrooms

- Are you going to have them?
- Cleaning
- Budget



Human Issues

- Litter
- Graffiti
- Pets
- Other behavior
- Information
- Workforce
- Emergency plan
- Data



Litter



Litter

Poop Bags

Fishermen

Party /Picnic

Litter density is directly proportional to proximity to water, and distance from road/parking



1. Signage
2. Steward
3. Litter clean up
4. Trash cans

Language of target audience

Managers need to have a plan

Graffiti

Generally closer to access points

Graffiti tends to breed more graffiti.

Clean up

1. Chemicals
2. Pressure washer
3. Paint over



Managers need to have a plan

Dogs

Most parks require dogs to be on leash – but rule generally ignored.

Poop bags

Are you going to try to enforce?

Signage

Rangers

Violations report number



Other behavior issues

Amplified music

Camping/ Homeless

Hunting/fishing

Taking plants

Drugs

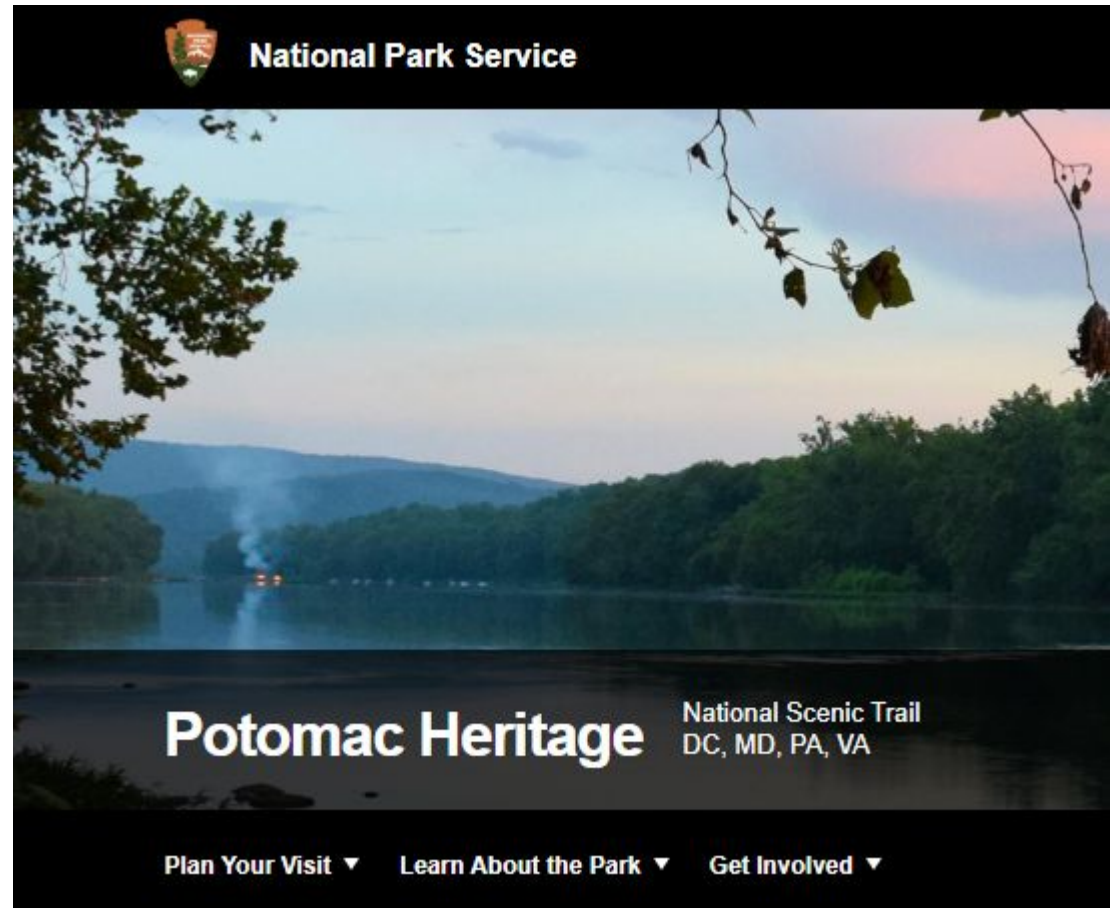


Signage
Ranger

Information

How do users get information about your trail?

