

Apex Park: Pedaling towards a Greener Future

Author: Alena Gagnon

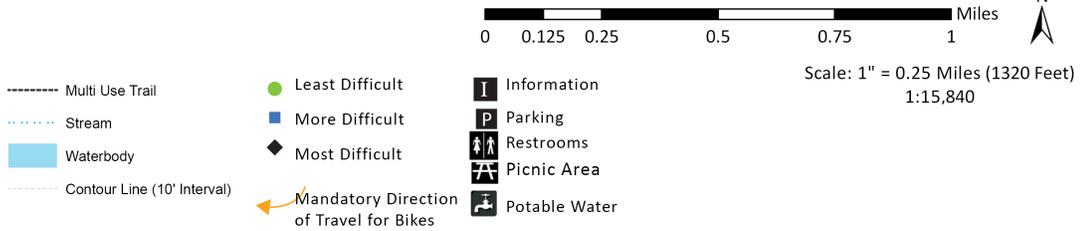
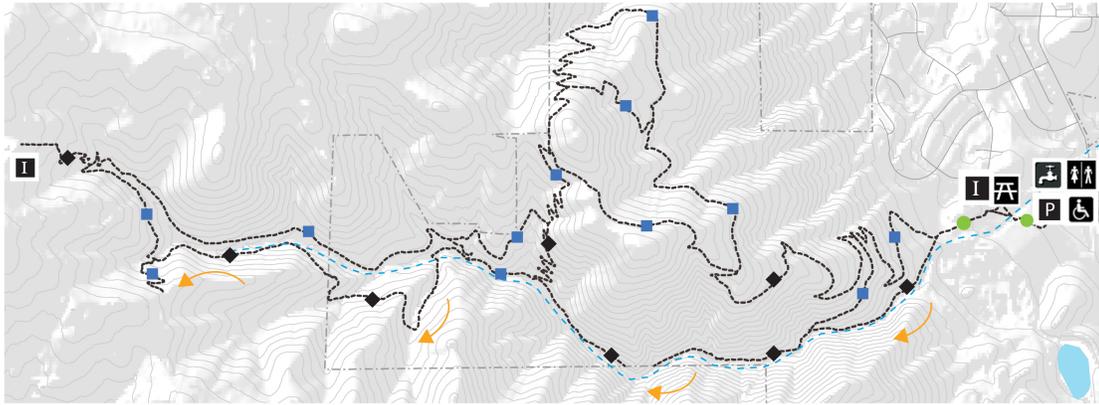
Mountain biking has become an incredibly popular adventure sport connecting outdoor enthusiasts to remote natural areas, and erosion is one of the largest contributors to trail degradation and increased maintenance needs. Colorado has a magnitude of opportunities for nature lovers and has developed an extensive trail system across the state with Jefferson County linking residents of Golden and surrounding towns to outdoor adventure. Apex Park, a prominent multiuse pedestrian/cycling trail, provides a varied topography to analyze erosion factors as exemplary of larger networks across Colorado's Front Range (fig 1). Through a preliminary literature review and open data acquisition, I chose to analyze runoff intersections, hill slope, surface aspect, elevation and trail difficulty. Using raster elevation models from the USGS and Jefferson county geospatial data I overlaid these factors to create a ranked risk rating system (fig 2-6).

Lastly, I overlaid all five factors to highlight potential highest risk areas (fig 7). To determine the validity of these determinants, I ground-truthed the areas to compare the eroded sections to what I predicted finding that aspect and riparian intersection were the biggest determinants of risk areas. Aspect, elevation, slope, run-off areas and trail difficulty were suitable factors for soil erosion prediction and could be extended to the greater Golden City area in order to highlight vulnerable trails (fig 8). This model could be refined and weighted more accurately to better determine erosion areas and could include factors such as trail popularity, type of use (mountain bike vs pedestrian), soil types and trail steepness.

Alena Gagnon is a Master of Landscape Architecture candidate in the College of Architecture and Planning and is pursuing her GIS Certificate with an anticipated graduation of May 2021. She worked as a mountain bike and snowboard coach before returning to design, and currently is employed at the Colorado Center for Community Development along with the Faculty for Advanced Spatial Technology (<https://clas.ucdenver.edu/fast/>). Alena was drawn to Colorado to transfer her love of the outdoors and adventure education into landscape architecture. Her appreciation for nature and design developed in her home state of Vermont where her undergraduate degree blended outdoor education and architectural studies. She hopes to continue exploring integrating natural spaces within communities and enhancing access to outdoor recreation.

