

City of Boulder
Open Space and Mountain Parks

West Trail Study Area Recreational Resource Inventory Report



Final draft
August 2009

Table of Contents

Introduction	4
Visitor Experience	7
Recreation Opportunities	8
Access to Destinations	15
Key Destinations Served by a Designated Trail or Trailhead.....	16
Undesignated Trails.....	18
Access Points.....	21
Wayfinding Signs at Designated Trail Intersections.....	22
Signs at the Intersection of designated and Undesignated Trails.....	23
Lack of Conflict	24
Perception of Conflict Today.....	26
Perception of Conflict with Dogs Today and in the past 12 months.....	27
Perception of Conflict with Bikes Today and in the past 12 months.....	28
Visitor Displacement.....	29
Connection with the Land	30
Awareness of OSMP Education Opportunities.....	31
Participation in OSMP Education Events.....	32
Participant Satisfaction with OSMP Education Programs.....	33
Volunteer Satisfaction with OSMP Programs.....	34
Safety	35
Response Time to Safety Calls.....	36
Patrol Frequencies.....	37
Perception of Safety.....	38
Perception of Rule Enforcement.....	39
Remoteness	40
Undesignated Trails in Habitat Conservation Areas.....	41
Sign Structures per Trail Mile in Natural Areas and Western Mountain Parks HCA.....	42
Visitor Infrastructure	43
Condition of Concentrated Use Areas	44
Service Level Compliance.....	45
Infrastructure Maintenance.....	46
Condition of Trails	47
Trail Management Objective Compliance.....	48
Trail Maintenance.....	50
References	51

Appendices

[Appendix A](#): Glossary

[Appendix B](#): Peer Agency Review Data

[Appendix C](#): Key Destinations

[Appendix D](#): Undesignated Trails Report Methodology

[Appendix E](#): Visitor Survey

[Appendix F](#): Citizen Survey

[Appendix G](#): Annual Volunteer Survey

[Appendix H](#): Participant Survey

[Appendix I](#): West TSA Safety Incidents

[Appendix J](#): West TSA Summons'

[Appendix K](#): Classes and Standards for Trailheads, Access Points, and Recreation Sites

[Appendix L](#): Trails in the West TSA

[Appendix M](#): Trail Management Objective Index

Maps

[Map 1](#): Designated Trails by Type of Activity

[Map 2](#): Dog Regulations on Designated Trails

[Map 3](#): Trails and Trailheads Accessible for People with Disabilities

[Map 4](#): Access to Key Destinations

[Map 5](#): Climbing Activity

[Map 6](#): Undesignated Trails

[Map 7](#): Key Connections Not Being Served by a Designated Trail

[Map 8](#): Density of Undesignated Trails

[Map 9](#): Impact Class of Undesignated Trails

[Map 10](#): Designated Access Points along the Urban Interface and Their Spacing

[Map 11](#): Designated Access Points served by a Bus

[Map 12](#): Designated and Undesignated Access Points

[Map 13](#): Wayfinding Signs at Designated Trail Intersections

[Map 14](#): Ranger Patrol Frequency

[Map 15](#): Trail Segment Condition

Introduction

The West Trail Study Area (West TSA) contains 10,669 acres of City of Boulder Open Space and Mountain Parks (OSMP) fee-owned land. All the lands in the West TSA are categorized under one of four management area designations that were identified in the Visitor Master Plan (VMP). Three of these management area designations exist in the West TSA: Passive Recreation Area, Natural Area and Habitat Conservation Area (HCA). The primary goal of each management area is to plan for and facilitate visitor activity in areas that can best accommodate the activity, which includes providing a high-quality visitor experience and ensuring compatibility of visitor activity with natural and cultural resources. Thus, the management area designations provide the foundation for what recreational opportunities are allowed and where.

At one end of the spectrum are Passive Recreation Areas that emphasize providing a high-quality visitor experience in areas that are closer to where people live and work, and can accommodate a higher level of visitor activity. At the other end of the spectrum are Habitat Conservation Areas where the emphasis is on protecting high quality habitats while providing a more remote visitor experience. In the West TSA, there are 3,959 acres designated as HCA, 5,240 acres designated as Passive Recreation Area and 1,470 acres designated as Natural Areas.

Results from the 2004-05 Visitation Study estimate that the West TSA receives 40-45% of the total number of person visits annually to OSMP, which equates to roughly 2 million visits annually (Vaske, Shelby, & Donnelly 2009). The West TSA's popularity is also evident by the 1,072 planned Commercial Use Permit trips for lands within the West TSA boundary in 2008. A total of 15,976 people planned to participate on the 1,072 trips. The following list breaks out the total people by activity:

- Hiking 3,127
- Nature Education 6,678
- Climbing 5,743
- Photos 243
- Filming 125

To help accommodate this level of activity, approximately 78 of OSMP's 144 miles (54%) of designated trails, and 51% of the 100 trailheads/access points are located within the West TSA. There are also five facilities that can be rented by the community. These include: the Wood Shelter (Jaycee Shelter), the Stone Shelter, Sunrise Amphitheater, the Half-Way House and the Bluebell Shelter.

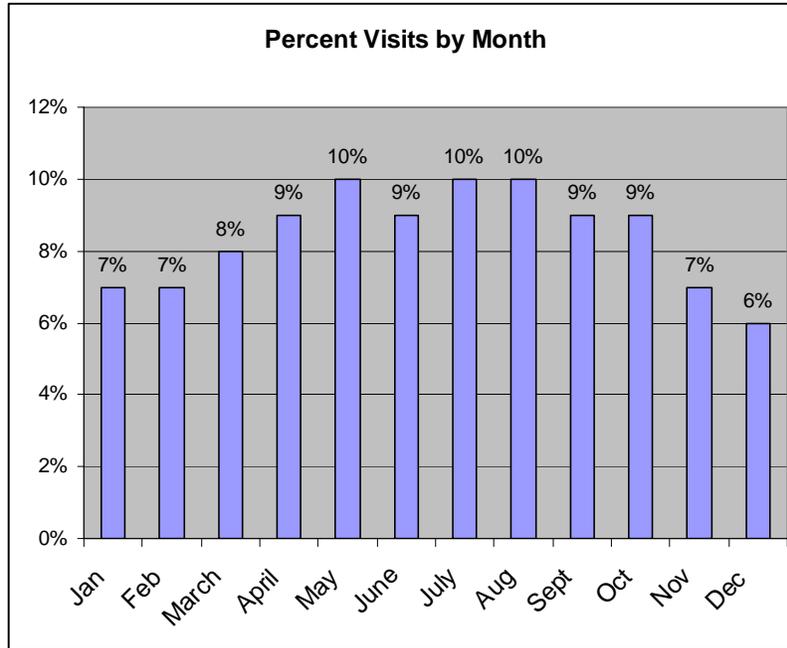
OSMP uses a variety of surveys to help understand and track visitor satisfaction with services provided by OSMP.

- The Citizen Survey is a survey of registered City of Boulder residents administered by phone or mail, and is usually repeated every 5 years (1999, 2004-05).
- The Visitor Survey is also typically administered every 5 years (2004-05), and is an exit survey of people leaving the OSMP system. The main purpose of this survey is to obtain demographic information, trip characteristics and experience evaluations.
- The Participant Survey is handed out at the end of many OSMP education programs and is used to rate participant satisfaction. This information is helpful when developing

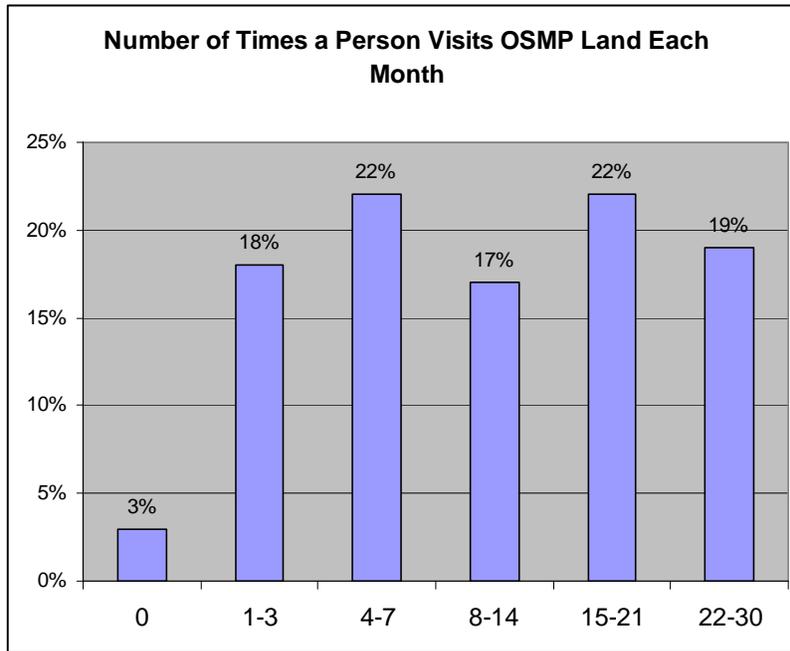
educational programs such as Meadow Music, Fishing for Kids and Roll or Stroll Birdwatching.

- The Volunteer survey is a year-end survey of every volunteer that contributed hours that year. This is an opportunity for volunteers to provide feedback about their experience and help staff continue to provide meaningful opportunities.

The following information is from the 2004-05 Visitor Survey (results are not specific to the West TSA) and is helpful to understand the “average” OSMP visitor.



- There is no “Slow Season.” OSMP receives consistent, year round visitation.
- 60% of the visitation occurs Monday – Friday, with each day receiving 12%. 19% occurs Saturday and 21% on Sunday.
- During the day, visitation peaks between 1-5:00 p.m.



- 41% of respondents visit OSMP 15 times a month or more
- The average visit lasts 1 hour
- 58% of respondents arrive at OSMP trailheads/access points by car. Compared to 32% who walk, 9% bike and 1% arrive by bus

The West TSA Recreation Recourses Inventory Report is a synthesis of the existing knowledge and data that relates to this portion of the OSMP system. This report integrates background information, recent monitoring data, past surveys and newly developed tracking systems to report the current condition of the recreation targets, attributes and indicators.

Future West TSA planning will identify and describe:

- Desired Future Conditions
- Management Issues
- Recommended strategies to deliver a quality visitor experience, sustainable visitor infrastructure and the conservation of natural and cultural resources

Recreation Target: Visitor Experience

The VMP identifies four key goals, including enhancing the visitor experience (VMP, p.28). All that a visitor does, thinks, feels and senses while on OSMP contributes to the visitor experience. Enhancing the visitor experience implies creating opportunities for visitors to enjoy their trip on OSMP. A high quality visitor experience is one that meets or exceeds the visitor's expectations (Bultena and Klessig, 1969 & La Page, 1983). OSMP managers can influence the visitor experience both directly through personal contact, and indirectly through influencing the recreation environment. The quality of the visitor experience can also be influenced by factors that land managers have no influence over, such as the weather. Given the extensive combination of all these factors and the visitor's personal preferences and values, the quality of visitor experience is difficult to measure. However, being able to gauge the quality of visitor experience is very important to land managers, and many agencies have created measures specific to the unique qualities of the resource they manage.

In the West TSA, OSMP has identified six attributes that define and can be used as a basis to measure the quality of Visitor Experience.

List of Associated Attributes

- *Recreation Opportunities*
- *Access to Destinations*
- *Lack of Conflict*
- *Connection with the Land*
- *Safety*
- *Remoteness*



Attribute: Recreational Opportunities

Summary Statistics: Trail based activities

Dog Walking

- Dogs are allowed under voice and sight control on 69% of trails in the West TSA (5% on corridor)
- Dogs are required to be on leash on 26% of the trails in the West TSA (6% are seasonal requirements)
- Dogs are not permitted on 5% of the trails in the West TSA

Horseback Riding

- Horses are permitted on 94% of the trails in the West TSA

Bicycling

- Bikes are not currently permitted on any trails in the West TSA

ADA accessible

- 1.1 miles of trail
- 7 trailheads

Refer to the following maps for the activities allowed on trail.

[Map 1](#) Designated Trails by Type of Activity is a map of the trails along with the associated allowed activities.

[Map 2](#) Dog Regulations on Designated Trails.

[Map 3](#) Trails and Trailheads Accessible for People with Disabilities



Passive Recreation Activities

Providing “passive recreation” is one of several OSMP purposes identified in the City of Boulder Charter. Although not precisely defined, the Charter does mention several “passive” recreational activities including: hiking, nature study and photography. Three other recreational activities are listed as appropriate under certain conditions: bicycling, fishing and horseback riding. However, mountain biking on lands previously managed under Boulder Mountain Parks was disallowed by City Council in the mid-1980s due to community concerns related to visitor safety and resource protection. To assist OSMP, a Passive Recreation Activity Assessment process, developed as part of the VMP, determines what activities will be considered appropriate.

The following table is from the VMP and summarizes the current status of recreational activities system-wide and where they are allowed.

Current Status of Recreational Activities on Open Space and Mountain Parks			
Allowed on Open Space and Mountain Parks (OSMP) Lands	Allowed only on Designated Trails	Allowed only in Specifically-Designated Areas or Sites	Activities <i>not</i> considered passive recreation
At current levels of use, these activities are generally compatible with OSMP visitor use and resource protection goals. The lower the impact, the greater degree of compatibility. Whenever possible, staying on-trail will minimize impact. In Habitat Conservation Areas, all visitor activities are required to be on-trail, unless approved under an off-trail permit.	To provide high-quality recreation opportunities in locations that can handle the impacts, these activities are allowed only on appropriate trails.	To provide high-quality recreation opportunities in locations that can handle the impacts, these activities are allowed only at appropriate sites.	These activities do not fit the criteria for passive recreation and therefore are not allowed on OSMP lands.
Hiking Trail running/jogging Wheel-chair use Nature study Photography Picnicking Traditional climbing/ bouldering Cross-country skiing Snowshoeing Virtual Geocaching Orienteering	Bicycling Horse-drawn wagons or sleds Dog sleds Strollers/joggers In-line skates Wheeled boards (e.g., skateboards, mountain boards) Horseback riding	Fishing Wading Tubing, kayaking, canoeing Sledding Hang/paragliding Bolted climbing Dog walking Camping (at 4 th -of-July campground only) Swimming (in creeks only) Model glider flying	Motorized vehicles Hunting Organized sports Paintball games Swimming (prohibited in lakes and ponds) Geocaching (when cache is left on OSMP property)

In the West TSA, the type of recreation opportunities provided will be based on their compatibility with natural and cultural resource protection, the management area designations, and other allowed activities in the area or on the trail.

The following table is a list of the recreational opportunities currently permitted/not permitted in the West TSA.

Current Status of Recreational Activities In West TSA			
Allowed on Open Space and Mountain Parks (OSMP) Lands	Allowed only on Designated Trails	Allowed only in Specifically-Designated Areas or Sites	Currently not permitted in the West TSA (are considered passive recreation)
Hiking Trail running/jogging Wheel-chair use Nature study Photography Picnicking Horseback riding Traditional climbing/ bouldering Cross-country skiing Snowshoeing Geocaching Orienteering	Horse-drawn sleds (non-wheeled) Dog sleds Strollers/joggers	Fishing Wading Tubing, kayaking, canoeing Sledding Bolted climbing Dog walking Swimming (in creeks only) Model glider flying	Hang gliding /paragliding Bicycling* In-line skates* Wheeled boards* (e.g., skateboards, mountain boards) Horse-drawn wagons* *(allowed only on designated roadways i.e. Flagstaff Summit Rd.)

Peer Agency Review

OSMP staff is interested in learning how OSMP’s situation and strategies compare to other jurisdictions, and thus conducted a peer agency review. Municipal and county open space agencies in the Front Range were used in the analysis. Similar to OSMP, these agencies are supported by a voter-approved open space sales tax. Two Colorado State Parks were also used in the comparison. These parks are funded by visitor fees.

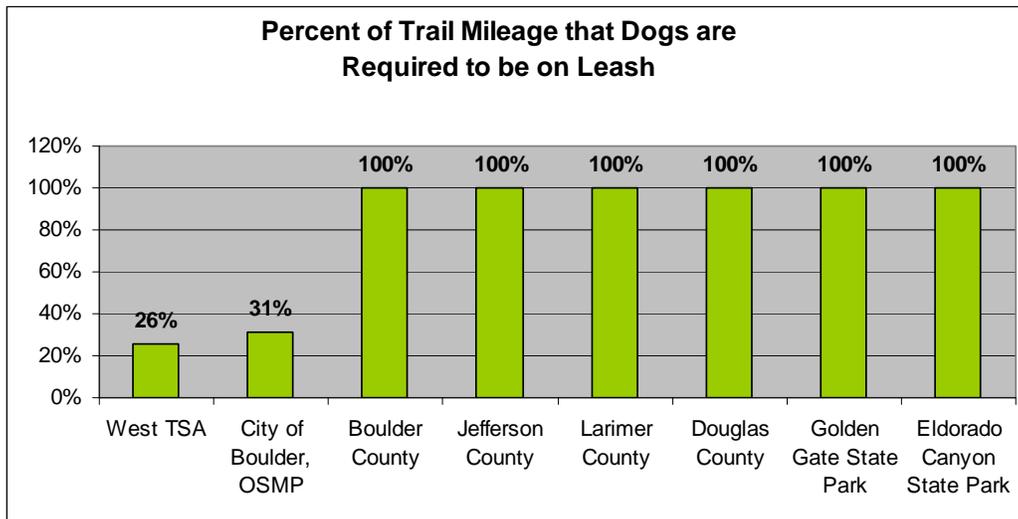
The agencies used for the peer agency review were:

- Jefferson County Open Space
- Boulder County Parks and Open Space
- Douglas County Open Space
- Larimer County Parks and Open Lands Areas
- Eldorado Canyon State Park
- Golden Gate State Park

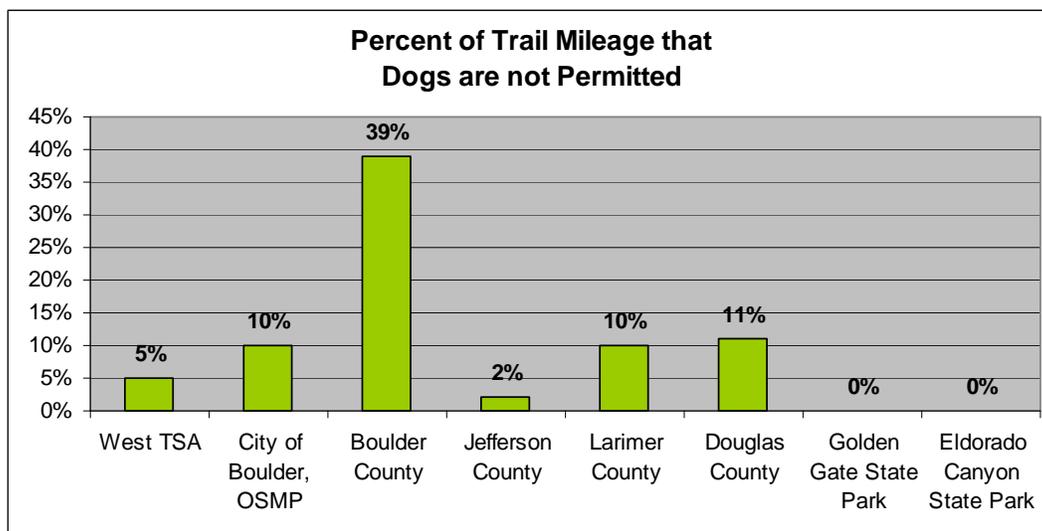
[Appendix B](#) contains the agency data used in the comparisons. Each agency’s data was obtained from their website, compiled, and sent to the respective agencies for review. Changes were made to reflect agency responses. Greenways and regional trails were not included in the analysis. [Appendix B](#) also lists the trails that were omitted from the analysis.

OSMP is interested in a comparison of:

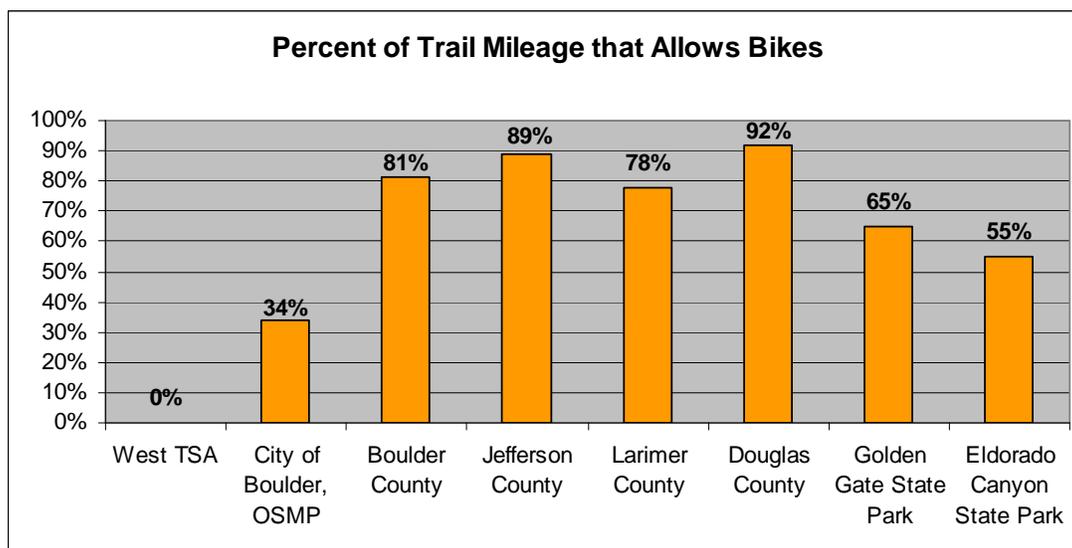
- Dog Management
- Bicycling
- Horseback Riding
- Annual Wildlife Seasonal Closures



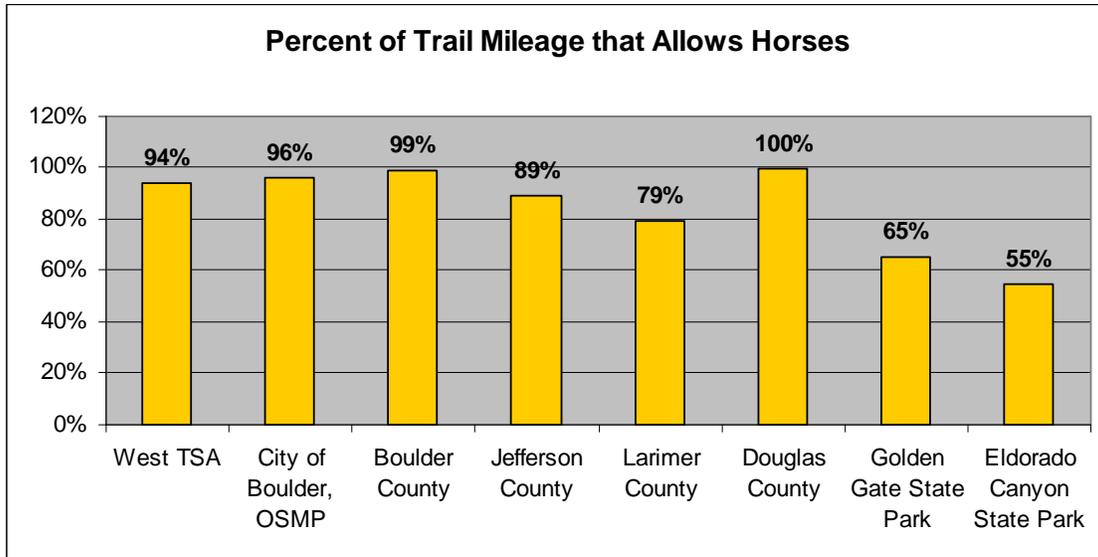
- Among the agencies surveyed, none allow dogs off-leash on trails. However, some agencies do have relatively small dog parks where dogs are allowed off-leash.
- OSMP is the only agency where dogs are allowed off-leash, under voice and sight control, on a significant portion of the trail system.



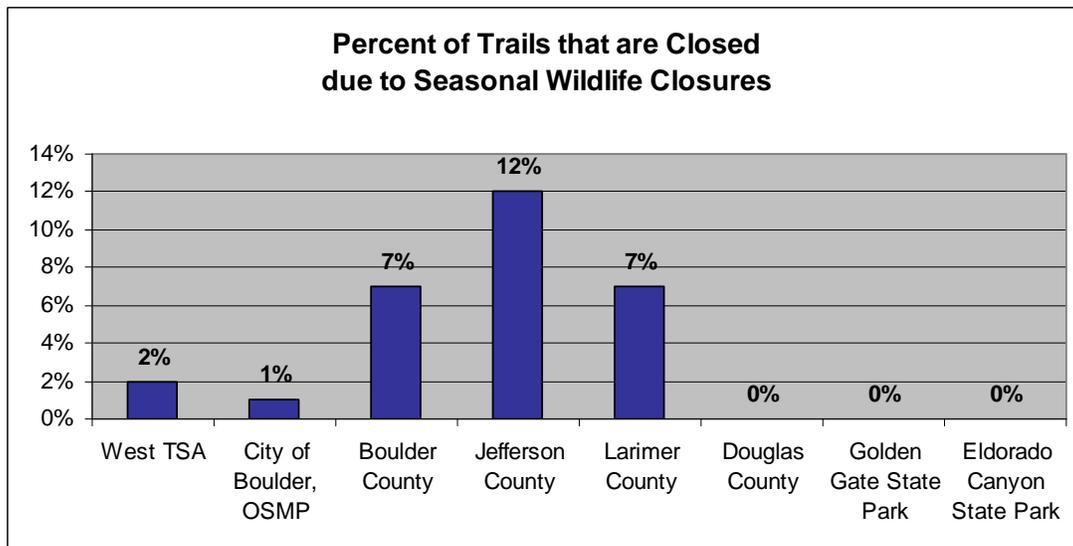
- All of the Open Space agencies (does not include State Parks) prohibit dogs on some portion of the trail system.
- Although a commonly used strategy, not allowing dogs is typically restricted to a small portion of the trail system.
- Boulder County had the highest percentage (39%) of trails where dogs are prohibited.



- Among the agencies surveyed, all allow bicycling on trails.
- All agencies, except OSMP, allow bicycling on over half their trail mileage.
- Jefferson County recently segregated hiking and biking on a portion of one of their trails.
- Boulder County and Jefferson County use an alternating activity management strategy. (i.e. bikes on even dates, hiking only on odd dates).



- Among the agencies surveyed, all allow equestrians on trails.
- In all cases, horses are allowed on a majority of the trail system.



- Four out of the seven agencies close a portion of their trail system each year for wildlife protections.
- Jefferson County also closes a portion of their trail system to accommodate hunting activities (included in their 12%).
- This strategy is typically restricted to a small portion of the trail system.

Snapshot of the Region

The relative availability and spatial distribution of passive recreational opportunities provided by land management agencies in the region may be a consideration when deciding what opportunities should be provided in the West TSA planning area. Examining the West TSA planning area in a regional context may provide direction in determining the mix of recreational opportunities.

The following agencies are the land management agencies surrounding the West TSA, and OSMP system, and create the larger context to explore the recreational opportunities of the West TSA.

- Open Space and Mountain Parks entire land system
- City of Boulder, Parks and Recreation Department
- Boulder County Parks and Open Space
- Eldorado Canyon State Park
- United States Forest Service (USFS) Boulder Ranger District

The West TSA encompasses most of the climbing and bouldering opportunities on OSMP lands. It also includes the only natural lands in the City of Boulder where sledding is allowed, Chautauqua. The West TSA contains the tallest peaks in the OSMP system, South Boulder Peak (8,549ft) and Bear Peak (8,461ft).

