

**A Re-evaluation of Significant Resources and
Trail Feasibility across Corona Hill
on Hall Ranch Open Space**

**Conducted for the Town of Lyons
by Boulder County Parks & Open Space**

June 2022

SUMMARY

In September 2021, the town of Lyons made a request to Boulder County Parks & Open Space (Parks & Open Space) to reassess the potential for a trail across Corona Hill connecting the town to the Hall Ranch Open Space trailhead. This trail option was removed from past planning efforts because of natural resource concerns and the difficulty of building a sustainable trail on the steep slopes. However, to document the current conditions and to see if any conditions had significantly changed since previous assessments, Parks & Open Space agreed to reassess the resources and trail options

The current assessment confirms the findings of past planning efforts. Although Parks & Open Space understands the desire to make a trail connection between the town of Lyons and Hall Ranch, the assessment does not support a trail over Corona Hill for the following reasons:

- Significant wildlife resources including nesting golden eagle and prairie falcons, among other species
- Significant natural plant communities
- Steep topography, ravines, and rock outcroppings making a sustainable trail unattainable
- Potential for new and expanded social trails, which would require additional ranger patrol and trail maintenance

Therefore, Parks & Open Space will not pursue a trail across Corona Hill at this time, but will continue to work with the town, residents, and other stakeholders to find a sustainable trail option in the years ahead.

1. Purpose and Need

The purpose of this evaluation is to re-assess the environmental resources and potential trail options across Corona Hill on Boulder County's Hall Ranch Open Space as requested by the town of Lyons. On August 9, 2021, the Lyons Parks and Recreation Commission (PRC) reviewed and approved a motion to the Town of Lyons Board of Trustees to formally request that Boulder County Parks & Open Space re-evaluate an alternate trail route between town and the Hall Ranch trailhead utilizing the southern portion of the Corona Hill area. On September 20, 2021, the Town Board voted in favor of this recommendation. Parks & Open Space staff attended both meetings and agreed to provide an updated assessment of Corona Hill, including a current assessment of the significant natural resources and the feasibility of a trail connection on the southern portion of Corona Hill that limits impacts to the natural resources and follows sustainable trail practices.

The county, town of Lyons, and members of the public have long desired a safe, sustainable, and environmentally sensitive trail connection from town to the trails and/or trailheads at Hall Ranch. Hall

Ranch Open Space has approximately 13.5 miles of trail that are accessed on the south from the main trailhead off State Highway (SH) 7 or on the northeast via the Antelope Trailhead off Antelope Drive. Currently, neither trailhead has a direct trail connection into town and must be accessed either by vehicle or by walking or biking along and across roadways, including Old South St. Vrain Road and SH 7 on the south and SH 36, Apple Valley Road, and Antelope Drive on the northeast.

In their August 9 memo, the PRC expressed concern about pedestrian and bicyclist safety along these roadways and the need to provide a safer route to Hall Ranch. In addition, the memo expressed interest in using a Corona Hill trail as a regional trail connection between town and Hall Ranch and continuing east of town. Finally, the PRC memo states a Corona Hill trail “would be an economic boost for the Town of Lyons and enhance its image as a recreational hub in Boulder County.”

Prior to September 2013, a trail on the south side of SH 7 along South St. Vrain Creek between Meily Street and Old South St. Vrain Road provided a connection from town to Old South St. Vrain Road for those who either wished to walk along Old South St. Vrain Road, connect to the Picture Rock trailhead at Heil Valley Ranch Open Space, or take an alternative route to the Hall Ranch trailhead. However, this trail was destroyed in the 2013 floods and subsequent efforts to reestablish it, including Colorado Department of Transportation’s evaluation as part of the SH 7 permanent post-flood repairs, have been unsuccessful. The creek shifted north during the flood and caused severe erosion on the north bank, thus washing away the trail. In order to reconstruct this trail, the creek would need to be realigned and the bank reestablished, which would require substantial engineering, permitting, and funds.

The following provides a current assessment of Corona Hill based on the town of Lyons’ request. It documents the current state of the significant resources and the feasibility for a trail in this area. The assessments were performed by Parks & Open Space resource specialists. This assessment does not change any past decisions made about or the management of Corona Hill, which would require a robust public process, a recommendation by the Boulder County Parks & Open Space Advisory Committee (POSAC), and a final decision by the Board of County Commissioners.

2. Previous Planning and Assessment

Boulder County acquired Hall Ranch in the mid-1990s for the purpose of protecting and managing its many open space values, including natural, cultural, and recreational resources. Management of the 3,205-acre property is the responsibility of the Parks & Open Space Department. A resource evaluation of the property, along with other adjacent county open space properties including Heil Valley Ranch (collectively referred to as the North Foothills Open Space), was completed in 1996 (Parks & Open Space 1996a), which was followed by a management plan for the entire open space complex (Parks & Open Space 1996b).

The overall vision for the property as set forth in the management plan is to provide a balance between protection and preservation of the natural and cultural resources, including native wildlife and plant communities, with providing sustainable and environmentally sensitive recreational opportunities for the residents of Boulder County.

