

Visitor Use Impact and Decision Framework

Name of Project: Maxwell Trail to the top – Pedestrian and Equestrian only

June 2019

Project Summary

This analysis considers a new pedestrian and equestrian only interior trail at Maxwell Natural Area. Two areas for alignments were considered based on the idea to separate foot traffic from mountain bikers (see attached map for Maxwell trail considerations). Although the Vaske intercept survey revealed that crowding and conflict are not yet issues at Maxwell, the current trail could be designated biking only to relieve the potential for conflict/crowding between user groups. An important factor includes the proposed Hughes redevelopment which could add a large number of housing units next to Maxwell.

Site Description (see Ecological Impacts Table)

Summary

The vegetation/habitat types at Maxwell are grasslands, shrubland, and foothills forest. The trail proposal is within the alderleaf mountain mahogany/ three-leaf sumac/ big bluestem plant community. This plant community is regionally endemic and imperiled and is found primarily along the northern portion of the Colorado Front Range. There are several known locations of this community but large patches without fragmentation are extremely rare. This plant community is highly threatened due to residential development, fire suppression, overgrazing and invasion by non-native species. The threats for this plant community are not expected to lessen over time because it is distributed in an area that is undergoing rapid development.

Wildlife

Despite its relatively small size (approximately 343 acres), Maxwell hosts a diversity of wildlife species found in the foothills natural areas including mule deer, coyote, foxes, mountain lions, bear, prairie dogs, raptors, songbirds, rabbits, rattlesnakes, other reptiles, amphibians, and other rodent species. The Foothills natural areas are part of a large mule deer winter concentration area as identified by Colorado Parks and Wildlife. Several rare butterflies are associated with foothills plant communities and serve as indicators of high-quality plant communities. The foothills are also important foraging grounds for bats, including the sensitive/imperiled Townsend's big eared bat, which does not roost in the Foothills natural areas but forages in the habitat that some sites provide (open grassy meadows and near water).

Soils and Slopes

Soils vary from strongly sloping, to steep stony sandy loam soils, to gently sloping high terrace clay loams. Soils contain up to 40% cobbles and stones. Depth to underlying bedrock, generally sandstone or shale, is less than 60 inches. Slopes for the conceptual trail alignments are approximately 10% and elevation gain is from 5270 ft to 5550 feet.

Geology

See soils description

Physical and Human Land Use

Maxwell is bordered on the west by Horsetooth reservoir, to the south by CR 42C, to the North by CSU/CDC, and to the east by mixed residential use. Most notably, the proposed Hughes residential development is in the conceptual phase of the planning process.

Cultural Resources

Areas that were disturbed by prior construction of trails, parking lots, etc. were surveyed for the presence of prehistoric cultural resources. To date no resources of significance have been found. If the proposal is implemented, the area to be disturbed would be surveyed prior to trail construction.

Other site considerations

Maxwell provides local access to Horsetooth Reservoir from the city. The Foothills planning area offers two other trail networks, at Reservoir Ridge and Coyote Ridge natural areas that access the Reservoir. There are two existing water towers on the site that are owned by Fort Collins Utilities and Loveland Water District.

Existing Trails and Visitor Amenities

The site has a parking lot on the south side of Maxwell that is allowed through prior arrangement with Bureau of Reclamation. A kiosk is installed adjacent to the vault toilet that is regularly updated with user information. The site hosts signage regarding mountain bike safety and etiquette.

Site Visits

Staff have visited Maxwell numerous times to identify and assess the potential alignments. Staff with expertise in trail building, environmental planning, communications, and resource management visited between March of 2019 and July 2019 to locate an alignment that would be of sufficient length to separate the uses while avoiding rare plant communities.

Project Details

What does the visitor use proposal entail?

The proposed trail is a single track, amended surface trail of approximately 8' disturbance. Two alignments were considered: 1) A trail that extends from the "trail triangle" to the north then west for approximately 3000 ft before meeting the existing trail (see map below). 2) A trail that extends from the existing trail from the parking lot to the old trail to the top that was closed twenty years ago when Maxwell was acquired by Natural Areas. A consideration for this alignment was the potential for impact to the viewshed of the "A". The trail would bring users up the eastern-facing slope of the foothills which could be visible to the community.