1. Website
2. Signage
3. Apps - All trails verify info



Signage

1. Information
2. Rules
3. Wayfinding
4. Interpretation

QR codes for more info



CEDARVILLE STATE FOREST ORANGE TRAILHEAD

Welcome!
HOURS: SUNRISE TO SUNSET
Orange Trail - Easy
The Orange Trail is our most traversed path. This trail is relatively flat, mostly single track with an easy climb. The Orange Trail does not cross through the developed parking area. Along with the Orange Trail, there are several other trails in the area. The Orange Trail is a great place to enjoy the outdoors and enjoy the view of the forest. The Orange Trail is a great place to enjoy the outdoors and enjoy the view of the forest.

Plants and Wildlife
Cedarville State Forest has a diverse range of plants and wildlife. This includes plants that support the abundance of mammals, birds and fish. The forest is a great place to enjoy the outdoors and enjoy the view of the forest.

History
Originally, this area was the homestead of the Potters. In the 1930s, the State of Maryland began purchasing land to create a forest preserve. The forest was established in 1937 and is now a great place to enjoy the outdoors and enjoy the view of the forest.

Announcements
Ask about Cedarville State Forest's new activity book! Visit our website for more information.

LEAVE NO TRACE!
Icons for Leave No Trace principles: 1. Plan Ahead and Prepare, 2. Travel on Durable Surfaces, 3. Dispose of Waste Properly, 4. Leave What You Find, 5. Respect Wildlife, 6. Be Considerate of Other Visitors, 7. Be Respectful of the Land.

CALENDAR OF EVENTS

MARYLAND
Department of Natural Resources

QR codes for more info

Signage

1. Information

SHARE THE TRAIL

Park trails are open to hiking, biking and horseback riding, unless otherwise posted.

Local Address:

10201 Bee Oak Rd, Brandywine, MD 20613
(UTM 340704 4279240)

Emergency
info

Emergency and 24-Hour Contact Info

EMERGENCY ASSISTANCE	911
FOR PARK INFORMATION OR ASSISTANCE CALL THE DUTY RANGER	443-975-4358
FOR 24-HOUR ASSISTANCE OR TO REPORT A VIOLATION CALL NATURAL RESOURCES POLICE	410-260-8888 OR 1-800-825-7275



The Natural Resources Police (NRP) is the primary law enforcement agency for Maryland State Parks

Signage to let users know what to expect



Signage

2. Rules

STATE PARK RULES AND REGULATIONS

SUMMARY

- **NO MOTORIZED VEHICLES ON TRAILS** - No electric or gas powered vehicles on trails
- **ALCOHOL** - Consumption of alcohol is prohibited except inside motor homes or designated areas with special permit.
- **AMPLIFIERS** - Amplifiers and loudspeakers are prohibited except with special permit.
- **CAMPFIRES** - Campfires (where permitted) must be supervised, contained within fire rings, and extinguished before departure.
- **CAMPING** - Camping requires a permit and is subject to additional regulations.
- **DISORDERLY CONDUCT** - Disorderly conduct, such as obscene language, indecent exposure, throwing objects, obstructing a public place, fighting, operating a generator or playing music at a disruptive volume, or causing a disturbance, is prohibited.
- **FIREWOOD** - Firewood must be obtained locally to prevent the spread of invasive insects. Firewood may not be harvested from live or standing timber.
- **FIREWORKS** - Fireworks (including sparklers) are prohibited.
- **GENERATORS** - Generators are prohibited during quiet hours.
- **HOURS OF OPERATION** - State parks close at sunset unless otherwise posted.
- **HUNTING** - Hunting is prohibited except in designated areas. A special permit may be required.
- **METAL DETECTING, RELIC HUNTING, AND MAGNET FISHING** - Digging in search of buried relics or treasures, the removal of any prehistoric or historic artifacts, and the use of metal detectors without permission, is prohibited.
- **PLANTS, ROCKS, AND MINERALS** - Removing, disturbing, damaging, or destroying plants, rocks, or minerals is prohibited.
- **PARKING** - Parking in non-designated areas is prohibited.
- **PETS** - Pets (where permitted) must be leashed and supervised. Please clean up pet waste.
- **SWIMMING** - Swim in designated areas only.
- **WEAPONS** - Weapons are prohibited except where permitted by the Park Service for a specific purpose, such as hunting or exhibition.
- **WILDLIFE** - Removing, disturbing, feeding, touching, harassing, or frightening wildlife is prohibited.
- **QUIET HOURS** - Quiet hours are 10 p.m. - 7 a.m.
- **TRASH** - Trash must be disposed of properly. Please, *Leave No Trace*: LNT.org