Other past planning processes have included the North Foothills Open Space Advisory Committee, which met in 1997 to formulate recommendations on issues left unresolved in the management plan including

trail connections, and a 2005 trail study, which assessed alternative trail alignments to connect Hall Ranch, as well as Heil Valley Ranch, to the town of Lyons.

In each instance, Corona Hill was considered as a trail corridor but was removed from further consideration because of the proximity of a golden eagle nest and feeding area, rare plant communities, and the difficulty of constructing and maintaining a sustainable and environmentally sensitive trail on the area's steep slopes, which include sections that are greater than 12%. Although many residents did not agree with it, POSAC and the Board of County Commissioners concurred with this decision.

A regional trail connection between the town of Lyons and Hall Ranch Open Space is also shown in the vicinity of SH 7 and South St. Vrain Creek on the Boulder County Comprehensive Plan County Trail Map, as well as in the St. Vrain Creek Corridor Open Space Management Plan (Parks & Open Space 2004).

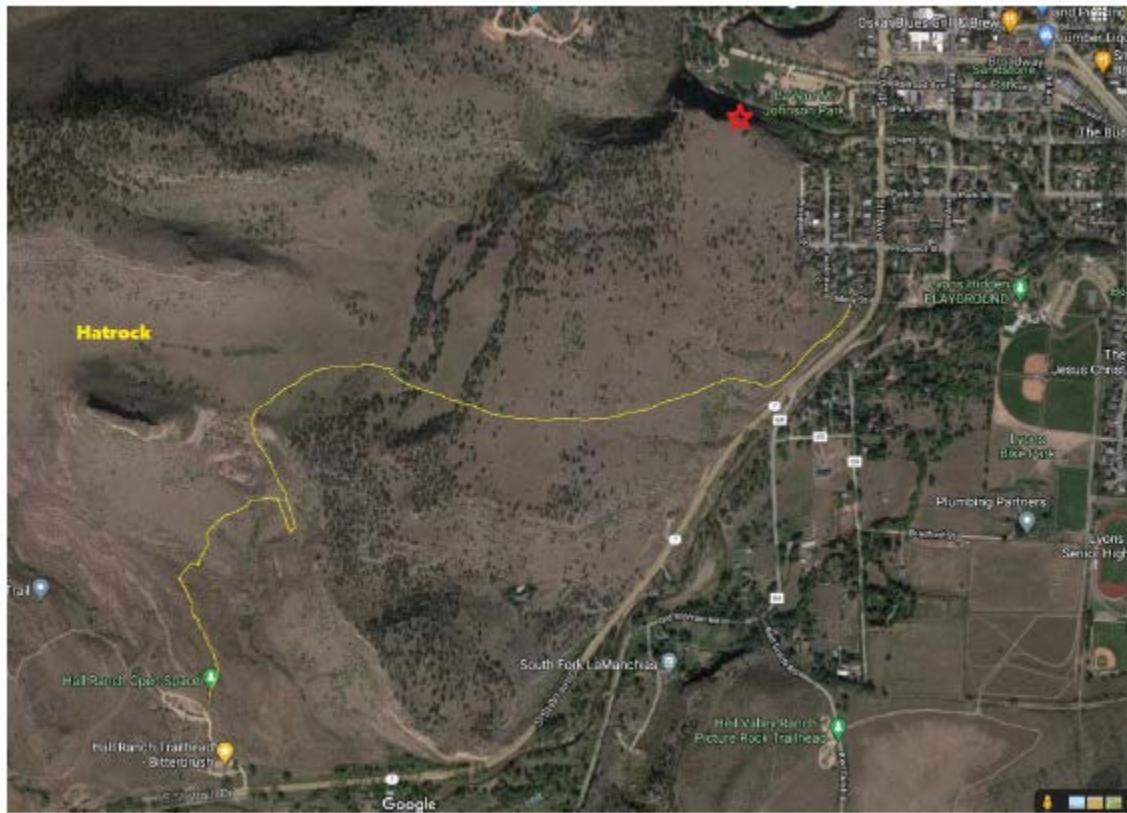
Finally, Parks & Open Space annually solicits input from municipalities, including Lyons, on their highest open space preservation and trail priorities. Since the early 2000s, Lyons has included a trail connection between town and Hall Ranch as one of their highest priorities.

3. Current Assessment

Between October 2021 and May 2022, Parks & Open Space resource specialist reviewed the existing conditions on and in the vicinity of Corona Hill. Specific resources that were assessed included significant wildlife and plant communities and the feasibility of constructing and maintaining a sustainable trail, while minimizing impacts to significant resources.

The boundaries for the assessment were based on the conceptual trail route proposed by the PRC in August 2021 (Figure 1). The route begins at Meily Street, parallels SH 7 along the contour for a short distance, and then bows up the hill along the south side of Corona Hill staying a minimum of $\frac{1}{4}$ mile away from the golden eagle nest until it reaches the "notch" that overlooks the Hall Ranch trailhead. From the notch, the conceptual trail switchbacks down to the parking lot.

Figure 1. Conceptual trail route proposed by the Parks and Recreation Commission (August 2021).



Landscape-Level Considerations.

The assessment included a review of landscape-level designations and policy guidance provided by the Boulder County Comprehensive Plan (BCCP) and the Colorado Natural Heritage Program (CNHP).