- The West TSA contains 78 miles of designated trails, 54% of all OSMP trails.
- One of the largest differences between the entire OSMP system and the West TSA is mountain biking opportunities. No trails in the West TSA permit mountain bikes, while they are permitted on 34%, or 49 miles, of trails in the OSMP system.
- While dogs are required to be on leash on 26% of West TSA trails, it is slightly higher for all OSMP trails at 31%. 5%, or 4 miles, of West TSA trails provide no-dog opportunities, and again is slightly higher on all OSMP lands at 10%, or 15 miles.
- 73 miles in the West TSA allow equestrians, while 138 miles of all OSMP trails allow equestrians.

The City of Boulder Parks and Recreation Department provides a variety of recreation opportunities in neighborhood ball and dog parks, recreation centers and the Boulder reservoir. Some recreation opportunities they provide are similar to those provided by OSMP. Parks and Recreation has trails in Natural Lands on three of their properties: the Boulder Reservoir Natural Area, Coot Lake, and Eaton for a combined trail mileage of approximately 6 miles. Both dogs and non-motorized bikes are allowed on all three trails. The Boulder Reservoir and Coot Lake allow dogs under voice-and-sight control, while at Eaton dogs are required to be on leash. There are three City of Boulder Parks where sledding is allowed; however sledding is not allowed on their natural lands.

Three of the larger Boulder County Parks and Open Space parks - Hall Ranch, Rabbit Mountain, and Heil Valley Ranch - are located in north Boulder County around Lyons. Other large parks are located in the western portion of Boulder County such as Walker Ranch, Caribou and Mud Lake, located near Nederland. Walker Ranch and Betasso are popular parks with relatively close proximity to the West TSA. Boulder County Parks and Open Space does not provide any voice-and-sight opportunities, and dogs are not permitted on almost 40 % (33 miles) of their trail

system. There are approximately 23 miles of mountain biking trails in Boulder County, some of which implement an alternating activity management strategy.

Eldorado Canyon State Park, located south of the West TSA, offers over 1000 climbing routes. Picnicking is also another popular activity. The park provides approximately 6 miles of trails to mountain bikers and equestrians, and 12 miles are open to dogs, but requires that they be on leash.

The Forest Service, Boulder Ranger District “elevations start at 7,000 feet in the lower foothills of the Rocky Mountains and soar to over 13,000 feet on the Continental Divide”. It is home to the east side of the Indian Peaks Wilderness, James Peak Wilderness, Brainard Lake Recreation Area, the Peak-to-Peak Highway and hundreds of miles of hiking, biking and four-wheel-drive roads. Located primarily in Boulder County and the northern portions of Gilpin County, the Boulder Ranger District covers 250,000 acres. About 160,000 acres of that area are National Forest and 87,000 acres are private lands interspersed within the national forest boundary. The Boulder Ranger District offers 261 miles of trails and Forest Development Roads (those that allow non-motorized bikes were included). They offer no dog-free areas and 65 % of the trails permit dogs to be off-leash. Dogs must be leashed in Wilderness Areas, which corresponds to 35% of trail mileage. They offer 140 miles of mountain biking opportunities, the majority of which are on 4WD roads. There are approximately 21 miles of single-track trail open to mountain bikes.

Deciding the Mix of Recreational Opportunities

The mix of recreational opportunities allowed in the West TSA is a very critical and important decision to be made during the West TSA planning process. In the Target, Attribute, Indicator report, recreational opportunities were identified as a key attribute of visitor experience.



However, there are no associated indicators. This is because a standards based, scientifically driven, framework cannot alone answer what is ultimately a policy decision that must account for concerns related to visitor conflict, trail sustainability and natural and cultural resource protection. Deciding what recreational opportunities will be allowed will be made through a collaborative community group process. An open and inclusive community conversation will be the means to working through these difficult decisions.

Attribute: Access to Destinations

The ability to travel to, enter, and navigate within the OSMP land system to destinations are all components of access. Designated trails and off-trail travel, where allowed, provide access within the OSMP system.

In HCAs, off-trail permits provide visitors an opportunity to access destinations not served by a designated trail. While in Natural Areas and Passive Recreation Areas, a permit is not required for off-trail travel. In many cases the visitor's desire to access areas not served by a designated trail is evident by the appearance of undesigned trails.

Although providing designated access to destinations is important to the visitor experience, it might not always be appropriate due to natural and cultural resource concerns.



Five indicators have been identified to measure and monitor Access to Destinations.

Indicators for Access to Destinations

- *Key Destinations Served by a Designated Trail*
- *Undesignated Trails*
- *Access Points*
- *Wayfinding Signs at Designated Trail Intersections*
- *Signs at the Intersection of Designated and Undesignated Trails*

Indicator: Key Destinations Served by a Designated Trail or Trailhead

Indicator Results:

- Habitat Conservation Areas: all 11 key destinations served, or 100%
- Natural Areas: 16 of 29 key destinations served, or 55%
- Passive Recreation Areas: 51 of 62 key destinations served, or 82%
- NCAR & NIST: 3 of 5 key destinations served, or 60%

- Overall 81/106 served or 76%

Key destinations are distinct landscape features, sites or infrastructure that have their own appeal and/or provide a point or place to linger for those traveling along a trail. Although access to key destinations is important to the quality of the visitor experience, it is only a part of the equation. Access needs to be considered along with other factors such as trail sustainability, safety and people’s opportunity to get away from the crowd.

Two categories of key destinations were identified by OSMP staff. The first category includes facilities, vistas, natural features, structures or popular gathering spots. This category makes up 66 of the 106 key destinations. The second category includes popular climbing and bouldering sites, and make up 40 of the 106 key destinations. “Popular” is defined as a formation or boulder that was estimated to receive greater than 300 visits per year. The initial list was created by OSMP staff and will need to be further refined during the community collaborative process.

Visitation to Climbing and Bouldering Areas:

Experienced climbers associated with the Flatirons Climbing Council assisted OSMP with the mapping of climbing/bouldering areas and also helped estimate visitation rates. The climbing activity ratings are:

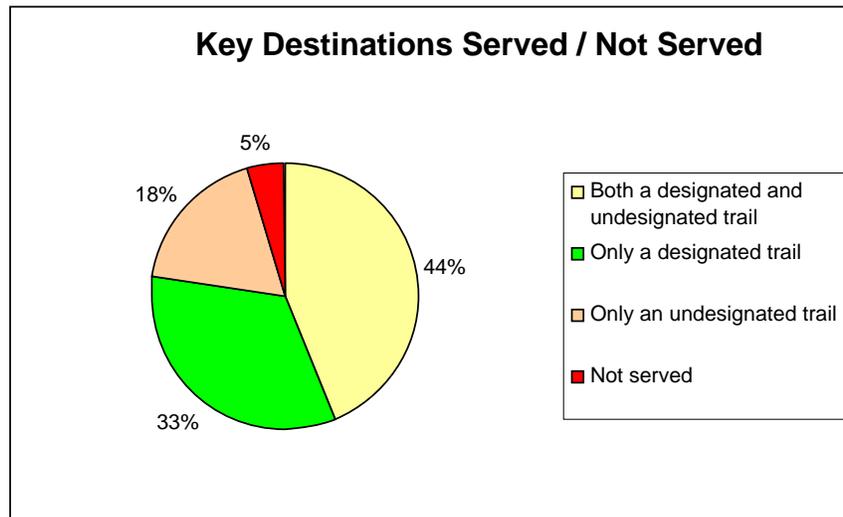
Infrequent = 1 to 100 visits/year
 Moderate = 100 to 500 visits/year
 Popular = over 500 visits/year

See [HMap 5H](#) for Climbing Activity with Estimated Visitation Rates.

Locations of key destinations are shown on [Map 4](#). All key destinations that are within 100ft of a designated trail or trailhead are considered served. Each point on the map represents a key destination. For the purpose of accurately analyzing spatial data, rock formations and trailheads were best described as geographic areas – rather than points. For these exceptions, a polygon was created around the point that encompassed the entire feature. This method of analysis can cause some confusing visual mapping results. In certain locations within the West TSA there are going to be “served” destinations that appear further from a designated trail than a non-served destination.

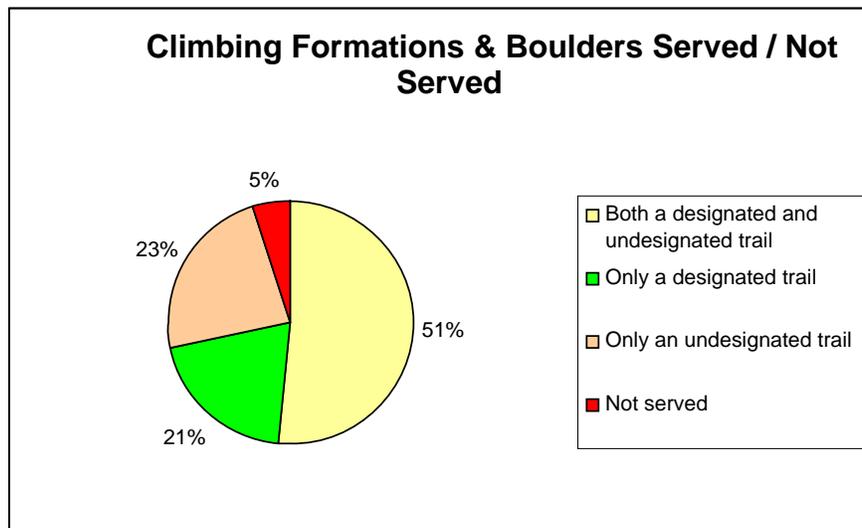
See [Appendix C](#) for a list of the key destinations, what they are, and how they are served (i.e. by both a designated trail and undesignated trail, only a designated, only an undesignated trail, and those not served).

The following figure illustrates how all key destinations are served in the West TSA.



- Undesignated trails lead to over half of the key destinations.
- Of the 23 % either not served or served only by an undesignated trail around half are in a Natural Area and the other half are in a Passive Recreation Area.

The following figure illustrates how climbing formations and boulders are served in the West TSA.



- Around half of the climbing formations and boulders in the West TSA are served by multiple trails.
- Around ¾ of the climbing formations and boulders have an undesignated trail leading to them.
- Around ¾ of the climbing formations and boulders are served by a designated trail.

Indicator: Undesignated Trails

Indicator Results:

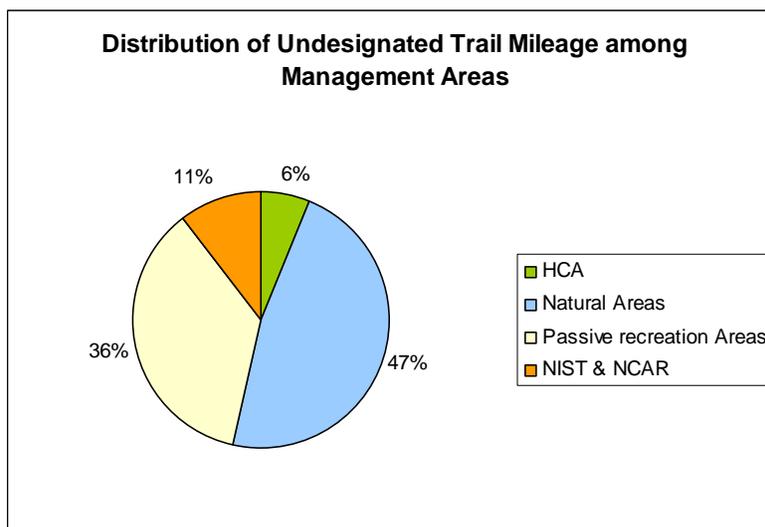
Miles of Undesignated Trails in each Management Area	
Management Area	Miles of Undesignated Trails
Habitat Conservation Area	3.5
Natural Area	27.7
Passive Recreation Area	20.9
NIST & NCAR	6.2
Total	58.3

See [HMap 6H](#) for Undesignated Trails in the West TSA.

The proliferation of undesignated trails in the West TSA is a good indication that the designated trail system does not provide access to some places visitors want to go. Undesignated trails can contribute positively to the visitor experience by providing access to destinations. However, there are also ecological impacts associated with undesignated trails, such as reduced habitat effectiveness and habitat connectivity, vegetation loss and weed spread.

This indicator is closely tied to the previous indicator, key destinations served by a designated trail or trailhead. Providing designated access, where feasible, to key destinations currently not served by a designated trail could reduce the total miles of undesignated trails. However, to reduce the mileage of undesignated trails, a variety of restoration efforts combined with public awareness tools would need to be used.

In addition, OSMP believes that some undesignated trails exist to provide links between trails. See [Map 7](#) for Key Connections Not Being Served by a Designated Trail. The identified connections are an initial list developed by staff.



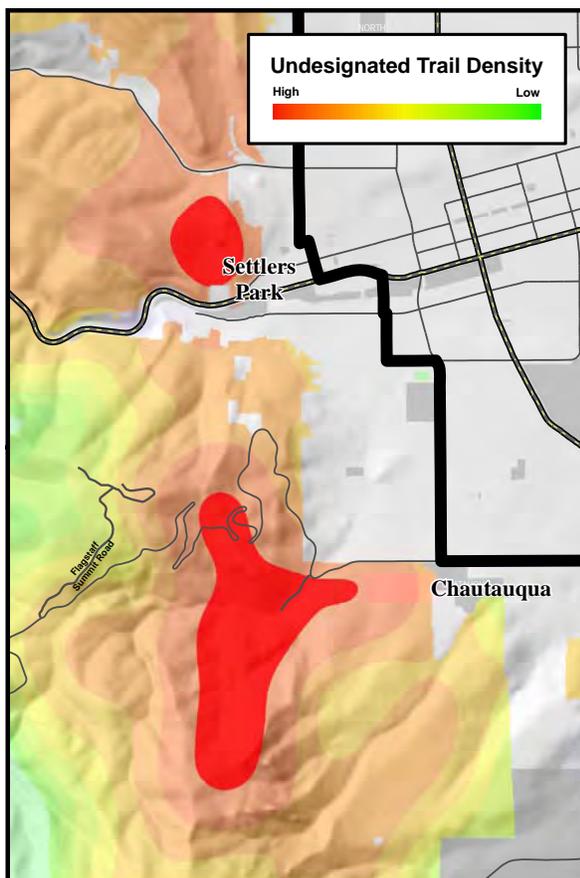
- 83% of the undesignated trails in the West TSA are located in the Natural Areas and Passive Recreation Areas.

Background

Since undesignated trails are not designed, constructed or maintained by experienced professionals they often have greater impacts to natural resources when compared to trails that are consciously designed, constructed and maintained. The lack of design in undesignated trails is evident where: multiple social trails serve a single destination, routes traverse vulnerable vegetation or sensitive wildlife habitats, and rare plants, animals or cultural resources are adversely affected by trampling or vandalism (Marion and Carr, 2007). Due to the lack of design and engineering, undesignated trails are more likely to be on flat terrain or strait up a hill. Flat trails drain poorly, this in turn leads to muddy conditions, which causes the trail to widen as people avoid muddy conditions, and erode because runoff is not properly directed off the trail. Steep trails that go strait up a hill, or follow the fall line, allow water to travel at greater speeds washing away soil material leading to erosion. Both flat and steep trails do not typically have any impediments to walking off the trail and are more susceptible to vegetation trampling and widening (Wimpy and Marion, in press).

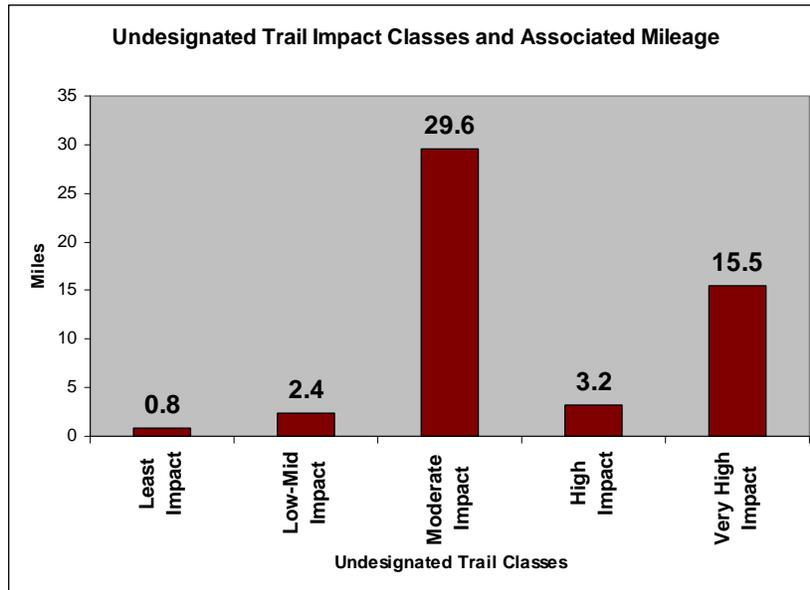
In 2006 a system-wide mapping of undesignated trails was undertaken by OSMP (City of Boulder, 2009), using methods highlighted in [Appendix D](#). Data from this system wide mapping was used to create West TSA specific maps and summaries, illustrating undesignated trail locations.

The following figure is of the areas with the highest undesignated trail density in the West TSA. See [Map 8](#) for Density of Undesignated Trails in the West TSA.



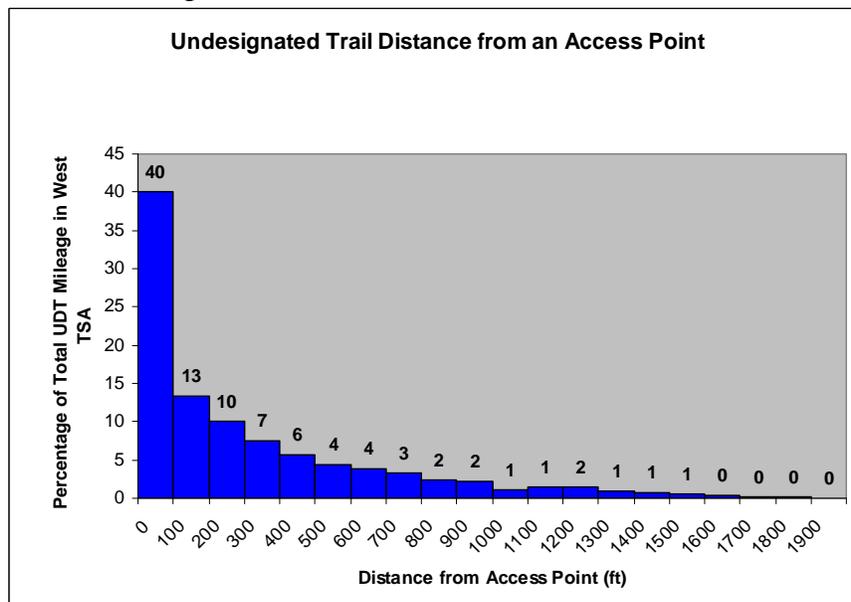
In the West TSA, undesignated trail density was found to be the highest in the vicinity of Chautauqua Meadow, Flagstaff, the 1st and 2nd Flatirons, and Settlers Park.

Undesignated trails were classified into “impact classes” (see methods in [Appendix D](#)) that measure the trail’s physical impact on natural resources, but not the overall impact to natural resources. Trail width, trail cross sectional area (width / 2 x maximum incision) and tread cover percent were measured and ranked. These rankings were combined to create one composite value, which was then classified into an “impact class”. The impact classes were Least Impact, Low-Mid, Moderate, High, and Very High Impact. See [Map 9](#) for the Impact Class of Undesignated Trails. The following figure displays the mileage of undesignated trails for each impact class.



- 57% of undesignated trails in the West TSA are classed as having a moderate impact.
- 30% are classed as having a very high impact.

The following figure illustrates the percentage of undesignated trail miles found at varying distances from a road or designated trail.



- Analysis of West TSA undesignated trail data suggests that the density of undesignated trails is related to the proximity of existing trails or roads, and the likelihood of encountering an undesignated trail diminishes with increasing distance from designated trails.

Indicator: Access Points

Indicator Results:

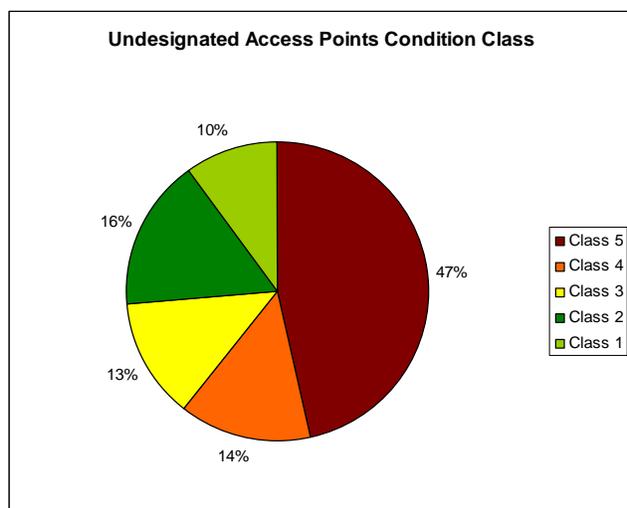
- 79% of designated access points along the urban interface are within ½ mile of another designated access point.

Most people can walk a quarter mile in about 5 minutes, which OSMP considers adequate convenience. Of the 29 designated access points along the urban boundary, 23 are within ½ mile of another access point (meaning the farthest a person would need to walk would be ¼ mile). As shown on [Map 10](#), there are three gaps where this ½ mile goal is not met. All three gaps exist in areas where houses on private property create a physical barrier to access. Two of the three gaps are also on steep hillsides where trail construction and maintenance is difficult and expensive. Also, 8 of the 29 designated access points along the urban boundary are within a ¼ mile of a bus stop and are shown on [Map 11](#).

Designated access points are classified based on estimated visitation levels. The level of facilities provided, such as signs and trash cans, is based on the access point’s class, more people = more services, fewer people = fewer services, in general.

In addition to the 29 designated access points along the urban boundary, there are 22 additional designated access points and 129 undesignated accesses within the West TSA. See [Map 12](#) for Designated and Undesignated Access Points.

Two steps were used to map undesignated access points and then rate the size of the trail extending from each point. First, the 2006 undesignated trail information was used to generate points of likely access. Utilizing the undesignated trail information, staff identified points along the OSMP boundary that had multiple undesignated trails originating from them. Second, a staff member walked the OSMP boundary to verify the undesignated access points identified in step one and to locate any additional access points not corresponding to undesignated trails. Based on the condition of the first 30ft of trail on OSMP, each undesignated access point was placed into one of Marion’s five condition classes (Marion & Carr, 2001). Of the undesignated access points, almost half fall in Class 5.



Marion’s Condition Classes

- Class 1: Trail distinguishable; slight loss of vegetation cover and/or minimal disturbance of organic litter.
- Class 2: Trail obvious; vegetation cover lost and/or organic litter pulverized in primary use area.
- Class 3: Vegetation cover lost and/or organic litter pulverized within the center of the tread, some bare soil exposed.
- Class 4: Nearly complete or total loss of vegetation cover and organic litter within the tread, bare soil widespread.
- Class 5: Soil erosion obvious, as indicated by exposed roots and rocks and/or gullying.

Indicator: Wayfinding Signs at Designated Trail Intersections

Indicator Results:

- Designated Trail Intersections with wayfinding signs: 68.4%
- Designated Trail Intersections without wayfinding signs: 31.6%

Wayfinding signs provide useful information at decision points along a trail and usually consist of a trail name with directional arrows or a map. Wayfinding signs mark the designated trail, reassuring the visitor they are on the designated trail and inform visitor where trail connections lead. They also help visitors navigate the designated trail system and decrease confusion. Being able to easily navigate the trail system without confusion, contributes greatly to the quality of visitor experience.

See [Map 13](#) for Wayfinding Signs at Designated Trail Intersections.



Sample Wayfinding Sign

Indicator: Signs at the Intersection of Designated and Undesignated Trails

Indicator Results:

- Intersections with a sign: 9.5%
- Intersections not signed: 90.2%

Signs provide useful information at decision points along a trail. OSMP has developed a suite of signs that are used to sign undesigned trails that are being restored or areas where travel is discouraged. These signs help visitors stay on the designated trail system, decrease confusion and help visitors distinguish between designated and undesigned trails.

Over the years, OSMP staff has encountered innumerable visitors who are lost, confused and frustrated. For those visitors who want to remain on a designated trail, to reach a certain destination, doing so is often difficult given the extensive network of undesigned trails in the West TSA. Often a map is not of much use, because it is difficult to distinguish between designated trails shown on the map and undesigned trails on the ground.

Example Trail Restoration Signs



During the implementation of the Eldorado Mountain/Doudy Draw Trail Study Area, OSMP developed a system to address undesigned trails. Each undesigned trail was categorized as one of the following: Retain (needed for OSMP management activities, but do not show on maps), Restore (close and restore) or Designate (the trail remains open, unsuitable conditions or alignments may be addressed and receives regular maintenance).

A process similar to this will be used in the West TSA. Once each undesigned trail has been categorized, it will then be signed appropriately so visitors who want to stay on a designated trail can do so.

Attribute: Lack of Conflict

Conflict results when behaviors of one or more visitors interfere with other visitors' ability to achieve desired experiences. Conflict degrades the quality of the visitor experience (Jacob and Schreyer, 1980). Conflict can include annoying and unpleasant encounters with others, such as loud yelling or noises, bikes startling other visitors or dogs jumping on other visitors. Conflict does not include experiences with natural objects or phenomena, such as slipping and falling or bad weather. Lack of conflict is a commonly accepted way to measure visitor satisfaction, particularly in front country environments like OSMP lands (Graefe and Thapa, 2004).

OSMP has used three surveys to assess conflict issues. The Citizen Survey (also called the attitudinal survey) gauged opinions of registered City of Boulder residents. The Visitor Survey measured views of people visiting OSMP. The Dog Conflict study gauged which dog related behaviors visitors rated the most conflicting. The results of previous conflict questions showed respondents believed the most conflicting behaviors were those of dog walkers and cyclists. Therefore, potential future survey questions will be specific to dog walking and bike riding behaviors.

To better understand the level of conflict, some of the potential future survey questions will measure conflict experiences the day the survey was completed, while other questions will measure conflict experiences over the past year. Asking visitors about the past 12 months lets the respondent tell us about something we would otherwise have missed. Asking about the past 12 months also provides OSMP with a generalized idea of how widespread conflict is.

Six indicators have been identified to measure and monitor Conflict. It is important to note that although the West TSA process is recommending including the following indicators as questions on future surveys, it is possible that they will not be selected for inclusion. In designing future surveys, given the practical constraints on the number of questions that can be included in a survey the questions will need to be prioritized. All surveys are administered system-wide. Therefore these potential survey questions will measure conflict system-wide and will not be specific to the West TSA.