Figure 1: Context

Apex Park



Sources: USGS, City of Golden Open Data,
Colorado Parks and Wildlife, Jeff Co
Open Data
Map Created by Aiena Gagnon

Figure 2: Aspect

Surface Aspect

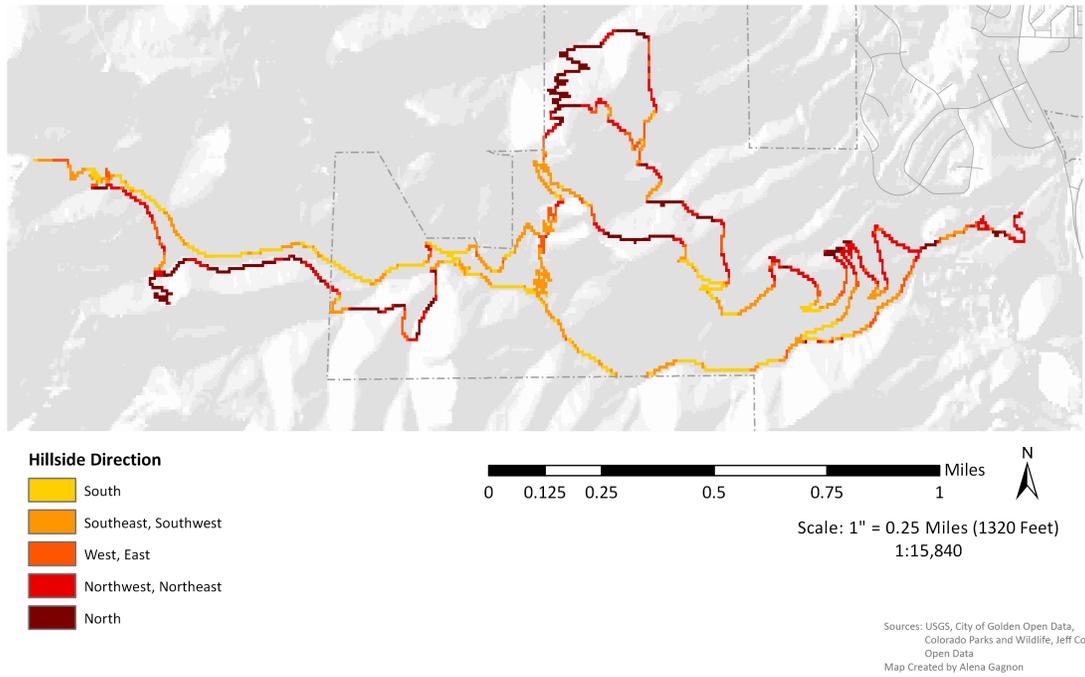
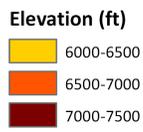
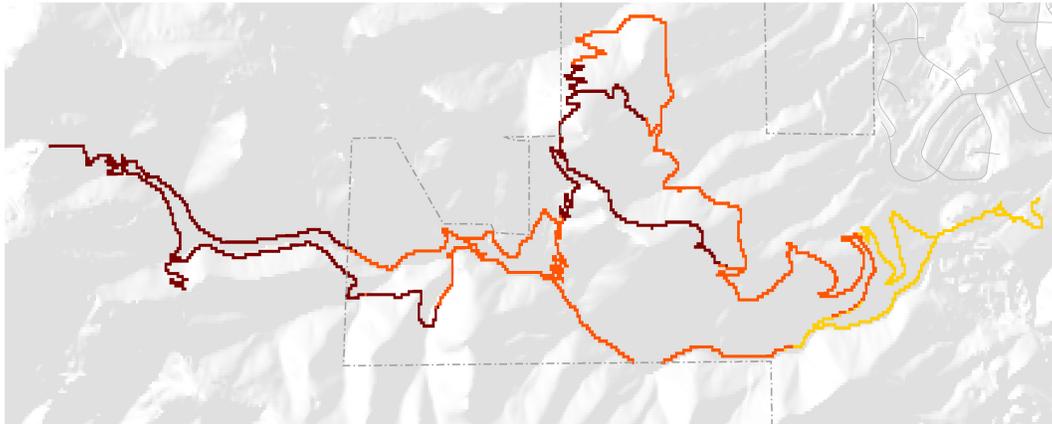