BCCP: Environmental Resources Element Guidance and Critical Wildlife Habitat Designations

The BCCP puts a high priority on the preservation of environmental and natural resources in making land use decisions. The overarching goals outlined in the BCCP include:

B.3 Boulder County shall promote the viability and integrity of all naturally occurring ecosystems and their native species populations by applying a variety of environmental conservation practices.

The BCCP element that guides the management of natural resources at Parks & Open Space is the Environmental Resources Element (ERE). The ERE states:

ER 1.06 Boulder County shall use its open space program as one means of achieving its goals for protecting environmental resources.

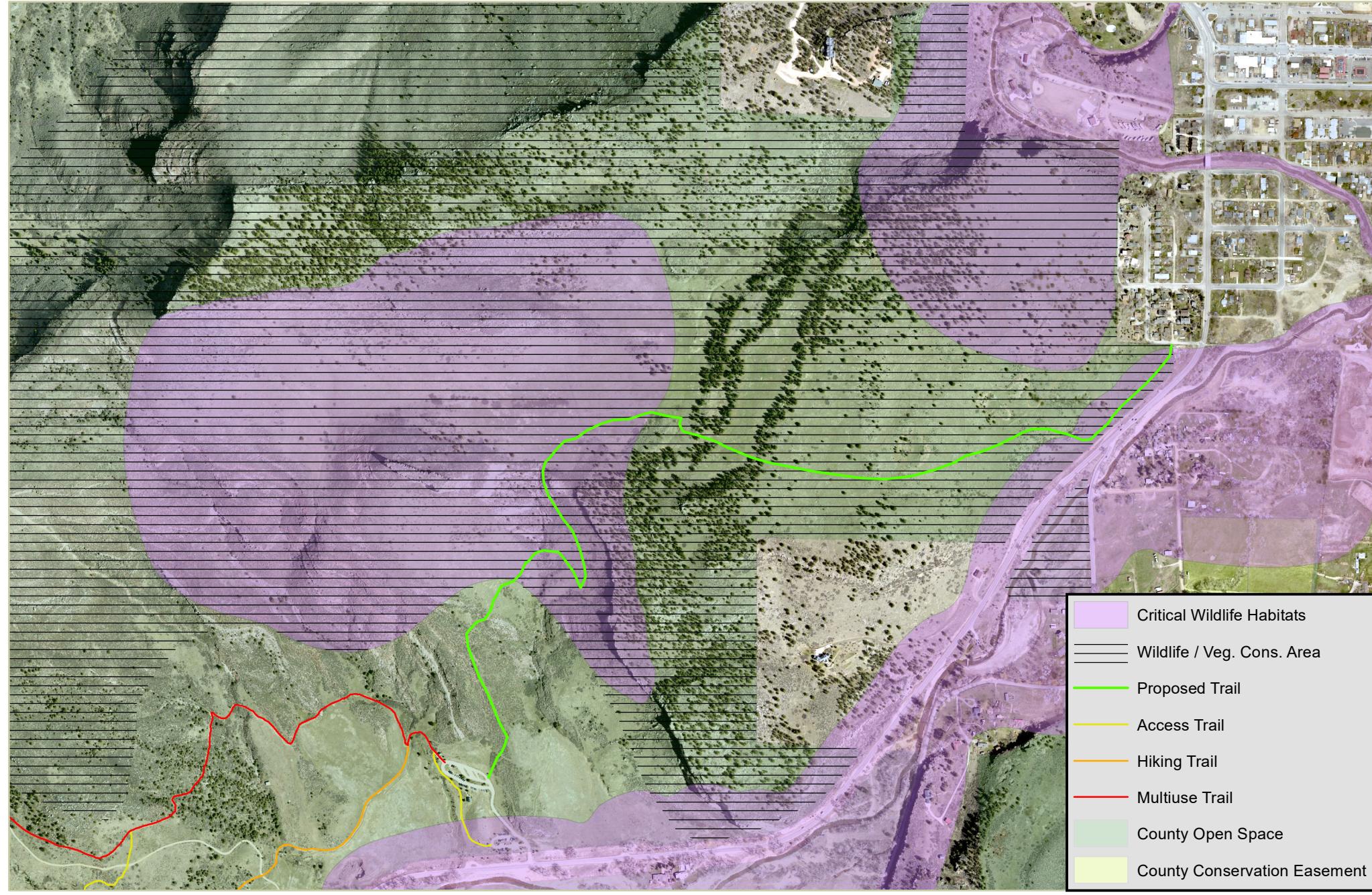
Additionally, the ERE provides guidance towards the designation of Critical Wildlife Habitat (CWH). The Corona Hill area contains two designated CWHs (Figure 2):

CWH# 74- Hat Rock. This area was designated in the 2013 update to the ERE, due to vital nesting habitat for Prairie Falcons. Prairie falcons are vulnerable to human encroachment near

Figure 2. Corona Hill - Mapped Wildlife Designations



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their nest sites during the breeding season. Disturbance can result in nest abandonment and negatively impact recruitment rates and population trends.

CWH# 5- St. Vrain Corridor. This area was designated originally in 1978 in the ERE. Included in the rationale for designation is the nesting golden eagles at Hall Ranch, as well as the prairie dog colony on Corona Hill.