Additional rules and regulations apply.
www.dnr.maryland.gov/Publiclands



Signage

Kiosk map

3. Wayfinding



4. Interpretation



Workforce

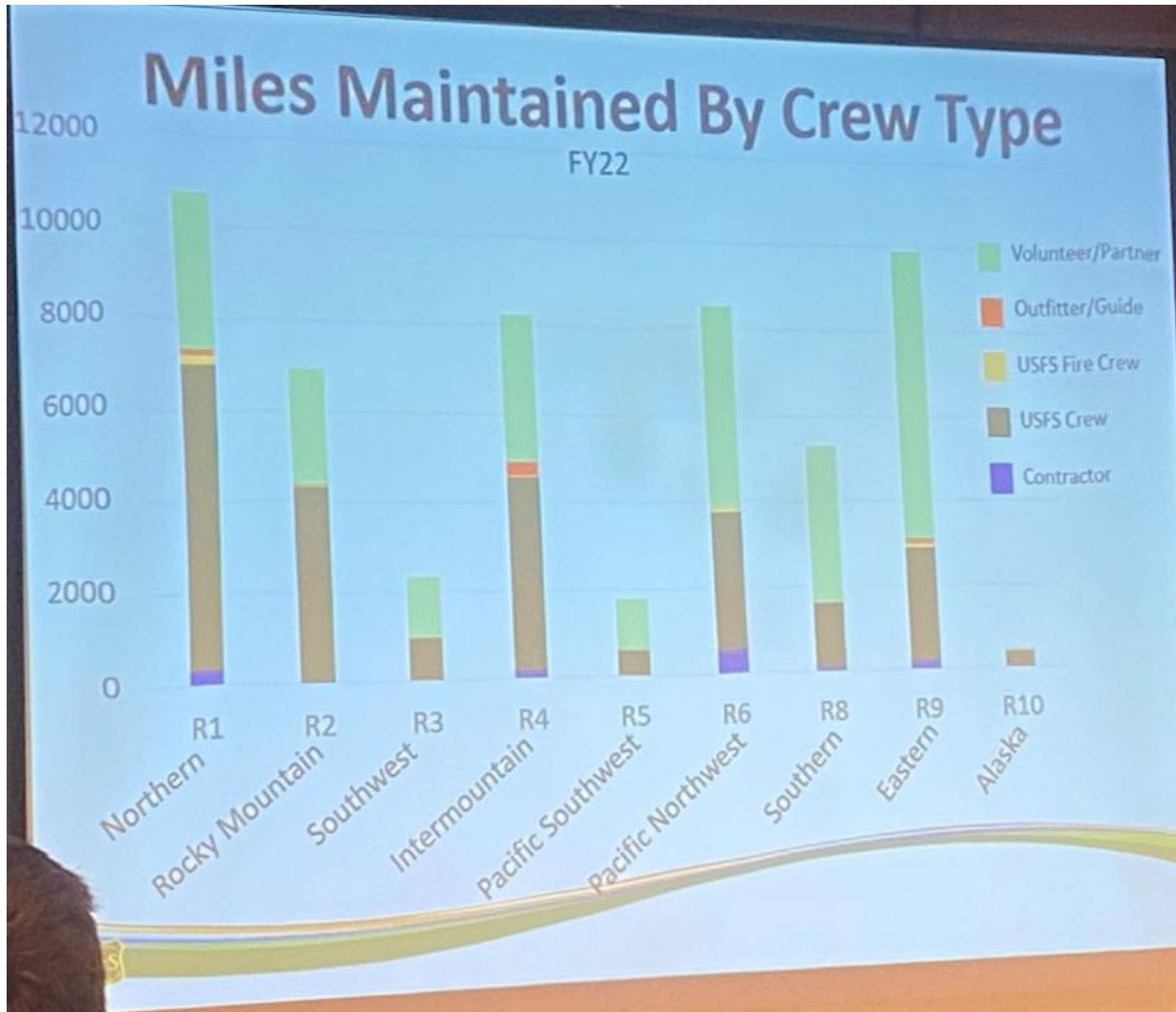
Who is going to do the maintenance?