Who is proposing the use?

Staff looked at areas for two trail alignments for Maxwell due to its popularity and the potential for the Hughes development. Note that the visitor intercept survey revealed that crowding and conflict is not yet an issue at Maxwell (see the Vaske report or perceived crowding and conflict below for more information).

Who will be the primary beneficiary of the use?

The primary beneficiaries of the trail would be mountain bikers, hikers and trail runners.

Why is the use being proposed?

The use is being proposed by the request of the Department's leadership.

When is the proposal to be implemented if approved?

2020/21

How much will the trail cost?

Cost depends on final alignment.

How will Natural Areas Maintain the trail?

Maintenance will be similar to other trails at Maxwell. Soils at Maxwell are challenging for trail building and must be regularly maintained to stay in good condition. Rangers would patrol Maxwell in the usual fashion and educate users on any new trail separation.

Which Plans and Policies apply to this proposal?

None. The trail was proposed as part of the 2019 update to the Foothills Management Plan.

Maps and Ecological Tool Review

Y:\Planning and Special Projects\2019 Update to Foothills Plan\IDF\Maxwell

Public Outreach

Results from the Vaske visitor intercept survey (all citations are from [Vaske, 2018](#)):

Use

Visitors indicated their primary activity at Maxwell as Trail Running (39%), Mountain Biking (30%), Hiking (28%) and Wildlife viewing (3%). Percentages were slightly different between weekdays and weekends (tables 11 and 12).

Experience and Satisfaction

At Maxwell Natural Area, visitors ranked the quality of their experience at 98%. Additionally, visitors ranked their satisfaction with the trails at 91%. Both rankings exceed the 80% standard for visitor experience.

Perceived crowding

Users ranked their perception of crowding on a scale of 1 (low) – 9 (high). The literature suggests less than 35% of visitors should rank between 3 – 9 to have a low perception of crowding. This standard was met or exceeded in 34 of the 38 contexts across all Foothills natural areas. However, these are still considered minor exceptions according to the crowding literature. The three exceptions at Maxwell were mountain bikers feeling crowded by hikers (see table below).

Study site	Evaluation context		Crowding %
	Evaluation by:	Evaluation for:	
Maxwell	Mountain bikers	Hikers on trail	58
Maxwell	Mountain bikers	Mountain bikers on trail	49
Reservoir Ridge	Mountain bikers	Hikers on trail	41
Maxwell	Mountain bikers	Hikers at trailhead	37

Two contexts at Maxwell and one at Reservoir Ridge fell into the category of low-normal perceived crowding (36-50%). Low-normal means that access, displacement, or crowding problems are not likely to exist at this time and that these areas may still offer unique low-density experiences. One context at Maxwell reached the high-normal perceived crowding category (51-65%). High-normal means that carrying capacity probably has not been exceeded but may be trending in that direction.

Perceived conflict

At Maxwell, visitor responses ranged from 83% to 99% of users indicated they did not observe unsafe behavior (Table 24). Approximately 17% of Maxwell users indicated that they saw “mountain bikers behaving unsafely”, the highest percentage of all user groups. However, the percentage is still at a low enough threshold that conflict did not exceed the established standard. The highest number of responses regarding behavior conflict was mountain bikers not yielding, followed by riding too fast, and passing without warning. Percentages differed when users were asked about experiencing a problem behavior (please note, users were asked about observation and experience). The highest percentage (54%) stated they had experienced a problem with mountain bikers riding unsafely followed by mountain bikers being discourteous (48%) (Table 25).