CNHP B2 Ranking: Very High Biodiversity Significance

CNHP “tracks and ranks Colorado's rare and imperiled species and habitats and provides information and expertise on these topics to promote the conservation of Colorado's valuable biological resources (CNHP 2021). In 2007-08, CNHP surveyed the significant biological resources of Boulder County with the goal of identifying areas for the conservation of rare and imperiled species and natural communities (CNHP 2009). Based on the results of the survey, Indian Lookout Mountain, which includes Corona Hill, received a B2 Ranking. This ranking signifies *Very High Biodiversity Significance* (nearly irreplaceable) as defined by the presence of several biodiversity elements that are globally rare, or globally common but rare in Colorado. The foothills of Boulder County are unique and remarkable based on the richness of rare flora and fauna and their habitats. Because of this, proactive conservation efforts in Boulder County have statewide and global significance (CNHP, 2009).

Wildlife Assessment.

The Corona Hill wildlife closure area contains areas of high-quality habitat juxtapositions, such as riparian corridors/gulches, palisades, and north-facing/south-facing slopes. This area overall is undisturbed, which is rare in the Front Range, as developed urban areas exist directly adjacent. The site spans the transitional zone between montane and foothills habitats, with a high component of shrublands which is the most imperiled zone within the Front Range.

The 1996 North Foothills Open Space Management Plan designates the Corona Hill area as a wildlife closure. The original rationale related to wildlife for this closure included the presence of the golden eagles and prairie dogs. These conditions have not changed. Figure 3 shows some of the mapped wildlife resources. The following provides assessments of the current species and groups of species utilizing Corona Hill.

Golden Eagles

The nesting golden eagles on the of Hall Ranch are monitored regularly by Parks & Open Space staff and volunteers, who have documented repeated disturbance to the eagles from human activity in LaVern M. Johnson Park (formerly known as Meadow Park). All memos and documents related to management of the Corona Hill area uphold the ongoing protection of the nest site with a ½ mile nest buffer as well as maintaining the undeveloped park land immediately south and west of the nest as undisturbed, unfragmented habitat (CPW 2020). While protection of nest sites is paramount, equal attention must be given to foraging areas, flyways, and perch locations within a raptor pair's territory. Given that approximately 1/3 of the nest buffer is impacted by human development, the remaining undeveloped park land has an elevated value as supporting habitat for these nesting raptors.

