

# Northern Heights Park



# Trail Update

March 16, 2024



What is RASC?





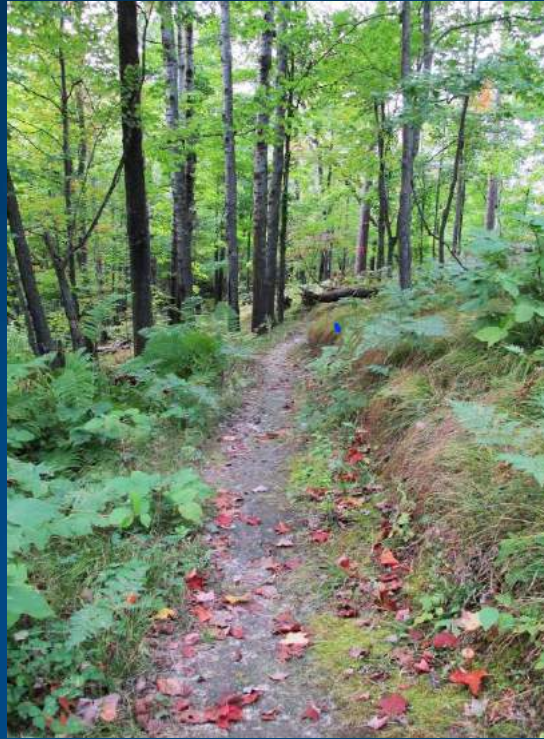
- Increase access to the park
- Increase community enjoyment of healthy activities
  - Hiking, trail running, biking, snowshoeing etc.
- Respect residential properties
- Seek resident feedback



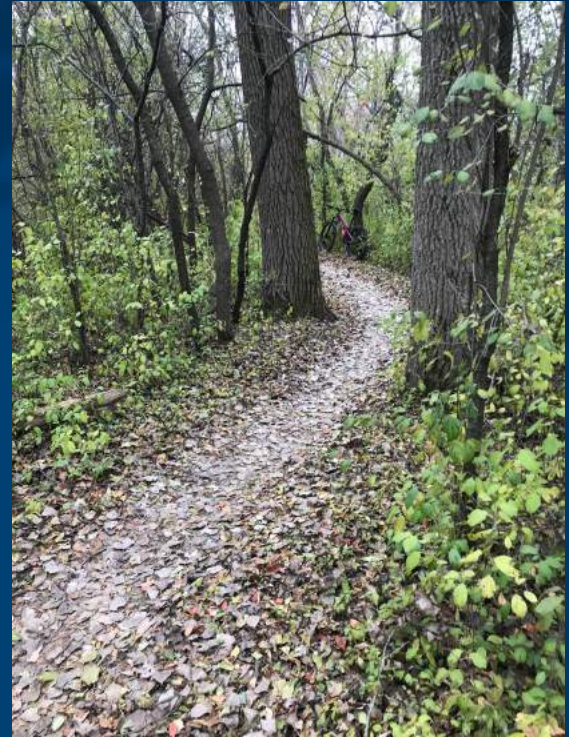
- Meeting with Parks & Rec staff to understand the process
- Meeting with Parks/WSB engineering firm to understand the evaluations needed
- Meeting with Parks/WSB staff with the results
- Meeting with Parks/County staff to help interpret the WSB results
- Walked the property with GPS software
- Utilized trail software including MN Topo LIDAR
- Meeting with Parks & Rec to review trail

How did we get here?

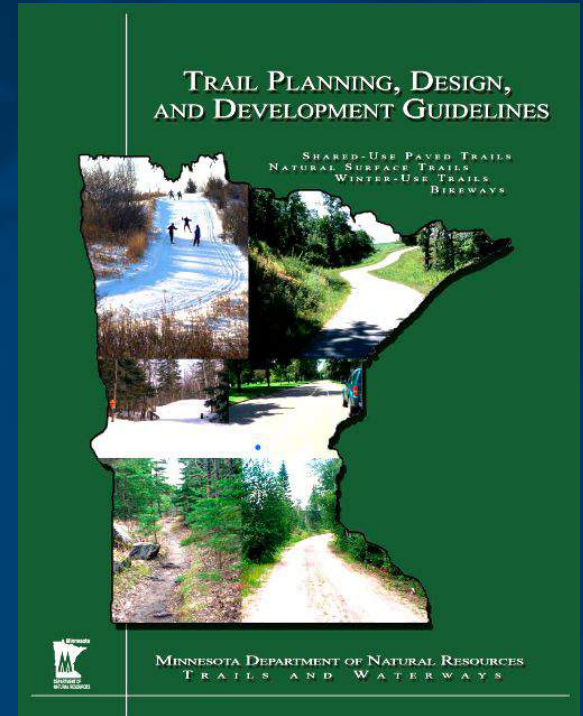




What is a sustainable single-track trail?



What is a sustainable single-track trail?