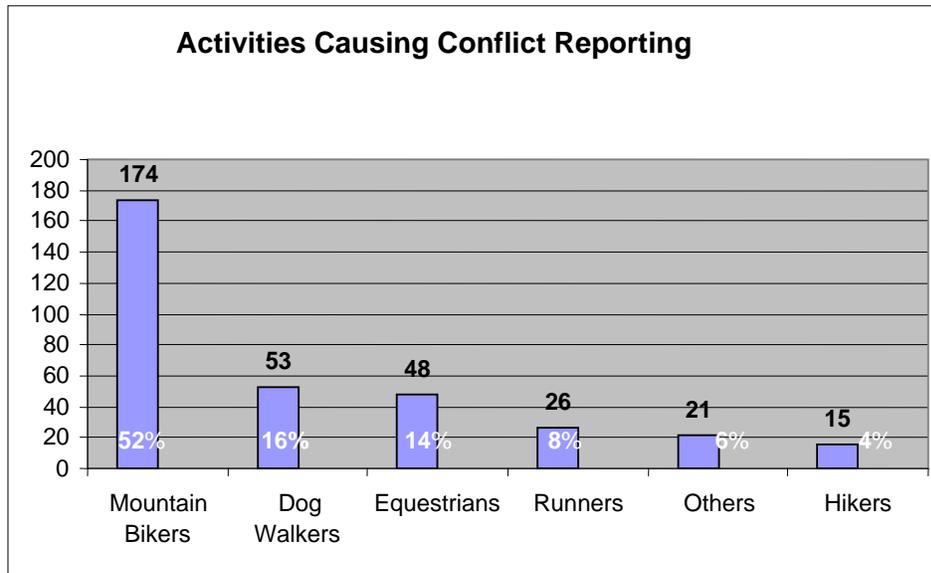
Indicators for Conflict

- *Perception of conflict today*
- *Perception of conflict with dogs today (this will likely be focused on a few specific behaviors with the most public concern as determined by past surveys)*
- *Perception of conflict with mountain bikes today (this will likely be focused on a few specific behaviors with the most public concern as determined by past surveys)*
- *Perception of conflict with dogs within the past 12 months*
- *Perception of conflict with mountain bikes within the past 12 months*
- *Visitor Displacement*

Background

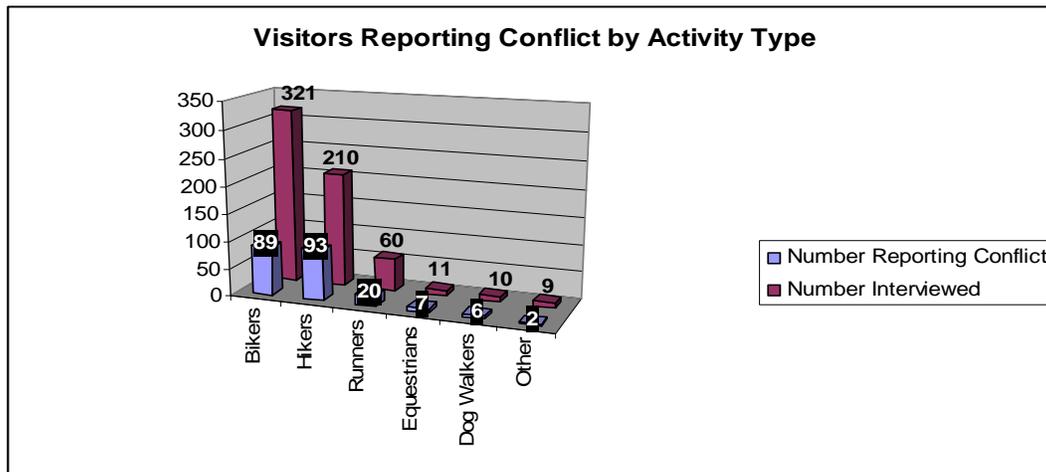
Boulder County Parks and Open Space Recreation Conflict Study

Boulder County Parks and Open Space conducted a recreation conflict study in 2003 to obtain baseline data on perceived visitor conflicts (Bauer, 2004). Another objective of the survey was to provide background data for other land management agencies, such as OSMP. During the summer of 2003, trained staff conducted 624 interviews at six Boulder County Parks and Open Space properties. Of the six County properties included in this conflict study, four properties allow dogs on leash, two do not allow dogs, and none allow dogs off leash. Whereas, dogs are allowed off-leash or with voice-and-sight control, on 69% of the West TSA lands.



The number of comments regarding mountain bikers' behaviors (174) was greater than the sum of the remaining comments (163).

The following figure illustrates the number and type of respondents who reported conflict.



- Of the 93 hikers who reported conflict, 65 reported conflicts with bikers and 25 reported conflict with dog walkers; much higher than the other visitor types.
- Mountain bikers distributed conflict comments more evenly across: bikers (35), equestrians (30), and dog walkers (21). Interestingly, mountain bikers reported conflicts with other mountain bikers (i.e. self reporting) more frequently than did any other activity type.
- Runners also reported conflict comments more evenly across: bikers (9), equestrians (7), and dog walkers (6).

Indicator: Perception of Conflict Today

Indicator Results:

- Percent of respondents experiencing conflict or unpleasant circumstances on today's visit:= 4%
- 4% roughly equals 190,000 conflictual experiences

The 2004-05 Visitor Survey asked the question: "Did you encounter any conflicts or unpleasant experiences today? Yes or No." A follow-up question asked "If yes, could you describe them?" and a space was provided for a write-in answer. 4% of the respondents reported having conflict that day. Dog related issues were identified as a major contributing factor to conflict. Inconsiderate behavior was also identified as a more general factor resulting in conflict.

A visitation study was conducted concurrent to the Visitor Survey and resulted in an estimate of 4.7 million annual visits to OSMP. Given the reported 4% conflict, simple math shows that this equated to roughly 190,000 conflictual experiences. Compared to the Boulder County survey that reported only 2% of respondents experienced conflict on the day they were interviewed - approximately 34% of respondents reported having experienced conflict at some point in the past.



Indicators: Perception of Conflict with Dogs Today
Perception of conflict with Dogs in the Past 12 Months

Indicator Results:

The following are two potential new survey questions:

- “Did you experience recreational conflict with dogs today?”
- “Did you experience recreational conflict with dogs within the past 12 months?”

The Visitor Survey and two Citizen Surveys have illustrated that dogs and dog walking activities are a concern for visitors. The 2004-05 Visitor Survey found that of the people who experienced conflict and provided an answer as to why, 60% said the conflict was dog related. Citizen Survey results found that dogs are thought to have the second greatest level of conflict with other activities, following biking. The 2004 Citizen Survey showed that 23% of people responded that dog issues can conflict with other activities; in the 1999 Citizen Survey the number was 26%.

In 2007, staff worked with interested members of the public to create a list of dog-guardian and dog behaviors thought to be offensive to some OSMP visitors. This list was used in a dog conflict study (Vaske and Donnelly, 2007). All behaviors tested were found to be a slight to extreme problem. The behaviors thought to be most problematic were owners not picking up after their dogs (57% reported extreme problem), dogs causing wildlife to flee (35%), dogs jumping on visitors (35%), dogs pawing visitors (24%), and dogs flushing birds (24%).

The dog conflict study also asked people if they observed the listed behavior that day. The following table illustrates the findings of that study.

Reported Behavior	Percent of respondents who observed the behavior that day
Dogs off-trail	32% (5% reported as extreme problem)
Dogs approach uninvited	19% (16% reported as extreme problem)
Dogs sniffing a visitor	18% (9% reported as extreme problem)
Dogs “playing chase” with another dog	18% (10% reported as extreme problem)
Owners not picking up after their dogs	10%
Dogs causing wildlife to flee	3%
Dogs jumping on visitors	3%
Dogs pawing other visitors	2%
Dogs flushing birds	2%

Based on this information, perception of conflict with dogs today and within the past 12 months, will be measured as the number of times a respondent observes the following behavior on the day of the survey:

- People not picking up after their dog
- Dogs causing wildlife to flee or killing wildlife
- Dogs jumping on or pawing people
- Dogs off-trail

**Indicators: Perception of Conflict with Bikes Today
Perception of Conflict with Bikes in the Past 12 Months**

Indicator Results:

The following are two potential new survey questions:

- “Did you experience recreational conflict with bikes today?”
- “Did you experience recreational conflict with bikes within the past 12 months?”

Previous Citizen Surveys have illustrated that bikers and biking activities are a concern for visitors. Citizen Survey results found that bikers are believed to have the greatest level of conflict with other activities. The 2004-05 Citizen Survey found that 37% of respondents reported that biking activities can conflict with other activities; in 1999 it was 27%.

Based on this information, perception of conflict with bikes today and within the past 12 months, will be measured as the number of times a respondent observes the following behaviors on the day of the survey:

- Bikes not yielding
- Bikers speeding
- Bikers not communicating on approach
- Bikers not being courteous



Indicator: Visitor Displacement

Indicator Results:

- The 1999 Citizen Survey found that 10% of respondents stopped visiting a particular open space area and 9% visited less often (system-wide)

Visitor displacement occurs when someone quits visiting a place or visits less often as a result of some adverse circumstance such as experiencing conflict or the area exceeds the person's tolerance for crowding. The 1999 Citizen Survey found that 10% of respondents stopped visiting a particular open space area and 9% visited less often. A follow-up question, asking respondents why they visited less often or stopped visiting entirely, showed that 36% stopped or visited less often because of crowding, 28% because of conflict, and 21% outside factors not related to open space.

The visitor displacement indicator will be measured as the number of respondents who report that they have quit visiting, or visit less often, a particular area on OSMP.

Attribute: Connection with the Land

OSMP offers hundreds of natural and cultural history interpretive hikes every year, staffs Farmer’s Markets and festivals to bring information about OSMP resources and management issues to the public. Volunteer opportunities provide avenues for further involvement on the land with tasks ranging from trail guides and bike patrol to bat and raptor monitors, as well as interpretive hikes, trail building and ecosystem restoration.

A person’s connection to the land is an emotional bond between a person and the place they love. As people explore areas in ways meaningful to each of them, these connections are established and reinforced. OSMP works to foster connections to OSMP lands through formal education programs and informal outreach programs. The intent is to enhance visitors’ enjoyment of the land by providing opportunities to learn about the remarkable places they find here. Hands-on volunteer activities help preserve and restore areas, deepen visitors’ understanding of the complex ecosystems and history of the land and can engender stewardship of the land. Collectively education and outreach opportunities help people strengthen their personal connection to the land.

Four indicators have been identified to measure and monitor Connection with the Land.

- Indicators for Connection with the Land***
- *Awareness of OSMP Education Opportunities*
 - *Participation in OSMP Education Events*
 - *Participant Satisfaction with OSMP Education Programs*
 - *Volunteer Satisfaction with OSMP Programs*



Interpretive hike participants, including staff & volunteer leaders

Indicator: Awareness of OSMP Education Opportunities

Indicator Results:

- From the Citizen Survey administered in 2004-05:
73% respondents were aware of the fact that OSMP offered guided hikes, programs at local schools, information at trailheads and events like Farmers' Market.

OSMP offers formal and informal education programs to the community year round. The public has many opportunities to ask questions of staff and volunteers at places like the Ranger Cottage, the Flagstaff Summit Nature Center, the holiday tree cutting event, Farmer's Market and local festivals. In 2008, about 64,000 informal contacts occurred. Specific to the West TSA in 2008, 7,808 people participated in formal education programs.

In an effort to poll a wide array of citizens, OSMP conducted a Citizen Survey (see [Appendix F](#)) of registered voters in the City of Boulder. One question asked if people are aware of the variety of OSMP education opportunities. The percentage of respondents who answer "yes" will serve as the indicator, or measure, for the public's awareness of OSMP's nature education offerings.



Trailhead outreach



Indicator: Participation in OSMP Education Events

Indicator Results:

- From the Citizen Survey administered in 2004-05:
47% of the citizens polled had participated in an educational event with Open Space and Mountain Parks.

The Citizen Survey (see [Appendix F](#)) asks, “If you or a family member has ever received nature education from City of Boulder Open Space and Mountain Parks staff members, where did it happen?” These responses will collectively serve as the indicator for the level of the general public’s participation in OSMP’s nature education programs.

Where did you participate in an education event with OSMP?

Farmers’ Market	11%
Chautauqua	10%
Schools/youth activities and places . . .	8%
On guided hikes	8%
Flagstaff Mountain	4%
Miscellaneous	4%
Information media/newspapers/mail...	2%
Total.....	47%
Didn’t participate in education program	38%
No response	4%

Responses of less than 2 percent, which totaled 11 percent, are not included.



Volunteer at Farmer’s Market

Indicator: Participant Satisfaction with OSMP Education Programs

Indicator Results:

- Participant Surveys, handed out at the end of a program, show an average rating of 9.2 (on a 1 worst - 10 best scale) for overall satisfaction with the program quality.

In 2008, OSMP staff and volunteers offered 424 programs across all OSMP properties to the community, with 12,490 people attending. These programs took the form of both free public educational hikes known as Natural Selections Programs and programs requested by various community groups and schools. Of the 424 programs offered in 2008, 194 were requested by the community and 230 were offered as Natural Selection hikes. These programs covered a range of topics including general wildlife, ecology, geology, astronomy, history, various arts, accessible trail activity, bird watching, OSMP 101, Habitat Conservation Areas, pine beetles, forest ecology, wetlands, grasslands, full-moon hikes, and bike hikes. These programs take visitors all over the OSMP system.

In 2008, a total of 306 programs were provided for 7,808 participants within the West TSA boundary. This accounts for about 73% of the total system-wide interpretive events offered by OSMP for the year of 2008. The intent of the Participant Survey is to measure overall satisfaction with each program; however the survey has been administered sporadically. With the identification of this indicator, OSMP staff and volunteers will work towards distributing the survey more regularly and encourage all participants to complete it. This will help education programs continue to evolve in a way that meets the community's expectations/desires.



Indicator: Volunteer Satisfaction with OSMP Programs

Indicator Results:

- The year end Volunteer Survey asks: “How would you rate your overall satisfaction with your volunteer experience on a scale of 1 - 5.”

Score	Number of Respondents
5 (Very Satisfied)	40
4	14
3	1
2	1
1 (Very Unsatisfied)	0

OSMP offers about 15 volunteer programs that occur in the West TSA area. Opportunities range from trail building and ecosystem restoration work, to bat, raptor, and frog monitoring, leading interpretive hikes for children, native plant gardening, Nature Center hosting, trash pick-up, neighborhood bear education teams and trail guides to name a few. More than 25,000 hours of volunteer time was logged in OSMP in 2008. About 9,150 hours, roughly 36%, occurred in the West TSA to some degree. For example, volunteers monitor bat activity across the OSMP system, some of which occurs in the West TSA.

At the end of each year, all volunteers are given a survey (see [Appendix G](#)) which is used by staff to help guide decisions about program development. This indicator will be used to provide an overarching view of how these programs serve the volunteers. In 2008, 71% of volunteers reported that their experience was “Very Satisfying”.



Bat Monitor Volunteer

Attribute: Safety

While risk is inherent in wildland settings and in many of the activities pursued on OSMP lands, OSMP does seek to improve the visitor experience by reducing the likelihood that visitors will encounter hazardous situations. In addition, OSMP provides information on how visitors can avoid some dangerous situations, and promptly responds to safety issues that come to the attention of the department.

Rangers respond to many types of incidents in the West TSA such as law enforcement situations, injured or lost persons, and wildfires. There are 12 full-time rangers on the OSMP organizational chart. However, at this time not all the positions are filled. Some of the incidents handled by OSMP rangers in the West TSA during 2008 are included below (number of incidents):

- Dog Related— 268
- Illegal Camping— 78
- Injuries— 30
- Lost Individuals— 5
- Wildfires/Smoke Reports— 5
- Car Break-Ins— 3



See [Appendix I](#) for a complete list of incidents that occurred in the West TSA in 2008.



Safety issues and corresponding actions can include the temporary closing of an area due to bear or mountain lion activity, the repair of trail infrastructure such as protruding rebar, and rangers enforcing the prohibition of campfires. As the department's highest priority, OSMP is prepared to respond promptly to any emergency including wildfires. Additional emergency services are provided by the Boulder Police and Fire Departments, Boulder County Sheriff's Department, Fire Protection Districts, and many volunteer organizations such as Rocky Mountain Search and Rescue.

Safety issues related to road crossings such as Flagstaff Trail along Flagstaff Road and South Boulder Creek Trail at Hwy 93 are addressed as part of the Visitor Infrastructure Target.

Four indicators have been identified to measure and monitor Safety.

- Indicators for Safety***
- *Response time to safety calls*
 - *Patrol frequencies*
 - *Perception of safety*
 - *Perception of rule enforcement*

Indicator: Response Time to Safety Calls

Indicator Results:

- Rangers responded to 100 % of the safety calls within 24 hours from March 15 to May 31 of 2009: Examples of safety issues responded to:
 - Injured hiker on the 1st/2nd Flatiron trail
 - Lost hikers on the Eldorado trail

The response time to safety calls is measured as the percent of public safety service calls responded to within 24 hours of department notification. Rangers began documenting response time to safety calls in March of 2009.

To measure ranger response time to public safety service calls, safety related incidents are recorded in a database. The database tracks the type of safety incident reported, location information, reporting party information, and the corresponding times that the call was received and the time the ranger responded to the call. A database has been used by OSMP rangers to record incidents for many years. This database provides information on the types and locations of law enforcement and emergency responses by rangers (but not response time until 3/09).

OSMP's highest priority is to be prepared to respond promptly to any emergency or safety related incident. The department's rangers are trained, equipped and available to render assistance in emergencies. Rangers are on duty daily and on-call for responding to after-hour incidents. As state certified peace officers, trained in first aid and wildland fire fighting, rangers are capable of emergency responses to incidents involving wildland fires, criminal activity and life threatening injuries. While not all incidents may require an emergency response, OSMP is committed to responding to all reported safety issues in a timely way.



Examples of Public Safety Service Calls:

- Report of lost person who has not returned from a hike
- A bicyclist injured after falling off their bike
- A dog behaving aggressively
- Report of a bear and cubs near a trail
- Smoke observed on OSMP lands

Indicator: Patrol Frequencies

Indicator Results:

- Percent of trailheads, trails, and properties patrolled by rangers at the desired frequencies.

First quarter results for 2009	
% of Desired Frequency	% of Patrol Points
100%	48%
70-99%	24%
0-69%	28%

See [HMap 14H](#) for Ranger Patrol Frequency

One of the primary responsibilities of rangers is to provide a consistent level of patrol across OSMP lands. During this base patrol, rangers check the condition of infrastructure, manage visitor activity and monitor resource condition. To guide and document this base patrol effort, patrol locations were identified and grouped by intended patrol frequency. Five groupings have been established which include trailheads, trail and property priority areas 1, 2, 3 and problem areas. The “problem area” category is a way to address special resource protection issues such as new trails in HCAs or areas that are generating ongoing visitor complaints. The patrol groupings are based upon visitation levels and where conflicts are most likely to occur.

The high proportion of patrol locations in the West TSA reflects the relatively high level of visitor activity.

The ability of ranger services to meet the desired patrol frequencies can vary based on factors such as harsh weather, muddy trails, and competing needs for ranger time (such as responding to wildfires, injuries, search and rescue missions, leading educational programs, and assisting with trail and sign maintenance).

The West TSA contains the following proportion of the system-wide total for each of the patrol groups:

Category	Patrol Frequency Target
Trailheads = 39%	3 times per week
Priority 1 = 50%	2 times per week
Priority 2 = 59%	1 time per week
Priority 3 = 38%	1 time every 2 weeks
Problem Areas (% can vary depending on conditions)	3 times per week (can change monthly)

Indicator: Perception of Safety

Indicator Results:

- The 2004-05 Citizen Survey asked: “How safe do you feel during your visits to Open Space and Mountain Parks areas?” 95% of respondents felt “Safe.”
 - 74% felt “Very Safe”
 - 21% felt “Somewhat Safe”
 - 3% felt “Somewhat Unsafe” or “ Very Unsafe”
 - 2% did not respond

- Reasons for “Very Safe” responses include:
 - Never a problem / never think about it
 - Lots of people / I stay in groups or go with companions
 - Rangers are patrolling / easy to get help if needed

*This indicator and results are system wide. It is not West TSA specific.

Measuring how visitors perceive personal safety during their visits is the most direct way of determining the visitors’ experience of “Safety” on OSMP. Many of the factors that affect a person’s perception of safety are not, and can not, be managed by OSMP. Some of these factors include personal comfort levels with outdoor activities and the OSMP landscape. Additionally, individuals have varying tolerances for risk, with some individuals desiring a higher degree of risk in their experience. The factors that can be managed, such as ranger staffing and responding quickly to concerns, are integral to providing a safe and quality visitor experience.

Reasons for “safe/ unsafe” responses:

Reasons for feeling safe:

- Never a problem/never think about it/never attached = 47%
- Lots of people there/I stay in groups/go with companions = 8%
- I’m very careful/can take care of myself/trust my instincts = 5%

Reasons for not feeling safe:

- Presence of mountain lions/fear of being killed by a bear = 7%
- I worry when I’m out alone/you never know who’s out there 5%
- Security gaps/not enough rangers/ car break-ins = 2%

Indicator: Perception of Rule Enforcement

Indicator Results:

- The average letter grade given by Visitor Survey respondents to the question “enforcement of rules” is 3.11 (on a point scale of 0-4, F=0, D=1, C=2, B=3, A=4)

*This indicator and results are system wide. It is not West TSA specific.

The presence of rangers patrolling OSMP properties and the enforcement of regulations are direct management actions that can impact, and hopefully reduce, the likelihood of criminal activity or activities that pose a safety risk. This indicator compliments the ranger patrol frequency indicator as it measures the perceived satisfaction visitors have with enforcement efforts. This indicator will be measured as the visitor perception and satisfaction with “enforcement of rules.” If visitors feel there is satisfactory enforcement, then safety concerns are also likely being addressed.



Attribute: Remoteness

People seek a remote experience where they can be alone with few visual reminders of every-day life. The OSMP land system provides an uncommonly good opportunity near an urban area for visitors to get away from the city, everyday stresses and other people. OSMP believes an hour long walk into the foothills can still provide a visitor with a near-wilderness experience with little evidence of human impact.

Many land management agencies manage Wilderness Areas to provide a visitor with a sense of remoteness and solitude by issuing a limited number of permits, thus allowing them to manage for a set carrying capacity. Although the number of off-trail permits issued in HCAs is monitored, it is not OSMP's intent to limit the number of visitors.

While a sense of remoteness can occur throughout the OSMP system, HCAs offer the best opportunity. One characteristic identified in the VMP of a HCA is that they tend to be located in more remote areas and are harder to access. This helps manage crowding, which plays an important role for providing a sense of remoteness. Also, HCAs typically represent the largest blocks of habitat with few, if any, trails or roads.

The presence of human evidence, such as signs and trails, can impact a visitor's sense of remoteness. Remoteness, similar to visitor experience, is influenced by the visitor's personal preferences. Therefore, OSMP selected three indicators that focus on what can be directly managed.

Indicators for Remoteness

- *Undesignated trails in Habitat Conservation Areas*
- *Sign structures in Habitat Conservation Areas*
- *Sign structures in Natural Areas*

Indicator: Undesignated Trails in Habitat Conservation Areas

Indicator Results:

- There are 16.6 miles of trails in the Western Mountain Park HCA
 - 22% are Undesignated Trails (3.5 miles)
 - 80% are Designated Trails (13.1 miles)

See [HMap 6H](#) for the Undesignated Trails in the West TSA.

The proliferation of undesignated trails in the West TSA is a good sign that the designated trail system does not provide access to some places visitors want to go. In comparison, there are the following miles of undesignated trails in the other management areas:

- There are 52.6 miles of trails in the Natural Areas within the West TSA
 - 53% are Undesignated Trails (27.7 miles)
 - 47% are Designated Trails (24.9 miles)
- There are 54.1 miles of trails in the Passive Recreation Areas within the West TSA
 - 39% are Undesignated Trails (20.9 miles)
 - 61% are Designated Trails (33.2 miles)
- There are 11.9 miles of trails on NCAR and NIST
 - 52% are Undesignated Trails (6.2 miles)
 - 48% are Designated Trails (5.7 miles)

Undesignated trails can contribute positively to the visitor experience by providing access to destinations. However, undesignated trails can also negatively impact the visitor experience by detracting from a visitor's sense of remoteness or visually representing ecological impacts.

The VMP specifically calls for the elimination of all undesignated trails in HCAs, unless they are made part of the designated trail system (pg.48). OSMP has developed a system to address undesignated trails. This system includes the categorizing of all undesignated trails as one of the following: Retain (keep for official OSMP use), Restore (close and restore) or Designate (the trail remains open and receives regular maintenance).

Indicator: Sign Structures per Trail Mile in Natural Areas and Western Mountain Parks HCA

Indicator Results:

- Western Mountain Parks HCA: 3.4 structures/ trail mile
- Natural Areas: 3.5 structures/ trail mile
- Although not an indicator, the number of signs structures/ trail mile in:
 - Passive Recreation Area: 6.4 sign structures/ trail mile
 - NCAR & NIST: 2.8 sign structures/ trail mile

Structures along a trail can add to or detract from the trail experience and sense of remoteness. Signs are one of the most visible built forms associated with trails. Each sign structure should be designed to fulfill the intended purpose and add to the character of the trail. Simple sign structures tend to be most harmonious in natural settings where visitors are seeking escape from the built environment and are most interested in viewing natural landscapes. In these instances, the success of a structure lies in how well it serves its purpose without detracting from the visual context and sense of remoteness.

Each sign structure can hold multiple signs that are intended to inform, provide directions, or elicit a certain behavior. Visitors are more willing to see sign structures/signs in a heavily used Passive Recreation Area than in a remote setting such as HCAs. OSMP partnered with Leave No Trace Inc., and the focus groups informed OSMP that the tolerance for signs was higher at the start of a hike and directly proximate to where an issue is. Many of our trails begin in a Passive Recreation Area, where sign structures would be tolerated, and not in HCAs.



Duplicate Sign Structures

Recreation Target: Visitor Infrastructure

OSMP maintains a system of trails, trailheads and other facilities to support and enhance the visitor experience. Although all development impacts the natural system either directly (i.e. a trail) or indirectly (e.g. changes to surrounding hydrological patterns, habitat fragmentation), sustainable infrastructure can reduce those impacts. Well designed, constructed and maintained infrastructure is stable over time, can reduce the likelihood that visitors will encounter hazardous situations, can increase visitor enjoyment, provides access, and reduces the aesthetic impact of litter. A recreation facility or trail is considered physically sustainable when it is able to accommodate all physical forces acting upon it, both natural and human caused, while encouraging visitors to stay on the trail (Minnesota Department of Natural Resources, 2006).

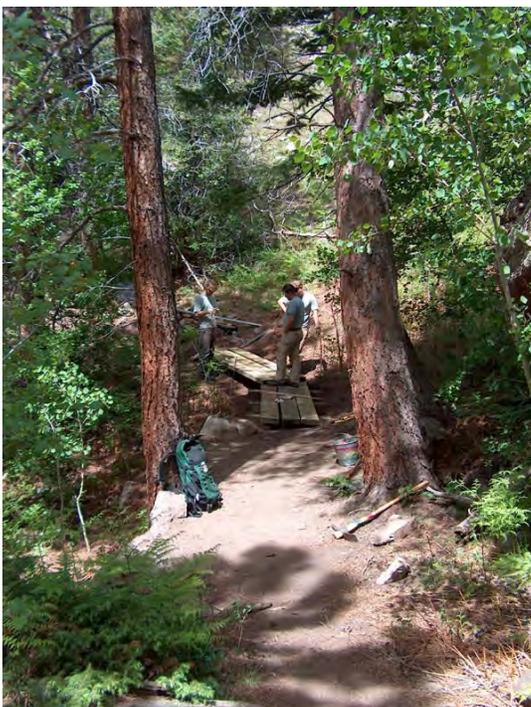
It is important to note that sustainable infrastructure requires regular maintenance to remain sustainable. In the absence of regular maintenance and upgrades, the condition of infrastructure can reach a degree of disrepair that is extremely costly to repair, or actually requires complete replacement.

Infrastructure can also help increase safety. For example, infrastructure such as road striping, flashing cross-walk signs and bridges can all increase safety when a trail crosses a road. The VMP identified two unsafe road crossings in the West TSA. These are located along Flagstaff road and at Centennial (old Sanitas) trailhead. The road crossing at Centennial trailhead has been upgraded, leaving the crossings along Flagstaff to be addressed.

For the West TSA, two attributes associated with the Visitor Infrastructure have been identified.

Attributes for Visitor Infrastructure

- *Condition of Concentrated Use Areas*
- *Condition of Trails*



Attribute: Condition of Concentrated Use Areas

OSMP manages and maintains concentrated use areas such as trailheads, overlooks, amphitheaters, picnic areas, access points, road crossings and large group areas.