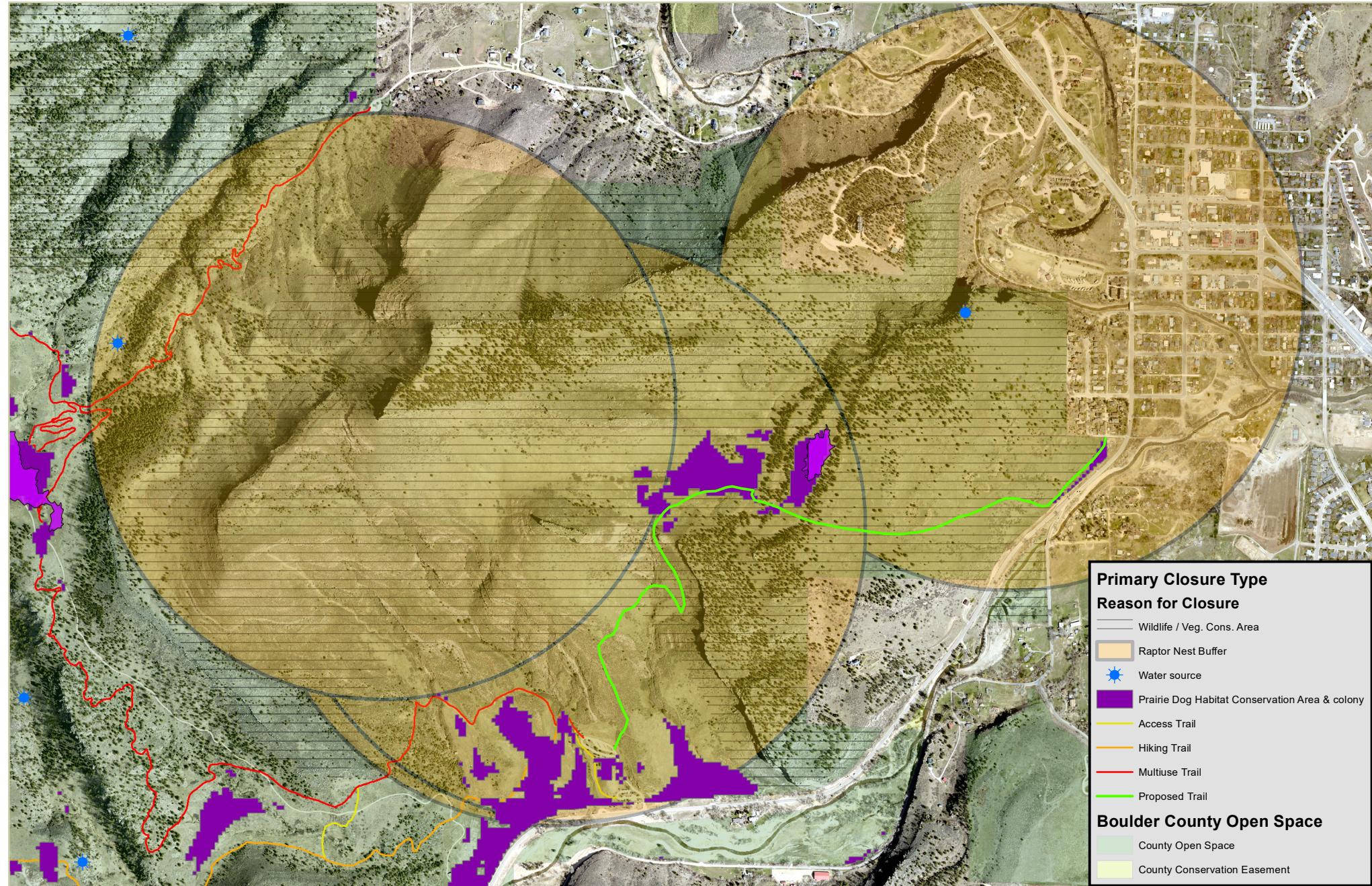
Prairie Falcons

In addition to nesting golden eagles, both Hat Rock and Indian Lookout Mountain also support three alternate nest locations for nesting prairie falcons. The buffer for this species is also ½ mile and together the buffers encompass the majority of Corona Hill (CPW 2020). Currently, prairie falcons are actively

Figure 3. Corona Hill - Mapped Wildlife Values



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nesting at one of these locations. This site overall has been repeatedly used by prairie falcons, who have high nest site fidelity as a species.

Prairie Dogs

Prairie dogs are present within the Corona Hill wildlife closure area. This colony has been present over time since the original assessment occurred. Prairie dogs are an integral part of the ecosystem, and in this case, are likely providing a consistent prey base for the nearby golden eagle and prairie falcon pairs.

Bats

The habitat values present in the Corona Hill area are highly suitable for a variety of bat species. The permanent water associated with the old quarries are likely providing vital, undisturbed water towards hosting significant species richness.

The quarries contain habitat like Ingersol quarry at Heil Valley Ranch, which is known to host many rare species, including small-footed myotis which use the scree-like rock areas for summer and winter roosting/hibernation. The unfragmented nature of the area provides undisturbed conditions that are known to be beneficial for bat species that are intolerant of human disturbance.

Most bat species are declining at an alarming rate, due to habitat loss, wind turbine towers, domestic and feral cats, climate change and White Nose Syndrome. Boulder County Open Space provides critical habitat for bat species along the Front Range, shown repeatedly in bat research studies on open space (<https://www.bouldercounty.org/open-space/education/research/>). The importance of maintaining undisturbed areas for all bat species cannot be overemphasized, due to the many challenges this taxon is facing.

Large Mammals

Corona Hill and Indian Lookout Mountain provide isolated habitat for a variety of large mammals when other locations are unavailable due to development and human recreation. Rather than limiting or altering the timing of feeding and movement by large mammals to evening hours when the park is closed, species such as black bear and bighorn sheep continue to be observed using the hanging meadows, plateau and slope features during daytime when other areas of the park may be perceived as unsafe by wildlife.

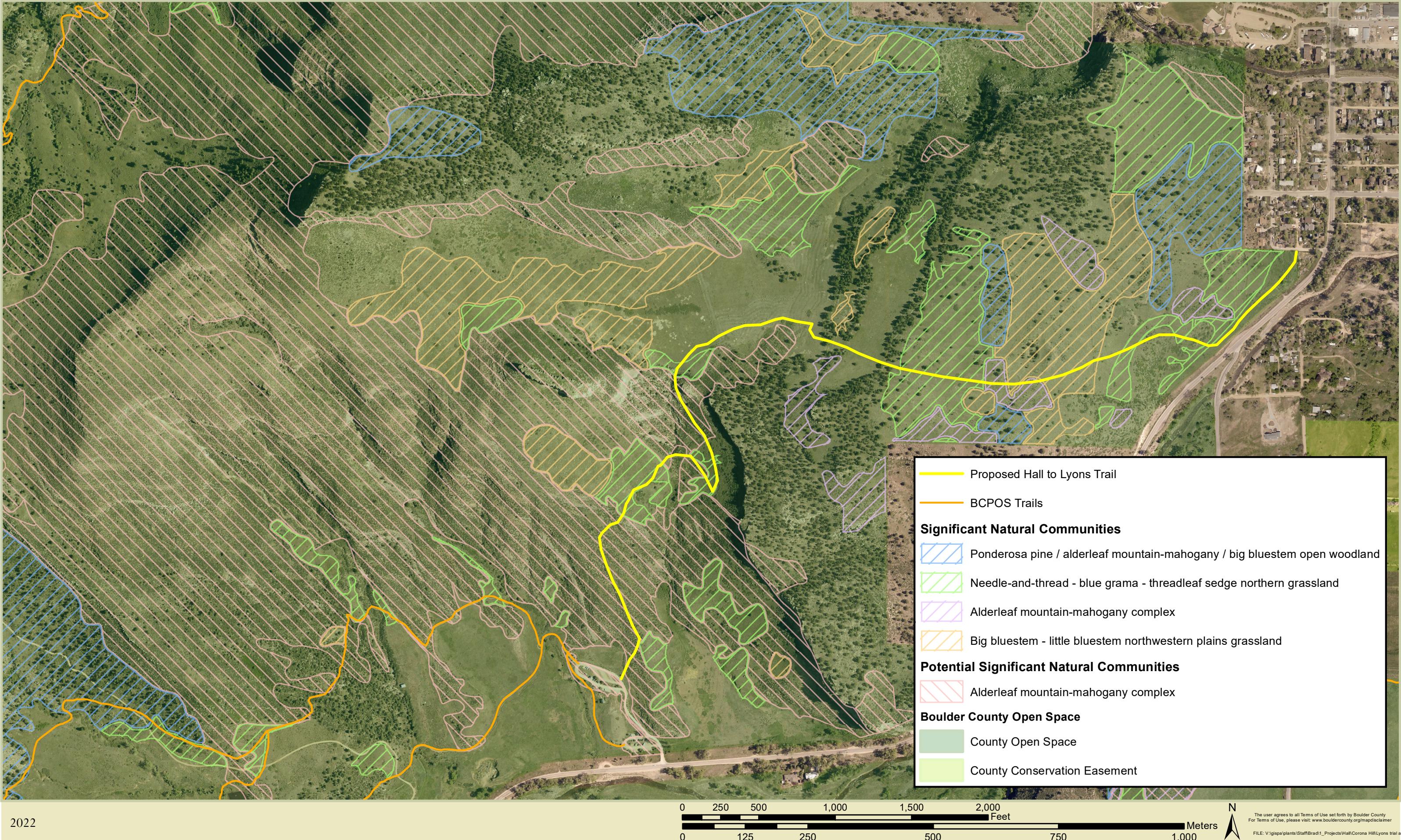
As visitor use of Hall Ranch and other open space areas has steadily increased over time, these closed conservation areas provide an increasingly valuable and necessary space for wildlife.

