

Gunbarrel Hill Site Management Plan

A Summary of the Process and Management Guidance, as refined and recommended by the Open Space Board of Trustees

City of Boulder Open Space and Mountain Parks
March 2020

Executive Summary



Figure 1: Runner along East Boulder Trail

Over eighteen months, staff with Open Space and Mountain Parks (OSMP) led the Gunbarrel Hill Integrated Site Project (ISP) to integrate and apply systemwide guidance and community desires for the high-value habitat blocks and trails in this area (see figure 2 showing the project area). In partnership with nearby residents and other community members, staff developed a project goal and objectives that led to the development of several alternatives. Staff then presented a draft preferred alternative for community review and revised the proposal based on that feedback. On February 13, 2020, the Open Space Board of Trustees (OSBT)

then considered the refined preferred alternative. After requesting final refinements, the board unanimously supported staff's proposal.

This summary provides background on the project and describes the preferred alternative, as amended by OSBT. Changes to this document made as a result of OSBT guidance have been highlighted in grey.

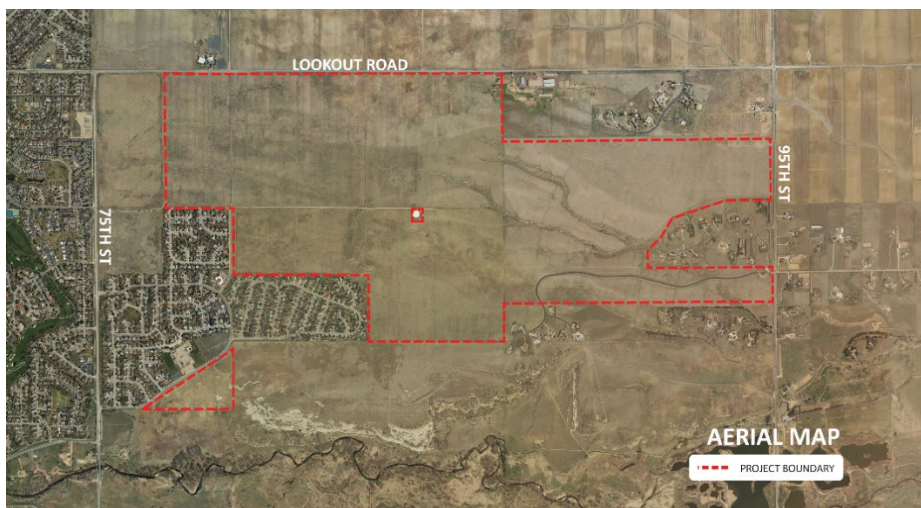


Figure 2: General project area shown in red dashed line.

Project Background



Figure 3: Grasslands at Gunbarrel hill in the Spring.

Once plowed, annual cropland during the 20th century, the Gunbarrel Hill project area is the site of OSMP's longest running grassland restoration project. After purchasing the land in the 1980's parcel by parcel, Open Space partnered with the USDA Natural Resource Conservation Service to stabilize and improve the soil by seeding with native grasses. Thirty years later, the native grass cover and height now create some of the best ground-nesting bird habitat in Boulder County (figure 3). Still, many of these bird species

are declining across the Great Plains due to habitat loss. In fact, the National Audubon Society documented greater than a 50 percent population decline for eight grassland bird species over the last 40 years. (Butcher and Niven 2007). For a more detailed map of resources at the site covering the existing conditions, see Appendix A.

Specifically, the Grasshopper Sparrow (see Figure 4 to the right) – while relatively abundant in the Gunbarrel Hill area – is at risk of further habitat loss across the broader grassland ecosystem. Gunbarrel Hill supports the densest population of Grasshopper Sparrows on OSMP (figure 5) and on public lands in Boulder County. However, a gradual increase in undesignated trails over the past decade threaten native grassland habitat in the planning area. Research indicates that Grasshopper Sparrows avoid nesting within 50 meters of edge habitats (Delisle and Savidge 1996) and are significantly more abundant in interior grasslands than those near human activity (Bock et al. 1999). Indeed, the species is considered “area-sensitive”, meaning that they are more likely to be present and more abundant in larger habitat blocks (Herkert 1994).



Figure 4: Grasshopper Sparrow sitting on barbed wire.

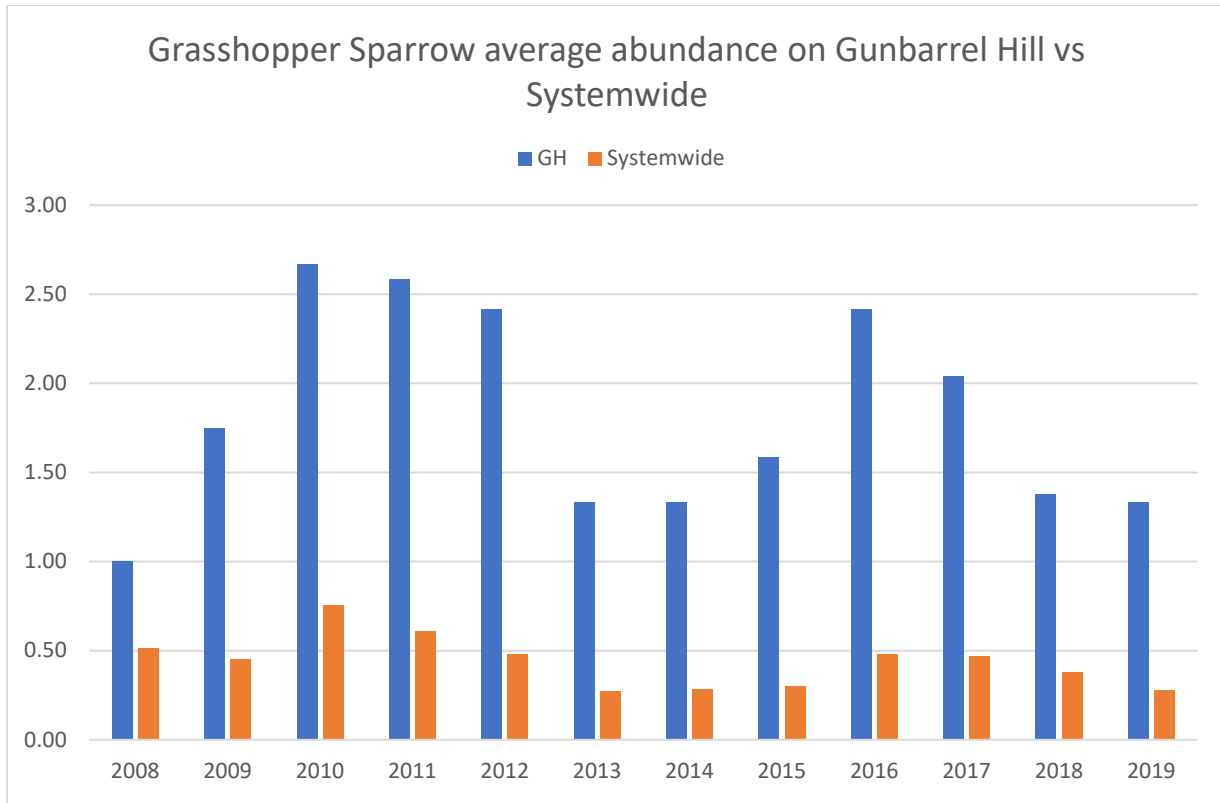


Figure 5: Grasshopper Sparrow average abundance on Gunbarrel Hill vs. Systemwide (measured by average number of singing males per transect)

Further, the OSMP Grassland Ecosystem Management Plan (Grassland Plan) identified the Grasshopper Sparrow as an indicator species for assessing the health of the mixed grass prairie mosaic, which once dominated Gunbarrel Hill. The health of an indicator species, often measured by abundance on the landscape, is integrally associated with the health of the ecosystem, which includes other species of concern found on Gunbarrel Hill such as other ground-nesting songbirds, the Burrowing Owl, Northern Harrier and Leonard’s (Pawnee) Skipper. In fact, the diversity of wildlife on Gunbarrel Hill led to the designation of the area as Critical Wildlife Habitat in the Boulder County Comprehensive Plan (2014). Coupled with increasing undesigned trails at Gunbarrel Hill, these habitat protection goals and broader ecosystem trends gave rise to the Gunbarrel Hill Integrated Site Project.