Table 24. Unsafe and discourteous behaviors witnessed at City of Fort Collins natural areas ¹

	City of Fort Collins Natural Area				Chi-square	p-value	Phi
	Percent who “never” observed the behavior						
	Coyote Ridge %	Maxwell %	Pineridge %	Reservoir Ridge %			
Saw hikers behaving unsafely	94	91	93	94	1.19	.756	.046
Saw mountain bikers behaving unsafely	80	83	81	86	3.74	.291	.079
Saw equestrian riders behaving unsafely	100	99	97	98	7.58	.056	.098
Witnessed hikers being discourteous	91	92	94	94	1.41	.704	.049
Witnessed mountain bikers being discourteous	82	84	85	84	0.72	.870	.035
Witnessed equestrian riders being discourteous	100	97	98	97	7.90	.048	.090

1. Percent of respondents who “never” observed the behavior

Table 25. Perceived problems with other visitors at City of Fort Collins natural areas ¹

	City of Fort Collins Natural Area				Chi-square	p-value	Phi
	Percent who "never" experienced the problem behavior						
	Coyote Ridge %	Maxwell %	Pineridge %	Reservoir Ridge %			
Hikers hiking unsafely	76	70	80	77	3.67	.299	.080
Mountain bikers riding unsafely	60	46	56	60	7.66	.053	.115
Equestrian riders riding unsafely	85	83	85	82	0.87	.833	.039
Hikers being discourteous	75	60	77	72	11.64	.009	.144
Mountain bikers being discourteous	61	52	64	63	5.06	.168	.094
Equestrian riders being discourteous	83	82	83	79	1.02	.796	.042

1. Percent of respondents who "never" experienced the problem behavior

Table 32. Perceived conflict at City of Fort Collins natural areas

	City of Fort Collins Natural Area				Chi-square	p-value	V
	Coyote Ridge %	Maxwell %	Pineridge %	Reservoir Ridge %			
Hikers hiking unsafely					7.35	.289	.094
No conflict	73	68	81	74			
Interpersonal conflict	4	9	2	7			
Social values conflict	23	23	17	19			
Mtn. bikers riding unsafely					11.44	.076	.118
No conflict	57	42	57	54			
Interpersonal conflict	20	17	13	14			
Social values conflict	23	41	30	32			
Equestrian riders riding unsafely					4.04	.671	.064
No conflict	83	80	86	80			
Interpersonal conflict	0	1	0	1			
Social values conflict	17	19	14	19			
Hikers being discourteous					10.39	.109	.112
No conflict	71	58	77	67			
Interpersonal conflict	7	8	3	8			
Social values conflict	22	34	19	25			
Mtn. bikers being discourteous					6.97	.324	.094
No conflict	57	48	63	57			
Interpersonal conflict	19	17	12	18			
Social values conflict	24	25	25	25			
Equestrians being discourteous					8.07	.233	.089
No conflict	80	78	84	75			
Interpersonal conflict	0	3	1	3			
Social values conflict	20	19	15	22			

Results from the Foothills Open House:

During the Foothills outreach process, the public was asked what of three options they supported at Maxwell. The majority (65%) supported the addition of a new trail that would separate bikers from foot traffic and horses. Approximately 26% of respondents supported keeping the trail system as is with continued maintenance and 9% supported alternating days that the current trail is open to mountain bikers/foot traffic.