Built Using Best Practices

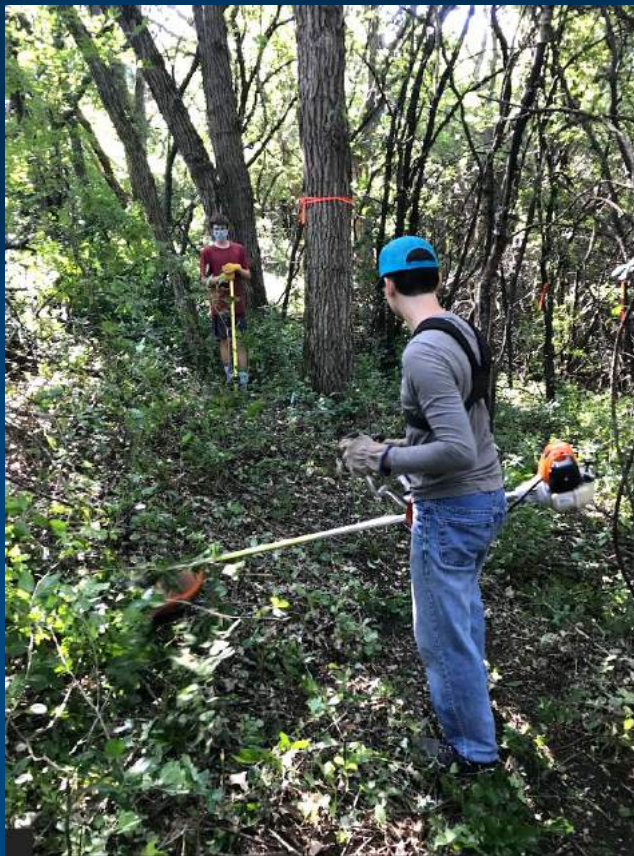




- Design/flagging
  - Consider overall space
  - Desired trail characteristics
  - Turn diameters
  - Slope severity and length
  - Natural features
  - User safety
  - Soil durability
  - Water impacts
  - Rare plant species

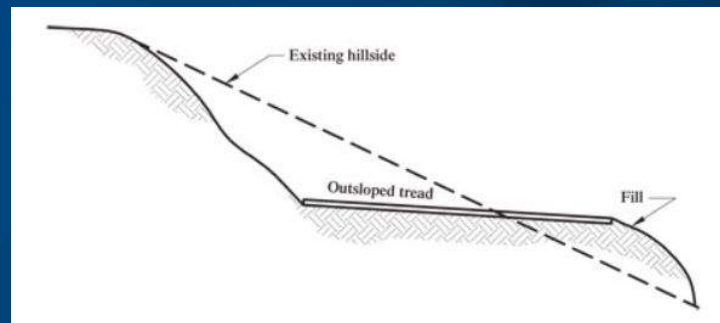
How are sustainable trails built?





Example of a “rake and ride” trail

- Rough-in the trail
  - Remove understory, adjacent invasive species
    - Weed whip, Brush mower, pruners
  - Benching, as needed
    - Manually create or tracked 6-way blade implement



How are sustainable trails built?



Example of hand-made bench trail

- Clear organic matter
  - Leaves
  - Branches
  - Understory
  - Loamy soil
- Finish
  - McLeod
  - Hoe
  - Rake
  - Shovel
  - Mattock
  - Tamper

How are sustainable trails built?



Example of hand-made bench trail

- Water Management
  - 5% gradient across tread to move water off trail
  - Back slope / fill slope on benched trail
  - Grade reversals and tread diverters to shed water that may run down the trail

How are sustainable trails built?



Downhill support allows for narrower bench trails

## Trail Construction Details

By math, % grade = **rise/run**

25% grade goes up 1' in elevation for every 4' traversed

- 5% Cross trail grade
- 92% of the trail goes up/down between 5-10% grade
- 6% of the trail goes up/down between 10-15% grade
- 1.7% of the trail (134') goes up/down between 15-20%

### Side slope grade breakdown

- 50% (half of the trail) goes along <20% grade
- 93.5% goes along <35% grade
- 4% is 35-40% grade
- 1.8% is 40-45%
- 0.6% (~16 steps) is 45-50%

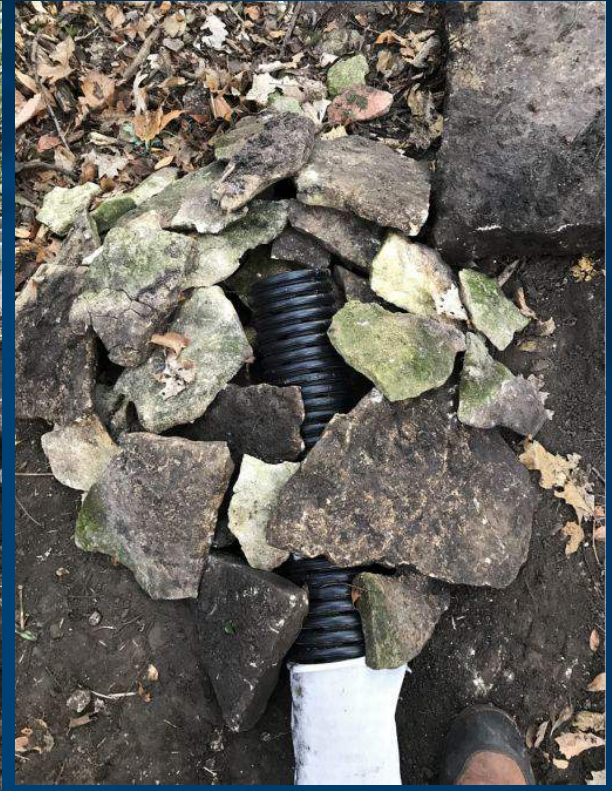
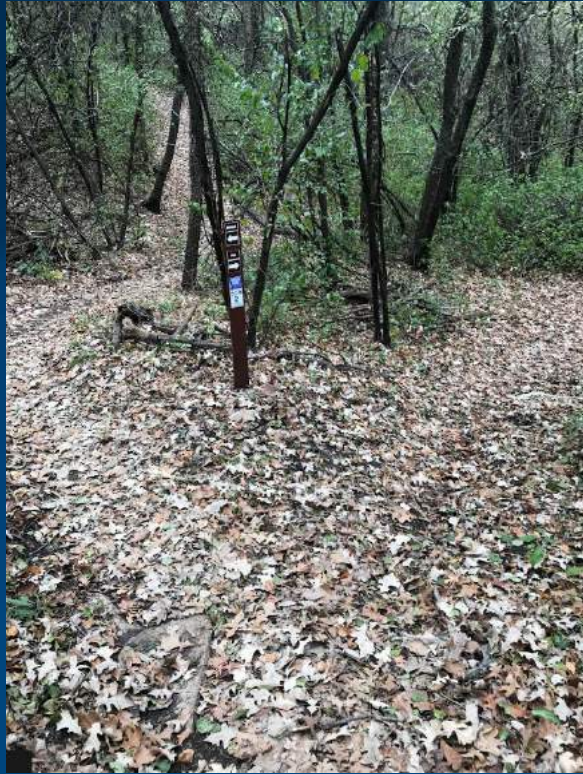
What is % grade?