In 2008, OSMP created a Classes and Standards document ([Appendix K](#)) to classify all concentrated uses areas based on visitation levels. Information from the 2004-05 Visitor Survey/Visitation Estimate and staff knowledge was used to estimate the visitation levels. In addition, each class has associated amenities that must be present and an associated maintenance frequency that must be met to comply with the standard.

The following table displays the number of concentrated use areas in each category and provides a brief description. The estimated use for each area breaks down as follows: 0-10,000 visits/per year were classified as very-low, 10-25,000 as low, 25-50,000 as medium, 50-90,000 as high and 90-110,000 as very high.

Concentrated Use Areas in the West TSA			
Type of Concentrated Use Area	Description	Estimated Use	Count
Trailheads			14
TH 1	Simple/Minor Developed Trailhead	Very Low Use	2
TH 2	Developed/Improved Trailhead	Medium Use	8
TH 3	Fully Developed Trailhead	High to Very High Use	4
Access Points			33
AP 1	Access to trails	Very Low Use	25
AP 2		Medium to High Use	5
AP 3		Very High	3
Recreational Facilities			4
RF 1	Provides no designated trail access. Includes picnic areas, viewpoints and bench sites.	Low to Medium Use	1
RF 2		High to Very High Use	3
Total			51

Two indicators have been identified for the West TSA to help measure compliance with the identified required amenities and maintenance schedule.

- Indicators for Condition of Concentrated Use Areas***

 - *Service Level Compliance*
 - *Infrastructure Maintenance*

Indicator: Service Level Compliance

Indicator Results:				
Concentrated Use Areas in the West TSA				
Type	Class	Total Number	Total that Comply with Standard	Total % that Comply
Trailhead (TH)	TH 1	2	0	0%
	TH 2	8	0	0%
	TH 3	4	0	0%
Access Points (AP)	AP 1	25	15	60%
	AP 2	5	4	80%
	AP3	3	3	100%
Recreation Facility (RF)	RF 1	1	0	0%
	RF2	3	1	33%

The Classes and Standards for Trailheads, Access Points and Recreation Sites ([Appendix K](#)) identifies the classification for each concentrated use area. Each classification has associated standard facilities, that must be present, and a list of optional facilities, that might be present given each site’s unique characteristics. For example, the only standard facility at an A1 is a wayfinding/regulatory sign post. Whereas the standard facilities at a T2 include: fence, parking area (road base surface), trailhead signs, trash cans, dog stations, ADA picnic tables/area and bike racks.

OSMP has inventoried all existing concentrated use areas, identified those sites out of compliance and identified a list of necessary upgrades ([Appendix K](#)). As illustrated in the above table, many sites do not comply. However, all newly constructed concentrated use areas should comply with the identified classification.

Indicator: Infrastructure Maintenance

Indicator Results:

There are currently no results to report. Although OSMP believes that we are meeting the maintenance standards at all concentrated use areas, OSMP has not historically tracked this. As a result of the West TSA planning process, a system has been implemented to track concentrated use maintenance schedules. Preliminary result will be available in 6 months.

The Classes and Standards for Trailheads, Access Points and Recreation Sites document ([Appendix K](#)) details the maintenance standards that OSMP staff will apply to each classification. Concentrated use areas are examined on a regular basis, the frequency of maintenance depends on the area's classification. For example, a very low – low access point (A1) is checked monthly for maintenance issues, whereas a high to very high trailhead (T3) is inspected twice weekly. Each time a concentrated use area is inspected OSMP staff look for erosion problems, pickup loose trash, repair any damage, trim and mow surrounding vegetation, service outhouses, and inspect the parking areas. Generally, problems or damage identified in an inspection is recorded and fixed as quickly as practical. However, some maintenance issues have a very specific timeline called out. Examples are listed below (see [Appendix K](#) for a complete list).

- Large items of trash, such as appliances or furniture, will be removed within 48hrs of identification/notification.
- Graffiti will be removed within 72 hours of being discovered.
- Outhouse exteriors will be stained/painted at least one every three years.
- Outhouse interiors will be power washed each month or on a more frequent basis if needed.



Attribute: Condition of Trails

OSMP manages 78 miles of designated trails in the West TSA, see [Appendix L](#) for a complete list of trail names and associated miles.

The construction and maintenance of trails provides opportunities for visitor travel, access to key destinations and specific passive recreational activities. When designing a trail many factors are taken into consideration, including the types of activities that will be allowed on the trail, the physical constraints of the terrain, resource protection priorities, estimated levels of activity, anticipated maintenance needs, potential viewsheds and the cost of construction. Well designed trails encourage visitors to stay on them because they provide the easiest and safest routes to destinations (Byers et al., 2000).

Trail infrastructure (e.g., steps, bridges, water bars and culverts) is often used to help increase the sustainability of the trail and decrease impacts to the surrounding natural and cultural resources. However, an abundance of trail infrastructure can detract from the visitor experience; therefore, trails and their associated infrastructure should be designed to add to the character of the trail while serving a function related to sustainability.

Each OSMP trail has an associated Trail Management Objective (TMO) that identifies a range of construction and maintenance guidelines. Guidelines are based on trail class and designed use. The trail class refers to a trail's level of development and the designed use describes the allowed activity on the trail, which dictates how it is built and maintained. All OSMP trails fall into one of six designed uses: Official Vehicle, ADA accessible, Equestrian, Biking, Hiking or Climbing Access.

TMOs identify construction guidelines for the cross-slope, tread width, clearing width and height, turn radius, maximum sustained grade, outslope and surface materials for a trail (see Appendix M). TMOs also identify desired maintenance frequencies to address issues such as trail widening, poor drainage, erosion, and trail braiding. While the TMO guidelines serve as baseline goals for OSMP trails, there are instances where deviations from the specification may be warranted. OSMP has established these guidelines and TMO's in order to define a physically sustainable trail.

Existing levels of visitation are high enough to result in significant wear and tear on the trail system. Thus, there is a need to monitor existing trail conditions using TMO guidelines to determine which trails need maintenance. Trails in a degraded condition can decrease the quality of the visitor experience and adversely affect natural resources. OSMP seeks to have well designed and maintained trails to mitigate impacts to resources and provide a quality visitor experience.

Indicators for Condition of Trails

- *Trail Management Objective Compliance*
- *Trail Maintenance*

Indicator: Trail Management Objective Compliance

Indicator Results:

Trail Management Objective (TMO) Compliance in the West TSA		
Condition Class *	Total Mileage of Trail	Percent of Trail Segments
0-20%	27.3	35%
20-40%	21.8	28%
40-60%	7	9%
60-80%	7.8	10%
>80%	7.8	10%
Not Inventoried	6.2	8%

* Condition Classes were broken down by the percent of trail that was not in compliance. This means the trail does not conform to the specifications in its TMO and had maintenance issues, such as poor drainage, erosion, and/or trail braiding.

See [Map 15](#) for Trail Segment Conditions. The >80% and 60-80% trail segments on the map indicate areas where work needs to be done, but these do not always represent the highest priority trail projects. Higher priorities may exist when trail segments that have a significant natural resource or safety concern, or do not affect a large section of trail and can be fixed quickly.

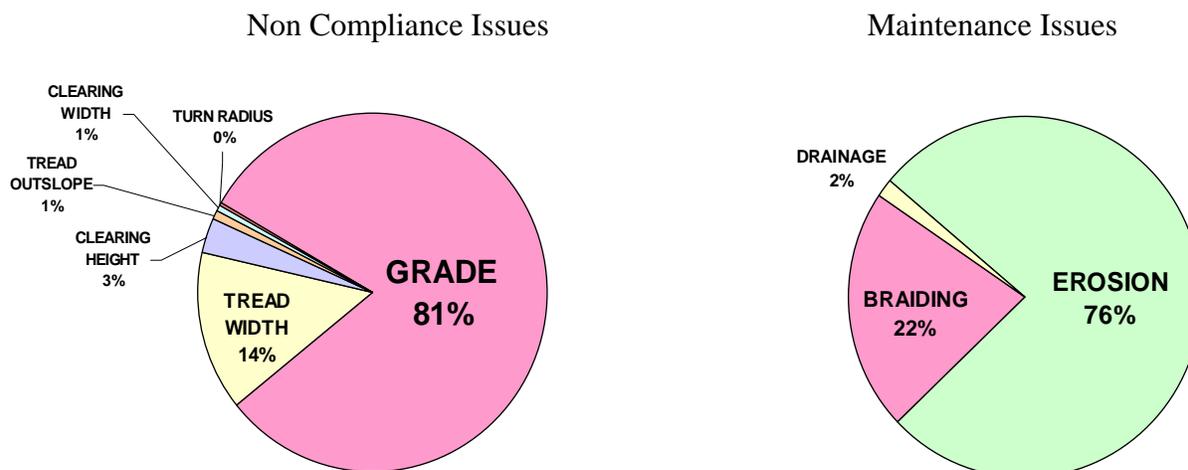
The following are trail compliance characteristics and maintenance issues for the West TSA trails system.



Trail Compliance Characteristics
<ul style="list-style-type: none"> • Trail grade • Trail width • Outslope • Clearing width, height • Surface materials • Turn radius

Maintenance Issues
<ul style="list-style-type: none"> • Drainage • Erosion • Braiding

The figures below show the maintenance issues and TMO Non-Compliance issues in the West TSA as identified in the 2008 Trail Condition Monitoring Report.



- Trail grade (trails that are too steep) was responsible for over 80% of the non-compliant segments.
- Tread width (trails that are too wide) accounted for 14% of the non-compliant segments.
- Erosion was the primary maintenance issue identified (maintenance issues were identified along approximately 12 miles of trails in the West TSA).
 - Most eroded portions occur in the following areas: Kohler Mesa, mountain backdrop, Flagstaff Road area, Red Rocks and Mount Sanitas. Most eroded sections co-occur with areas that are too steep.

Background

Although popular among visitors, much of the trail system in the West TSA is not physically sustainable and is in poor condition. There are several possible factors for the existing condition of the trails in the West TSA.

First, much of the designated trail system was never designed for long-term sustainability. Many, if not most trails came about because of historic, repeated travel along game trails and temporary roads used for forestry and quarrying. Also, trails in the West TSA are not in sustainable locations. They are either located on the fall line or in a drainage or along a ridgeline, instead of a more sustainable locations along the hillside.

In addition to the lack of design, the West TSA is characterized by steep grades and highly erodable substrates. Under these conditions, trails built without appropriate design and engineering are especially vulnerable to degradation.

A third factor responsible for the trail condition is the high level of activity. Wear and tear to trails is directly related to the amount of visitor traffic. The West TSA sees considerable year round activity.

Lastly, the trails in the West TSA have not been regularly maintained. Extended periods of low, or no routine maintenance have resulted in accelerated degradation of trails in the West TSA, especially in steep, highly erodable areas where activity levels are high.

Indicator: Trail Maintenance

Indicator Results:

Currently there are no results to report. Qualitatively, OSMP staff believes that most of the trails in the West TSA received light maintenance in 2008. However, all trail work conducted in 2009 will be entered in a “work log” database. This will allow OSMP to track this indicator. Results will be available at the end of the season (generally the end of October)

Each year OSMP staff endeavor to assess every designated trail in the system. They perform Light Maintenance, which means water diversion structures (water bars, dips) are cleaned out and repaired, the trail corridor is cleared, safety issues are addressed, and other trail repairs that takes 2 people a half or less are completed. Work that needs to be done that will take a larger labor effort gets put on a list of work projects, is prioritized in with other pending trail projects.

Despite the large need for maintenance, the OSMP trails group has a budgeted amount of resources: staff hours, seasonal hours, Jr. Ranger hours, and money for equipment, contractors, and construction materials. A certain amount of those resources are committed to Light Maintenance and an allocation of time/materials for unforeseen trail work (such as a bridge getting washed out or trees blowing down and blocking a trail).

Junior Rangers

In 2008, Junior Rangers provided Light Maintenance on the OSMP system to correct drainage and erosion problems, maintain tread conditions and the trail corridor. Junior Rangers also address safety hazards and degraded structures.

Junior Rangers completed Light Maintenance on approximately 50% of the trail system (by mileage).



References

- Bauer, M. (2004.) Recreation Conflict at Six Boulder County Parks and Open Space Properties: A Baseline Study. Boulder, Colorado: Boulder County Parks and Open Space. Accessed on: 6/16/09. Available from: <http://www.californiatrills.org/documents/ConflOutdoorRec2.pdf>
- Bultena, G.L. and Klessig, L.L. (1969) Satisfaction in camping: a conceptualization and guide to social research, *Journal of Leisure Research* 1, 348-354.
- Byers, B., J Ebersole and M. Hesse. (2000). *Garden of the Gods Restoration Report. Current Conditions and Recommendations*. [Report online] Accessed on: 12/10/08. Available from: <http://www.rmfi.org/pdfs/GOGRestorationReport-Web.pdf>
- City of Boulder. (2005). City of Boulder Open Space & Mountain Parks Visitor Master Plan. Boulder, CO.
- City of Boulder. (2009) Draft Inventory and Analysis of Undesignated Trails, Boulder, CO.
- Graefe, A. G., & Thapa, B. (2004). Conflict in Natural Resource Recreation. In Manfredo, A. J. et. al. (Eds.), *Society and Natrural Resources: Summary of Knowlaedge* (209 - 224). Jefferson, Missouri: Modern Litho.
- Jacob, G.R., & Schreyer, R. (1980). Conflict in Outdoor Recreation: Theoretical Perspectives. *Journal of Leisure Sciences*, Fourt Quarter, 59(4), 368-380.
- LaPage, W.F. (1983) Recreation resource management for visitor satisfaction, *Journal of Park and Recreation Administration*, 1(2), 37-44.
- Marion, J.L. & Carr, C (2007). An Assessment of Recreational Impacts to Cliffs in Shenandoah National Parks, 14.
- Marion, J.L. & Lenug, Y.F. 2001. Trail Resource Impacts and an Examination of Alternative Assessment Techniques. *Journal of Park & Recreation Administration* 19(1): 17-37.
- Minnesota Department of Natural Resource, Trails and Waterways. (2006). *Trail Planning, Design, and Development Guidelines*. Minnesota: Brauer & Associated, Ltd.
- Vaske, J. J., & Donnelly, M. P. (2007). Perceived conflict with off leash dogs at Boulder Open Space and Mountain Parks. (HDNRU Report No. 76). Report for Boulder Open Space and Mountain Parks. Fort Collins: Colorado State University, Human Dimensions in Natural Resources Unit.

- Vaske, J. J., & Donnelly, M. P. (2007). Visitor tolerances and standards for off leash dogs at Boulder Open Space and Mountain Parks. (HDNRU Report No. 75). Report for Boulder Open Space and Mountain Parks. Fort Collins: Colorado State University, Human Dimensions in Natural Resources Unit.
- Vaske, J. J., & Donnelly, M. P. (2007). Off leash dog / human interactions at Boulder Open Space and Mountain Parks: Supplemental analyses. (HDNRU Report No. 77). Report for Boulder Open Space and Mountain Parks. Fort Collins: Colorado State University, Human Dimensions in Natural Resources Unit.
- Vaske, J.J., Shelby, L.B., & Donnelly, M.P. (2009). *Estimating Visitation to Boulder Open Space and Mountain Parks*. (HDNRU Report No. 80). Report for Boulder Open Space and Mountain Parks. Fort Collins: Colorado State University, Humane Dimensions of Natural Resources.
- Wimpey, J.F & Marion, J.L. (2009). The Influence of Use, Environmental and Managerial Factors on the Width of Recreational Trails. In press.

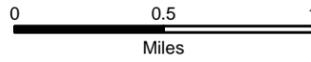
Map 1

West TSA - Trails

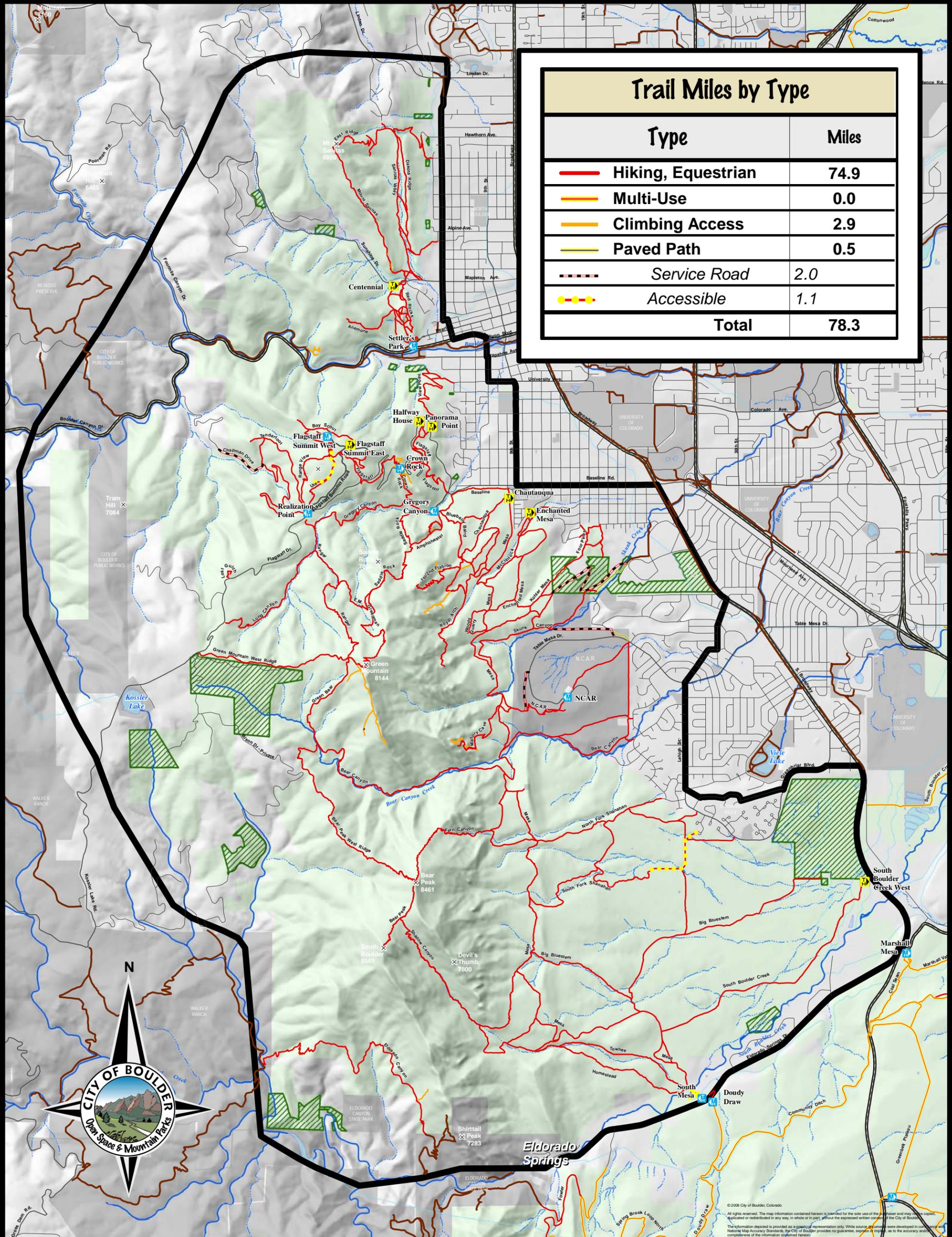
-  West TSA Boundary
-  Other Government Land

-  OSMP Land
-  OSMP Conservation Easement

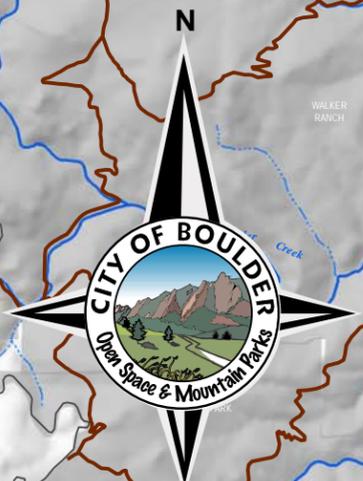
-  Trailhead
-  Trailhead with Accessable Facilities (7)
-  Trail Not Managed By OSMP



revised: 4/22/2009



Trail Miles by Type	
Type	Miles
 Hiking, Equestrian	74.9
 Multi-Use	0.0
 Climbing Access	2.9
 Paved Path	0.5
 Service Road	2.0
 Accessible	1.1
Total	78.3



© 2008 City of Boulder, Colorado
All rights reserved. This map information contained herein is intended for the sole use of the purchaser and may not be copied, reproduced, or redistributed in any way, in whole or in part, without the expressed written consent of the City of Boulder.
The information depicted is provided as a graphical representation only. While source companies were developed in accordance with National Map Accuracy Standards, the City of Boulder provides no guarantee, express or implied, as to the accuracy and completeness of the information contained herein.

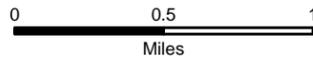
Map 2

West TSA - Dog Regulations

 West TSA Boundary
 Other Government Land

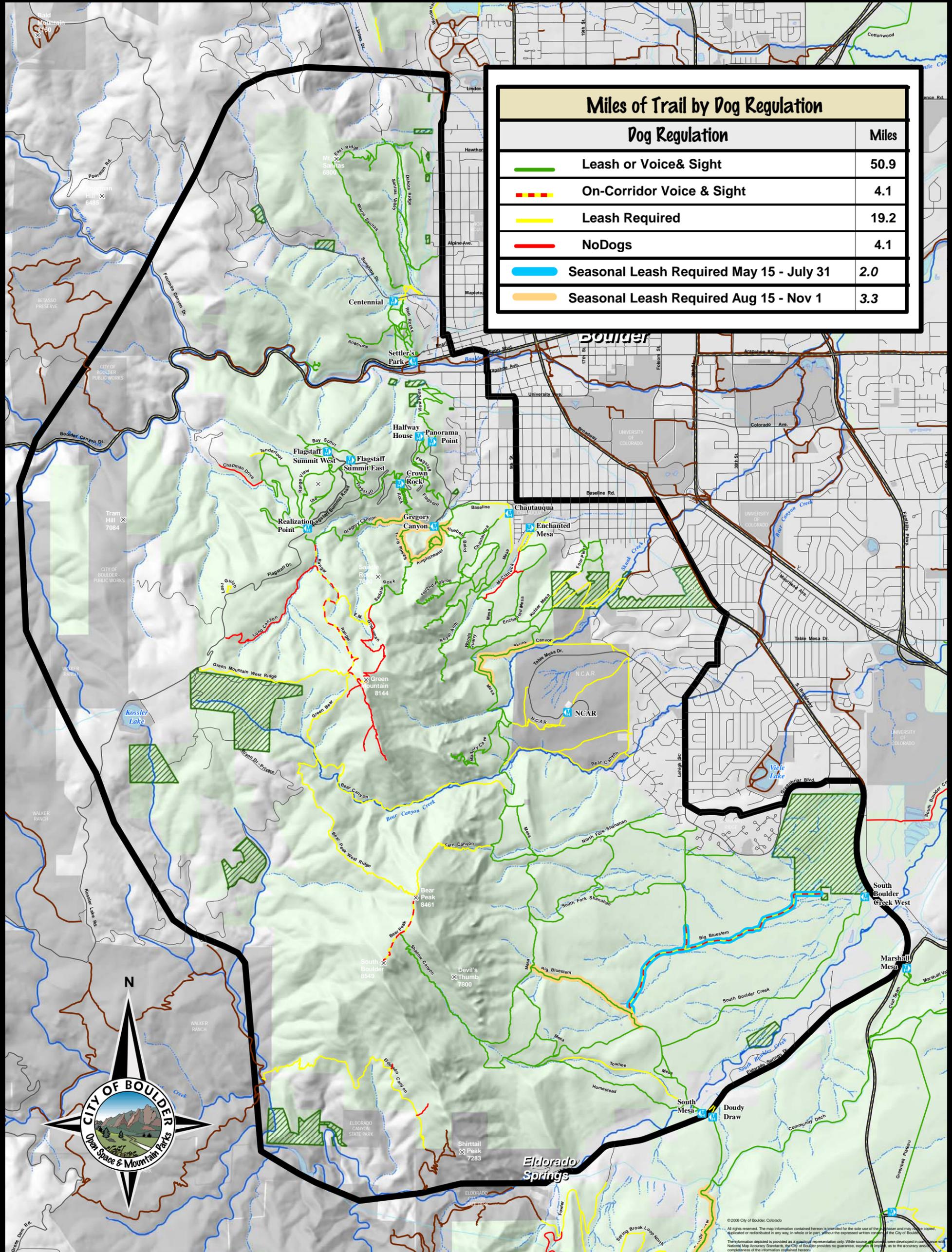
 OSMP Land
 OSMP Conservation Easement

 Trailhead
 Trail Not Managed By OSMP



revised: 6/05/2009

Miles of Trail by Dog Regulation	
Dog Regulation	Miles
 Leash or Voice & Sight	50.9
 On-Corridor Voice & Sight	4.1
 Leash Required	19.2
 NoDogs	4.1
 Seasonal Leash Required May 15 - July 31	2.0
 Seasonal Leash Required Aug 15 - Nov 1	3.3



© 2008 City of Boulder, Colorado
 All rights reserved. The map information contained herein is intended for the sole use of the user and may not be copied, reproduced, or redistributed in any way, in whole or in part, without the expressed written consent of the City of Boulder.
 The information depicted is provided as a graphical representation only. While source information was developed in accordance with National Map Accuracy Standards, the City of Boulder provides no guarantee, express or implied, as to the accuracy and completeness of the information contained herein.

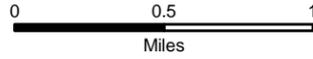
Map 4

West TSA - Access to Key Destinations

- Habitat Conservation Area
- Natural Area
- Passive Recreation Area
- NIST and NCAR

- West TSA Boundary
- Other Government Land
- OSMP Conservation Easement

- Trailhead
- Trails Managed By OSMP
- Trail Not Managed By OSMP
- Undesignated Trails



revised: 7/2/2009

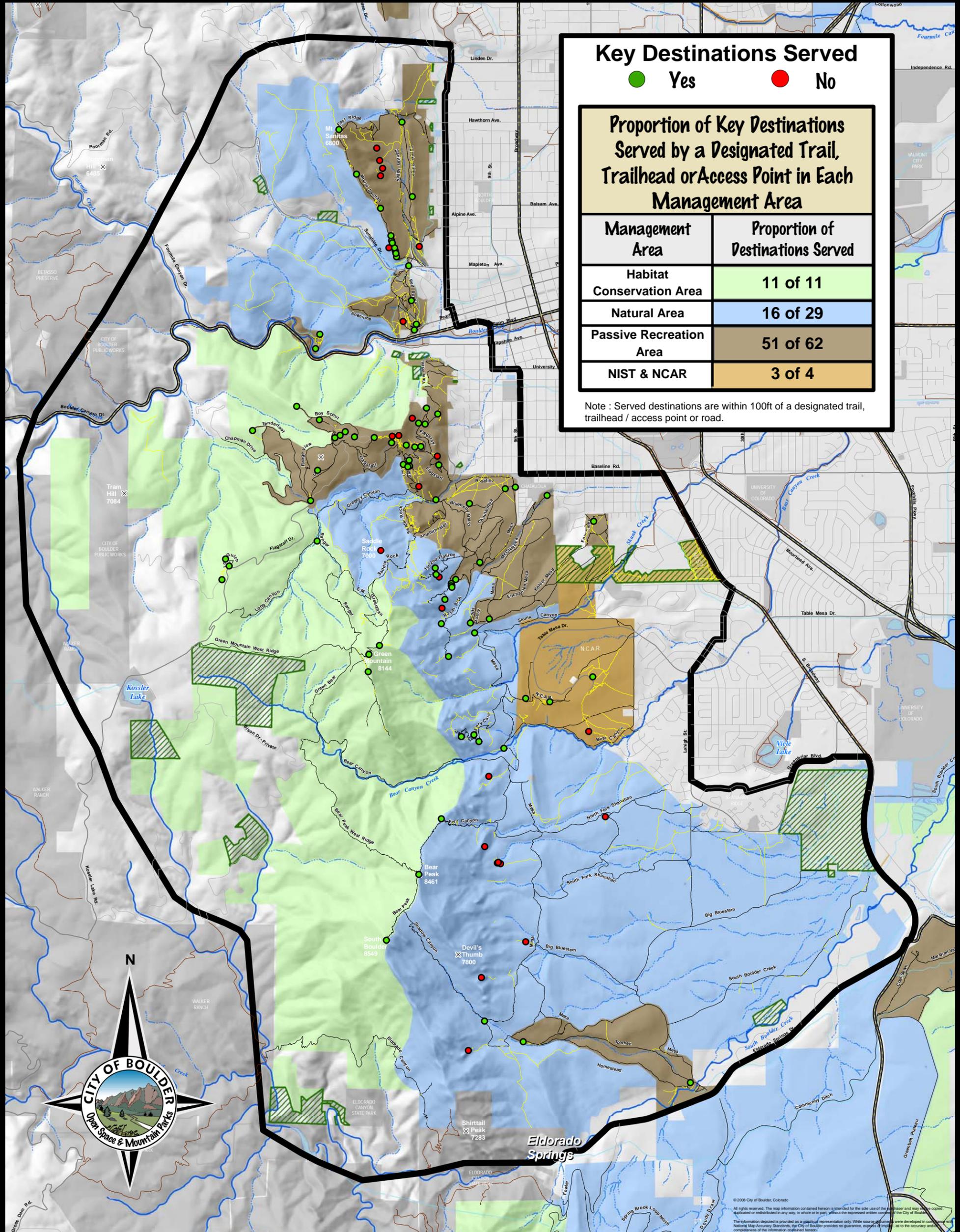
Key Destinations Served

- Yes
- No

Proportion of Key Destinations Served by a Designated Trail, Trailhead or Access Point in Each Management Area

Management Area	Proportion of Destinations Served
Habitat Conservation Area	11 of 11
Natural Area	16 of 29
Passive Recreation Area	51 of 62
NIST & NCAR	3 of 4

Note : Served destinations are within 100ft of a designated trail, trailhead / access point or road.