Vegetation Assessment.

Vegetation across Corona Hill is comprised of primarily native grasses, forbs, shrubs, and trees with patches of non-native vegetation particularly in areas that have been disturbed. The original resource evaluation and management plan in 1996 identified several significant natural communities (SNC) in the Corona Hill area. These were confirmed with additional vegetation mapping undertaken on Hall Ranch in 2006 and again in 2021. Much of the area consists of four SNC which are shown on Figure 4.

Additionally, other large areas near and west of the proposed trail alignment potentially contain other SNC, given the unique assemblages of vegetation, but require additional work to confirm. These SNC are based on tracking and rankings of conservation status performed by CNHP in conjunction with NatureServe and are included on the *Boulder County Rare Plant Species and Significant Natural Communities Species of Special Concern List* (Boulder County 2013). Rankings are based on a species or

Figure 4. Corona Hill - Significant Natural Vegetation Communities



community's global (G) conservation status and state (S) conservation status and use a numeric system to define their status. Table 1 provides definitions for each rank (NatureServe 2021a).

Table 1. Definitions of Conservation Rank Modified from NatureServe 2021a.

Rank	Definition
G1 / S1	Critically Imperiled — At very high risk of extinction or collapse due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
G2 / S2	Imperiled — At high risk of extinction or collapse due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3 / S3	Vulnerable — At moderate risk of extinction or collapse due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
G4 / S4	Apparently Secure — At fairly low risk of extinction or collapse due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
G5 / S5	Secure — At very low risk of extinction or collapse due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

The SNC on Corona Hill include:

Existing Significant Natural Communities

- Ponderosa Pine / alderleaf mountain-mahogany / big bluestem (*Pinus ponderosa / Cercocarpus montanus / Andropogon gerardii*) open woodland
 - This SNC is found in patches across Corona Hill (Figure 4)
 - It has a rank of G2 and S2, which means it is *Imperiled* at both the global and state level.
 - It is a regional endemic, meaning it is only found in the foothills of the northern Front Range of Colorado.
 - NatureServe (2021b) states, “This association is very threatened rangewide because it occurs in the region of Colorado that is growing most rapidly as a result of a burgeoning population. Threats include housing development, noxious weed invasion, fire suppression, and overgrazing. A very large portion of the potential habitat of this association has already been lost due to agricultural conversion, fire suppression that changes the composition and structure of the association, and development of homes and roads.”
- Needle-and-thread - blue grama - threadleaf sedge (*Hesperostipa comata - Bouteloua gracilis - Carex filifolia*) northern grassland
 - This SNC is found in patches across Corona Hill (Figure 4)

- This SNC has a global rank of G4, but a state rank of S2, which means it is *Apparently Secure* globally but *Imperiled* in Colorado
 - Threats include conversion to other land uses and invasive species (NatureServe 2021c)
- Alderleaf mountain-mahogany complex

This SNC Complex includes two rare plant associations, both found in patches across Corona Hill (Figure 4). Those associations are described below. While some vegetation communities toward the western end of the proposed trail alignment could potentially support these SNC, other areas toward the eastern end that intersect or are near the proposed trail alignment have been confirmed to contain these SNC. The confirmed vs. potential alderleaf mountain-mahogany complex SNC are delineated in Figure 4.