1. Volunteers
2. Paid park staff
3. Conservancy crew/Job corp
4. Contractors



Workforce

Who is going to do the maintenance?



Workforce

Volunteers

Pros

- Low cost
- Motivated
- Can be skilled
- Can be self supervising
- Employment flexible

Cons

- Tools and supplies need to be provided
- Need volunteer agreement, insurance
- Can be very unskilled
- May need organization/supervision

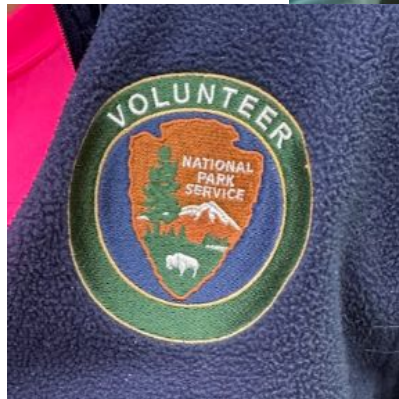


Generally, a good choice for routine maintenance

Workforce

Managing Volunteers

- Guidelines on what they may or may not do
- Project approvals
- Tools and equipment
- Training
- Logging hours
- **Appreciation**



Turkey Run Steps Grand Opening

Workforce

Managing Volunteers

Safety

Any trail crew needs to have a safety plan.

- Far from care. Golden hour.
- Tailgate talk to discuss possible hazards and how to mitigate them
- First aid training
- First aid kits



Managing Volunteers

PPE

Hardhat

Safety glasses

Gloves

Footwear

Ear protection



Workforce

Volunteers

- Use an existing group such as the Potomac Appalachian Trail Club
- Create your own group
- Meetup platform



Workforce

Paid staff

Pros

- Higher skill level
- Insurance/payroll already set up
- Have own supervision
- Have tools/equipment

Cons

- Variable skill level
- Higher cost
- Variable motivation
- Employment less flexible



Workforce

Conservancy/
Job corp organizations

Pros
Moderate cost
Higher skill level
Usually have insurance/payroll
Have own supervision
Provide tools/equipment
Employment flexible

Cons
Not always skilled
Not right for all tasks

Generally more interested in
doing a discrete project rather
than routine maintenance



Workforce

Contractors

Pros

- High skill level-generally
- Have insurance/payroll
- Have own supervision
- Provide tools/equipment
- Motivated
- Can provide technical expertise
- Employment flexible

Cons

- Higher cost
- Not right for all tasks
- Procurement challenges
- Manager needs more expertise to supervise



Generally more interested in doing a discrete job rather than routine maintenance

Compliance

NEPA

The National Environmental Policy Act (NEPA) is a US environmental law signed into effect on January 1, 1970, requiring federal agencies to assess the environmental impacts of their actions and decisions before making them.