Community members have long enjoyed using this area on a regular basis, often to walk dogs, hike, run, horseback ride or bicycle. In a 2016-2017 OSMP visitor survey, 78 percent of respondents reported having visited OSMP for 10 or more years, and 65 percent reported visiting an average of more than 3 times per week. In 2017, staff estimated that the project area supported roughly 77,000 total annual visits, many of which came from repeat visitors. This long-standing, frequent use underscores the important sense of place this area provides neighbors and the broader community.



Figure 6: A family walking along East Boulder Trail

Through community engagement for this project, members of the public expressed enjoying this area because of its opportunities for passive recreation, the views it provides, and the peaceful opportunities it affords in an open, wild, and relatively low-use environment (see Appendix B: Engagement Window 1 - Summary). For example, during the first engagement window, staff asked community members, ‘*What is great about Gunbarrel hill now?*’ One respondent said, “The silence and the long stretches of endless grasslands. Love the sounds of the birds in Spring.” In addition, we heard an appreciation for the land in responses like, “The native landscape, grasses and wildlife it nourishes.”

By providing both visitor facilities like designated trails and staff-led educational hikes, OSMP staff and volunteer naturalists facilitate and deepen these connections with nature. Several times a year, for example, OSMP’s education and outreach team organizes walks up to the viewpoint at the top of the hill, supporting natural inquiry, bird identification and other interpretive opportunities. In addition, the Wood Brothers property – near Heatherwood Elementary – supports activities such as casual walking and wildlife viewing. These opportunities engage the community with the natural wonders in their own backyard and inspire collective stewardship for these important grasslands.

Existing Conditions

OSMP facilitates access to the Gunbarrel Hill area through two main entrances – one within the Heatherwood neighborhood at Boulderado and Cambridge and one directly off 95th Street near the Gunbarrel Ridge property. Visitors can also access the area from the south on the East Boulder Trail.

Currently, OSMP manages about 2.3 miles of designated trail along the East Boulder Trail within the project area, much of which needs more than just routine maintenance. Most of this mileage is open to a diversity of uses including hiking, walking dogs on-leash or under voice and sight control, horseback riding, or biking. Currently, dogs are not allowed on one stretch of East Boulder Trail out to 95th street.

Beyond these official trails, based on our data from 2017 and 2018 about 11.8 miles of undesignated or informal trails have also emerged over time, which suggest visitors are looking for more opportunities than OSMP currently provides. We also understand that this has and continues to expand. Figures 10 and 11 display the growth between 2002 and 2017.

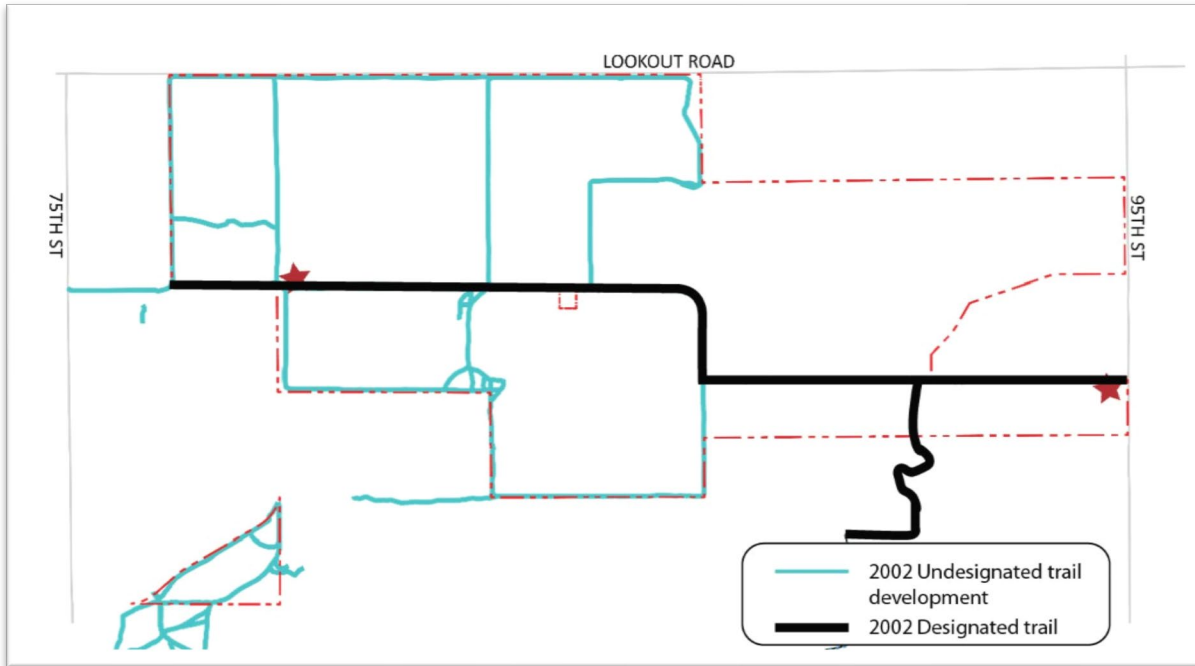


Figure 7: 2002 Undesignated trail development.

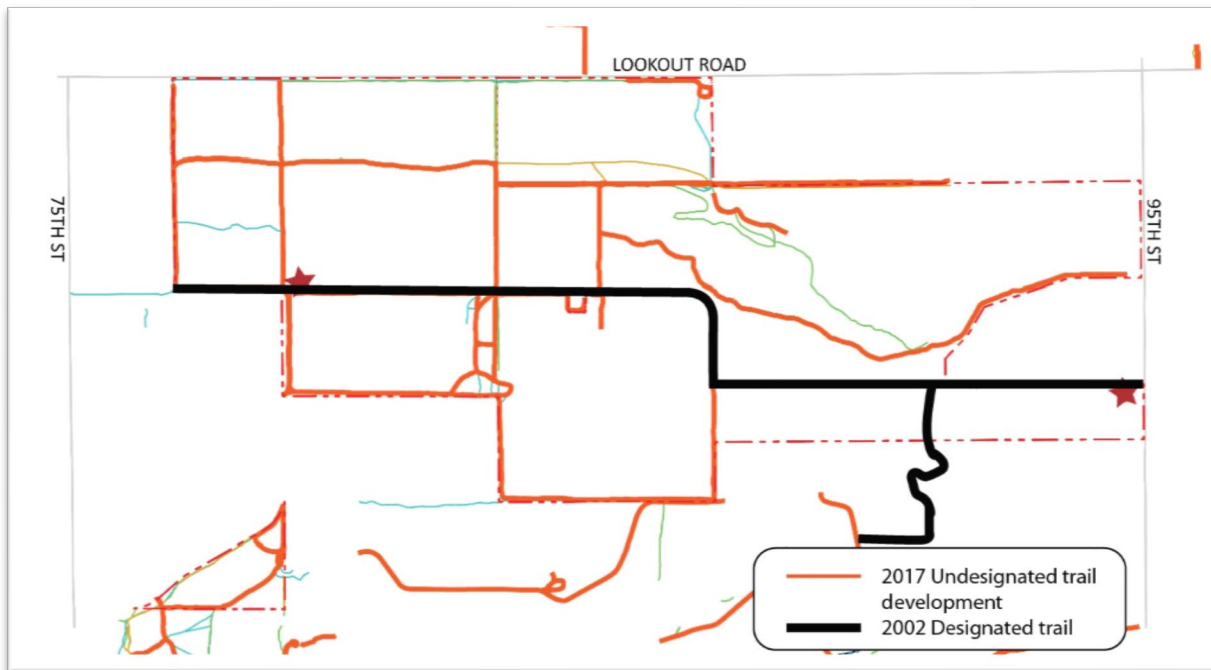


Figure 8: 2017 Undesignated trail development.