Another option





Examples of water management techniques with a natural finish

# Trail Construction Details



Examples of water management techniques with a natural finish





Examples of water management techniques

# Other water management options



2019



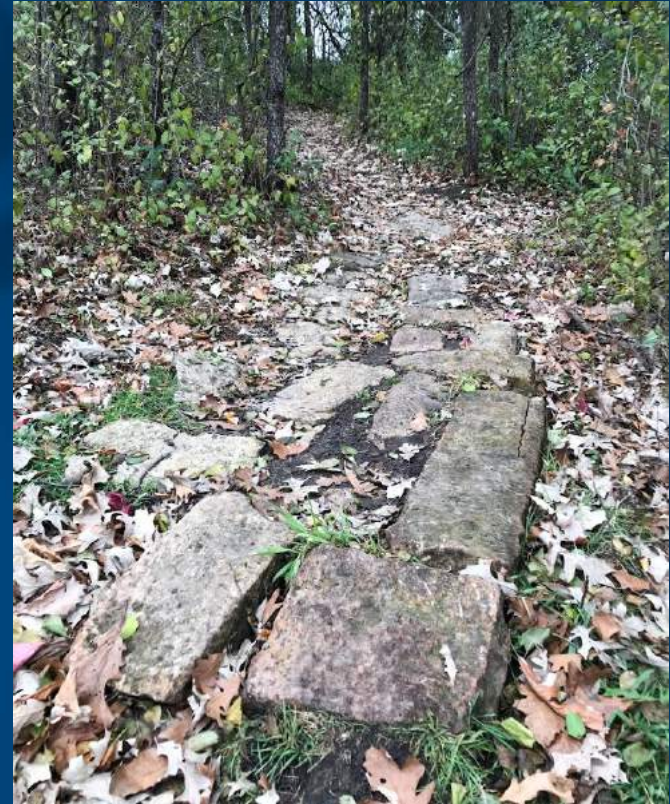
2023

Trail Maintenance Mediation





2019



2023

Trail Maintenance Mediation



Before



In Use (August-April)



Five Months After  
Decommissioning



Trail Aging





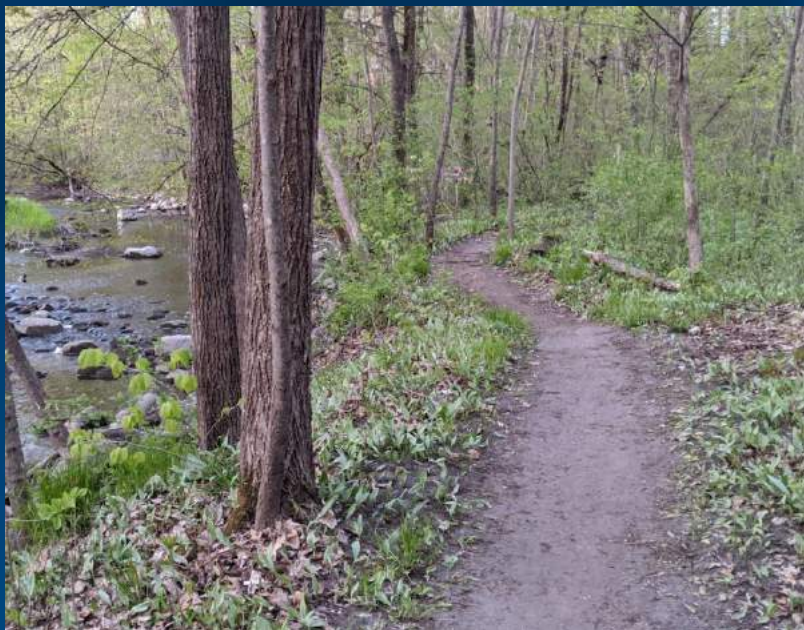
Owatonna



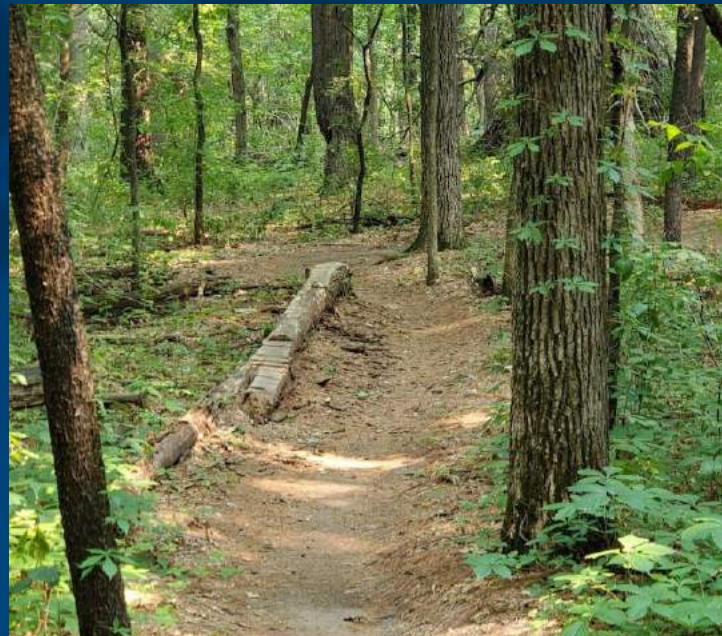
Redwing

Like other MN cities...