Figure 3: Elevation

Trail Elevation



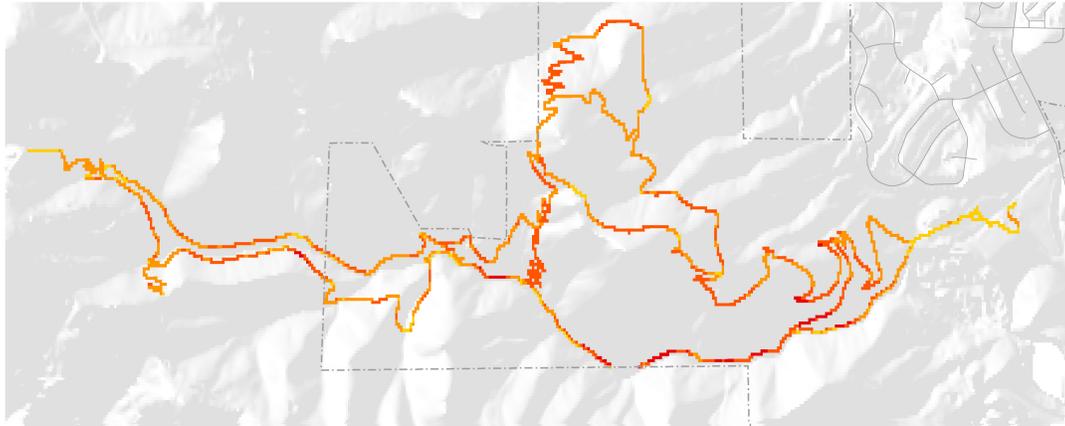
Scale: 1" = 0.25 Miles (1320 Feet)
1:15,840



Sources: USGS, City of Golden Open Data,
Colorado Parks and Wildlife, Jeff Co
Open Data
Map Created by Alena Gagnon

Figure 4: Slope

Trail Surface Slope



Surface Slope

- 0-10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%

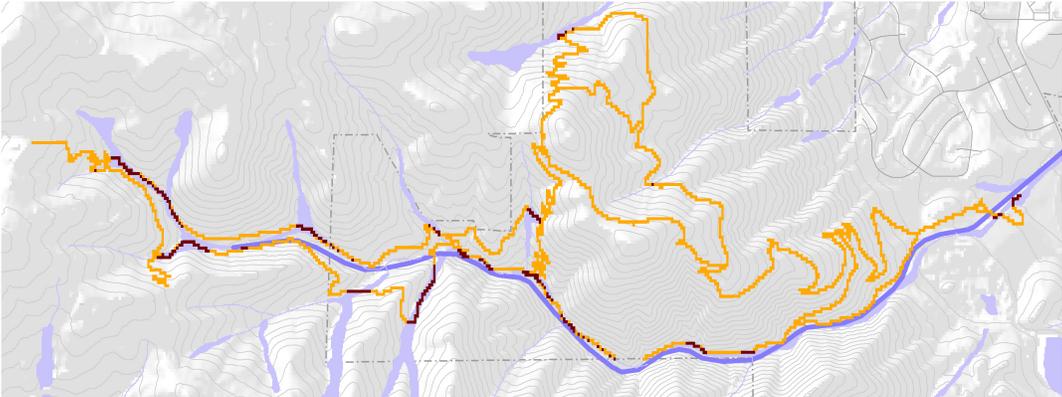


Miles
Scale: 1" = 0.25 Miles (1320 Feet)
1:15,840

Sources: USGS, City of Golden Open Data,
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Figure 5: Runoff