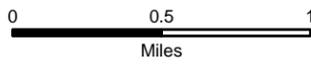
Map 5

West TSA - Climbing Activity

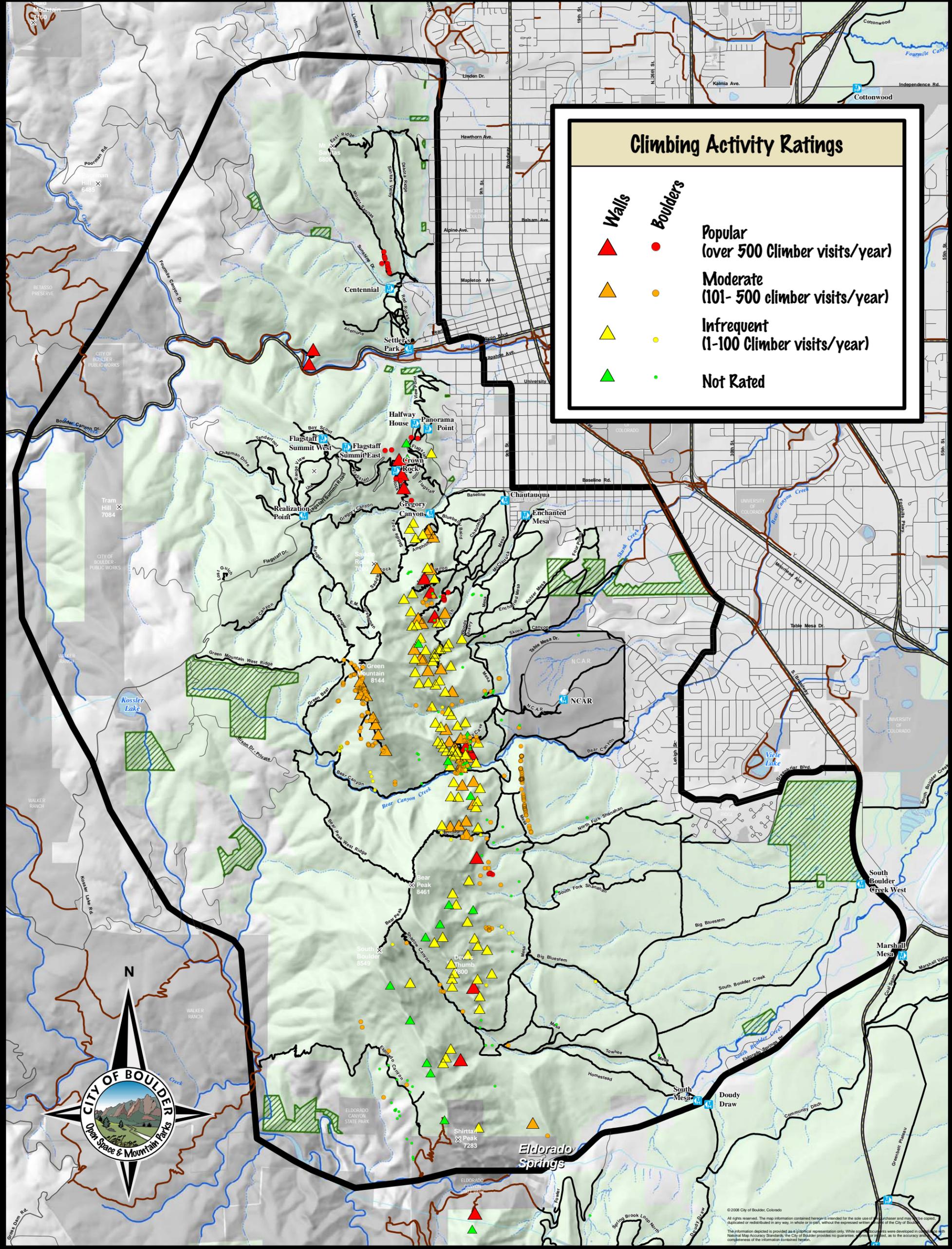
 West TSA Boundary
 Other Government Land

 OSMP Land
 OSMP Conservation Easement

 Trails Managed By OSMP
 Trail Not Managed By OSMP
 Trailhead

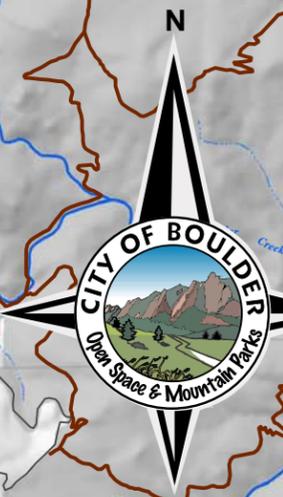


revised: 7/08/2009



Climbing Activity Ratings

Walls	Boulders	Rating
		Popular (over 500 Climber visits/year)
		Moderate (101- 500 climber visits/year)
		Infrequent (1-100 Climber visits/year)
		Not Rated



©2008 City of Boulder, Colorado
 All rights reserved. The map information contained hereon is intended for the sole use of the purchaser and may not be copied, duplicated or redistributed in any way, in whole or in part, without the expressed written consent of the City of Boulder.
 The information depicted is provided as a graphical representation only. While some accounts were developed in compliance with National Map Accuracy Standards, the City of Boulder provides no guarantee, express or implied, as to the accuracy and completeness of the information contained herein.

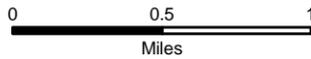
Map 6

West TSA - Undesignated Trails

- Habitat Conservation Area
- Natural Area
- Passive Recreation Area
- NIST and NCAR

- West TSA Boundary
- Other Government Land
- OSMP Conservation Easement

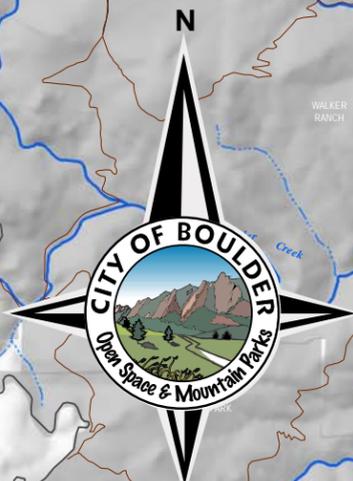
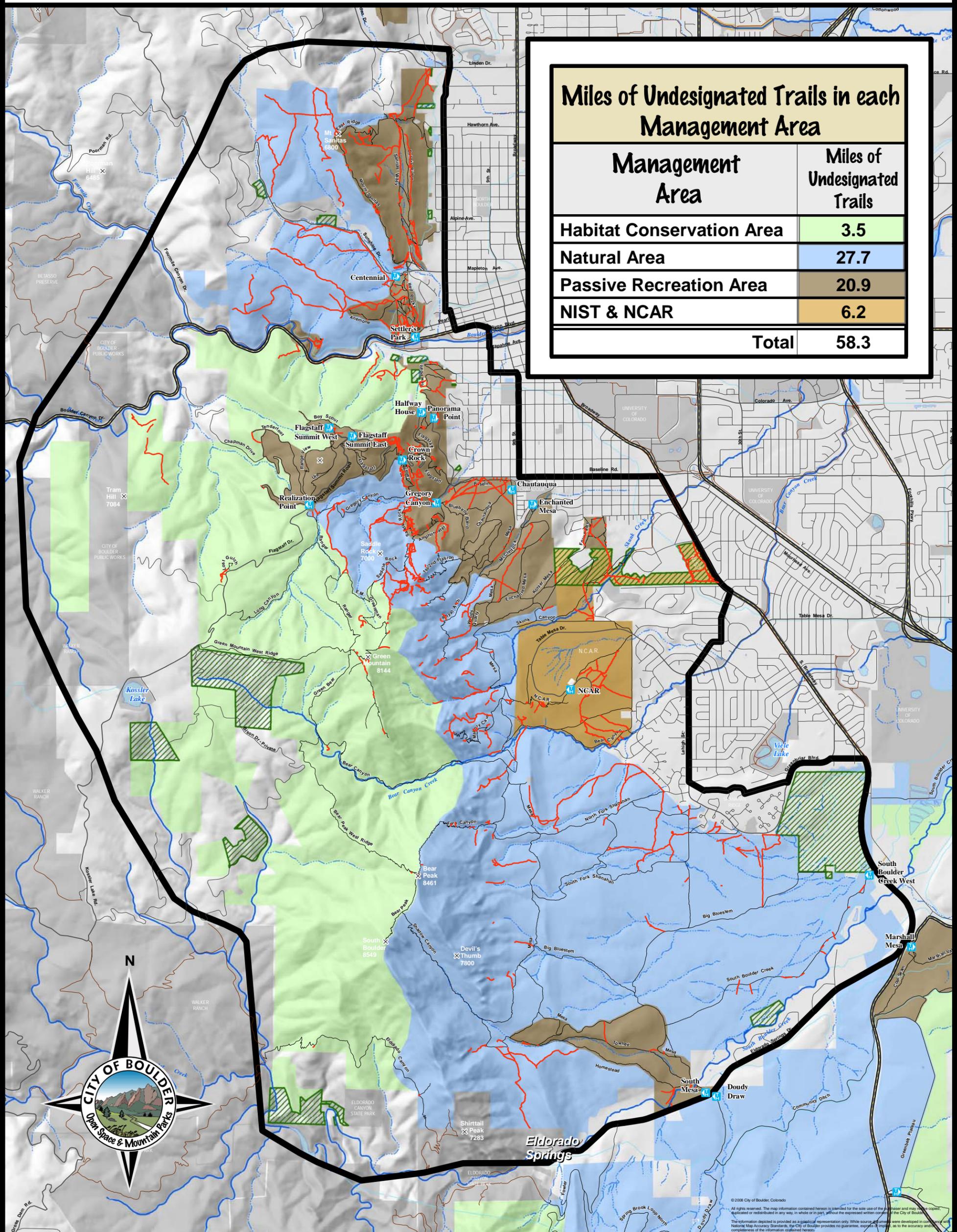
- TH Trailhead
- Trails Managed By OSMP
- Trail Not Managed By OSMP
- Undesignated Trails



revised: 4/22/2009

Miles of Undesignated Trails in each Management Area

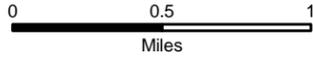
Management Area	Miles of Undesignated Trails
Habitat Conservation Area	3.5
Natural Area	27.7
Passive Recreation Area	20.9
NIST & NCAR	6.2
Total	58.3



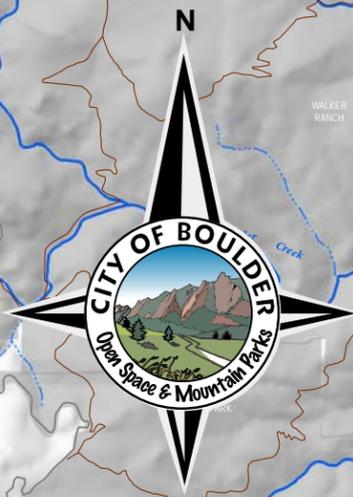
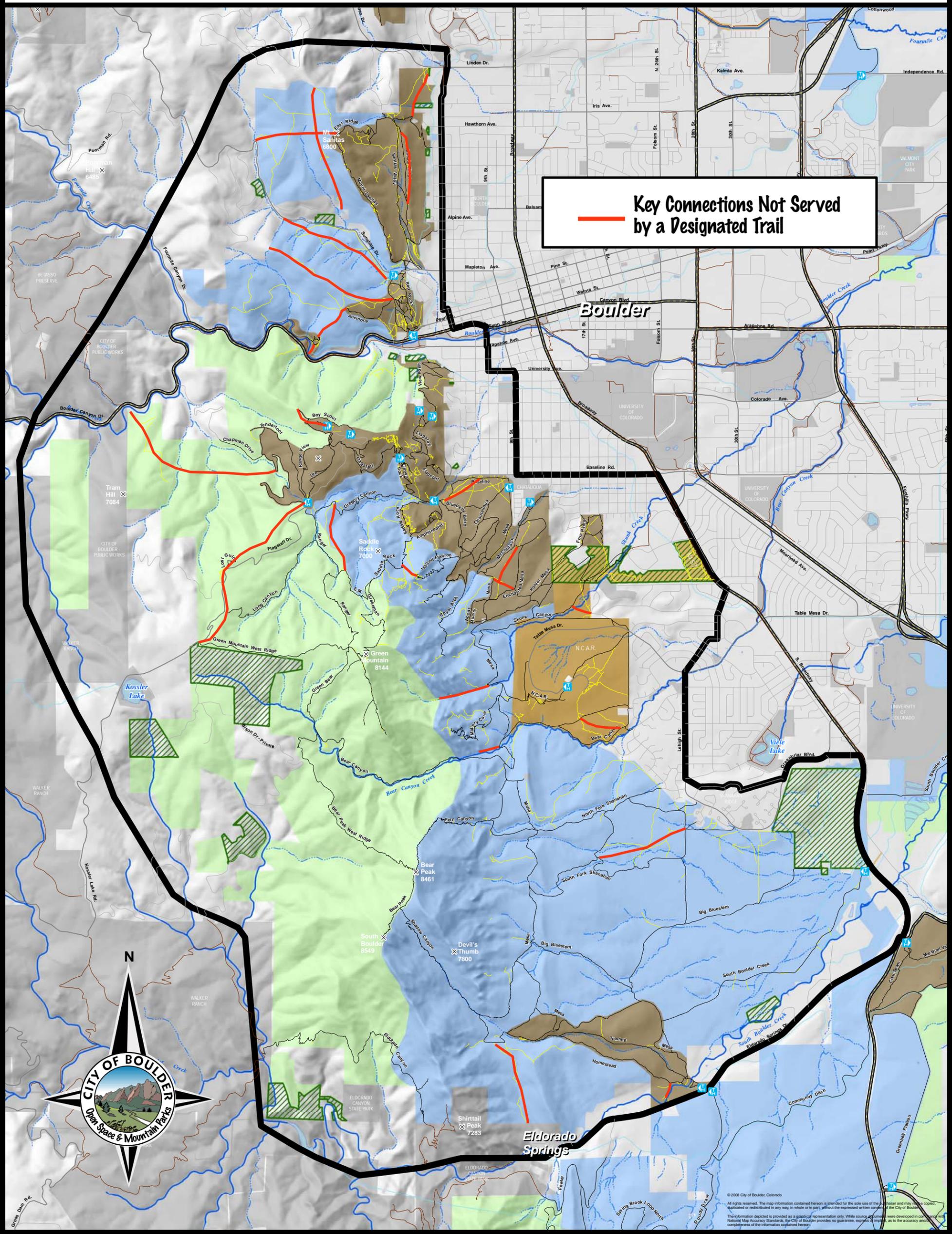
© 2008 City of Boulder, Colorado
All rights reserved. This map information contained herein is intended for the sole use of the user and may not be copied, reproduced, or redistributed in any way, in whole or in part, without the expressed written consent of the City of Boulder.
The information depicted is provided as a graphical representation only. While sources were used in the development of this map, the City of Boulder provides no guarantee, express or implied, as to the accuracy and completeness of the information contained herein.

Map 7 West TSA - Key Connections not Served by a Designated Trail

- Habitat Conservation Area
- Natural Area
- Passive Recreation Area
- NISTand NCAR
- West TSA Boundary
- Other Government Land
- OSMP Conservation Easement
- Trailhead
- Trails Managed By OSMP
- Trail Not Managed By OSMP
- Undesignated Trails



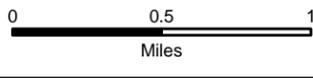
revised:6/4/2009



© 2008 City of Boulder, Colorado
All rights reserved. This map information contained herein is intended for the sole use of the user and may not be copied, reproduced, or redistributed in any way, in whole or in part, without the expressed written consent of the City of Boulder.
The information depicted is provided as a graphical representation only. While source data were developed in compliance with National Map Accuracy Standards, the City of Boulder provides no guarantee, express or implied, as to the accuracy and completeness of the information contained herein.

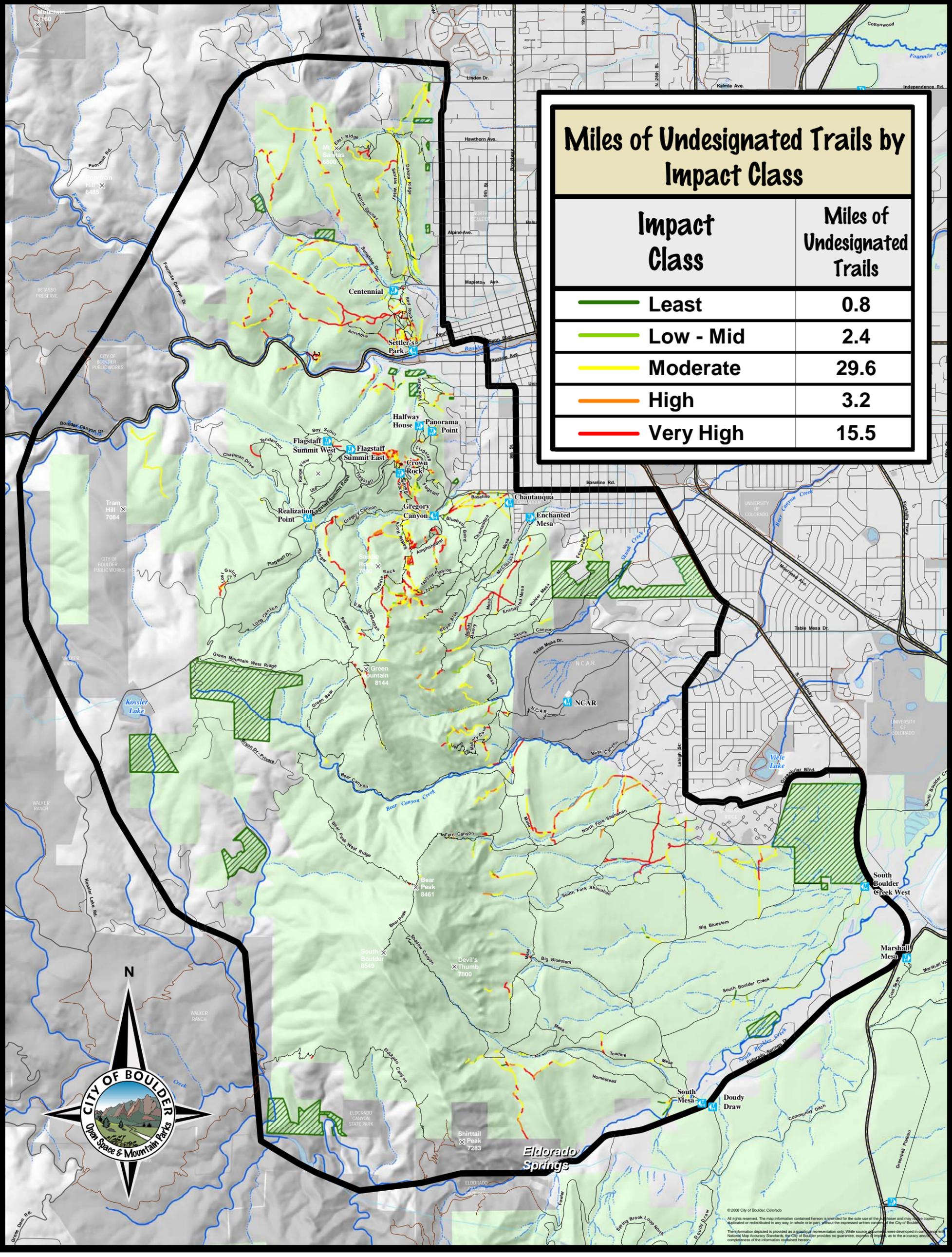
Map 9 West TSA - Undesignated Trail Impact Classes

- OSMP Land
- OSMP Conservation Easement
- Other Government Land
- West TSA Boundary
- H Trailhead
- Trails Managed By OSMP
- Trail Not Managed By OSMP



revised:6/01/2009

Miles of Undesignated Trails by Impact Class	
Impact Class	Miles of Undesignated Trails
 Least	0.8
 Low - Mid	2.4
 Moderate	29.6
 High	3.2
 Very High	15.5



Map 11

West TSA - Bus Access

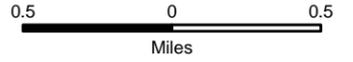
-  West TSA Boundary
-  OSMP Land
-  OSMP Conservation Easement
-  Other Government Lands

Trails Managed By OSMP

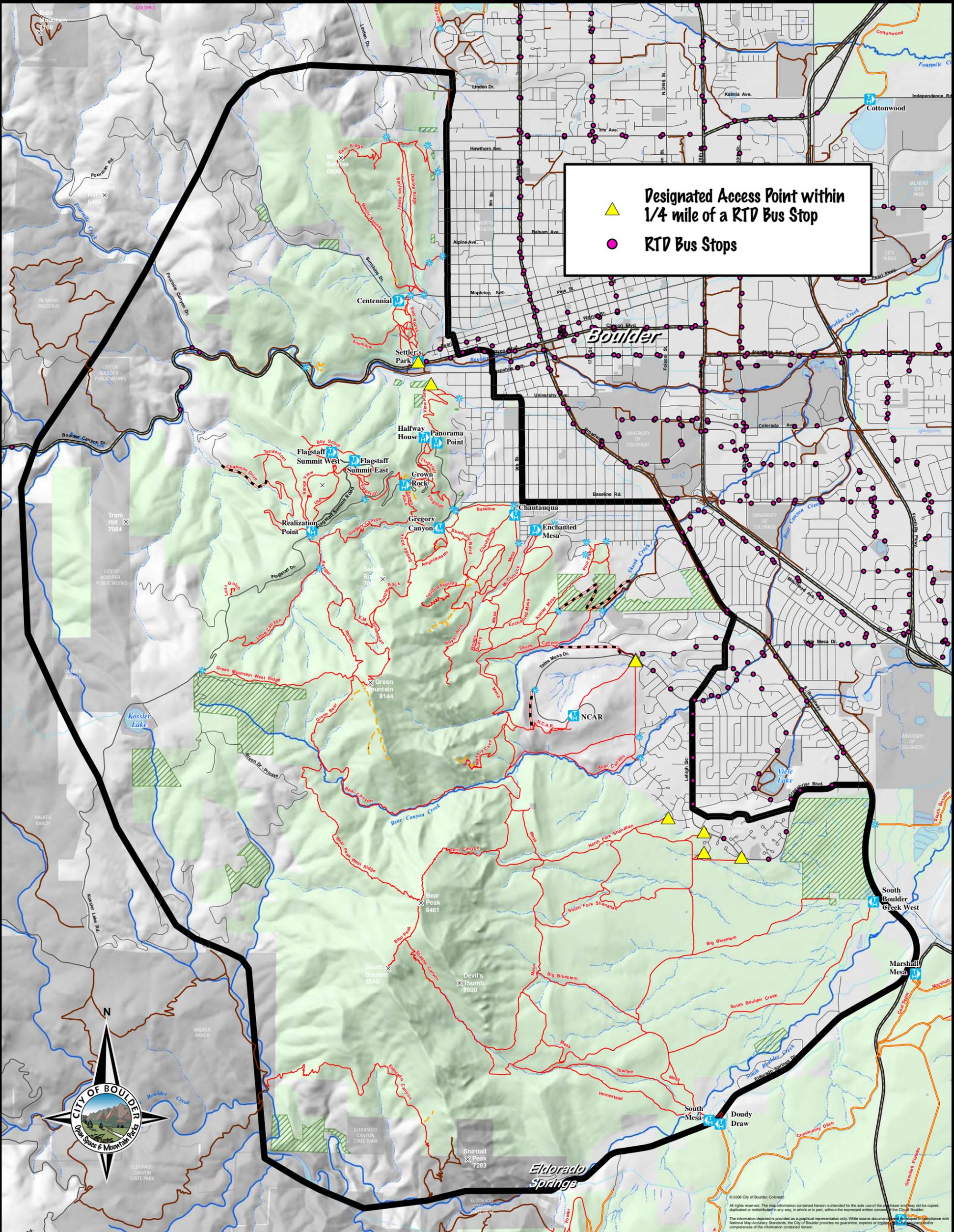
-  Hiking Trail
-  Multi-Use Trail
-  Paved Path
-  Climbing Access
-  Service Road
-  Trails Not Managed By OSMP