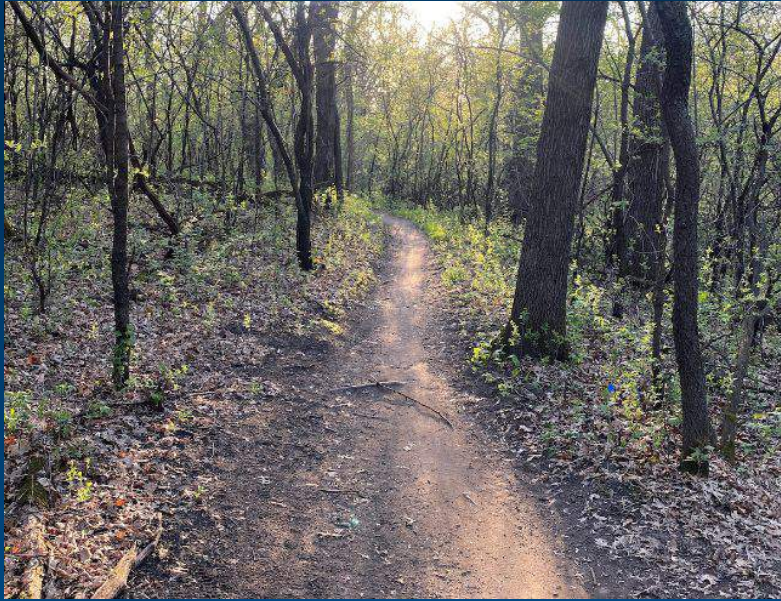
Northfield



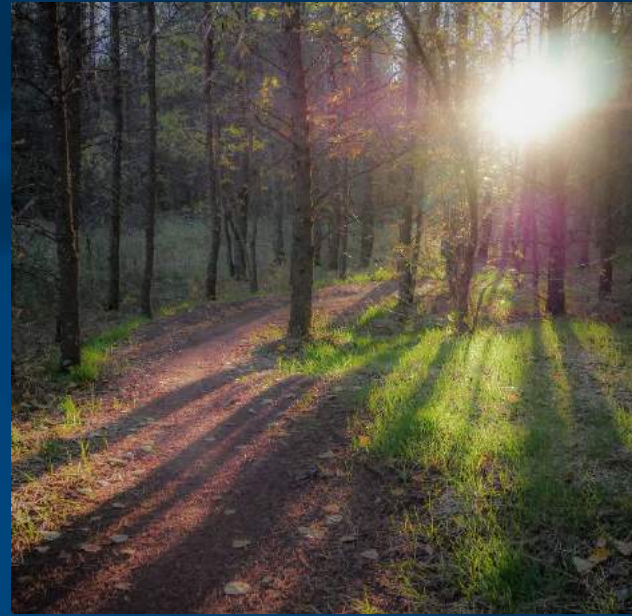
St. Cloud

Like other MN cities...





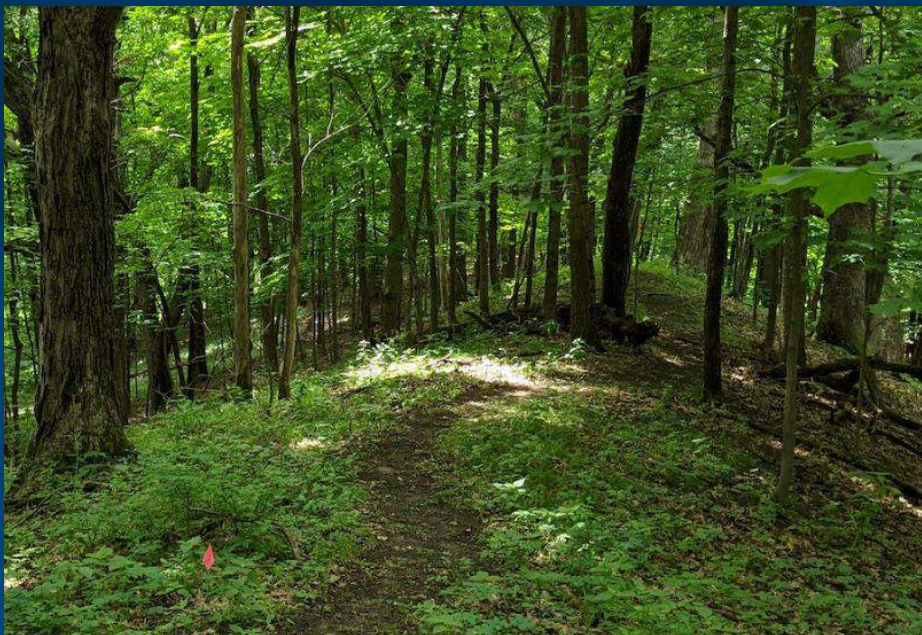
Eagan



Crosby

Like other MN cities...