 - Alderleaf mountain-mahogany / needle-and-thread (*Cercocarpus montanus* / *Hesperostipa comata*) shrubland
 - This SNC has a rank of G2 and S2, which means it is *Imperiled* at both the global and state level.
 - It is a regional endemic, meaning it is only found in the foothills of the northern Front Range of Colorado.
 - NatureServe (2021d) states “This association remains highly threatened. Threats include residential development, sand and gravel mining, fire suppression, overgrazing, and invasion by non-native plant species. These threats will not lessen over time because the center of this association's distribution is in the heart of the Colorado Front Range, an area undergoing rapid growth.”
 - Alderleaf mountain-mahogany - skunkbush sumac / big bluestem (*Cercocarpus montanus* - *Rhus trilobata* / *Andropogon gerardii*) shrubland
 - This SNC has a rank of G2G3, which means it is between an *Imperiled* and *Vulnerable* status globally, and S2, which means it is *Imperiled* at the state level.
 - It is a regional endemic, meaning it only found in the foothills of the northern Front Range of Colorado.
- Big Bluestem - little bluestem (*Andropogon gerardii* – *Schizachyrium scoparium*) northwestern plains grassland
 - This SNC is found in patches across Corona Hill (Figure 4)
 - This SNC has a rank of G2 and S2, which means it is *Imperiled* at both the global and state level.
 - According to NatureServe (2022e), this SNC remains very threatened by development along the Front Range, mining operations, and invasion by woody species in response to a lack of fire.

In addition to the native plant species occurring on Corona Hill, areas of non-native cheatgrass (*Bromus tectorum*) are also present in small patches, especially in areas previously disturbed. Cheatgrass poses significant problems because it dominates ecosystems and increases the likelihood of wildfires. Parks & Open Space plans to control this invasive species, which will enhance the native flora and reduce wildfire risk.

Trail Feasibility Assessment

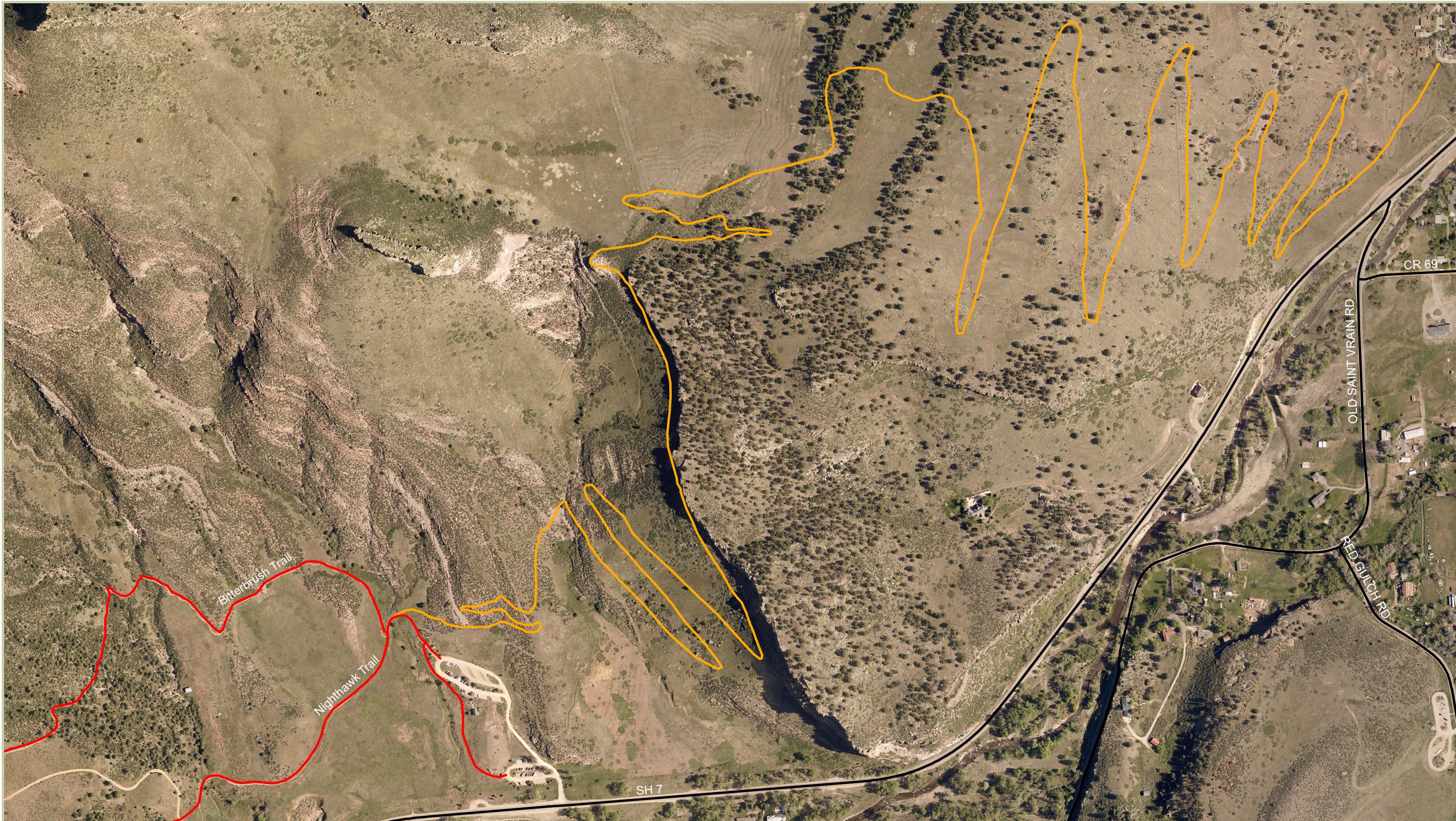
Parks & Open Space prioritizes sustainable trail design while balancing natural resources when considering where a trail can be constructed with minimal routine maintenance. One criteria involved in sustainable trail design is trail grade versus the cross slope of a hill. Parks & Open Space uses a combination of guidelines from “Trails Solutions IMBA’s Guide to Building Sweet Singletrack” and “Guide to Sustainable Mountain Trails” from the National Park Service (NPS). IMBA utilizes “The Half Rule” where the trail grade should not exceed half the grade of the cross slope while NPS recommends the trail grade to stay less than $\frac{1}{3}$ of the cross slope. Parks & Open Space combines both these methods by keeping the trail grade $\frac{1}{3}$ or less of the cross slope.