While these undesignated trails can support visitor enjoyment, they also impact the quality, size and availability of habitat for:

- the Grasshopper Sparrow, a tier 2 species of greatest conservation need in the updated Colorado State Wildlife Action Plan (SWAP) from 2015; and
- the Burrowing Owl, a tier 1 species in SWAP and a Colorado State Threatened species.

Additional ecological considerations include another species of special concern in the state of Colorado – black tailed prairie dogs – as well as important patches of untilled native grasslands that remain along intermittent streams. Currently, prairie dogs are abundant in some parts of Gunbarrel Hill, providing prey for raptors and nest locations for burrowing owls. Remnant untilled grasslands, however, are at risk in the northeastern section of the project area where staff documented new undesigned trails in 2017. These new trails further reduce habitat block size and increase the risk of spreading invasive weeds. All of these influences are impacting habitat quality and further challenging restoration efforts.

As stated in the Grassland Plan and OSMP Master Plan, habitat block size is one way to assess ecological health and resilience, as larger blocks:

- Are more likely than small blocks to be self-sustaining;
- Are better insulated from impacts from surrounding land use than smaller blocks;
- Possess a higher diversity of species;
- Support more biotic and abiotic processes, such as fire, grazing, predation and soil forming processes;
- Are more resilient and better able to recover from extremes in natural or new disturbances;
- Provide a fuller range of habitat variability;
- Support the habitat needs of a wider range of species—both plant and animal;
- Support species requiring large areas; and
- Represent the best opportunity to conserve species sensitive to the effects of urbanization.

At Gunbarrel Hill, undesigned trails have reduced habitat block size and therefore, the viability of these natural lands and the species that depend on them. At a little over 1000 total acres, the project area is fragmented into smaller habitat blocks, many of which do not meet the threshold for suitable habitat (Figure 9 below).

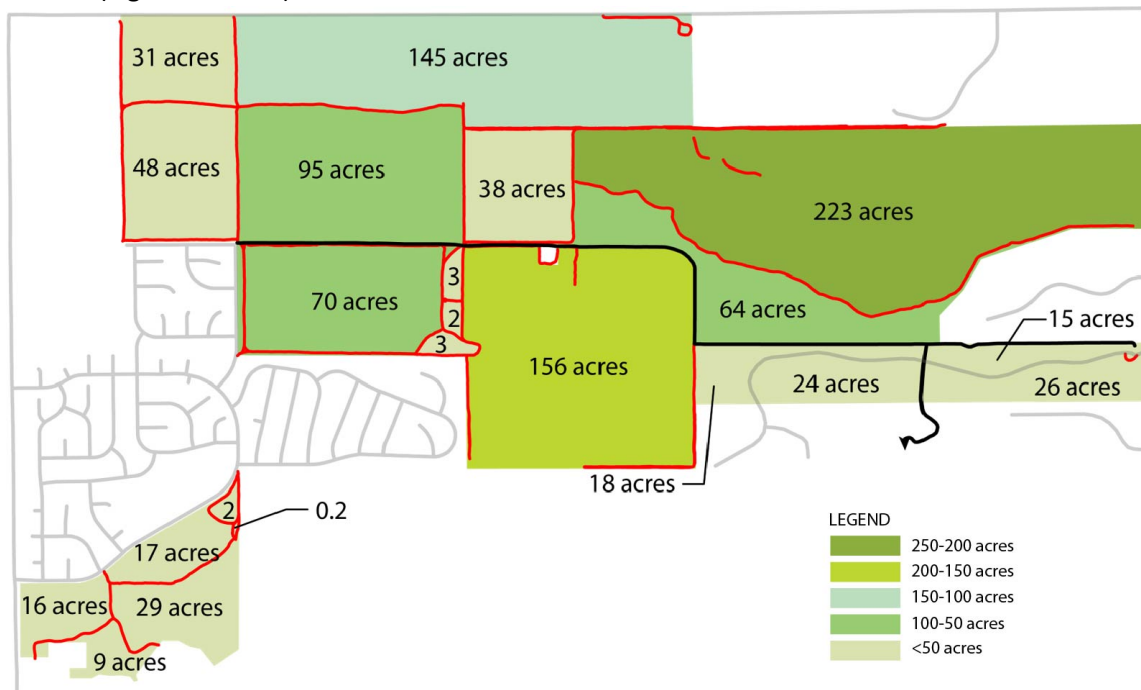


Figure 9: Habitat blocks as delineated by trail development, 2017.

Policy Guidance

To improve trail conditions, community connections with nature, and habitat quality in the Gunbarrel area, staff collaborated with the community to develop management solutions that best meet the overall project goal and objectives. As a first step, the following policy guidance informed this integrated process.

The OSMP Master Plan, approved by City Council in 2019, directs staff to prioritize and support ecosystem health and resilience and:

- **PRESERVE AND RESTORE IMPORTANT HABITAT BLOCKS AND CORRIDORS:** Sustain, enhance, connect and restore habitat blocks with high ecological value and potential through conservation practices.
- **REDUCE UNDESIGNATED TRAILS:** Guided by best practices or area-specific plans, mitigate resource impacts by restoring, designating, re-routing or recategorizing undesignated trails, especially in sensitive habitat areas, while considering appropriate routes to serve desired destinations for visitors.
- **EXTEND ON-TRAIL REQUIREMENTS:** Through future area planning, reduce off-trail travel in targeted locations, especially in sensitive habitat areas.

Within other focus areas, it also guides staff to:

- **REDUCE TRAIL MAINTENANCE BACKLOG**
- **SUPPORT A RANGE OF PASSIVE RECREATION EXPERIENCES**
- **CONNECT YOUTH TO THE OUTDOORS**
- **PROVIDE WELCOMING AND INSPIRING VISITOR FACILITIES AND SERVICES, and**
- **INSPIRE ENVIRONMENTAL LITERACY AND NEW INVOLVEMENT IN OSMP.**

Over the decades, staff has also managed this area in accordance with the Grassland Plan and the 2005 Visitor Use Master Plan (VMP). For example, the 2005 VMP designates this area as a Passive Recreation Area and recommends staff to:

- address undesignated trails around the Gunbarrel and Heatherwood subdivisions;
- consider visitor access restrictions to support the restoration of native grasslands on the Conservation Reserve Program lands; and
- require seasonal closures or dog exclusions to protect seasonal nesting of grassland birds.

The 2010 Grassland Plan identifies two important conservation targets to manage for at Gunbarrel hill:

- **Mixed grass Prairie Mosaic** (where mid- and short-grass prairie species blend with Rocky Mountain species to form a distinctive and localized set of plant associations), and
- **Black-tailed Prairie Dog and Associates** (where the presence of these prairie dogs provides prey and landscape structure necessary for associated species and the larger grassland ecosystem).