Faribault

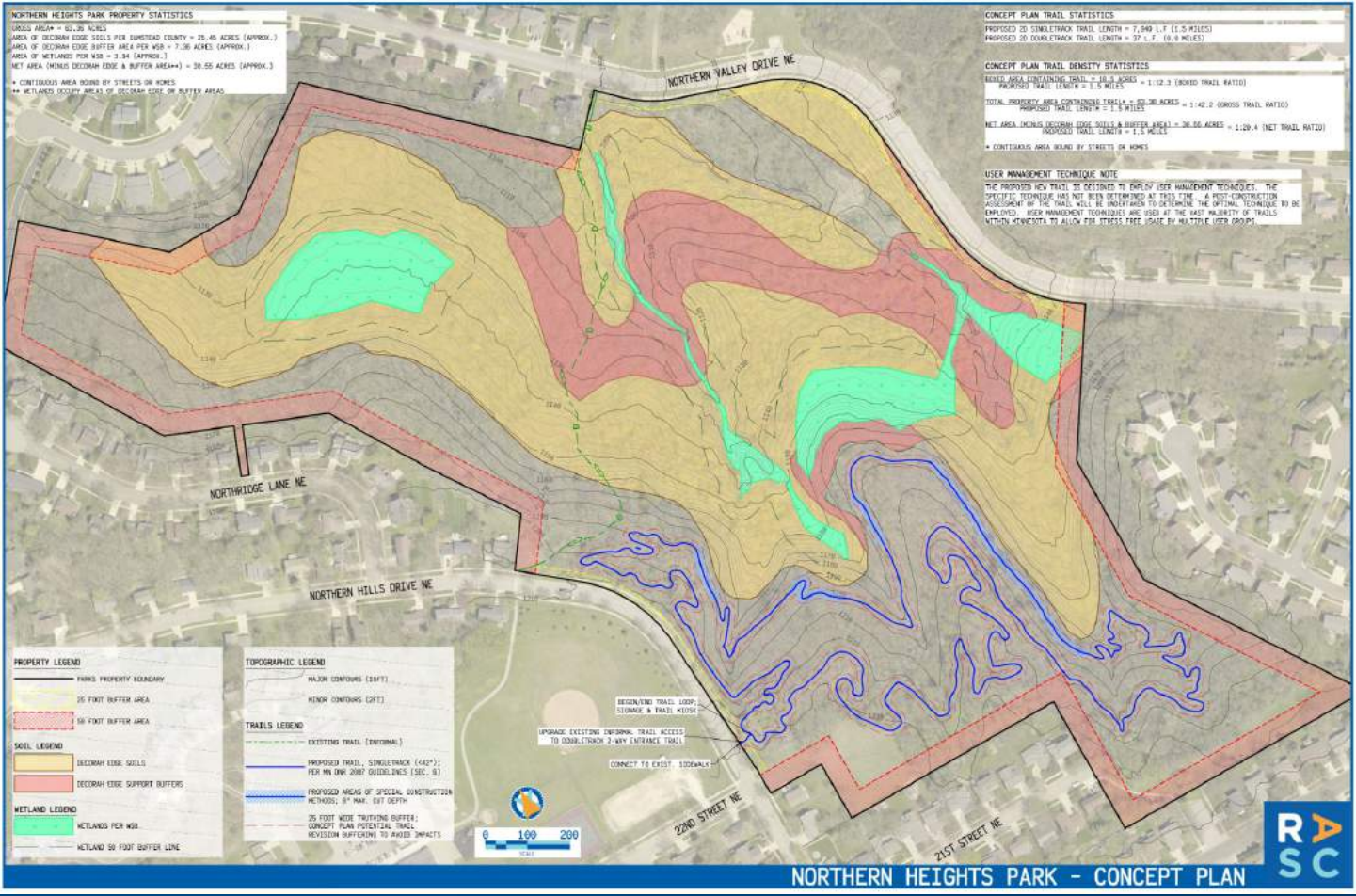


Grand Marais

Over 900 trails in MN... 108 miles in city parks.







**NORTHERN HEIGHTS PARK PROPERTY STATISTICS**  
 GROSS AREA = 52.35 ACRES  
 AREA OF DECORAH EDGE SLOES PER SUMMIT COUNTY = 25.46 ACRES (APPROX.)  
 AREA OF DECORAH EDGE BUFFER AREA PER MGR = 7.36 ACRES (APPROX.)  
 AREA OF WETLANDS PER MGR = 3.34 ACRES (APPROX.)  
 NET AREA (MINUS DECORAH EDGE & BUFFER AREAS) = 30.55 ACRES (APPROX.)

\* CONTIGUOUS AREA BOUND BY STREETS OR HOMES  
 \*\* WETLANDS OCCUPY AREAS OF DECORAH EDGE OR BUFFER AREAS

**CONCEPT PLAN TRAIL STATISTICS**  
 PROPOSED 20' SINGLETRACK TRAIL LENGTH = 7,940 L.F. (1.5 MILES)  
 PROPOSED 20' DOUBLETRACK TRAIL LENGTH = 97 L.F. (0.8 MILES)

**CONCEPT PLAN TRAIL DENSITY STATISTICS**  
 GROSS AREA CONTAINING TRAIL = 49.8 ACRES = 1:122.3 (GROSS TRAIL RATIO)  
 PROPOSED TRAIL LENGTH = 7.9 MILES  
 TOTAL PROPERTY AREA CONTAINING TRAILS = 52.35 ACRES = 1:42.2 (GROSS TRAIL RATIO)  
 PROPOSED TRAIL LENGTH = 7.9 MILES  
 NET AREA (MINUS DECORAH EDGE SLOES & BUFFER AREA) = 30.55 ACRES = 1:208.4 (NET TRAIL RATIO)  
 PROPOSED TRAIL LENGTH = 7.9 MILES

\* CONTIGUOUS AREA BOUND BY STREETS OR HOMES

**USER MANAGEMENT TECHNIQUE NOTE**  
 THE PROPOSED NEW TRAILS ARE DESIGNED TO EMPLOY USER MANAGEMENT TECHNIQUES. THE SPECIFIC TECHNIQUE HAS NOT BEEN DETERMINED AT THIS TIME. A POST-CONSTRUCTION ASSESSMENT OF THE TRAILS WILL BE UNDERTAKEN TO DETERMINE THE OPTIMAL TECHNIQUE TO BE EMPLOYED. USER MANAGEMENT TECHNIQUES ARE USED AT THE MAJORITY OF TRAILS WITHIN METROPOLIS TO ALLOW FOR STRESS-FREE USE BY MULTIPLE USER GROUPS.