Trailhead
* Designated Access Point



revised: 7/27/2009



Map 12 West TSA - Designated and Undesignated Access Points

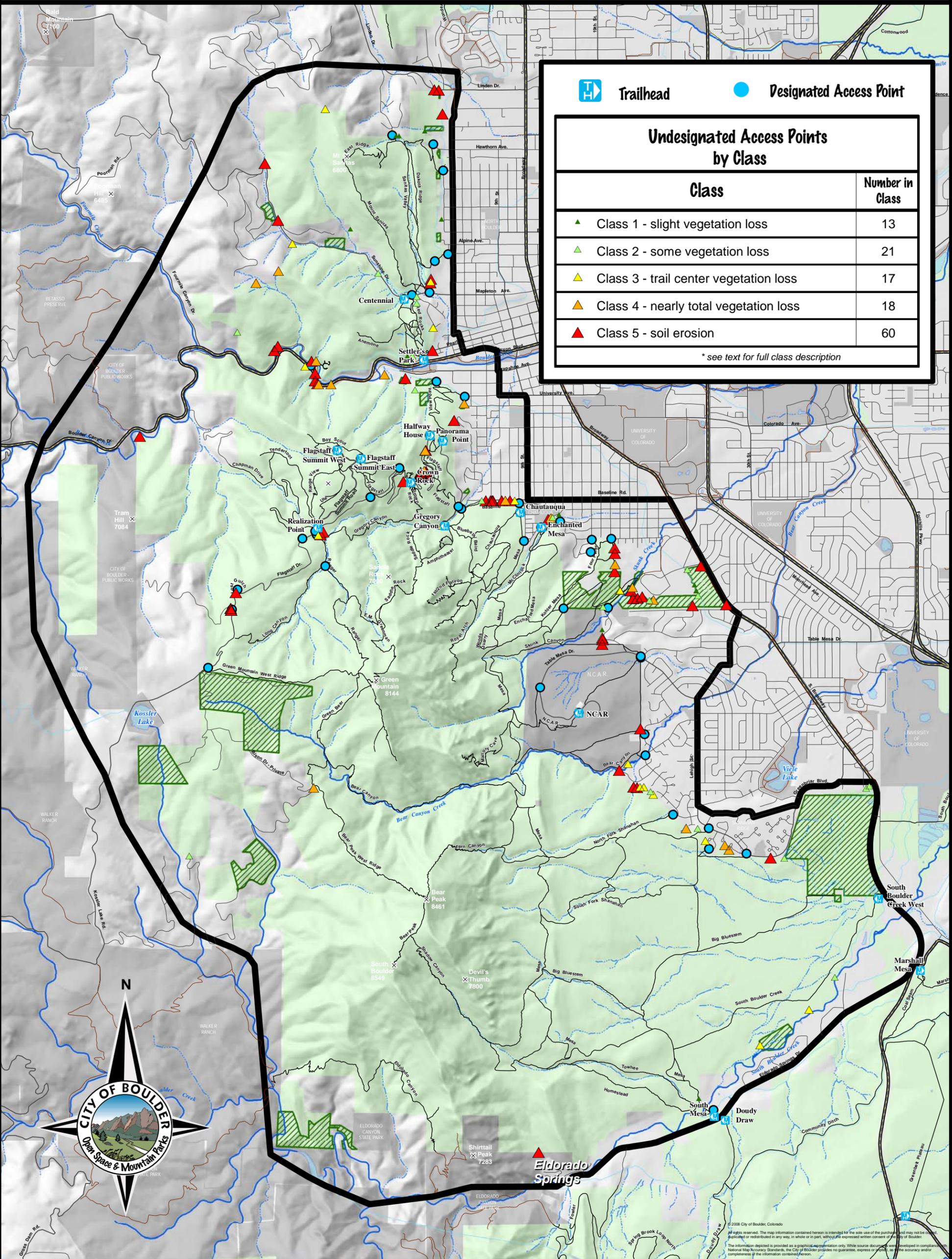
 West TSA Boundary
 Other Government Land

 OSMP Land
 OSMP Conservation Easement

 Trails Managed By OSMP
 Trail Not Managed By OSMP



revised:6/2/2009



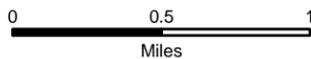
Map 13

West TSA - Wayfinding Signs at Designated Trail Intersections

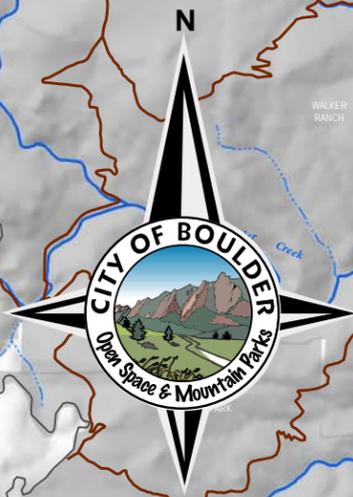
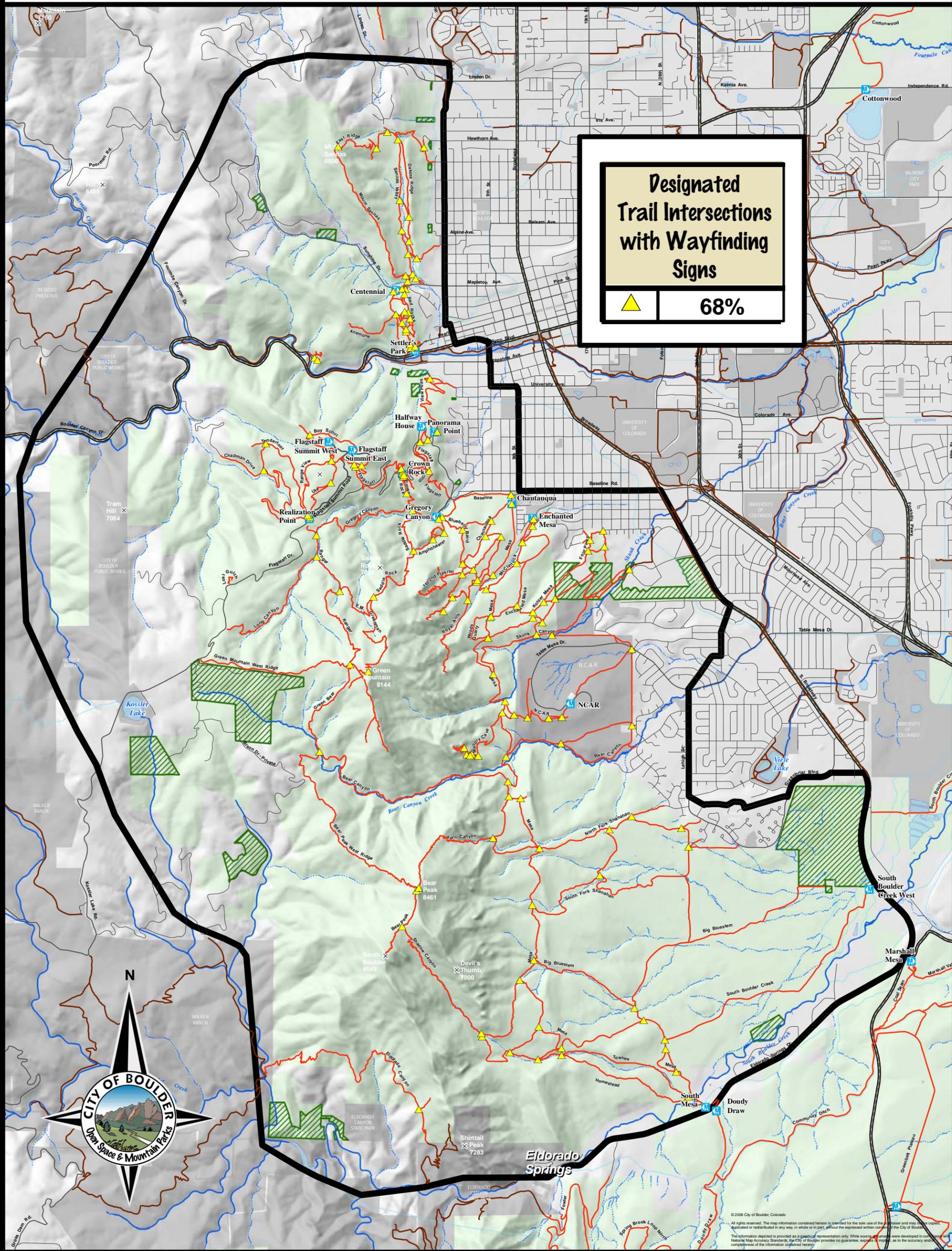
 West TSA Boundary
 Other Government Land

 OSMP Land
 OSMP Conservation Easement

 Trailhead
 Trails Managed By OSMP
 Trail Not Managed By OSMP



revised: 6/09/2009



© 2008 City of Boulder, Colorado
 All rights reserved. The map information contained herein is intended for the sole use of the user and may not be copied, reproduced, or redistributed in any way, in whole or in part, without the expressed written consent of the City of Boulder.
 The information depicted is provided as a graphical representation only. While source information was developed in accordance with National Map Accuracy Standards, the City of Boulder provides no guarantee, express or implied, as to the accuracy and completeness of the information contained herein.

Map 14

West TSA - Patrol Frequency Q1 2009

West TSA Boundary

Other Government Land

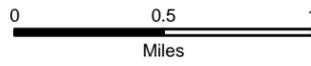
OSMP Land

OSMP Conservation Easement

Trails Managed By OSMP

Trail Not Managed By OSMP

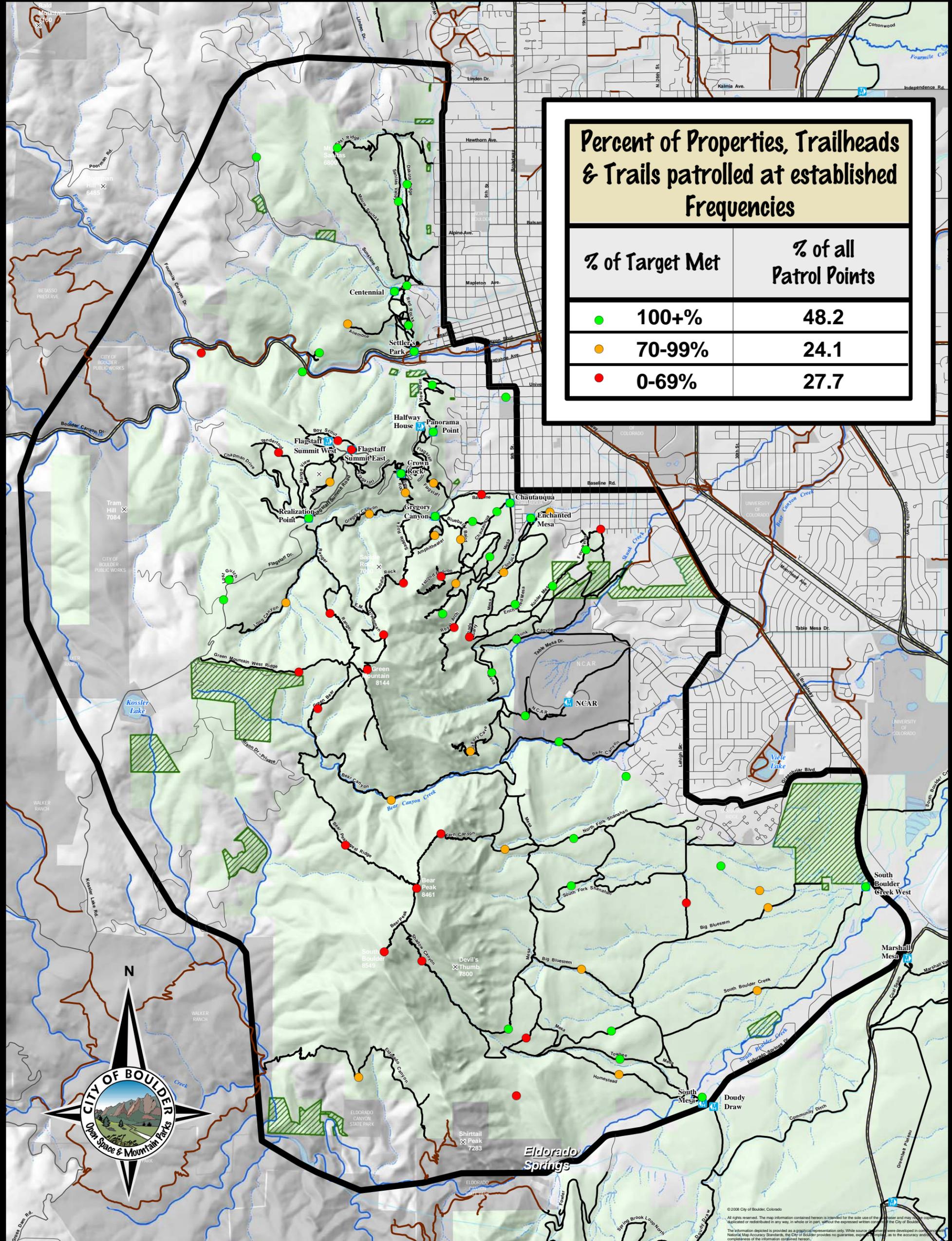
Trailhead



revised: 4/21/2009

Percent of Properties, Trailheads & Trails patrolled at established Frequencies

% of Target Met	% of all Patrol Points
100+%	48.2
70-99%	24.1
0-69%	27.7



Map 15 West TSA - Trail Management Objective (TMO) Compliance

West TSA Boundary

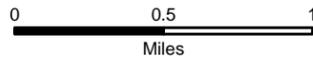
Other Government Land

OSMP Land

OSMP Conservation Easement

Trailhead

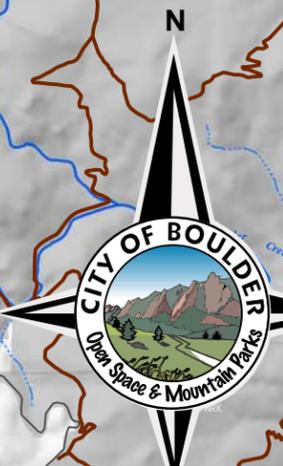
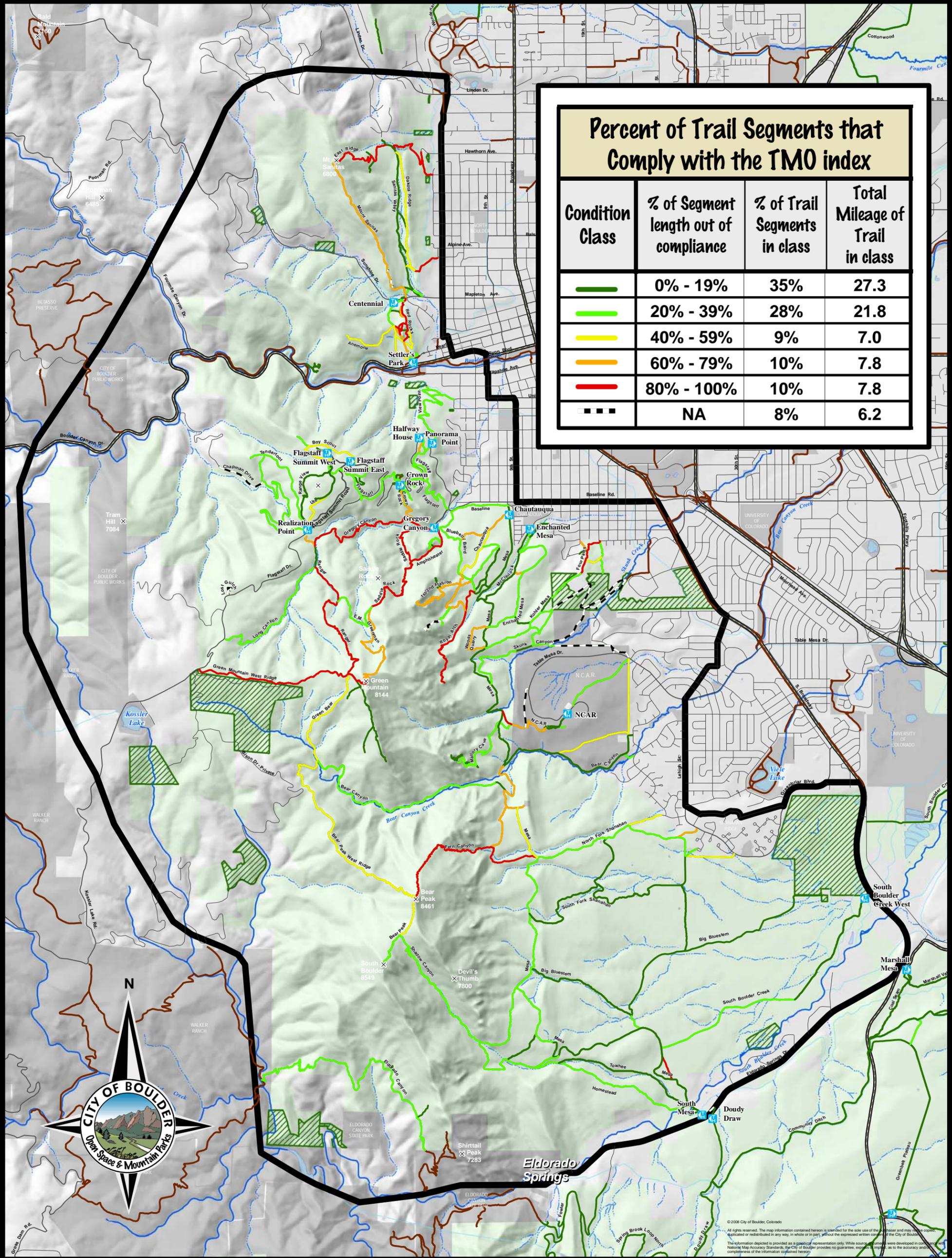
Trail Not Managed By OSMP



revised: 7/14/2009

Percent of Trail Segments that Comply with the TMO index

Condition Class	% of Segment length out of compliance	% of Trail Segments in class	Total Mileage of Trail in class
	0% - 19%	35%	27.3
	20% - 39%	28%	21.8
	40% - 59%	9%	7.0
	60% - 79%	10%	7.8
	80% - 100%	10%	7.8
	NA	8%	6.2



© 2008 City of Boulder, Colorado
All rights reserved. The map information contained herein is intended for the sole use of the user and may not be copied, reproduced, or redistributed in any way, in whole or in part, without the expressed written consent of the City of Boulder. The information depicted is provided as a graphical representation only. While sources were used in the development of this map, the City of Boulder provides no guarantee, express or implied, as to the accuracy and completeness of the information contained herein.

Appendix A: Glossary

Bench Cut/Bench: A relatively flat, stable surface (tread) on a hillside occurring naturally or by excavation. When excavated often referred to as full, half, or partial bench.

Berm: The ridge of material formed on the outer edge of the trail that projects higher than the center of the trail tread. When improperly designed or unintentionally caused by tread compaction and soil displacement during trail use, a berm can trap water on the trail and lead to erosion

Boardwalk: An elevated, fixed-planked structure, usually built on pilings in areas of wet soil or water to provide dry crossings.

Borrow: Fill material required for on-site trail construction and obtained from other nearby locations.

Braiding: Parallel, redundant trail tread(s) adjacent to an established trail caused by users avoiding the established trail and wearing in a new path(s).

Citizen Survey: Survey of City of Boulder residents by phone or mail and typically repeated every 5 years. (1999, 2004)

Clearing: Removal of windfall trees, uproots, leaning trees, loose limbs, wood chunks, etc. from both the vertical and horizontal trail corridor.

Clearing Height (Vertical Clearance): The vertical dimension, which must be cleared of all tree branches and other obstructions that would otherwise obstruct movement along the trail.

Clearing Limit: The area over and beside a trail that is cleared of trees, limbs, and other obstructions.

Concentrated Use Area: A discrete place containing a concentration of facilities and services used to provide and support recreation opportunities. Examples include: trailheads, overlooks, amphitheater, picnic areas, access points, road crossings, large group areas.

Control Point, Negative: Are places you want users to avoid.

Control Point, Positive: Are places you want trail users to visit.

Corridor, Trail: The full dimensions of the trail, including the area (2 to 3 feet) on either side of the tread and the space overhead (10 to 12 feet) from which brush and obstacles need to be cleared. The area of passage of the trail, including all cleared and managed parts above, below, and adjacent to the tread.

Culvert, Cross Drainage: Pipe- or box-like construction of native rock, wood, metal, plastic, or concrete under a trail to catch surface water from side ditches and direct it away from a trail. Generally, a catch basin is created above the trail; the culvert is then buried underneath the trail between the catch basin and the downhill side. Sometimes a rock lining is laid on the downhill side to slow the flow of water.

Cupped (Cupping): A board or plank whose edges are higher or lower than the center. Cupping is often found in decks, where the board edges are higher than the middle. Water, trapped in the cupped area, accelerates rot. Cupping also refers to a process of erosion that turns the trail into a gully or the opposite of crowning. Lowering of the center portion of the tread due to user caused erosion or stock traffic, loosening soil in the center of the tread which is then removed by water or kicked off and built up into a berm.

Deberming: Removing the high ridge of material that has formed along the outer (downhill) edge of a trail, allowing water to once again flow off and not down the trail.

Designated Trails: Trails which are signed, shown on public trail maps, and maintained.

Designed Use: Refers to the allowed use on the trail which dictates how it is designed, built and maintained. All City of Boulder Open Space and Mountain Parks trails fall into one of six designed uses: Official Vehicle, ADA accessible, Equestrian, Biking, Hiking or Climbing Access.

Drainage Structure: A water diversion structure constructed across the trail tread to remove water flowing down the trail tread or to prevent it from entering the tread.

Erosion: Natural processes (water, wind, ice, or other physical processes) by which soil particles are detached from the ground surface and moved downslope, principally by the actions of running water (gully, rill, or sheet erosion). The combination of water falling on the trail, running down the trail, and freezing and thawing, and the wear and tear from traffic create significant erosion problems on trails.

Fall Line: Steepest line across a given contour or the direction water flows down a slope (path of least resistance) under most circumstances. Constructing a trail on the fall line encourages water to run down the trail and leads to erosion.

Grade: The vertical distance of ascent or descent of the trail expressed as a percentage of the horizontal distance, commonly measured as a ratio of rise to length or as a percent. For example, a trail that rises 8 vertical feet in 100 horizontal feet has an 8% grade. Grade is different than angle; angle is measured with a straight vertical as 90° and a straight horizontal as 0°. A grade of 100% would have an angle of 45°.

Grade, Average Trail (Overall Trail Grade): The average steepness of a trail over its entire length.

Grade, Reverse (Grade Reversal, Grade Change, Adverse Pitch): A reverse in the trail grade, usually a short dip followed by a rise&emdash;that forces water off the trail. Grade reversals are subtle and typically designed into the alignment of the trail. When designed into the alignment they can prevent the future need for more artificial water diversion structures such as waterbars.

Grade, Sustained: The steepest acceptable grade permitted over the majority of the trail length.

Grade, Trail: The average grade over the length of a trail or long section of trail.

Hazard: A reported trail, infrastructure or facility related hazard, or a natural hazard that does not pose an immediate public safety risk but does require an investigation and a response. (examples: rebar protruding from a wooden water bar, fallen trees near a trail, icy sidewalk)

Outslope (Outsloping, Offslope): A method of tread grading that leaves the outside edge of a hillside trail lower than the inside to shed water. The outslope should be barely noticeable, usually no more than about one inch of outslope for every 18 inches of tread width.

Public Safety Service Call: A report from a citizen of an emergency, injury, law enforcement incident, unsafe condition, or natural hazard that is passed on to OSMP rangers for their investigation and response. Rangers will determine if a particular issue constitutes an emergency or if an immediate response is needed to provide for public safety. If so, the report is categorized as a public safety service call. (examples: wildland fire, lost person, injured hiker, aggressive wildlife, criminal activity)

Rake Down: Trail construction where all spoils are distributed below or to the side of the trail vs. "full clean" where all spoils must be removed.

Saddle: Ridge between two peaks.

Sideslope: The natural slope of the ground measured at right angles to the centerline of the trail, or the adjacent slope, which is created after excavating a sloping ground surface for a railway, often termed a cut-and-fill-slope, left and right of the trail tread.

Site Classification: All trailheads, access points and recreation sites on OSMP lands are classified based on visitor use levels. Each class identifies a set of required facilities, optional facilities and a maintenance schedule. For more information please refer to the *Classes and Standards for Trailheads, Access Points and Recreation Sites* document dated 12/08.

Substrate: Underlying layer of loose/soft material below topsoil and overlying bedrock. The composition of a streambed, including either mineral or organic materials.

Switchback: A sustainable sharp turn on a hillside (usually on a slope of more than 15%) to reverse the direction of travel and to gain elevation. The landing is the turning portion of the switchback. The approaches are the trail sections upgrade and downgrade from the landing.

Trail Class: Refers to a trail's level of development. All City of Boulder Open Space and Mountain Parks trails fall into one of the following classes: Class 1 (Primitive/Undeveloped), Class 2 (Minor Development), Class 3 (Developed/Improved), Class 4 (Highly Developed) or Class 5 (Fully Developed).

Trail Design: Designing and layout of trails requires special training, knowledge, experience, and skill. When designing trails, many different factors are taken into account including hydrology, topography, soils, flora, fauna, management objectives, user expectations and characteristics, and trail design standards. The designer will utilize data collected from area site analysis, environmental assessments, public meetings, and area trail and management plans.

Trail Infrastructure: Any managed or constructed features or components of those features on or associated with a trail. Examples include: walls, steps, bridges, water bars, culverts (this is not an exhaustive list).

Trail Management Objective Index: Based on a trail's designed use and trail class, a range of construction and maintenance guidelines are identified for the cross-slope, tread width, clearing width and heights, turn radius, maximum sustained grade and appropriate surface materials. Combined, these guidelines make-up the Trail Management Objective Index for each trail.

Trailbed: The finished surface on which base course or surfacing may be constructed. For trails without surfacing, the trailbed is the tread.

Tread (Treadway): The surface portion of a trail upon which users travel excluding backslope, ditch, and shoulder. Common tread surfaces are native material, gravel, soil cement, asphalt, concrete, or shredded recycled tires.

Undesignated Trails: Trails created or worn into the landscape by visitors repeatedly walking off of designated trails. Sometimes, undesignated trails begin as wildlife or cattle trails that attract the interest of hikers or other visitors. They are not shown on public trail maps and are not maintained.

Visitor Survey: Exit survey of people leaving OSMP system and typically repeated every five years. The main purpose of the survey is to obtain demographic information, trip characteristics, and experience evaluations. (2004)

Volunteer Survey: A yearly survey of all active OSMP volunteers.

Waterbar: A drainage structure (for turning water) composed of an outsloped segment of tread leading to a barrier (log, stone, or timber) placed at a 45° angle to the trail. Water

flowing down the trail will be diverted by the outslope or, as a last resort, by the barrier. This type of drainage structure is not longer recommended for construction or use on trails. Grade dips are preferred.