The Grassland Plan also classifies the northwest parcels of Gunbarrel Hill as a Best Opportunity Area for grassland restoration and directs staff to increase bird community diversity and reduce non-native species within the mixed grass prairie mosaic.

Project Goal and Objectives

At the first and second public engagements for the Gunbarrel Hill Integrated Site Project, OSMP staff presented a draft goal and supporting objectives to obtain input from the community. Based on what we heard, we then modified the goal and objectives to capture the community's values. The final statements are shown below.

Gunbarrel Hill ISP Goal

"In partnership with the community, improve the quality of the habitat for native ground-nesting birds and other wildlife, while providing an enhanced visitor experience to promote enjoyment of the area."

Objectives

- Enhance opportunities for access and enjoyment.
- Restore and conserve the high-quality habitats on Gunbarrel Hill.
- Partner with the community in planning, design and stewardship efforts.

Developing Alternatives and Community Engagement

Guided by the citywide Engagement Strategic Framework, the approach to engagement included three engagement windows. The [project website](#) contains the presentations, posters and summaries of community input for the ISP's engagement up to this point.

Engagement Window 1: Background and Project Goal Setting (Involve)

The purpose of the first engagement window was to introduce the project, the site's history and context, as well as explain OSMP's reasons for the project and request feedback on the draft goal. The engagement window kicked off with a community meeting at Heatherwood Elementary School on January 23, 2019. A staff naturalist and interpreter shared the historic and cultural context of the site as well as the natural wonders of the grassland ecosystem. After the presentation, staff shared an overview of the site and an explanation of why we were there. A draft project goal was shared with the intent to use it as a starting point for conversation and refinement. This meeting was followed by a two-week online questionnaire so community members who did not attend the meeting could provide their input and so that meeting attendees who formed ideas after the meeting could also share their thoughts. A summary of community input is available on the [project website](#).

Many community members were excited to hear the background and story of Gunbarrel Hill and asked for more educational opportunities. Others were glad that OSMP was ready to address visitor access and enjoyment, as very little planning and design work had been focused on the area since its acquisition 20

to 30 years ago. Participants also expressed interest and concern over the expansion of prairie dog colonies in the area and the prospect of oil and gas development. By the end of the engagement window there was strong support for the project goal and the community had provided a great deal of input that informed the development of draft objectives and conceptual options for the next round of community input.

Engagement Window 2: Developing Options (Involve)

The engagement window opened with a public workshop at the OSMP Hub on June 19, 2019 and included a two-week online questionnaire that began after the workshop. At the workshop and online, staff shared the results of the first engagement window, as well as the project timeline, the final project goal, and draft project objectives. Staff also asked for feedback on two conceptual options for addressing the project goal and objectives, see Appendix B. Over 85% of those who responded to the open-access, online questionnaire or attended the workshop preferred Option 1. After the close of the second engagement window, staff modified Option 1 in response to suggested improvements from the public to develop a preferred alternative for habitat restoration and trail improvements.

Engagement Window 3: Review of the Draft Preferred Alternative (Involve)

The purpose of this period of community engagement was to introduce refinements to Option 1 and get feedback on the draft preferred alternative to inform any further revisions prior to OSBT consideration. Specifically, staff sought input on proposed approaches for enhancing visitors' experiences and managing visitor use to achieve the project goal and objectives. The third engagement window started with a workshop at the OSMP Hub on December 9, 2019, which was complemented by an online questionnaire open from 12/10/19 to 1/1/20, an extended response time due to the holidays. All materials from the workshop and summaries of public comment are available online [here](#).

Feedback during this final engagement window included support for the preferred alternative, as well as final suggestions to improve or clarify certain elements, including:

- Maintaining the natural character of trails, including topography, surfacing and width;
- Moving trails further away from private property where feasible;
- Adding or enhancing small gathering areas in strategic locations;
- Enhancing the trailhead area at Boulderado and Cambridge;
- Improving signs; and
- Adding site amenities such as dog stations further within the site.

Final Management Guidance

The preferred management approach for Gunbarrel Hill focuses on relevant guidance in the Grassland Plan and Visitor Master Plan as well as the OSMP Master Plan. Many of the recommendations also address community values and ideas shared throughout the ISP process. For example, under this preferred alternative (see Figure 10), staff **will**:

- Designate and/or improve a variety of new trail loops that vary in length and character;
- Increase habitat block size by closing and restoring undesigned trails in high-value Grasshopper Sparrow habitat (once each phase of trail improvement projects begins);
- Following trail construction phases, seed grasslands with native forbs to increase habitat quality;
- Continue managing invasive weeds;
- Establish an annual, seasonal closure from May 1 to July 31 to protect grassland nesting birds, requiring all visitors to stay on trail and dogs to be leashed (once each phase of trail improvement projects begins);
- Create small areas to gather, take in views and/or sit and rest;
- Address major maintenance needs along the East Boulder Trail;
- Install and manage fencing adaptively to increase the success of restoration efforts;
- Monitor ecological health and undesigned trail restoration over time to track progress towards project objectives;
- Collaborate with the community to consider volunteer opportunities to work with staff on stewardship projects;
- Update on-site educational opportunities and interpretive facilities to build understanding of protected species and site restoration, connect youth with nature, and inspire collective stewardship with community members.

As guided by the VMP, staff would continue managing the site as a Passive Recreation Area, in which visitors are encouraged but not required to stay on trail, except during seasonal closures. In addition, during trail construction, strategic visitor access restrictions will help ensure safety. The following table describes the most common activities and how they will be managed through the implementation of the Preferred Alternative:

| | What opportunities will be provided on site? | What provisions will support restoration success for the 2-4 years following each phase of trail construction?* | What provisions will be in place after restoration is successful?*** |
|---------------------------------|--|--|--|
| Hiking, running, walking | Roughly 6.8 miles of newly designated trail, plus roughly 3 miles along East Boulder Trail | Year-round, on-trail requirements | On-trail travel encouraged but not required, except during seasonal closure. |
| Biking | Bikes will continue to be allowed on the East Boulder Trail only. | Year-round, on-trail requirements | Year-round on-trail requirements |
| Dog-walking | Roughly 6.8 miles of newly designated trail, plus roughly 3 miles along East Boulder Trail | On leash or under voice and sight on corridor except during seasonal closure. Seasonal leash requirements from May 1 st through July 31 st during nesting season. | On leash or under voice and sight control except during seasonal closure. Seasonal leash requirements from May 1 st through July 31 st during nesting season. |

| | What opportunities will be provided on site? | What provisions will support restoration success for the 2-4 years following each phase of trail construction?* | What provisions will be in place after restoration is successful?*** |
|-------------------------|--|--|--|
| Horseback riding | Roughly 6.8 miles of newly designated trail, plus roughly 3 miles along East Boulder Trail | Year-round, on-trail requirements | On-trail travel encouraged but not required, except during seasonal closure. Seasonal on-trail requirements from May 1 st through July 31 st during nesting season. |
| Sledding | Designated sledding hill on Wood Brothers property | Not applicable | Not applicable |

*Following each phase of trail construction, the actual amount of time will be based on whether vegetation has reasonably re-established and undesignated trails are restored.

**As a part of OSMP’s adaptive management approach, staff will monitor effectiveness of restoration efforts and communicate updates with OSBT. If necessary, staff will engage with community members and/or OSBT to consider what actions would better achieve project goal and objectives.