**PROPERTY LEGEND**

- PARKS PROPERTY BOUNDARY
- 25 FOOT BUFFER AREA
- 50 FOOT BUFFER AREA

**SOIL LEGEND**

- DECORAH EDGE SOILS
- DECORAH EDGE SUPPORT BUFFERS

**WETLAND LEGEND**

- WETLANDS PER MGR
- WETLAND 50 FOOT BUFFER LINE

**TOPOGRAPHIC LEGEND**

- MAJOR CONTOURS (20FT)
- MINOR CONTOURS (5FT)

**TRAILS LEGEND**

- EXISTING TRAIL (INFORMAL)
- PROPOSED TRAIL - SINGLETRACK (44") PER MGR 2007 GUIDELINES (SEC. 8)
- PROPOSED AREAS OF SPECIAL CONSTRUCTION METHODS, 6" MAX. CUT DEPTH
- 25 FOOT WIDE TRAILING BUFFER; CONCEPT PLAN POTENTIAL TRAIL ROUTES/IMPACTS TO TRAIL IMPACTS



UPGRADE EXISTING INFORMAL TRAIL ACCESS TO DOUBLETRACK 2-WAY ENTRANCE TRAIL

CONNECT TO EXIST. SIDEWALK

SECONDARY TRAIL LOOP, SLOUNGE & TRAIL MIDWAY

NORTHERN HEIGHTS PARK - CONCEPT PLAN



Trail Proposal



## Summer Trail Uses Can Include

- Mountain Biking
- Hiking
- Trail Running
- Bird Watching
- Dog Walking
- Casual Strolling





## Winter Trail Uses Can Include

- Hiking
- Snowshoeing
- Bird Watching
- Dog Walking
- Casual Strolling





- RASC has no interest or need to host major events at this trail. We view this trail to be neighborhood oriented which may have additional benefits for nearby Churchill Elementary.
- RASC has no interest or need for any services from Parks such as bathrooms, porta potties, bike repair stations, parking lots etc.
- RASC is not requesting any special place in the existing parking lot nor asking for any change to the ball field, ice rink or other current amenities.

Concerns - Impact To Current Park





# Big Picture: What are 'Sustainable Trails'?



Joshua Rebennack

- Live in Central Minnesota

Secular Work:

- Civil/Environmental engineering for the last 25 years

Advocacy:

- Sustainable Trails

Experience:

- Trail Boss since 2009
- Designed over 17 miles of hiker/biker trails in state parks & county lands
- Created state bonding requests for trails
- Written multiple Environmental Assessments (EA) & Environmental Assessment Worksheets (EAW) for trails
- Travel the country helping communities create urban trail experiences
- Due paying member of the Rewilding Institute & Mossy Earth

GOOD

REAL

NEGATIVE



POSITIVE

BAD

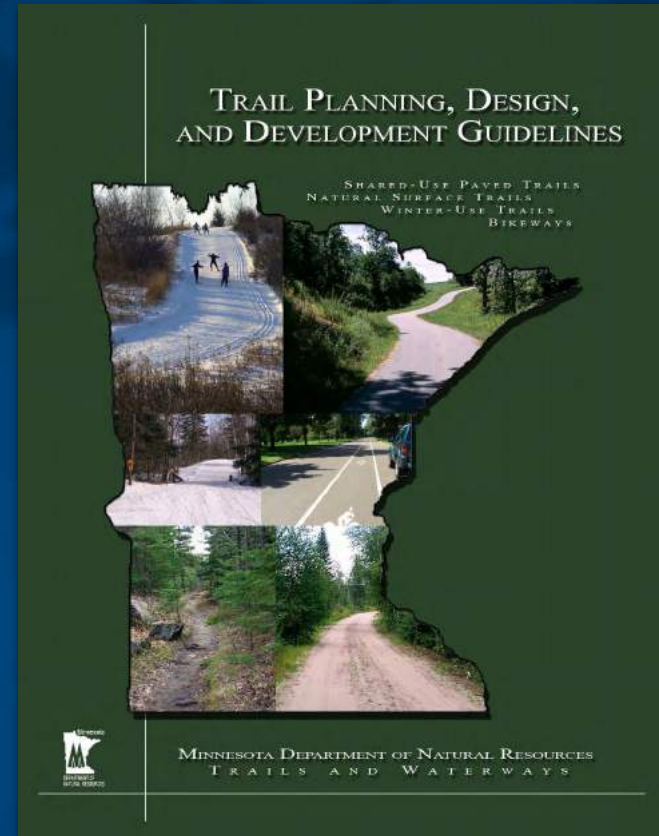
FAKE

What are Sustainable Trails?

Trail Planning, Design, and Development Guidelines, Minnesota Department of Natural Resources, Parks and Trails Division, 2007:

*“The guidelines establish a common language to foster consistency in classifying and developing trails across Minnesota... The guidelines emphasize the development of physically and ecologically sustainable trails that will serve the needs of users for generations to come while preserving the sense of place and protecting the surrounding environment.”*

- Page 1.1 (page 8 PDF)



Where does the term come from?



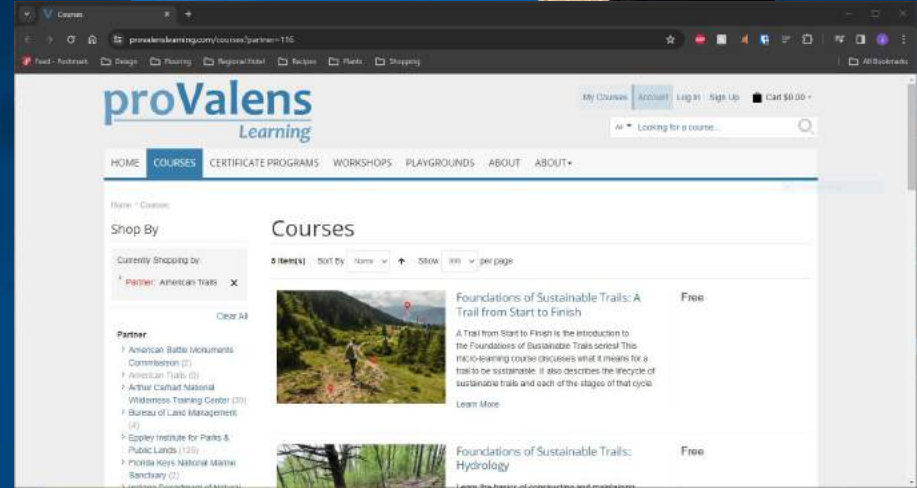


In 2007 the following guidelines were released:

- American Trails
- Minnesota Department of Natural Resources (MN DNR)
- United States Forest Service (USFS)

All these guidelines were built atop the 2004 International Mountain Biking Association (IMBA) guidelines. (pg. 6.2; (195) MN DNR)

We consider these trail guidelines (American Trails, MN DNR, USFS) or any trail guideline built atop them to be defining “sustainable trails”.