Runoff Area Intersection



Water Runoff Areas

-  Trail Crossing
-  Trail Not Crossing
-  Stream
-  Water Runoff Areas

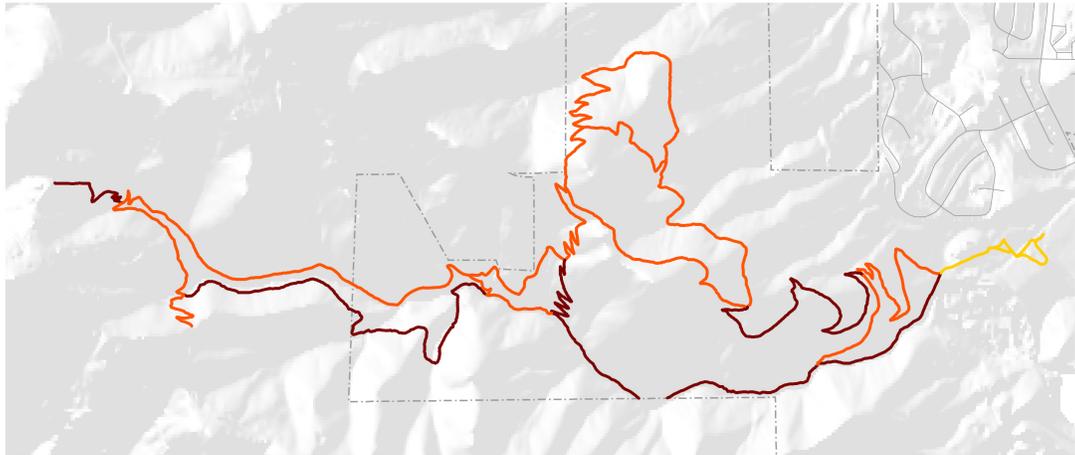


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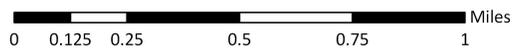
Figure 6: Difficulty

Jefferson County Trail Difficulty Rating



Difficulty Rating

- Least Difficult
- More Difficult
- Most Difficult



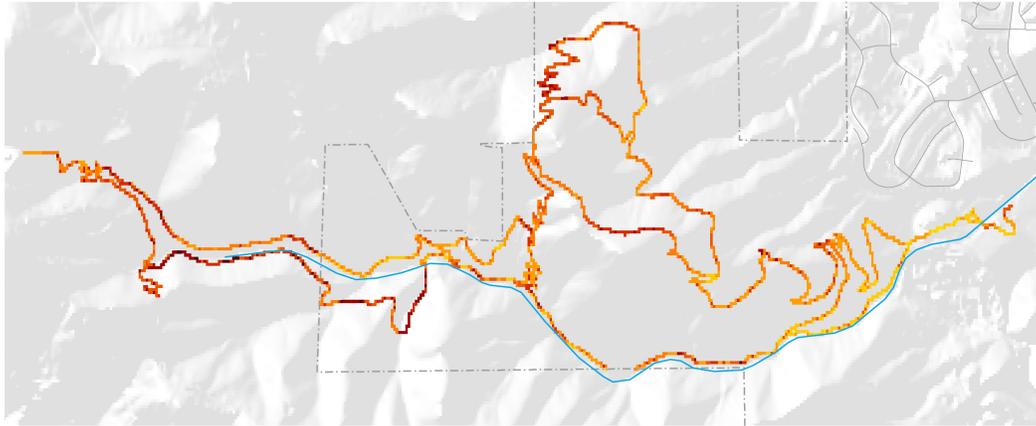
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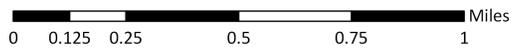
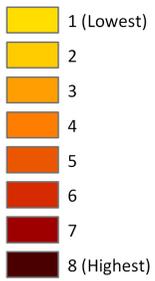
Figure 7: Combined

Combined Risk Factors

Aspect + Elevation + Slope + Runoff + Difficulty



Erodibility Risk



Scale: 1" = 0.25 Miles (1320 Feet)
1:15,840

Apex Park:

Mountain Bike Trail Stats:

Length: 51818 LF (9.8 Miles)
Area Covered: 700 Acres (1.1 sq Miles)

Sources: USGS, City of Golden Open Data,
Colorado Parks and Wildlife, Jeff Co
Open Data
Map Created by Alena Gagnon

Figure 8: Golden

Golden Area Combined Risk Factors
Aspect + Elevation + Slope + Runoff + Difficulty