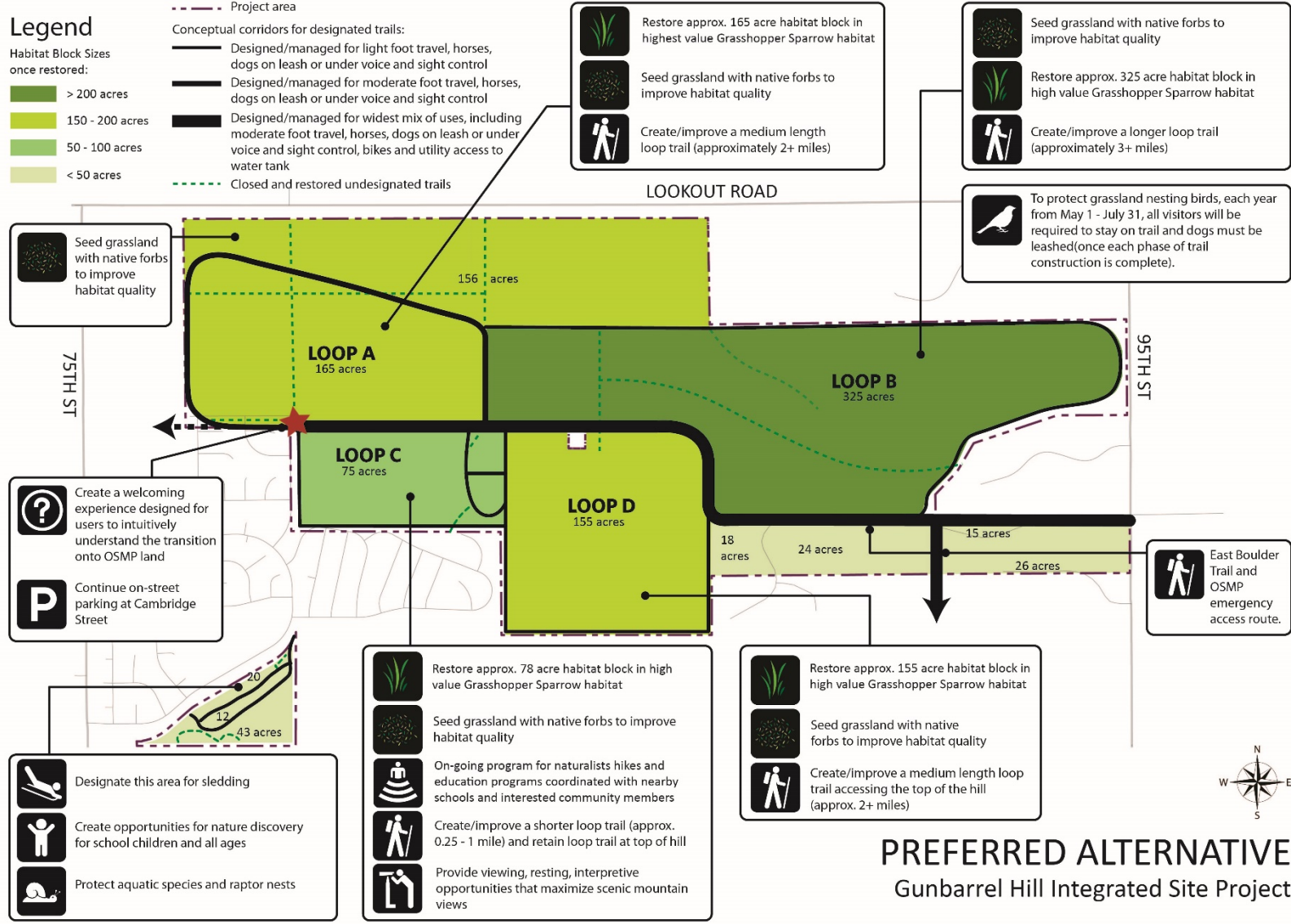
With community feedback on the preferred alternative, staff updated the site management approach to include or clarify the following:

- Designing the specific alignment, width and surfacing of each trail section to fit with the natural character of OSMP lands, including topography, soils, drainage, views, anticipated levels and types of use, and proximity to residential areas;
- Clarifying that staff will use natural materials for all trail surfaces, rather than asphalt or concrete;
- Designating the trail loop at the top of Gunbarrel Hill with the view of Indian Peaks, which is often enjoyed by community members and used by OSMP staff and volunteers to support educational programs;
- Providing a welcoming experience for visitors of all abilities that provides places to gather, learn and stage their activities at the trailhead located at Boulderado Drive and Cambridge Street;
- Improving signs to support wayfinding and clarify where and when certain uses are allowed;
- Increasing ranger presence, especially during the first few years after construction and restoration;
- Exploring opportunities to collaborate with the Boulder Valley School District and Heatherwood Elementary to support interpretation at the Gunbarrel trailhead and nature discovery on the Wood Brothers property across from the school;
- Exploring opportunities to add site amenities such as additional dog stations located further within the site where appropriate and accessible for maintenance; and
- Continuing clear communication with the local community and OSBT to keep them up-to-date on the project phases of implementation.

Legend

- Habitat Block Sizes once restored:
- > 200 acres
 - 150 - 200 acres
 - 50 - 100 acres
 - < 50 acres

- Conceptual corridors for designated trails:
- Designed/managed for light foot travel, horses, dogs on leash or under voice and sight control
 - Designed/managed for moderate foot travel, horses, dogs on leash or under voice and sight control
 - Designed/managed for widest mix of uses, including moderate foot travel, horses, dogs on leash or under voice and sight control, bikes and utility access to water tank
 - Closed and restored undesignated trails



PREFERRED ALTERNATIVE Gunbarrel Hill Integrated Site Project



Figure 10: Preferred Alternative Conceptual Site Plan for Gunbarrel Hill.

As we implement restoration and site improvements, natural resource objectives and trail sustainability will further inform the design for this site. For example, as staff continues to explore the details of how to re-align the East Boulder Trail east of the water tower, the new alignment will better accommodate drainage and follow the natural topography more than it currently does. Therefore, the conceptual trail alignments illustrated in Figure 12 do not represent specific location and alignments of trails. During more detailed design, staff will finalize those details to enhance visitors’ experiences and trail sustainability, while limiting the area of disturbance to the extent possible. This approach aims to advance all City Charter purposes for open space, including protecting and improving the health of grasslands as well as facilitating responsible recreation, stewardship and enjoyment in ways that address community interests.

In addition, the following refinements or clarifications resulted from OSBT guidance on February 13, 2020. The final management approach now also includes:

- Incorporating [OSMP’s Ecological Best Management Practices for Trail Planning and Design, Construction, Maintenance and Closure](#), including provisions that construction activities will happen outside grasshopper sparrow nesting season;
- Maintaining respectful and appropriate distances between trails and private property, with consideration of the project goal of increasing habitat block size;
- Adjusting fencing and gates as needed, for example, closing a gap in the fence along Lookout Road street or improvements along Loop B to accommodate a mix of uses;
- Installing an additional dog composting station along the East Boulder Trail within proximity of the access point at Boulderado and Cambridge;
- Using trail surface materials that are dog-friendly;
- Developing educational messaging that clarifies trail regulations and encourages compliance; and
- Developing a framework for monitoring and reporting results to OSBT and the community.