**Appendix B: Peer Agency/
Regional Data**

Jefferson County

Park Name	Trail mileage	dogs on leash	Dogs not permitted	Bikes permitted	Horses permitted	Closed Seasonally
Alderfer / Three Sisters	15.2	15.2	0	15.2	15.2	0
Apex	8.3	8.3	0	8.3	8.3	0
Centennial Cone	14.3	14.3	0	14.3	14.3	14.3
Crown Hill	6.5	0	.7	5.8	5.8	0
Deer Creek Canyon	10.6	10.6	0	7.5	7.5	0
Elk Meadow	9.6	9.6	0	9.6	9.6	0
Flying J	3	3	0	3	3	0
Lair o' the Bear	4.6	4.6	0	3.8	3.8	0
Lookout Mtn Nature Center	1.4	0	1.6	0	0	0
Matthews / Winters **	7.1	7.1	0	7.1	7.1	0
Meyer Ranch	4.3	4.3	0	4.3	4.3	0
Mount Galbraith	4.7	4.7	0	0	0	0
Mount Falcon	11.1	11.1	0	9.4	9.4	0
Pine Valley Ranch	5.2	5.2	0	3.3	3.3	0
Reynolds	5.9	5.9	0	5.9	5.9	0
South Valley	6.9	6.9	0	5.7	5.7	2.5
Van Bibber	4.0	4.0	0	4.0	4.0	0
Windy Saddle	2.1	2.1	0	2.1	2.1	0
White Ranch	19.7	19.7	0	19.7	19.7	0
Total	144.5	136.6	2.3	129	129	16.8

Properties not included: Hildebrand Ranch (under construction), Hiwan Homestead (museum- no trails), Welchester (only .2 miles of trail- small pocket park), Clear Creek Trail (trail only- no park land), Coal Creek Canyon (currently developing a management plan), Fairmount Trail (trail only- no park land), Mount Glennon (no facilities or parking- access is limited), Mount Lindo (no facilities or parking- access is limited), North Table Mountain Park (currently undeveloped- in the conceptual management planning stage), Pioneer Trail (trail only- limited park land), and South Table Mountain Park (management plan in progress, have completed around 3-4 miles of multiuse trails)

**Recently designated portions of Matthew/Winters Park as “Bike Only” and “Hike Only”.

Alternating use management strategy: yes

Percent of Trail Mileage where dogs are required to be on leash (on trails where dogs are allowed) - 100%

Percent of Trail Mileage where dogs are not permitted - 2%

Percent of Trail Mileage where bikes are allowed - 89%

Percent of Trail Mileage where horses are allowed - 89%

Percent of Trails that are closed seasonally – 12%

Boulder County

Park Name	Trail mileage	dogs on leash	Dogs not permitted	Bikes permitted	Horses permitted	Closed Seasonally
Hall Ranch	13.6	0	13.6	6.9	13.6	0
Rabbit Mountain	6.1	6.1	0	6.1	6.1	0
Heil Valley Ranch	14.6	0	14.6	13.3	14.6	0
Lohr Agricultural Heritage Center	.5	0	.5	0	0	0
Pella Crossing	3.6	3.6	0	3.6	3.6	0
Fairgrounds	2.8	2.8	0	2.8	2.8	0
Lagerman Reservoir	1.6	1.6	0	1.6	1.6	1.6
Niwot Loop Trail	5.8	5.8	0	5.8	5.8	0
Twin Lakes	3.3	3.3	0	3.3	3.3	0
Bald Mountain	1.5	1.5	0	1.5	1.5	0
Walden Ponds	2.5	2.5	0	2.5	2.5	0
Betasso Preserve	5	5	0	4.6	5	0
Legion Park	.9	.9	0	.9	.9	0
Caribou Ranch	4.5	0	4.5	0	4.5	4.5
Mud Lake	2.6	2.6	0	2.6	2.6	0
Walker Ranch	9.6	9.6	0	9.6	9.6	0
Carolyn Holmberg Preserve	3.1	3.1	0	3.1	3.1	0
Four Mile Open Space	2.6	2.6	0	0	2.6	0
Total	84.2	51	33.2	68.2	83.7	6.1

Properties not included: Beech, James F. Bailey Assay Office Museum (museum – no trails), Flagg Park, Boulder Canyon (trail only – no park land), Coal Creek Trail (regional trail- no park land), Coalton Road (trail only- no park land), Dodd Lake (0.1 miles), Gunbarrel Est. (trail only- no park land), Harney-Lastoka (trail only- no park land), Heatherwood (trail only- no park land), Homestead (trail only- no park land), Imel/NW Parkway (trail only- no park land), Mayhoffer-Singletree (trail only- no park land),

Alternating use management strategy: yes

Percent of Trail Mileage where dogs are required to be on leash (on trails where dogs are allowed)- 100%

Percent of Trail Mileage where dogs are not permitted - 39%

Percent of Trail Mileage where bikes are allowed - 81%

Percent of Trail Mileage where horses are allowed - 99%

Percent of Trails that are closed seasonally - 7%

Golden Gate Canyon State Park

Park Name	Trail mileage	dogs on leash	Dogs not permitted	Bikes permitted	Horses permitted	Closed Seasonally
Black Bear	2.8	2.8	0	0	0	0
Blue Grouse	.7	.7	0	.7	.7	0
Buffalo Trail	1.2	1.2	0	1.2	1.2	0
Burro Trail	4.5	4.5	0	0	0	0
Coyote Trail	2	2	0	0	0	0
Elk Trail	1.7	1.7	0	1.7	1.7	0
Horseshoe Trail	1.8	1.8	0	1.8	1.8	0
Mountain Lion Trail	6.7	6.7	0	6.7	6.7	0
Mule Deer Trail	5.2	5.2	0	5.2	5.2	0
Raccoon Trail	2.5	2.5	0	2.5	2.5	0
Snowshoe Trail	3	3	0	3	3	0
Beaver Trail	2.5	2.5	0	0	0	0
Visitor Center Show Pond Trail	.25	.25	0	0	0	0
Visitor Center Nature Trail	.10	.10	0	0	0	0
Reverend's Ridge Nature Trail	.25	.25	0	0	0	0
TOTAL	35.1	35.1	0	22.8	22.8	0

Alternating use management strategy: no

Percent of Trail Mileage where dogs are required to be on leash (on trails where dogs are allowed) - 100%

Percent of Trail Mileage where dogs are not permitted - 0%

Percent of Trail Mileage where bikes are allowed - 65%

Percent of Trail Mileage where horses are allowed - 65%

Percent of Trails that are closed seasonally - 0%

Eldorado Canyon State Park

Park Name	Trail mileage	dogs on leash	Dogs not permitted	Bikes permitted	Horses permitted	Closed Seasonally
Eldorado Canyon Trail	3.5	3.5	0	0	3.5	0
Rattlesnake Gulch Trail	3.6	3.6	0	3.6	0	0
Fowler Trail	.9	.9	0	0	0	0
Streamside Trail	.5	.5	0	0	0	0
Crescent Meadows	2.5	2.5	0	2.5	2.5	0
Total	11	11	0	6.1	6	0

Alternating use management strategy: no

Percent of Trail Mileage where dogs are required to be on leash (on trails where dogs are allowed) - 100%

Percent of Trail Mileage where dogs are not permitted - 0%

Percent of Trail Mileage where bikes are allowed - 55%

Percent of Trail Mileage where horses are allowed - 55%

Percent of Trails that are closed seasonally (wildlife closures) - 0%

Douglas County

Park Name	Trail mileage	dogs on leash	Dogs not permitted	Bikes permitted	Horses permitted	Closed Seasonally
Greenland Open Space Trail	8.5	8.5	0	8.5	8.5	0
Columbine Open Space Trail	1.5	0	1.5	1.5	1.5	0
Glendale Open Space Trail	1.6	1.6	0	1.6	1.6	0
Hidden Mesa Trail	5.5	5.5	0	5.5	5.5	0
High Line Canal Trail	8	8	0	8	8	0
Sharptail Ridge Trail System	4	0	4	0	4	0
Spruce Meadows	8.5	8.5	0	8.5	8.5	0
Spruce Mountain Trail	4.5	4.5	0	4.5	4.5	0
Swallowtail Trail	3.5	3.5	0	3.5	3.5	0
Ringtail Trail	3.5	3.5	0	3.5	3.5	0
Total	49.1	43.6	5.5	45.1	49.1	0

Properties / Trails not included: Cherry Creek Regional Trail, East – West Regional Trail, Bluffs Regional Park Trail, Town of Parker, Town of Castle Rock, City of Lone Tree

Alternating use management strategy: no

Percent of Trail Mileage where dogs are required to be on leash (on trails where dogs are allowed) - 100%

Percent of Trail Mileage where dogs are not permitted - 11%

Percent of Trail Mileage where bikes are allowed - 92%

Percent of Trail Mileage where horses are allowed - 100%

Percent of Trails that are closed seasonally - 0%

Larimer County Open Space

Park/Trail Name	Trail mileage	dogs on leash	Dogs not permitted	Bikes permitted	Horses permitted	Closed Seasonally
Carter Lake	4	4	0	4	4	0
Coyote Ridge	2.1	0	2.1	2.1	2.1	0
Devil's Backbone	12.5	12.5		12.5	12.5	0
Rimrock	1.7	0	1.7	1.7	1.7	0
Eagle's Nest	4.8	4.8	0	0	4.8	1.8
Hermit Park	3.75	3.75	0	1	1	0
Horsetooth Mountain	26.4	26.4	0	22.7	22.7	0
Ramsay-Shockey	4	4	0	4		0
Fossil Creek Reservoir	2.4	0	2.4	0	0	2.4
Total	61.65	55.45	6.2	48	48.8	4.2

Properties not included: Carter Lake, Flatiron Reservoir, Horsetooth Reservoir, Pinewood Reservoir

Percent of Trail Mileage where dogs are required to be on leash (on trails where dogs are allowed) - 100%

Percent of Trail Mileage where dogs are not permitted - 10%

Percent of Trail Mileage where bikes are allowed - 78%

Percent of Trail Mileage where horses are allowed - 79%

Percent of Trails that are closed seasonally - 7%

United States Forest Service USFS-Boulder Ranger District
Trails and Forest Development Roads, FDR's

Trail or Forest Development Road (FDR)	Trail mileage (distances are one way)	Bikes permitted	Horses Permitted	Dogs required on leash	Dogs off leash
Arapaho Glacier Trail Indian Peaks Wilderness	7.8	0	7.8	7.8	0
Arapaho Pass Trail Indian Peaks Wilderness	3.3	0	3.3	3.3	0
Beaver Bog Road FDR, 4WD road	1	1	1	0	1
Beaver Creek Trail Indian Peaks Wilderness	6.9	0	6.9 * enter from Coney Flats only	6.9	0
Blue Lake Indian Peaks Wilderness	2.5	0	0	2.5	0
Bright Extension Trail	1.8	0	1.8	0	1.8
Buchanan Pass Indian Peaks Wilderness	9.1	0	9.1	~4.1(approximately)	~5
Bunce School Road FDR, 4WD road	5.2	5.2	5.2	0	5.2
Carabou Flats FDR, 4WD road	11	11	11	0	11
Ceran Saint Vrain Trail	6	6	6	0	6
Coney Creek Road FDR, 4WD road	4	4	4	0	4
Coney Lake Trail (after Coney Creek Road) Indian Peaks Wilderness	2.5	0	2.5	2.5	0
Coulson Gulch loop Trail	9	0	9	0	9
Crater Lakes James Peak Wilderness	4.6	0	4.6	4.6	0
Devil's Thumb Trail (from Lost Lake) Indian Peaks Wilderness	5.1	0	5.1	5.1	0

United States Forest Service USFS-Boulder Ranger District Cont.

Trail or Forest Development Road (FDR)	Trail mileage (distances are one way)	Bikes permitted	Horses Permitted	Dogs required on leash	Dogs off leash
Diamond Lake Indian Peaks Wilderness	2	0	0	2	0
Dry Saint Vrain Trail	1.5	0	1.5	0	1.5
Forest Lakes James Peak Wilderness	4	0	4	4	0
Fourth of July Road, County Road 111	5	5	0	0	5
Gross Reservoir Area, FDR, 4WD road	5	5	5	0	5
Heart Lake/ South Boulder Creek Trail James Peak Wilderness	4.6	0	4.6	4.6	0
Isabelle Glacier Trail Indian Peaks Wilderness	4.2	0	0	4.2	0
James Peak Lake & Ute Trail	5	0	5	5	0
Jean Lunning Trail Indian Peaks Wilderness	3.2	0	0	3.2	0
Johnny Park Area FDR, 4WD road	14	14	14	0	14
King(Betty & Bob) Lake Trail (from Lost Lake) Indian Peaks Wilderness	4.6	0	0	4.6	0
Lost Lake Trail	1.4	0	1.4	0	1.4
Mammoth Basin FDR, 4WD road	25	25	25	0	25
Middle Saint Vrain Road FDR, 4WD road	4.5	4.5	4.5	0	4.5
Mitchell Lake Trail Indian Peaks Wilderness	2.5	0	0	2.5	0
Moffat Road FDR, 4WD road	13	13	13	0	13

United States Forest Service USFS-Boulder Ranger District Cont.

Trail or Forest Development Road (FDR)	Trail mileage (distances are one way)	Bikes permitted	Horses Permitted	Dogs required on leash	Dogs off leash
Mount Audubon Trail Indian Peaks Wilderness	3.8	0	0	3.8	0
Pawnee Pass Trail Indian Peaks Wilderness	4.6	0	0	4.6	0
Rainbow Lakes Trail Indian Peaks Wilderness	1.2	0	1.2	1.2	0
Rainbow Lakes Road, FDR, rough 2WD road	4.5	4.5	4.5	0	4.5
Rock Creek Road 4WD road	4	4	4	0	4
Saint Vrain Glaciers Trail Indian Peaks Wilderness	8.4	0	8.4	~ 4	~ 4.4
Saint Vrain Mountain Trail Indian Peaks Wilderness	4.5	0	4.5	4.5	0
Sourdough Trail	14.7	14.7	14.7	0	14.7
South Boulder Creek Trail James Peak Wilderness	4.6	0	4.6	4.6	0
South Saint Vrain Trail	5.9	0	~ 5 *no horses within BLRA	0	5.9
Switzerland Trail old railroad bed	18.6	18.6	18.6	0	18.6
Taylor Mountain FDR, 4WD road and single track	5	5	5	0	5
Woodland Lake Trail (from Devil's Thumb Trail juncture) Indian Peak Wilderness	2.4	0	2.4	2.4	0
Total	261.5	140.5	223.2	92	169.5

* did not include the Continental Divide Trail

United States Forest Service USFS-Boulder Ranger District Cont.

Percent of Trail Mileage where dogs are required to be on leash- 35%

Percent of Trail Mileage where dogs are not permitted- 0% (dogs are allowed either on or off leash on all forest service trails)

Percent of Trail Mileage where bikes are allowed- 54% (however of that 54%, 15% (or 20.7 miles) are multiuse trails, the remaining 85% are roads)

Percent of Trail Mileage where horses are allowed- 85 %

Percent of Trail Mileage where dogs are required to be on leash (on trails where dogs are allowed)

Jefferson County	100%
Boulder County	100%
Douglas County	100%
Larimer County	100%
City of Boulder OSMP	31.2%
West TSA	25.9%

Golden Gate Canyon State Park	100%
Eldorado Canyon State Park	100%
USFS Boulder Ranger District	35%

Percent of Trail Mileage where dogs are not permitted

Jefferson County	2%
Boulder County	39%
Douglas County	11%
Larimer County	10%
City of Boulder OSMP	10%
West TSA	5%

Golden Gate Canyon State Park	0%
Eldorado Canyon State Park	0%
USFS Boulder Ranger District	0%

Percent of Trail Mileage that bikes are allowed on

Jefferson County	89%
Boulder County	81%
Douglas County	92%
Larimer County	78%
City of Boulder OSMP	34%
West TSA	0%

Golden Gate Canyon State Park	65%
Eldorado Canyon State Park	55%
USFS Boulder Ranger District	54%

Percent of Trail Mileage that horses are allowed on

Jefferson County	89%
Boulder County	99%
Douglas County	100%
Larimer County	79%
City of Boulder OSMP	96%
West TSA	94%
Golden Gate State Park	65%
Eldorado Canyon State Park	55%
USFS Boulder Ranger District	85%

Percent of Trails that are closed seasonally (due to wildlife)

Jefferson County	12%
Boulder County	7%
Douglas County	0%
Larimer County	7%
City of Boulder OSMP	1%
West TSA	2%
Golden Gate State Park	0%
Eldorado Canyon State Park	0%

Counties that use an alternating use management strategy

Jefferson County
Boulder County

Jefferson County recently designated portions of trails as “bike only” and “hike only”.

Appendix C: Key Destinations

Habitat Conservation Areas		
Destination	Destination Type	Trail Service
Lost Gulch Accessible	Viewpoint	Designated and Undesignated Trails
Cathedral	Concentrated Use Area	Designated and Undesignated Trails
Tenderfoot Overlook	Viewpoint	Designated and Undesignated Trails
Green Mountain Summit	Peak Summit	Designated and Undesignated Trails
Green Mountain False Summit	Viewpoint	Designated and Undesignated Trails
Sacred Overlook	Viewpoint	Designated and Undesignated Trails
Bear Peak Summit	Peak Summit	Designated and Undesignated Trails
Mays Point	Viewpoint	Designated Trails
Lost Gulch	Concentrated Use Area	Designated Trails
South Boulder Peak	Peak Summit	Designated Trails
Green Mountain Lodge	Historic Feature	Designated Trails

Natural Areas		
Destination	Destination Type	Trail Service
First Flatiron	Climbing Formation	Designated and Undesignated Trails
Third Flatiron	Climbing Formation	Designated and Undesignated Trails
Der Zerkle	Climbing Formation	Designated and Undesignated Trails
Bear Canyon Pool	Natural Feature	Designated and Undesignated Trails
Second Flatiron	Climbing Formation	Designated and Undesignated Trails
Mesa Trail Viewpoint @ skunk Canyon	Viewpoint	Designated Trails
Dinosaur Rock	Climbing Formation	Designated Trails
Royal Arch	Natural Feature	Designated Trails
Mallory Cave	Natural Feature	Designated Trails
G-friend Boulder	Boulder	Designated Trails
Stardust Boulder	Boulder	Designated Trails
A-7 Boulder	Boulder	Designated Trails
BBC Boulder	Boulder	Designated Trails
Sentinal Ridge	Viewpoint	Designated Trails
Nebel Horn Saddle	Viewpoint	Designated Trails
Stockton Cabin	Historic Feature	Designated Trails
The Matron	Climbing Formation	Undesignated Trails
The Maiden	Climbing Formation	Undesignated Trails
Twin Fins	Boulder	Undesignated Trails
Funk Soul Boulder	Boulder	Undesignated Trails
Animal Chin Boulder	Boulder	Undesignated Trails
The Ice Cube-Fairview Boulder	Boulder	Undesignated Trails
Stone Shelter	Historic Feature	Undesignated Trails
Harmon Cave	Natural Feature	Undesignated Trails

Natural Areas		
Destination	Destination Type	Trail Service
Shanahan Stock Pond	Manmade Feature	Undesignated Trails
Saddle Rock	Viewpoint	Not Served
Ghetto Bouldering	Boulder	Not Served
Compound Boulder	Boulder	Not Served
The Slab	Climbing Formation	Not Served

Passive Recreation Areas		
Destination	Destination Type	Trail Service
Crown Rock	Climbing Formation	Designated and Undesignated Trails
Flagstaff Stone Shelter	Concentrated Use Area	Designated and Undesignated Trails
Contact Corner	Concentrated Use Area	Designated and Undesignated Trails
Capstan	Boulder	Designated and Undesignated Trails
Cloud Shadow	Boulder	Designated and Undesignated Trails
Pumpkin Rock	Boulder	Designated and Undesignated Trails
Panorama Point	Concentrated Use Area	Designated and Undesignated Trails
Lower Gregory Canyon	Natural Feature	Designated and Undesignated Trails
North Shelf Blocks	Boulder	Designated and Undesignated Trails
Red Rocks Quarry	Manmade Feature	Designated and Undesignated Trails
Red Rocks Summit	Viewpoint	Designated and Undesignated Trails
Flagstaff Amphitheater	Concentrated Use Area	Designated and Undesignated Trails
Woods Quarry	Manmade Feature	Designated and Undesignated Trails
Scoop Wall	Boulder	Designated and Undesignated Trails
Amphitheatre	Climbing Formation	Designated and Undesignated Trails
Beer Barrel/Tree Slab/	Boulder	Designated and Undesignated Trails
Alamo	Climbing Formation	Designated and Undesignated Trails
Cookie Jar	Boulder	Designated and Undesignated Trails
Classy Wall	Boulder	Designated and Undesignated Trails
Ridge Gap Wall	Boulder	Designated and Undesignated Trails
Mt Sanitas Summit	Viewpoint	Designated and Undesignated Trails
Dakota Ridge Hogback A	Viewpoint	Designated and Undesignated Trails
Dakota Ridge Hogback B (bench)	Viewpoint	Designated and Undesignated Trails
Sanitas Ridge View Point	Viewpoint	Designated and Undesignated Trails
The Dome	Climbing Formation	Designated and Undesignated Trails
Corner Rock	Boulder	Designated and Undesignated Trails
Davey Crockets Cave	Natural Feature	Designated and Undesignated Trails
Monkey Traverse	Boulder	Designated and Undesignated Trails
Elephant Buttresses	Climbing Formation	Designated and Undesignated Trails
Photo OPP rocks, boulders and sweet pea	Natural Feature	Designated and Undesignated Trails
McGilvery Cabin	Historic Feature	Designated and Undesignated Trails
Dunn House	Historic Feature	Designated and Undesignated Trails

Passive Recreation Areas

Destination	Destination Type	Trail Service
Four Pines Bench	Viewpoint	Designated and Undesignated Trails
Halfway House	Concentrated Use Area	Designated Trails
Flagstaff Summit Nature Center	Concentrated Use Area	Designated Trails
Flagstaff Wood Shelter	Concentrated Use Area	Designated Trails
Sanitas Shelter	Concentrated Use Area	Designated Trails
Ranger Cottage	Concentrated Use Area	Designated Trails
Realization Point	Concentrated Use Area	Designated Trails
Sledding Hill	Natural Feature	Designated Trails
Sanitas Proper	Boulder	Designated Trails
Settlers Park	Concentrated Use Area	Designated Trails
Rangeview Photo Opp.	Viewpoint	Designated Trails
Ute Overlook	Viewpoint	Designated Trails
Mt Sanitas False Summit	Viewpoint	Designated Trails
Artists Point	Viewpoint	Designated Trails
South Shelf Blocks	Boulder	Designated Trails
Sputnik Boulder	Boulder	Designated Trails
Roosa (Boy Scout) Cabin	Historic Feature	Designated Trails
McClintock Rock	Natural Feature	Designated Trails
Bluebell Shelter	Concentrated Use Area	Designated Trails
Old Reservoir	Manmade Feature	Undesignated Trails
Upper Area	Boulder	Undesignated Trails
Candel Area	Boulder	Undesignated Trails
Sanitas Rock Quarry D	Manmade Feature	Undesignated Trails
Sanitas Rock Quarry C	Manmade Feature	Undesignated Trails
Sanitas Rock Quarry B	Manmade Feature	Undesignated Trails
3-of-a-Kind Wall	Boulder	Undesignated Trails
Sanitas Stone Shelter	Historic Feature	Undesignated Trails
Campbell Cliffs	Viewpoint	Undesignated Trails
Holiday Star	Manmade Feature	Not Served
Sanitas Rock Quarry A	Manmade Feature	Not Served

NCAR and NIST

Destination	Destination Type	Trail Service
NCAR mesa	Viewpoint	Designated and Undesignated Trails
NCAR East Overlook	Viewpoint	Designated Trails
NCSR Ridge	Viewpoint	Designated Trails
Anthill	Viewpoint	Undesignated Trails

Appendix D Undesignated Trails Report Methodology

The following is excerpted from the Draft Inventory and Analysis of Undesignated Trails report.

Undesignated trails were mapped by collecting waypoints with a Global Positioning System (GPS) receiver. Waypoints were collected at the start of the trail, at a randomly selected distance along the 1st 200 ft trail segment, and every 200 ft thereafter. At each GPS waypoint, undesignated trail condition indicators were measured or characterized along a transect perpendicular to the trail. Measured variables were entered electronically using the data dictionary programmed into the GPS.

Table 1 – Indicators of undesignated trail conditions measured and recorded for each sample point

Indicator	Description
Tread width (in.)	Tread width measured with metal tape between trail edges. Edges defined by pronounced changes in ground vegetation height, cover, composition (including improved surface), or organic litter.
Trail alignment (<i>proxy for ½ rule</i>)	a. Within 45° of direct ascent b. Within 45° of side-hill
Trail gradient	Slope measured with hand held clinometer. Recorded in 5% increments
Tread Cover	Percentage of trail width covered by various tread surfaces listed below. Measured by observation and recorded in increments of 10%
• Exposed soil	Exposed soil of all types, including mud but excluding rock and organic litter
• Rock	Naturally occurring rock surfaces (bedrock, stones, boulders & gravel)
• Organic litter	Organic litter or duff sufficient to obscure the tread surface
• Vegetative cover	Vegetative cover rooted within the tread boundaries, including exposed tree or shrub roots
Maximum incision	Maximum depth between tread surface and a line connecting trail tread edges. Measured with a meter stick (to provide horizontal surface) and metal tape to measure depth.
OSMP maintenance	Signs, improved surfaces, water bars, etc.
Comments	Presence of noxious weeds, other notable occurrences

Undesignated Trail Impact Classification

A multi-metric analysis was conducted to classify undesignated trails into “impact classes”. In a multi-metric analysis several trail measurements are assigned ranked values

representing their relative impacts and the rankings combined to create one composite value. For this analyses, three metrics, trail width, trail cross-sectional area (trail width/2 x maximum incision), and tread cover percent were combined to create a composite trail impact value. Each trail metric was first divided into three impact categories and assigned ranks of 3, 9, or 15 representing increasing degrees of impact.

For trail width and cross-sectional area metrics, the three impact categories were defined quantitatively to include the range of measurements below, within, and above one standard deviation of the mean (Table 2).

Table 2 shows the trail width and trail cross-sectional area classes and the related rank associated with each class.

Trail Width (in)	Rank	Trail Cross-Sectional (in ²)	Rank
5-11	3	1-11	3
12-22	9	12-34	9
≥ 23	15	≥ 34	15

For the tread cover percent metric, field measurements of organic litter, exposed soil, and vegetation cover on undesignated trail segments were compared to cover values for an ideal “no trail” reference condition desired by OSMP. Reference values (means; standard deviations) for “un-trailed” conditions on OSMP lands were derived separately for mountainous forest (70 forest understory plots, Chris Wanner) and grasslands (85 transects). For each cover type (organic litter, exposed soil, and vegetation) and undesignated trail segment measured, a corresponding rank value of 1, 3, or 5 was assigned, representing increasing degrees of deviation from the ideal reference conditions (Table 3) and increasing levels of impact. Summing these ranks across the three tread cover types gave a metric that was comparable in weight to the other two metrics.

Table 3 summarizes cover classes and associated ranks for the mountains/forests and grassland plains locations. Rank values of 1 represent conditions on undesignated trails most similar to reference conditions.

Table 3 – Cover Classes Ranks

Soil Cover (%)	Rank	Vegetation Cover (%)	Rank	Organic Cover (%)	Rank
< 10	1	> 20%	1	> 80%	1
NA	3	10–20%	3	60–80%	3
≥ 10	5	0%	5	< 60%	5

(b) Grasslands					
Soil Cover (%)	Rank	Vegetation Cover (%)	Rank	Organic Cover (%)	Rank
≤ 25	1	≥ 30	1	25–50	1
25–35	3	15–30	3	5–25 or 60–100	3
> 35	5	< 15	5	0	5

Table 4 contains composite rank ranges and the associated impact classes, derived by summing all three trail metrics and then dividing by three.

Table 4 – Impact classes and associated rank values for undesignated trail segments.

Impact Class	Composite Ranks (ranges)
Least	1.0 – 1.7
Low-Mid Impact	1.9 – 2.1
Moderate Impact	2.3 – 3.7
High Impact	3.9 – 4.1
Very High Impact	4.3 – 5.0



Appendix E: 2004-05 Visitor Survey

Open Space and Mountain Parks Survey

1. What time did you start on a trail today? _____ Start time _____ Current time
2. How did you get to the trailhead? Car Walk/Run Bike Bus
3. How many people are in your group? _____
4. Which one of the following was the most important reason for visiting Open Space & Mountain Parks?
 I came here to enjoy the place itself.
 I came here because it is a good place to do the activities that I enjoy.
 I came here because I wanted to spend more time with family or friends.
5. What activities did you do during this visit? (PLEASE CHECK ALL THAT APPLY)
 Climbing/Bouldering Walking dog(s) Viewing scenery
 Photography Picnicking Viewing wildlife
 Social gathering Contemplation/Meditation Horseback riding
 Hiking Biking Nature study
 Running Pleasure driving Other _____
6. Please **CIRCLE** the one activity from **ABOVE** that you consider your **PRIMARY ACTIVITY** today.
7. If walking dogs today, how many are with you? 1 2 3 4 5+ N/A
8. What made your trip enjoyable today? (PLEASE CHECK ALL THAT APPLY)
 Scenery Close to home Get away from daily pressures
 Wildlife Family or friends Exercise/Health
 Plants/Wildflowers Being with my dog(s) Other _____
9. Where do you live?
 Boulder (within city limits) Longmont Other area in Colorado
 Louisville Unincorporated Boulder County Out of state
 Lafayette Other city in Boulder County Out of country
 Superior Metro Denver

PLEASE FLIP OVER TO SECOND PAGE →

10. Please grade Open Space & Mountain Parks on the following categories based on your recent experience. **A= Excellent** **F=Failing**

PLEASE CHECK ONE FOR EACH CATEGORY.	A	B	C	D	F	N/A
Trail conditions and maintenance	<input type="checkbox"/>					
Trash cans and bag dispensers	<input type="checkbox"/>					
Usefulness of signs and brochures	<input type="checkbox"/>					
Experience with bikers	<input type="checkbox"/>					
Fixing eroded or trampled areas	<input type="checkbox"/>					
Restroom cleanliness	<input type="checkbox"/>					
Experience with dogs and dog walkers	<input type="checkbox"/>					
Trailhead and nature education	<input type="checkbox"/>					
Enforcement of rules	<input type="checkbox"/>					
Overall satisfaction with Open Space & Mountain Parks	<input type="checkbox"/>					

11. Did you encounter any conflicts or unpleasant experiences today? Yes No

12. If yes, could you describe them?

13. Please estimate how many times a month, on average; you have visited Open Space & Mountain Parks during the last year? _____ Times per month

14. How many years have you been coming to Open Space & Mountain Parks?
_____ Number of years

QUESTION # 15 AND QUESTION # 16 ARE OPTIONAL

15. How old were you on your last birthday? _____ Years old

16. What is your gender? Female Male

PLEASE REFER TO THE MAP

17. Did you enter from this access/trailhead?

Yes If No, where did you enter from? Please write access number _____
OR, I entered off the scope of this map (CHECK BOX)

18. Do you have any additional comments to improve the management of OSMP?

THANK YOU FOR YOUR TIME!