Visitor Use Impact and Decision Framework

A. Ecological Impacts			
Project or Use: New Interior Maxwell trail			
Reason for proposal: NAD staff			
Rating Questions	High/Moderate/Low	Rationale	BMP
1. What is the likelihood that the management action involves sensitive, rare, or irreplaceable natural resources and wildlife?	Alignments 1 and 2 - High	Extremely likely - The proposal is within the alderleaf - mountain mahogany/ three-leaf sumac/ big bluestem (<i>Cercocarpus montuanus/ Rhus trilobata/ Andropogon gerardii</i>) shrubland. This plant community is regionally endemic and imperiled and is only found primarily along the northern portion of the Colorado Front Range. There are several known locations of this community but large patches without fragmentation are extremely rare. This plant community is highly threatened due to residential development, fire suppression, overgrazing and invasion by non-native species. The threats for this plant community are not expected to lessen over time because it is distributed in an area that is undergoing rapid growth from humans. The Colorado Natural Heritage Program ranking is It is a G2G3 S2 (Imperiled globally and in Colorado).	
2. What is the change in the eco-score?	N/A	<i>This question is a place holder when the Eco-Tool is complete</i>	
3. What is the likelihood of imminent and significant changes to the natural resources?	Alignments 1 and 2 - High	The trail would displace the mountain mahogany community along the trail corridor in addition to providing a vector for invasive species to establish in the understory. This is significant due to the threatened status of this plant community. Each alignment will further fragment habitat at Maxwell. Although Maxwell is relatively fragmented now due to trails, gravel roads to the water towers, a ditch, CR42C, the residential development to the east, and Centennial drive to the west, the slopes supporting the mountain mahogany community are mostly intact. The intact slopes provide a refuge for wildlife that extends to the north on property owned by CSU up to the Foothills campus on Laporte Ave. This is a rare refuge so close to town.	

		In addition to the mountain mahogany, the northern area analyzed for alignment supports a high-quality riparian area. The area is currently sheltered and away from human disturbance, providing valuable habitat,	
4. How will the management action affect other aspects of ecological land management in the area or surrounding area?	Alignments 1 and 2 - Low	More weed control will be required	
5. What is the geographic extent of the management action's impacts? Scales of impacts include: project, portion of site, property, local, regional, or global	Alignments 1 and 2 - High	This is a regional impact due to the status of the mountain mahogany status as a G2G3 – globally imperiled and S2 – state, and regionally endemic and imperiled (very vulnerable to extinction throughout its range).	
6. Is the impact temporary (low) or long lasting (high)?	Alignments 1 and 2 - High	The impacts are long lasting. The mountain mahogany community regenerates extremely slowly, if at all.	

Majority rating = HIGH

Staff Recommendation

Staff does **not recommend the trail** for the two proposed alignments within the Maxwell Natural Area due to high ecological impact. Both alignments require extensive disturbance of the state and globally imperiled mountain mahogany plant community. In summary:

- The proposal is within the alderleaf mountain mahogany/ three-leaf sumac/ big bluestem (*Cercocarpus montuanus/ Rhus trilobata/ Andropogon gerardii*) shrubland. This plant community is regionally endemic and state and globally imperiled.
- This plant community is highly threatened due to residential development, fire suppression, overgrazing, and invasion by non-native species.
- The threats for this plant community are not expected to lessen over time because it is distributed in an area that is undergoing rapid growth from development.
- Although Maxwell Natural Area is fragmented, the slopes supporting the Mountain mahogany community are mostly intact. The intact slopes provide a refuge for wildlife.

Best Management Practices

- Natural Areas will continue to explore a new trail that would provide connectivity from Maxwell to Laporte Ave by the CSU Foothills Mountain campus.
- Natural Areas will work with an outside trail building expert to plan improvements to the existing trail system that ensure sustainability while keeping the trail fun and safe for all users. User input will help inform the trail refresh.
- Natural Areas will enhance education around proper trail etiquette including keeping dogs on-leash, one earbud out, not riding too fast, giving verbal warnings when passing, and general trail courtesy for all users.

Core Management Team Decision

- Confirmed staff recommendation at 6/20/2019 meeting. **Decision is to explore a trail connection from Maxwell to Laporte Ave to provide connectivity to CSU Foothills campus.**

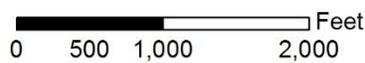
Please note that Cultural, Social, and Natural Area's consideration were not completed in this analysis due to the high ecological impacts from each proposed alignment.

Trail Proposal

Maxwell Natural Area



- Potential Trail Areas
- Paved Trail
- - - Natural Surface Trail
- Trail Area of Influence
- Erosive Soil
- Riverine
- Habitat Types**
- Foothills Shrubland
- Developed
- Foothills Mixed Forest
- Native Mixed Grass
- Mountain Mahogany/Three-leaf sumac/Big bluestem
- Non-native Grassland



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