Phasing and Implementation Projects

The Gunbarrel Hill ISP process has been designed to support coordinated work-planning and phased implementation of projects that would be managed by various staff workgroups in the short- and long-term, depending on funding and staff capacity. To support this collaboration, the following table summarizes the type of implementation projects needed to move the preferred alternative forward, as well as the general phasing that would guide project timelines. With OSBT’s recommendation to proceed with the preferred alternative, staff will further develop implementation details and cost estimates.

| IMPLEMENTATION PROJECTS | Phase 1 | | Phase 2 |
|---|---------|---------|-----------------|
| | 2020 | 2021-22 | 2023 and beyond |
| Ecological Health and Resilience | | | |
| Following trail construction phases, seed grasslands with native forbs to improve habitat for grassland birds and increase native plant diversity | | X | X |
| Develop and execute weed management strategy | X | X | X |

| IMPLEMENTATION PROJECTS | Phase 1 | | Phase 2 |
|--|---------|---------|-----------------|
| | 2020 | 2021-22 | 2023 and beyond |
| Following trail construction phases, institute seasonal area closures from May 1st - July 31 st each year, requiring on-trail travel during this time to protect grassland nesting birds | | X | X |
| Inside Loop A: <ul style="list-style-type: none"> - Restore approximately 1.4 miles of undesignated trails to improve habitat quality and close newly emerging undesignated trails - Replace or extend fencing to manage public access - Require on-trail travel for first 2-4 years of restoration | . | X | |
| Inside loops B, C, and D <ul style="list-style-type: none"> - Restore approximately 8.6 miles of undesignated trails to improve habitat quality and close newly emerging undesignated trails. - Replace or extend fencing to manage public access | | | X |
| Monitoring and reporting regarding ecological health and undesignated trail restoration. | X | X | X |
| Responsible Recreation, Stewardship and Enjoyment | | | |
| Create a more welcoming experience for visitors of all abilities at the trailhead at Boulderado and Cambridge | | X | |
| Create small areas to gather, take in views and/or sit and rest | | X | X |
| Install additional dog composting station | | X | |
| Design and construct Loop A | | X | |
| Close a gap in the fence along Lookout Road | | X | |
| Improve condition, alignment and sustainability of the East Boulder Trail east of the water tank | | X | |
| Designate trail loop at the top of Gunbarrel Hill | | X | |
| Designate Wood Brothers property for sledding | X | | |
| Building on lessons learned from Phase 1, design and construct loops B, C, and D. | | | X |
| Community Connections, Education and Inclusion | | | |
| Continue community rangers and clear communication with local community and OSBT as implementation progresses | X | X | X |
| Make incremental improvements to signs and interpretive opportunities throughout the site | X | X | X |

| IMPLEMENTATION PROJECTS | Phase 1 | | Phase 2 |
|--|---------|---------|-----------------|
| | 2020 | 2021-22 | 2023 and beyond |
| Continue and enhance on-site programming through guided hikes and other ways of building connections to the landscape | X | X | X |
| Further explore design options to improve nature-based learning at the Gunbarrel trailhead and on Wood Brothers property | | X | X |
| Continue or enhance on-site volunteer opportunities for shared stewardship | X | X | X |

Additionally, revisions to managed use policies will be implemented as each phase is completed and not before. See matrix under the Preferred Alternative description for details starting on page 12.

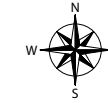
Next Steps

With a recommendation from OSBT to proceed, staff will advance this project into more detailed design, permitting and implementation planning for the site. Trail construction will begin once permits are obtained and funding secured. Restoration efforts will follow each phase of trail work, as described above. Project updates will also be communicated to neighbors and community members throughout implementation.

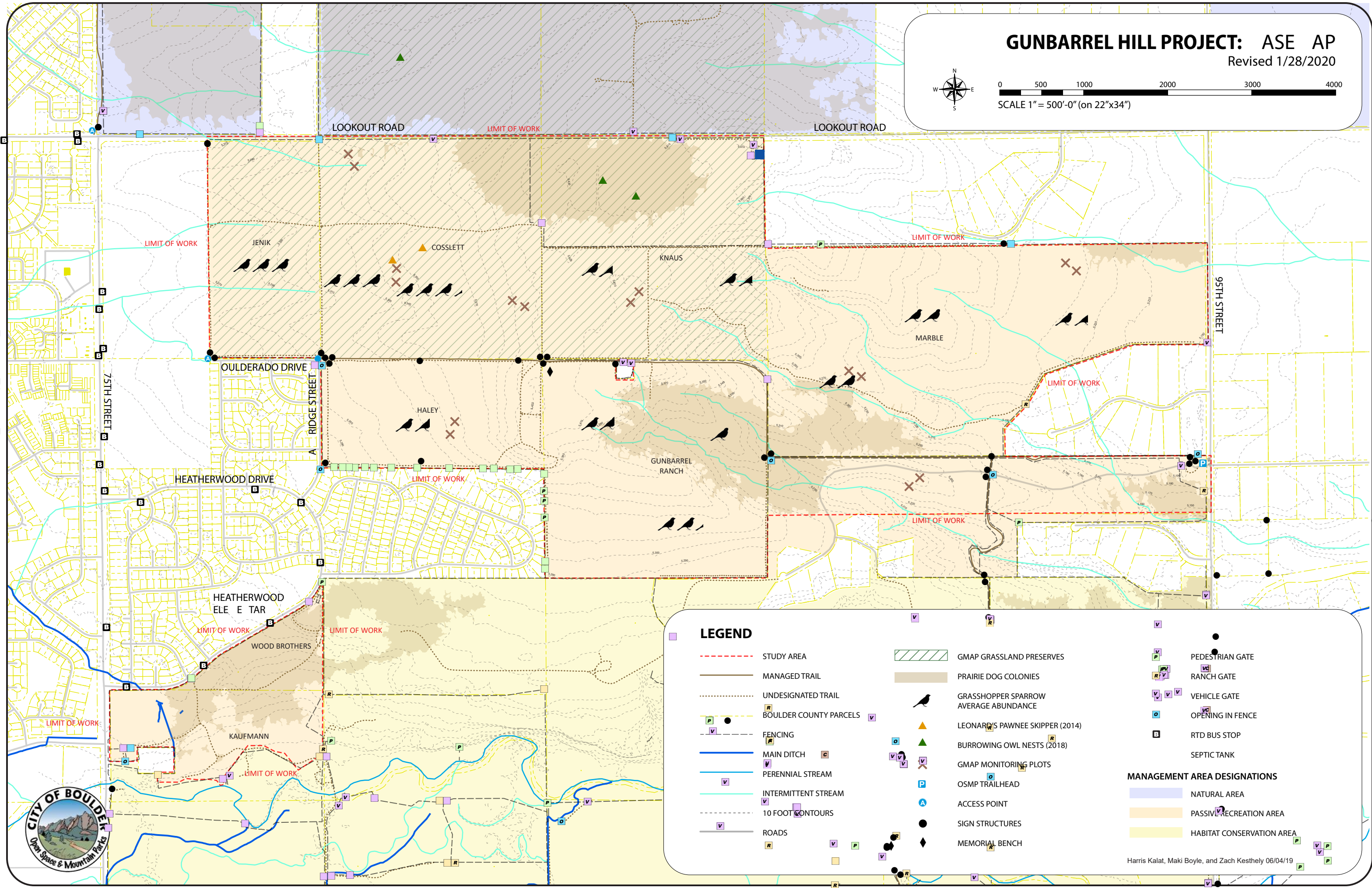
| Date | Description |
|-------------|---|
| Fall 2020 | Staff will refine the preferred alternative through detailed implementation planning to determine coordinated work plans over time. Staff will also determine specific field-located trail alignments, dimensions, and materiality that can be used to develop construction documents and be submitted for permitting. At this stage, staff will be able to phase and develop cost estimates at a level of detail appropriate to this phase of the project. |
| Spring 2021 | Final design and permitting |
| Spring 2021 | Update to OSBT |
| 2021-2022 | Phase I work begins, if funding secured. |
| 2023-beyond | Phase II work begins, if funding secured. |