Open Space & Mountain Parks Questionnaire

(Note: all bold and italicized items are instructions to interviewers.)

“Hello. My name is _____. I’m a public opinion interviewer with The Public Information Corporation. We’re conducting a public opinion survey of voting age residents for the City of Boulder Open Space and Mountain Parks program. We’re not talking about the Boulder County government’s Parks and Open Space, or national parks or national forests. The survey results will be used to help improve recreational experiences and the natural environment in open space and the mountain parks.

1. First of all, what do you feel is the most important purpose for having open space and mountain parks? ***(Open end. Probe.)***

2. When you visit the City’s open space and mountain parks areas, would you describe the quality of your experiences being excellent, good, only fair or poor?	Excellent 1 Good 2 Only fair 3 Poor 4 No Response 5
--	---

3. As a whole, would you rate the facilities and services of the City’s open space and mountain parks areas, such as trails and signs, and services such as education and law enforcement, as being excellent, good, only fair or poor?	Excellent 1 Good 2 Only fair 3 Poor 4 No response 5
---	---

4. If there is one thing about open space and mountain parks facilities and services that you feel is most in need of improvement, what would it be? ***(Open end. Probe.)***

5. In order to both protect the natural environment and provide high quality recreational experiences a careful management balance is required. Do you think Open Space and Mountain Parks management is <u>about right</u> , OR is there <u>too much</u> emphasis on preserving the natural environment and <u>not enough</u> on recreation, OR is there <u>too much</u> emphasis on providing recreation and <u>not enough</u> on preserving the natural environment?	About right 1 Too much/natural env. 2 Too much/recreation 3 Other _____ 4 No response 5
---	---

6. I am going to read you a list of Open Space and Mountain Parks management responsibilities. When managing the lands which one of the following do you believe should receive the highest priority? **(Read each of choices from the list at right. Repeat as necessary. Accept but do not read "all the same."**
- | | |
|--|---|
| Preserving scenic views | 1 |
| Protecting habitat for wildlife . . . | 2 |
| Providing passive recreation, such as hiking, biking and dog walking | 3 |
| Preserving agricultural lands . . | 4 |
| OR | |
| Providing community buffers . | 5 |
| All the same | 6 |
| No response | 7 |

7. What activities do you personally do on the City's open space and in mountain parks? **(Open end. Probe. Accept, but do not solicit, as many as three responses.)**

The folks at Open Space and Mountain Parks try to keep recreation activities, on one hand, in balance with preservation of wildlife habitat and ecosystems, on the other. They also work to reduce conflict among visitors. They currently are considering a number of strategies to help do this. I am going to tell you about some of these strategies, and for each of them I would like you to tell me, based on what you know or have heard, if you feel that it is very appropriate, somewhat appropriate, somewhat inappropriate or very inappropriate. What about:

(Read questions 8-19 and repeat the response categories as necessary. Record but do not read "no response." Rotate questions starting with the check mark.)

	<u>Very Apprp</u>	<u>Some-what Apprp</u>	<u>Some-what Inappr</u>	<u>Very Inappr</u>	<u>No Resp</u>
8. Requiring dogs to be kept on leash for for the first 100 yards at trailheads?	1	2	3	4	5
9. Requiring dogs to be certified in order to be off leash under voice and sight control.	1	2	3	4	5
10. Having City ecologists determine what open space and mountain parks areas will be designated as having high wildlife habitat value.	1	2	3	4	5
11. Having City ecologists determine how areas with high wildlife habitat value will be managed.	1	2	3	4	5
12. Prohibiting dogs in areas designated as having high wildlife habitat value.	1	2	3	4	5
13. Requiring dogs to be <u>leashed</u> in areas with high wildlife habitat value.	1	2	3	4	5

14. Requiring all visitors to stay on designated trails in areas with high wildlife habitat value.	1	2	3	4	5
15. Requiring all visitors to stay on designated trails in areas with high wildlife habitat value unless they have a permit to be off trail.	1	2	3	4	5
16. Charging a fee for open space and mountain parks use by people who live outside of Boulder County.	1	2	3	4	5
17. Charging a fee for open space and mountain parks use by people who live outside of the City of Boulder.	1	2	3	4	5
18. Providing more trails west of Broadway for bikes.	1	2	3	4	5
19. Requiring a permit and fee for commercial uses such as horse liveryes or teaching rock climbing or hang gliding.	1	2	3	4	5

Next, I will describe some kinds of management provided by Open Space and Mountain Parks. Please tell me how adequate you feel they are -- very adequate, somewhat adequate, somewhat inadequate or very inadequate. What about:

(Read questions 20-23 and repeat the response categories as necessary. Record but do not read "no response.")

	<u>Very Adeq.</u>	<u>Some-what Adeq.</u>	<u>Some-what Inadeq.</u>	<u>Very Inadeq.</u>	<u>No Resp.</u>
20. Enforcement of bike regulations.	1	2	3	4	5
21. Enforcement of regulations for people whose dogs are <u>not</u> under voice and sight control when off leash.	1	2	3	4	5
22. Enforcement of regulations about removal of dog excrement.	1	2	3	4	5
23. Signs warning of hazards.	1	2	3	4	5

24. Open Space and Mountain Parks provides nature education with guided nature hikes, programs at local schools, information at trailheads and events like Farmer's Market. Were you aware of these educational opportunities?	Yes	1
	No	2
	No response . .	3

(If "no" to q. 24, SKIP to q. 26).

25. If you or a family member have ever received nature education from City of Boulder Open Space and Mountain Parks staff members, where did it happen? **(Open end. Probe.)**

- | | | |
|--|---------------------------|---|
| 26. How safe do you feel during your visits to Open Space and Mountain Park areas? Would you say very safe, somewhat safe, somewhat unsafe or very unsafe? | Very safe | 1 |
| | Somewhat safe | 2 |
| | Somewhat unsafe | 3 |
| | Very unsafe | 4 |
| | No response | 5 |

(If “no response” to q.26, SKIP to q.28).

27. What mostly caused you to say that you feel _____ in Open Space and Mountain Parks? **(Repeat response to q.26. Open end. Probe.)**

28. Sometimes particular recreational activities in open space and mountain parks areas conflict and result in unpleasant encounters. From what you know or have heard, what specific recreational activities would you say are in conflict with other specific activities? **(Open end. Probe.)**

(If unresponsive to q.28, skip to text just above q.30)

29. What do you think Open Space and Mountain Parks should do to help remedy the conflict you just mentioned?

Activities of other users of open space and mountain parks areas could make your own experience more pleasant or less pleasant. I will read a list of such activities. Please tell me if they make your experience much more pleasant, somewhat more pleasant, somewhat less pleasant or much less pleasant. How about **(Read questions 30 through 35. Rotate. Accept, but do not read “no impact.”)**

	<u>Much more pleasant</u>	<u>Some-what more pleasant</u>	<u>Some-what less pleasant</u>	<u>Much less pleasant</u>	<u>No impact</u>	<u>No resp.</u>
30. Mountain bikers	1	2	3	4	5	6
31. Horseback riders.	1	2	3	4	5	6
32. Dogs on leash	1	2	3	4	5	6
33. Dogs off leash	1	2	3	4	5	6
34. Runners	1	2	3	4	5	6
35. Hikers	1	2	3	4	5	6

36. How often do you use City of Boulder Open Space or Mountain Parks? **(Read the list only if respondent needs prompting. Enter anything “once a year” or more as “no response/never.”**
- | | |
|---------------------------------|---|
| Every day | 1 |
| 2 to 3 times per week | 2 |
| Once a week | 3 |
| 2 to 3 times a month | 4 |
| Once a month | 5 |
| 2 to 3 times a year | 6 |
| No response/never | 7 |

37. Do you ever walk or run a dog in City of Boulder Open Space or Mountain Parks areas?
- | | |
|-----------------------|---|
| Yes | 1 |
| No | 2 |
| No response | 3 |

(If response to q.37 was “no” or “no response,” SKIP to q.39).

38. How often or when do you use a leash? Would you say: always, frequently, occasionally, never, OR just when other people are near?
- | | |
|----------------------------|---|
| Always | 1 |
| Frequently | 2 |
| Occasionally | 3 |
| Never | 4 |
| When others near | 5 |
| No response | 6 |

39. How long have you lived in Boulder?	1 to 2 years	1
	3 to 4 years	2
	5 to 6 years	3
	7 to 10 years	4
	11 to 20 years	5
	21 years or more	6
	No response	7

40. How old are you?	18 to 24	1
	25 to 34	2
	35 to 44	3
	45 to 54	4
	55 to 64	5
	65 and older	6
	No response	7

(Double check to make certain that you asked all of the questions. Thank the respondent, hang up and then complete q.41 and q.42 from your calling sheet. These are important, too, because they are used in making certain that we have a representative sampling.)

(Question 42 is only used to ensure the sample is reflective of the population)

41. Gender:	Male	1
	Female	2
42. Party affiliation	Republican	1
	Democrat	2
	Unaffiliated	3
	Other _____	4

Precinct number _____ Calling sheet number _____

“I certify that the responses on this questionnaire are complete and accurate, as presented by the respondent.”

INTERVIEWER’S INITIALS _____ INTERVIEWER’S NUMBER _____ Date: _____

#

Appendix G:

City of Boulder Open Space and Mountain Parks Volunteer Survey - Fall 2008

Dear Open Space and Mountain Parks Volunteer,

Please take a moment to fill out this evaluation. We appreciate knowing about your experiences, suggestions and insights!

Please respond as soon as possible. You can respond directly to this email, or if you wish to remain anonymous, print out the e-mail and return by snail mail. We also appreciate hearing from you in person.

Thanks for your service in 2008, and here's to another great year in 2009!

Yours,

Lisa Dierauf and Susan Ross
Coordinators of Volunteer Services
720-564-2014 and 720-564-2013
66 South Cherryvale Road, Boulder, CO 80303

1. How long have you been a volunteer for OSMP?

2. In which programs have you participated?
Dates or years for each if possible.

3. Did you feel you were appropriately trained for your volunteer work?

4. How would you rate your overall satisfaction with your volunteer experience?

Very satisfied 5 4 3 2 1 Very unsatisfied

5. What three (or more) things worked well for you in 2008?

6. What three (or more) things can be improved?

7. Were you able to fulfill your commitment?

Yes No

If no, please let us know why. Is there anything we can do to help you meet your commitment?

8. Are you interested in joining another OSMP volunteer program?

(Go to www.OSMP.org for more information on assignment opportunities.)

9. Other comments and suggestions:

If printing, use the other side of this page if necessary.

Name:(optional)

Date:



Appendix: H
City of Boulder Open Space and Mountain Parks
Public Program Evaluation

Please take a minute to evaluate the program you attended. Your comments help us improve our programs.

Program _____ Date _____ Naturalist(s) _____

Please rate the overall quality of this program on a scale of 1 (worst) to 10 (best). _____

Was the program the right amount of time? Y/N Too long?___ Too Short? _____

Did the program start at a good time and day? Y/N

What would have been a better time or day?_____

Was the level of exertion required for this hike good? Y/N. Too strenuous?___ Not strenuous enough?___

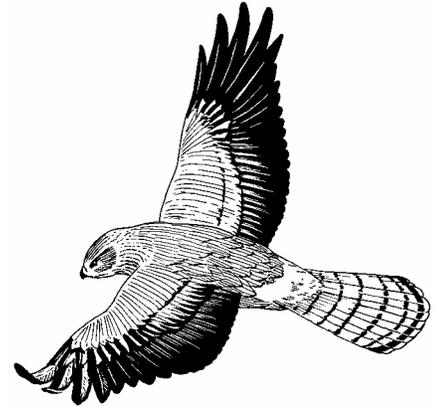
Were the activities and content presented at an appropriate level for the group? Y/N.

Too technical?___ Not technical enough?___

Comments:

Please rate the naturalist(s) on the following qualities:

Enthusiasm	Excellent	Good	Fair	Poor
Rapport with group	Excellent	Good	Fair	Poor
Knowledge of subject	Excellent	Good	Fair	Poor
Voice level and clarity	Excellent	Good	Fair	Poor
Receptivity to questions	Excellent	Good	Fair	Poor



What did you learn about the OSMP Program from this hike?_____

What did you like about the program? _____

How could the program be improved?_____

Would you attend another OSMP naturalist program?_____

How did you hear about this program?_____

What other programs would you like to see us offer? _____

Is there anything else you would like us to know?

Do you want Natural Selections sent to you by e-mail?
go to naturehikes.org and you'll see the link to subscribe to the list

Appendix I: West TSA Safety Incidents (2008)

2008 West TSA Incidents	
Type of Incident	Number
Dogs	268
Camping Without Consent	78
Injured Hiker	21
Trespass-Wildlife Closure	15
Other	14
Drug Possession	11
Injured Climber	5
Littering/Dumping	5
Damaging Public Property	4
Lost Party	4
Alcohol	3
Animal Welfare Check	3
1st Degree Criminal Trespass (Vehicle Break-In)	3
Injured Dog	3
Wildfire	3
Permits	3
Injured Cyclist	3
Smoke Report	2
Vehicle Accident	2
Assault	2
Building Illegal Campfire	2
Wanted Person	2
Suicidal Person	2
Person Stuck on Rock	2
Juvenile Party (Alcohol)	2
Vehicle Off-Road	1
Injured Horseback Rider	1
Bear Incident	1
Bikes Prohibited	1
Domestic Abuse	1
Property Damage	1
Fireworks	1
Death	1
Rattlesnake Bite	1
Harassment	1
Overdue Hikers	1
Resource Damage	1
Firearms	1
Trespass-Public Property	1

Appendix J: West TSA Summons'

2008 West TSA Summons'	
Type of Violation	Number
Voice and sight control evidence tag required	118
Dog running at large, not on leash	82
Camping on property without consent	64
Dog running at large, no guardian	25
Dog running at large, not in voice and sight control	15
Entering wildlife closure	12
Dogs prohibited	7
Possessing glass bottles	6
Building fires prohibited	5
Damaging public property	4
Travel off designated trail prohibited in HCA	3
Aggressive animal prohibited	3
Dog running at large, not on leash in trailhead area	2
Entering Boulder Falls closure	2
Littering	2
Permit required for commercial use	2
Possession of alcohol by minors	2
Obstructing a police officer	2
Failure to protect wildlife	1
Driving/parking vehicle in violation of signs	1
Possession/consumption of alcohol in public	1
Possession/discharge of fireworks	1
Tent, net, structure prohibited	1
Assault in the third degree	1
Entering closed property	1

Classes*	Visitor Use Patterns	Examples	Standard Facilities**	Optional	Replace - Nonconforming Structures	Maintenance Standards***
Class A1 Access to trails	Very Low to Low	Four Pines at 17th St. Shanahan Ridge - Hardscrabble Sawhill Access East	1. Wayfinding/regulatory sign post ****	1. Trailhead signs ****	1. Dog station	1. Checked monthly 2. Pickup loose trash 3. Fix and repair any damage
Class A2 Access to trails	Medium to High	Wonderland Lake Trail at Poplar South Boulder Creek Trail south of South Boulder Road Eagle Trail at coffee shop Dakota Ridge - 4th and Maxwell	1. Wayfinding/regulatory sign post ****	1. Trailhead signs **** 2. Fence	1. Dog station 2. Outhouse 3. Trash can(s)	1. Checked monthly 2. Pickup loose trash 3. Fix and repair any damage
Class A3 Access to trails	Very High	Wonderland Lake Trail at Utica Sanitas Valley Trail, south end	1. Trailhead signs **** 2. Dog station 3. New bear proof trash can	1. Fence	1. Outhouse	1. Checked monthly 2. Pickup loose trash 3. Fix and repair any damage
Class T1 Simple/Minor developed Trailhead	Very Low to Low	White Rocks Greenbelt Plateau Halfway House White Rocks	1. Fence 2. Parking area (road base surface) 3. Trailhead signs **** 4. New bear proof trash can 5. Dog stations 6. Bike racks	1. Access to facilities 3. Horse trailer parking 4. Asphalt parking if required by law 5. Parking bollards	1. Bench 2. Grills 3. Horse trailer parking 4. Picnic tables 5. Outhouse	1. Checked twice weekly 2. ID erosion problems and fix as needed 3. Pickup loose trash 4. Fix and repair any damage 5. Trim and mow when vegetation height is greater than 8"
Class T2 Developed/Improved Trailhead	Medium	South Teller Wonderland Lake Realization Point Crown Rock Boulder Valley Ranch	1. Fence 2. Parking area (road base surface) 3. Trailhead signs **** 4. Trash can(s) 5. Dog stations 6. ADA Picnic tables/area 7. Bike racks	1. Outhouse if not near developed area 3. Bench 4. Parking bollards 5. Asphalt parking if required by law 6. Horse trailer parking	1. Grills	1. Checked twice weekly 2. ID erosion problems and fix as needed 3. Pickup loose trash 4. Fix and repair any damage 5. Trim and mow when vegetation height is greater than 8" 6. Service restrooms 7. Power wash restrooms monthly or as needed
Class T3 Fully Developed Trailhead	High to Very High	Chautauqua Marshall Mesa Dry Creek Four Mile Creek	1. Fence 2. Parking area (road base surface) 3. Trailhead signs **** 4. New bear proof trash can 5. Dog stations 6. Picnic tables/area 7. Bike racks 8. Outhouse	1. Access to facilities 2. Bench 3. Parking bollards 4. Asphalt parking if required by law 5. Horse trailer parking	1. Grills 2. Campground	1. Checked twice weekly 2. ID erosion problems and fix as needed 3. Pickup loose trash 4. Fix and repair any damage 5. Trim and mow when vegetation height is greater than 8" 6. Service restrooms 7. Power wash restrooms monthly or as needed
Class R1 Access to recreational facilities (No access to OSMP designated trail system)	NA	Bench at Eisenhower Bench at Forest and 4th Juniper pulloff in Lefthand	1. Wayfinding/regulatory sign post ****	1. Trailhead signs **** 2. Access to facilities 3. Fence 4. Bench	1. Dog station	1. Checked monthly 2. ID erosion problems and fix as needed 3. Pickup loose trash 4. Fix and repair any damage 5. Trim and mow when vegetation height is greater than 8"
Class R2 Access to recreational facilities (No access to OSMP designated trail system)	NA	Cottonwood pull off (Lefthand Canyon) Baseline Picnic Area Pulloffs on Flagstaff Rd	1. Wayfinding/regulatory sign post **** 2. Picnic tables	1. Trailhead signs **** 2. Access to facilities 3. Fence 4. Bench 5. Picnic tables 6. Trash can	1. Dog station 2. Grills	1. Checked monthly 2. ID erosion problems and fix as needed 3. Pickup loose trash 4. Fix and repair any damage 5. Trim and mow when vegetation height is greater than 8"

*Recreational facilities include picnic areas, viewpoints, bench sites. Trailheads provide access to a trail and have at least one parking spot managed by OSMP.

**Please see "Definition of Facilities" attached.

***Please see 'OSMP Trailhead Maintenance Standards' attached.

**** Please see "Trailhead signs and structures" document to view various signs used at each class of trailhead

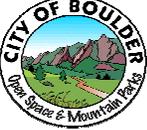
Appendix L: Trails in the West TSA

1st Flatiron Bridge	0.02
1st/2nd Flatiron	0.69
3rd Flatiron	0.18
Amphitheater	0.40
Amphitheater Access	0.02
Amphitheater Express	0.23
Anemone	0.44
Artist Point	0.08
Baseline	0.58
Bear Canyon	1.85
Bear Canyon - NCAR	1.17
Bear Peak	0.36
Bear Peak West Ridge	1.80
Big Bluestem West	0.12
Bluebell Mesa	0.44
Bluebell Road	0.93
Bluebell Spur	0.26
Bluebell-Baird	0.65
Bluestem Connector	0.47
Boy Scout	0.67
Chapman Drive	1.72
Chautauqua	0.61
Cragmoor Connector	0.24
Crown Rock	0.40
Crown Rock Climbing Areas	0.54
Dakota Ridge	1.39
Der Zerkel	0.05
Devils Thumb Access	0.08
Dinosaur Rock	0.02
E.M. Greenman	1.54
East Ridge	0.64
Eldorado Canyon	2.40
Eldorado Canyon Spur	0.15
Elephant Buttress	0.13
Enchanted - McClintock Spur	0.07
Enchanted Mesa Trail	1.15
Enchanted-Kohler Spur	0.14
Fern Canyon	1.43
Flagstaff	2.07
Flatirons Descent	0.20
Flatirons Loop	0.54
Four Pines	1.22
Goat Trail	0.60
Green Bear	0.80
Green Mountain West Ridge	1.36
Green Mtn Lodge Road	0.26
Gregory Canyon	1.18

Halfway House	0.21
Hardscrabble Connector	0.10
Homestead	0.98
Homestead Spur	0.09
Kohler Mesa	0.60
Kohler Spur	0.19
Lehigh Connector - North	0.16
Lehigh Connector - South	0.35
Long Canyon	1.08
Lost Gulch	0.10
Lower Big Bluestem	1.79
Mallory Cave	0.78
May's Point	0.11
McClintock Lower	0.37
McClintock Upper	0.45
Mesa	6.24
Mesa Connector	0.18
Mount Sanitas	1.23
N.C.A.R. - Bear Connector	0.53
N.C.A.R. - Skunk Canyon	0.59
N.C.A.R. - Table Mesa	0.53
N.C.A.R. - Table Mesa/Bear	0.51
N.C.A.R. Trail	0.96
N.C.A.R. Water Tank Road	0.29
NIST Service Road	0.88
Northern Quarry Trail	0.04
Panorama	0.27
Plains Overlook	0.34
Range View	0.62
Ranger	1.16
Red Devil	0.20
Red Rocks	0.58
Red Rocks Spur	1.66
Royal Arch	0.88
S. Mesa Spur	0.13
Sacred Cliffs	1.01
Saddle Rock	1.19
Sanitas Bouldering	0.05
Sanitas Connector	0.04
Sanitas Spur	0.13
Sanitas Valley	1.27
Sensory Trail	0.09
Serpentine	0.10
Shadow Canyon North	0.63
Shadow Canyon South	0.86
Shadow Canyon South Spur	0.29
Shadow Canyon Trail	1.22
Shanahan - Mesa	0.45
Shanahan - North Fork	1.25
Shanahan - South Fork	1.83

Shanahan Connector	0.41
Ski Jump	0.24
Skunk Canyon	1.30
Skunk Canyon Path	0.31
Skunk Canyon Spur	0.22
South Boulder Creek West	1.93
South Boulder Peak	0.29
South Mesa Connector	0.05
Southern Quarry Trail	0.10
Spy	0.09
Tenderfoot	0.99
The Dome	0.16
Touch Monkey	0.01
Towhee	1.21
Upper Big Bluestem	0.83
Ute	0.76
Viewpoint	1.11
Woods Quarry	0.40

Appendix M

 Trail Design & Management Guidelines Matrix														
	X-Slope Range	Tread Width	Max. Sustained Grade	Max. Sustained Outslope	Clearing		Turn Radius	Surface Materials						
					Width	Height		Natural	Gravel	Crusher	Roadbase	Concrete	Asphalt	
Accessible	0-50%	>=3'	8.33%	<2%	8'	8'	4'	ok	No	ok	ok	ok	ok	ok
Class 5 <i>Fully Developed</i>	Hiking	0-30%	3-5'	8%	<=5%	6'	8'	2'	ok	ok	ok	ok	ok	ok
	Biking	0-30%	3-8'	8%	<=5%	10'	10'	6'	No	ok	ok	ok	ok	ok
	Equestrian	0-30%	3-8'	8%	<=5%	10'	10'	8'	No	ok	ok	ok	No	No
	Official Vehicle	N/A	8-10'	8%	<= 8%	28-40'	12'	10-12'	No	ok	ok	ok	ok	ok
Class 4 <i>Highly Developed</i>	Hiking	0-50%	2.5-5'	10%	<=5%	6'	8'	2'	ok	ok	ok	ok	No	No
	Biking	0-50%	3-8'	8%	<=5%	6-10'	10'	6'	ok	ok	ok	ok	No	No
	Equestrian	0-50%	3-8'	8%	<=5%	6-10'	10'	8'	ok	ok	ok	ok	No	No
	Official Vehicle	N/A	8-10'	6%	<= 6%	28'	12'	10-12'	No	ok	ok	ok	ok	ok
Class 3 <i>Developed/ Improved</i>	Hiking	0-75%	1.5-3'	15%	<= 8%	4-6'	8'	2'	ok	ok	ok	ok	No	No
	Biking	0-75%	1.5-5'	12%	<=5%	4-6'	10'	6'	ok	ok	ok	ok	No	No
	Equestrian	0-75%	1.5-6'	12%	<=5%	6'	10'	8'	ok	ok	ok	ok	No	No
	Official Vehicle	N/A	8-10'	6%	<=5%	12'	10'	10-12'	ok	ok	ok	ok	No	No
Class 2 <i>Minor Development</i>	Hiking	0-75%	1.5-2.5'	15%	<=10%	4'	8'	2'	ok	No	No	No	No	No
	Biking	0-75%	1.5-3'	12%	<= 8%	4-6'	10'	6'	ok	No	No	No	No	No
	Equestrian	0-75%	1.5-2.5'	12%	<= 8%	6'	10'	8'	ok	No	No	No	No	No
	Official Vehicle	N/A	8-10'	5%	<=5%	10'	10'	10-12'	ok	N/A	No	No	No	No
Class 1 <i>Primitive/ Undeveloped</i>	Hiking	0-90%	1.5-2'	15%	<=10%	N/A	N/A	2'	ok	No	No	No	No	No
	Biking	0-90%	1.5-2'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	N/A	N/A
	Equestrian	0-90%	1.5-2'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	N/A	N/A
	Official Vehicle	N/A	8-10'	4%	<= 3%	N/A	N/A	10-12'	ok	N/A	No	No	No	No
Climbing Access	Climbing	N/A	0-2'	N/A	<=15%	N/A	N/A	N/A	ok	No	No	No	No	No

Trail Design Parameters provide guidance for the assessment, survey and design, construction, repair and maintenance of trails, based on the Trail Class and Designed Use of the trail.

Exceptions and variances to these parameters can occur when site-specific circumstances demand such exceptions. These exceptions should be noted in the TMO for the trail.

* Accessible is currently a separate Trail Class. If assessing/designing trails for accessibility, refer to current Agency trail accessibility guidance.

Finalized 12/04/07