It's not just Minnesota...



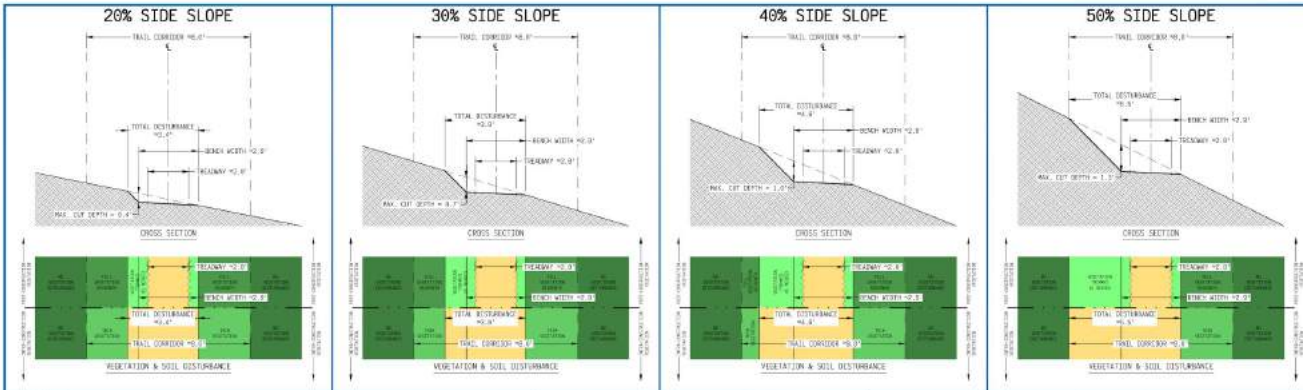
## A sustainable trail is:

- A trail built and maintained to a sustainable standard
  - (American Trails 2007, MN DNR 2007, USFS 2007)
- Benchcut
- Rolling Contour layout
- Minimum & maximum linear grades
- Designed for shared use



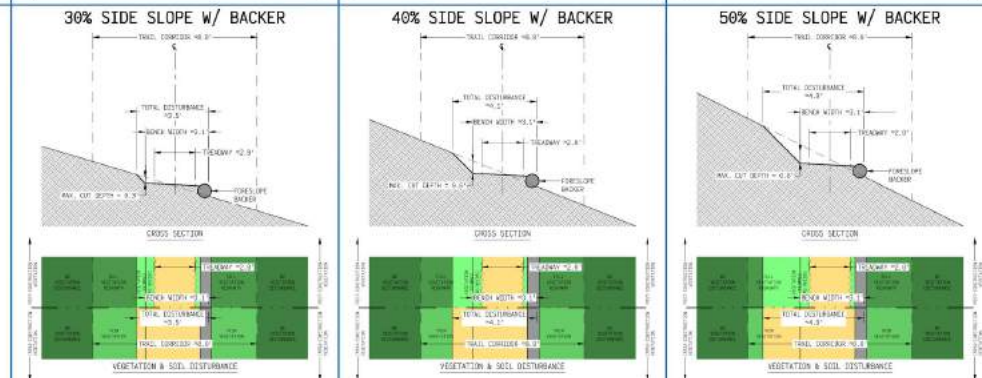
- 7.44 sq.ft./14.5” depth
- 1369 l.f.
- Assume 50%
- 189 cu.yd. soil loss

What (structurally) are Sustainable Trails?



- ASSUMPTIONS:**
- SUSTAINABLE TRAIL PER NORTHEASTA COMPONENT OF NATURAL RESOURCES (NW 101), PUBLIC AND TRAIL DISTURBANCE, TRAIL PLANNING, DESIGN, AND DEVELOPMENT REGULATIONS (2001)
  - WALKWAY WIDTH: MINIMUM WIDTH 6' OR DEVELOP MINIMUM: 7.5' (3.0' C&G) TRAIL WIDTH
  - TRAIL CORRIDOR: 8.0' WIDE; CENTERED ON BENCH
  - ROADWAY: 2.0' (C&G) WIDE WITH OUTSIDE INTERSECTION AT FINEST SLOPE HEIGHT; 2.0' SIDE CROSS SLOPE
  - FINEST SLOPE: SAME AS EXISTING SLOPE
  - FINEST SLOPE BACKER (GRADE) 6:1 (33°) (4" TYP)
  - SHOULDER: 1:1 (45°) SLOPE TO INTERSECTION WITH SIDE SLOPE, BASED ON BENCH WIDTH
  - ROADWAY: SHOULDER OR MOST COMMON TRAILWAY WIDTH IN NORTHEASTA (EXACT DIMENSIONS VARY)

- TRAIL CORRIDOR ASSUMPTIONS MADE IN THE FOLLOWING SUSTAINABLE TRAILS IN NORTHEASTA:**
- Wahkiakum Region American Park
  - Wahkiakum Hills
  - Bluff Creek Park
  - Carver Lake Park
  - Carver Park Reserve (Recreation)
  - Cascade Country State Recreation Area
  - Buhalah-Thompson Glacier, Heritage, Pleasure, Museum
  - Ediz Clava Park (Recreation)
  - Hoodon Falls Regional Park
  - Wahkiakum Park
  - Oakland Woods Park
  - Laika-Buhalah-Fremont
  - Linnahon Hills Regional Park
  - Clara Lewis Park
  - R. S. Carver Park
  - Wahkiakum Recreation Area
  - Wahkiakum Recreation Trail System
  - Pike Valley Scenic Area
  - River Mouth Regional Park
  - Sooty Park
  - Wahkiakum State Park (School Campus)
  - Salish River Nature Area
  - Salish River Park
  - Fortress Park
  - Frederick Park



SIDESLOPE, DISTURBANCE, & VEGETATION ILLUSTRATION



Benchcut Depths





Sustainable Trails - Everything, All at Once





Sustainable Trails - Do They Work?