GUNBARREL HILL PROJECT: ASE AP

Revised 1/28/2020



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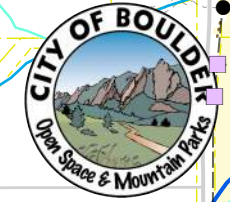
LEGEND

| | | | | | |
|--|------------------------|--|---------------------------------------|--|------------------|
| | STUDY AREA | | GMAP GRASSLAND PRESERVES | | PEDESTRIAN GATE |
| | MANAGED TRAIL | | PRAIRIE DOG COLONIES | | RANCH GATE |
| | UNDESIGNATED TRAIL | | GRASSHOPPER SPARROW AVERAGE ABUNDANCE | | VEHICLE GATE |
| | BOULDER COUNTY PARCELS | | LEONARD'S PAWNEE SKIPPER (2014) | | OPENING IN FENCE |
| | FENCING | | BURROWING OWL NESTS (2018) | | RTD BUS STOP |
| | MAIN DITCH | | GMAP MONITORING PLOTS | | SEPTIC TANK |
| | PERENNIAL STREAM | | OSMP TRAILHEAD | | MEMORIAL BENCH |
| | INTERMITTENT STREAM | | ACCESS POINT | | |
| | 10 FOOT CONTOURS | | SIGN STRUCTURES | | |
| | ROADS | | MEMORIAL BENCH | | |

MANAGEMENT AREA DESIGNATIONS

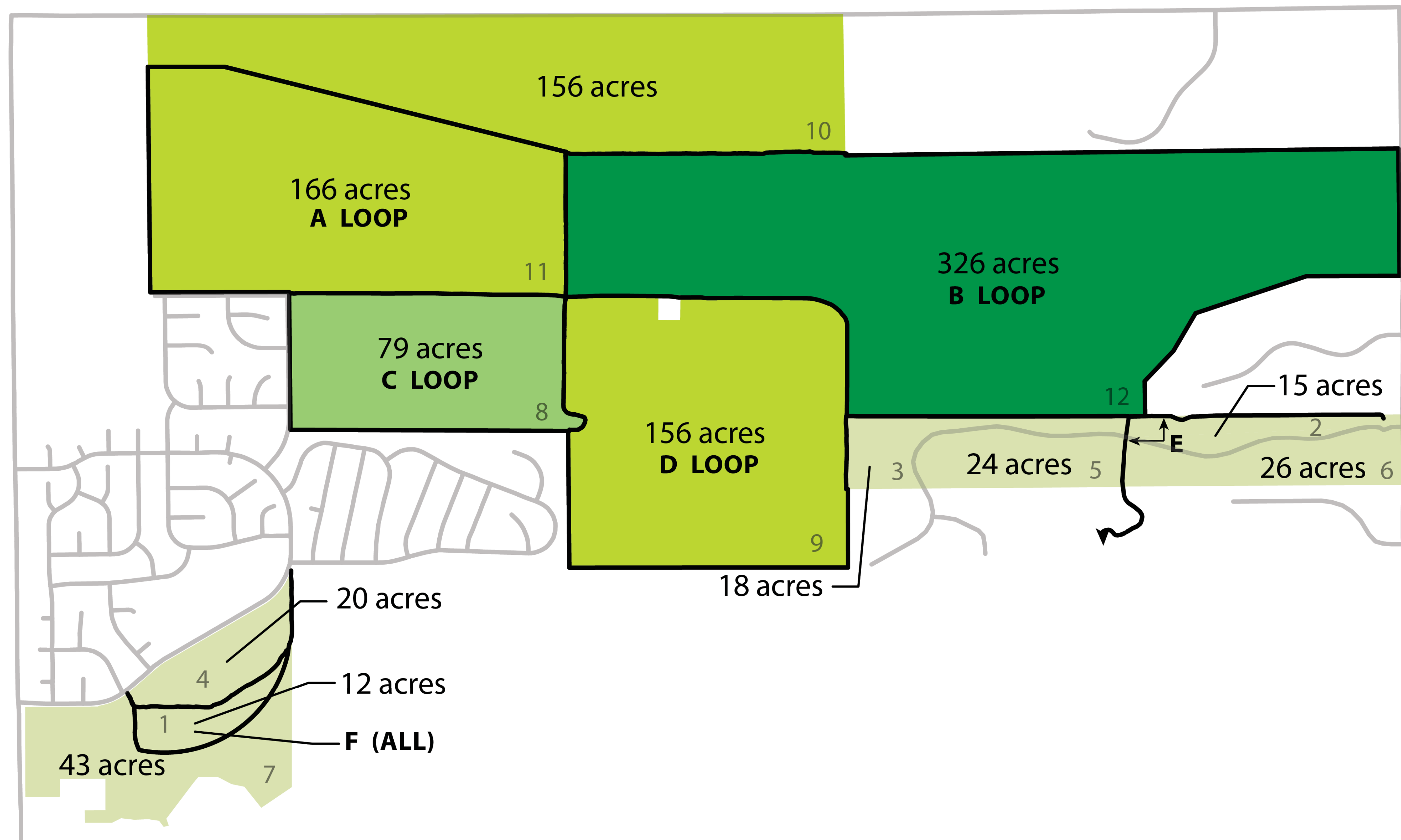
| | |
|--|---------------------------|
| | NATURAL AREA |
| | PASSIVE RECREATION AREA |
| | HABITAT CONSERVATION AREA |