- Regardless of who is doing the work, work beyond routine maintenance on federal lands requires a compliance review before any work starts
- Contact land manager for rules and process



Emergency plan

Responding agency

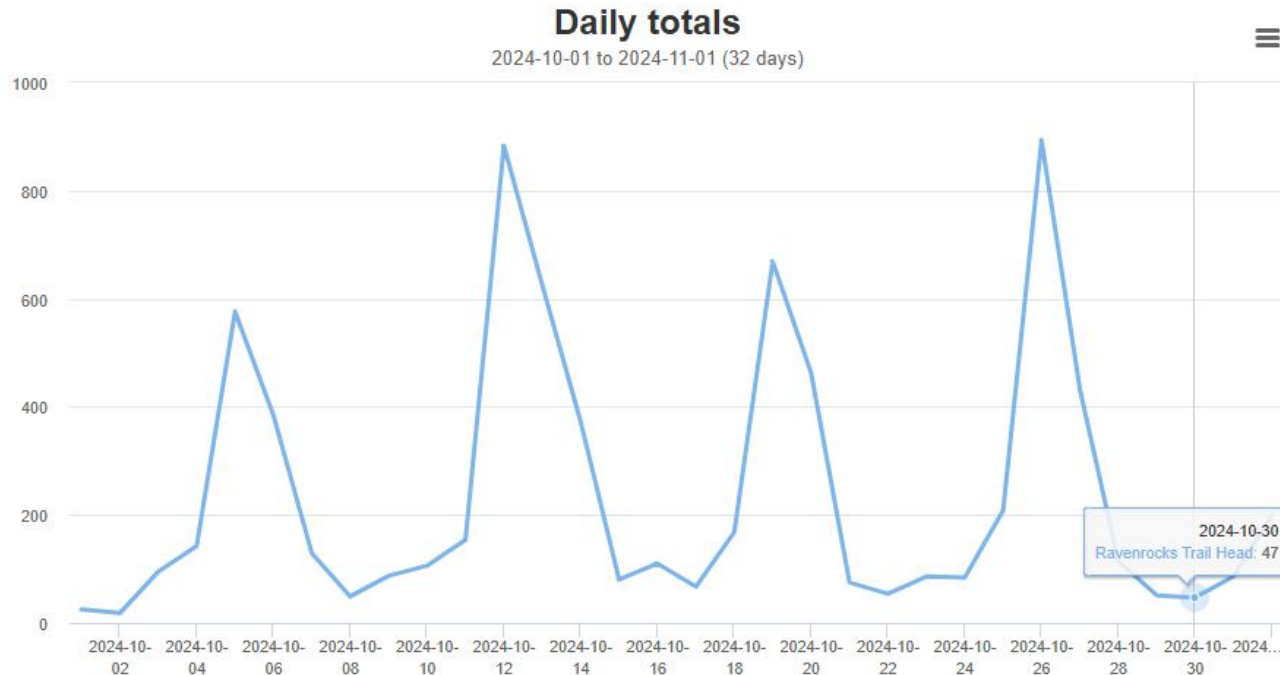
- Do they have trail access plan
- Road access locations
- Gate keys
- Airlift locations mapped
- Water access locations mapped
- Trail location markers GPS located



User data

It can be useful to know how many users you have, when they are using the trail, and what type of user they are.

- Trail counter
- Person



User data



Resources

Online

- US Forest Service Trail Maintenance and Construction Notebook 2025
- American Trails.org [Trail Resources - American Trails](#) Plethora of online resources about all topic's trails
- NPS Trails Management Handbook
- North Country Trail Handbook

Books

- *Trail Solutions. IMBAs Guide to Building Sweet Singletrack.* Concepts applicable to all trails.
- *Natural Surface Trails by Design* Troy Scott Parker
- *Appalachian Trail Design, Construction, and Maintenance.* Appalachian Trail Conservancy

Resources

questions/comments/thoughts

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