For multi-use trails, Parks & Open Space prefers to keep the trail grades between 6-8% due to soil types and to keep speeds lower to minimize user conflict and user caused erosion, such as through repetitive braking. IMBA recommends shallower (<10%) maximum trail grades if high use is anticipated. The Salt Lake City Foothills Trail System Plan guidelines have an overall trail grade of 10% or less for multi-use trails and an overall trail grade of 6-8% or less for bike optimized trails. Parks & Open Space will at times exceed these grades due to topography, property boundaries or wildlife buffers but will keep them short in length and attempts to not exceed 15% as long as the cross slope is sufficient.

When analyzing the Corona Hill area, staff drew conceptual trails in GIS based on topography lines and then analyzed the trail grade versus the cross slope. Although any conceptual trail would have to be verified in the field based on actual site conditions, GIS is a useful tool for the purpose of checking the potential of a sustainable trail alignment. The conceptual trail was modified several times based on the results of the GIS analysis to try to improve the sustainability of the trail.

Based on the results, a trail would need to be approximately four miles in length to get from the eastern property boundary near Meily St heading west to the Hall Ranch trailhead (Figure 5). After the final GIS analysis, the easternmost two miles were very close to meeting the guidelines above however there would need to be approximately eleven switchbacks to get to the desired elevation. The eastern two miles would be in a very open area with limited natural barriers to prevent users from cutting switchbacks which adds concern and would most likely need to be mitigated with fencing. The westernmost two miles is in challenging terrain (i.e., steep areas, ravines, rock outcroppings) and segments of the alignment did not meet guidelines after several modifications. The topography makes it very difficult to drop in elevation at a sustainable rate. It would require multiple switchbacks and cross several ravines. Therefore, meeting sustainable criteria was unattainable.

For these reasons, staff would not recommend a trail alignment in the area as it would be costly to construct and maintain with the numerous switchbacks, has been found to not meet sustainability guidelines for a significant portion of the alignment, and would require substantial switchback cutting mitigation.



Other Considerations

In addition to the above assessment, Parks & Open Space also considered other potential impacts if a trail were approved on Corona Hill. A primary consideration is the potential for new and expanded social trails in the area. Even though the area is currently closed, staff have found several illegal social trails across the property. If a trail was built on the south side of the property, the number of illegal social trails would likely increase as trail users would be attracted to portions of the property that are still closed, such as Hat Rock and along the golden eagle cliff edge. Not only would this require additional inspection and enforcement by the ranger staff and continual maintenance by trails staff, it would also be a safety concern for the public. In addition, the number of visitors would likely increase because of the easy access to the trail from town, which would impact the trail as well as staff. Because Lyons is a tourist destination, the trail would likely be used by many non-county residents, thus increasing these impacts. This desire is specifically called out in the town of Lyons' Resolution 2021-100, which was the impetus for this assessment:

WHEREAS, the Lyons Comprehensive Plan emphasizes, in multiple focus areas, the importance of establishing regional trail connections in the Lyons area, including the following...

- (b) POSTR Strategy 1.1.8: "Create a map of trails and key destinations in Lyons and the immediate surrounding area to help include Lyons' parks, trails, and open lands into the Town's marketing plan."
- (c) Economic Development Strategy 2.1.1: "Implement the Town of Lyons Marketing Plan to promote Lyons as a tourism and retail destination."

and

WHEREAS, owners of new or planned hotel and tiny home resort properties in Lyons, as well as the users of such properties, have emphasized the importance of promoting Lyons as an outdoor recreation destination and providing outdoor recreation opportunities for visitors to Lyons

4. Conclusions

Based on the re-assessment of existing resources at Corona Hill, Parks & Open Space has determined that the closure on Corona Hill is still warranted and a new trail is not feasible. Parks & Open Space, however, will continue working with the town of Lyons on a suitable, sustainable, environmentally-sound trail connection between Lyons and Hall Ranch where feasible.

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