Harris Kalat, Maki Boyle, and Zach Kesthely 06/04/19



GUNBARREL HILL OPTIONS

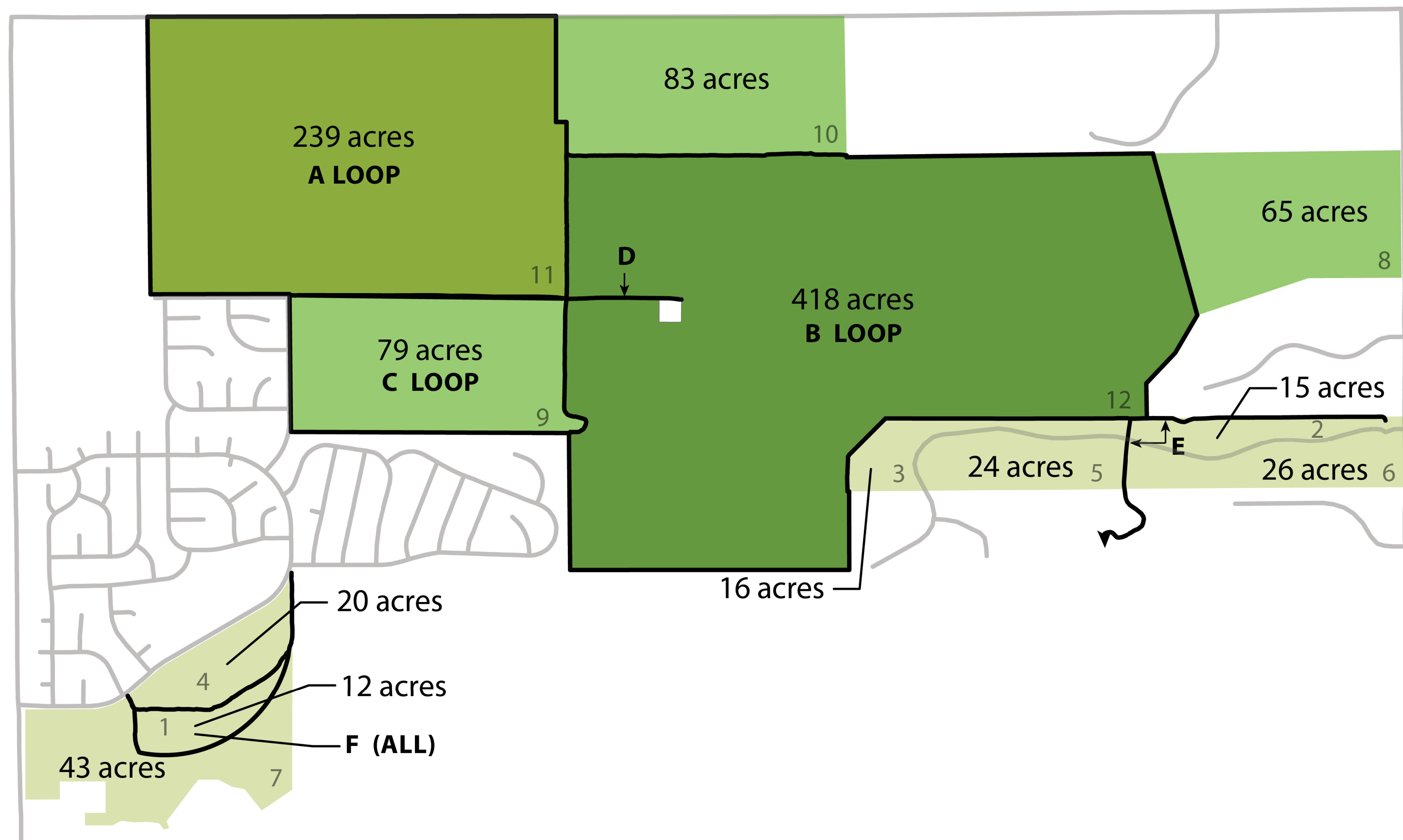
OPTION 1



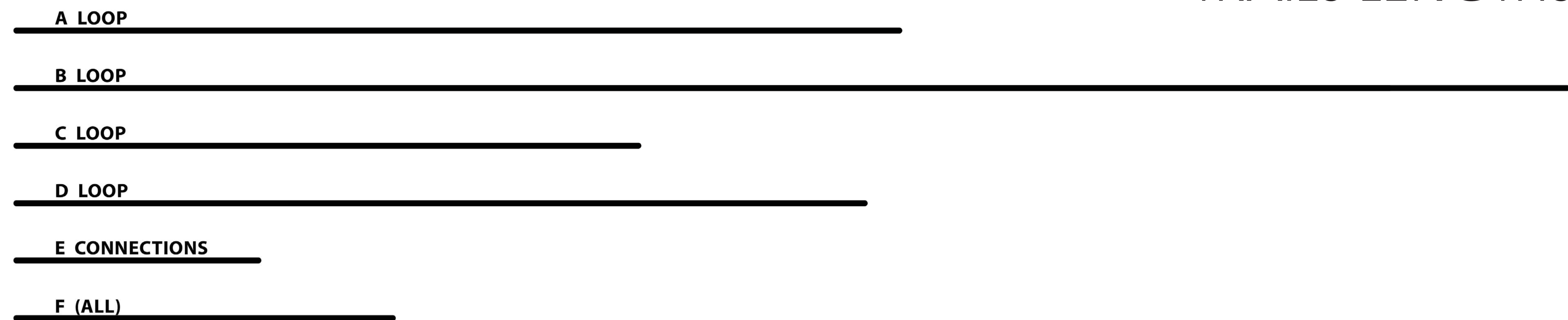
LARGEST HABITAT BLOCK: **326 ACRES**

LARGEST HABITAT BLOCK: **418 ACRES**

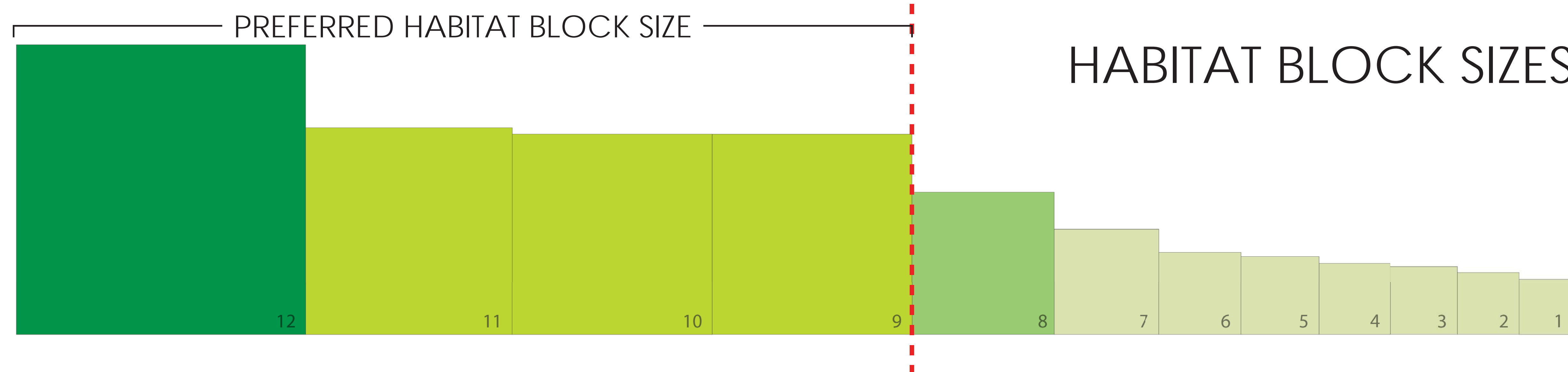
OPTION 2



TRAILS LENGTHS



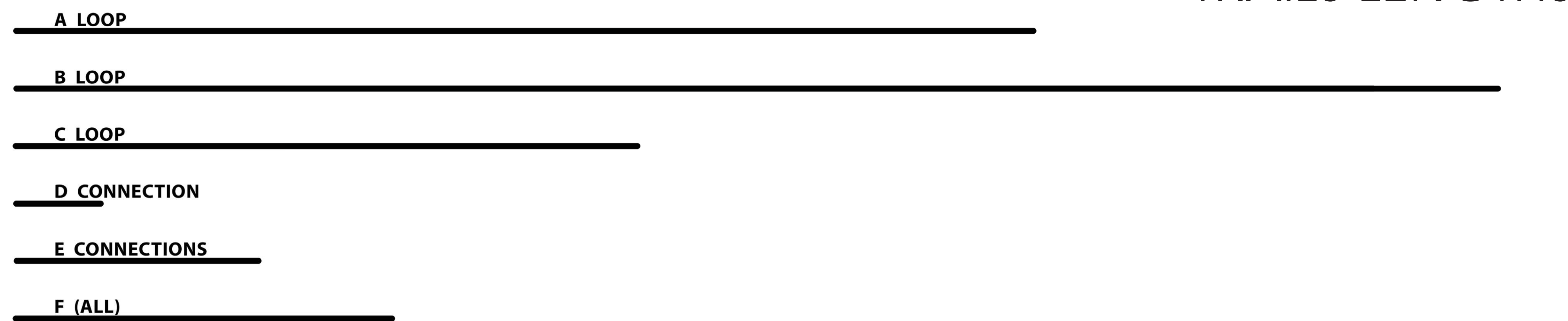
HABITAT BLOCK SIZES



MANAGED TRAIL DISTANCE: 10+ MILES

MANAGED TRAIL DISTANCE: 9+ MILES

TRAILS LENGTHS



HABITAT BLOCK SIZES