*“In summary, this research reveals that trail grade and slope alignment angle appear to have the greatest influence on soil loss from recreational trails. A Trail Sustainability Rating System is offered to trail designers and managers to more clearly guide the development and evaluation of trail sustainability and to illustrate the tradeoffs between these influential factors. In most instances a limited number of trail segments will be identified as “unsustainable” and managers can replace them with alternative reroutes that feature side-hill alignments and low grades.”*

Marion, Jeffrey L., and Jeremy Wimpey. "Assessing the influence of sustainable trail design and maintenance on soil loss." *Journal of Environmental Management* 189 (2017): 46-57

*“This study fills the knowledge gaps by unveiling the multi-dimensionality of trail degradation and examining the effects of managerial and use-related factors by multivariate statistical techniques...Furthermore, hiking generates “all-around” degradation while the influences of mountain biking mainly concentrate on tread surface; management strategy should be formulated with the consideration of their effect on specific degradation dimensions. This study would benefit both trail professionals and park managers in decision-making and future research.”*

Fang, Wei, and Sai-Leung Ng. "Trail degradation caused by mountain biking and hiking: a multi-dimensional analysis." *Journal of environmental management* 351 (2024): 119801

**Sustainable Trails - What Does the Science Say?**



To summarize:

- Sustainable trails are not just pleasant sounding language
- Sustainable trails are a real, definable standard, with expansive guidelines & educational tools to go with them
- Sustainable trails are the only state-sanctioned way to build trails
- Sustainable trails are designed for use by multiple user groups
- Sustainable trails have 20 years of rigorous scientific study & local (Minnesota) history behind them

Consider for a moment...

**Sustainable Trails - A Real Thing**





# Big Picture: Trails in Minnesota



Lets focus on one type of trail:

- Urban (inside a city)
- Sustainable Trail
- Allowed use for mountain bikes

By the numbers (per Trailforks)...



**660 total miles  
of trail**

**108 miles in  
small parks**

13.4% of the total miles of this type of trail in the USA are in Minnesota

Minnesota has the largest number of parks with sustainable trails

Minnesota also wrote the book on these types of trails:

- Trail Planning, Design, and Development Guidelines (2007)
- Mountain Bike Trail Development Guidelines (2023)

Minnesota codified the User Management Techniques

Minnesota entities regularly host groups to learn what we know





Minnesota Trails - So Far Ahead



- Most sustainable trails are located in urban natural areas or urban wildernesses.
  - Traverse des Sioux Park (St. Peter), Pine Valley Park (Cloquet), Valley View Park (Oak Park Heights), etc.
- Most sustainable trails are in parks partially or completely surrounded by residential neighborhoods
  - Lone Lake Park (Minnetonka), American Legion Park (Grand Rapids), Serenity Hills/Trapper Pond (Buffalo), Ashmun Hills (Brainerd), etc.
- Most sustainable trails use trail ratios, not park size, to determine length of trail
  - Hillside Park (Elk River), Hidden Falls (St. Paul), Reid Park (Lake Elmo), M. B. Johnson Park (Moorhead), etc.



By any measure, sustainable trails are a runaway success in Minnesota

Lets narrow down what “success” means, for a moment.

- A trail that has been around for some time.
- A trail that is loved by its visitors.
- A trail that does all this without messing up the park it's in.
- One that is appreciated by the land manager.

Are then trails in Minnesota successful?



Minnesota Trails - Success Gets Noticed



*“Working with the mountain bike community is a highlight of what I get to do and model of example how to cost-effectively manage a public recreational opportunity.”*

- Katie Pata, Park Operations Supervisor at Dakota County Parks

*“Three Rivers Park District maintains four singletrack trail systems. These are an important part of our recreational offerings and get park users into the more natural settings of the parks.”*

- John Moriarty, Senior Manager of Wildlife at Three River Parks District

Minneapolis Parks

2004

0 miles

2024

15 miles

Three Rivers

2004

8\* miles

2024

67 miles

City of Duluth

2004

23\* miles

2024

103  
miles

Minnesota Trails - Successful Growth





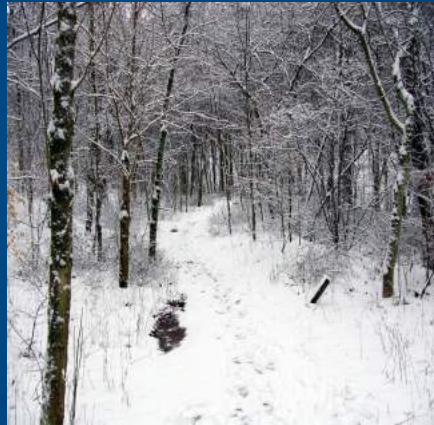
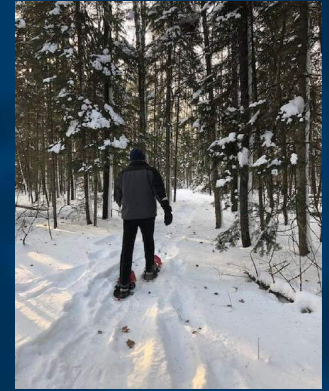
To summarize:

- Minnesota leads the nation in sustainable trails in urban parks; especially small-scale residential natural areas
- Minnesota quite literally wrote the book on how to do low-environmental impact, sustainable trails, shared by users
- The Concept Plan for Northern Heights Park is not different from other trails in Minnesota
- The Concept Plan for Northern Heights Park is designed to meet or exceed the standards other trails in Minnesota use
- These type of trails have been a successful in other communities

Consider for a moment...

**Minnesota Trails - We Got This!**





Questions and comments