



City of Boulder  
Open Space and Mountain Parks

# West Trail Study Area Recreational Resource Inventory Report



Final draft  
August 2009

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## 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.

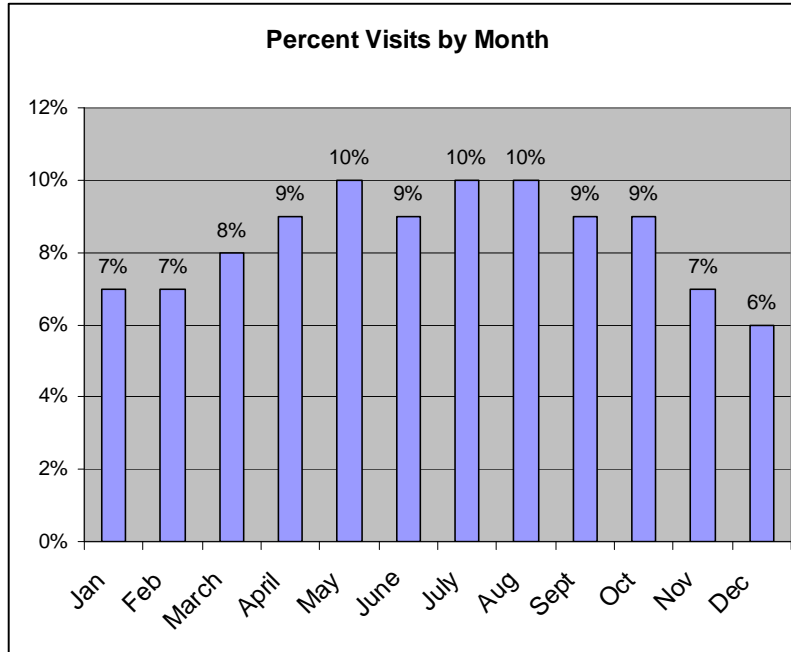
OSMP uses a variety of surveys to help understand and track visitor satisfaction with services provided by OSMP.

- 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

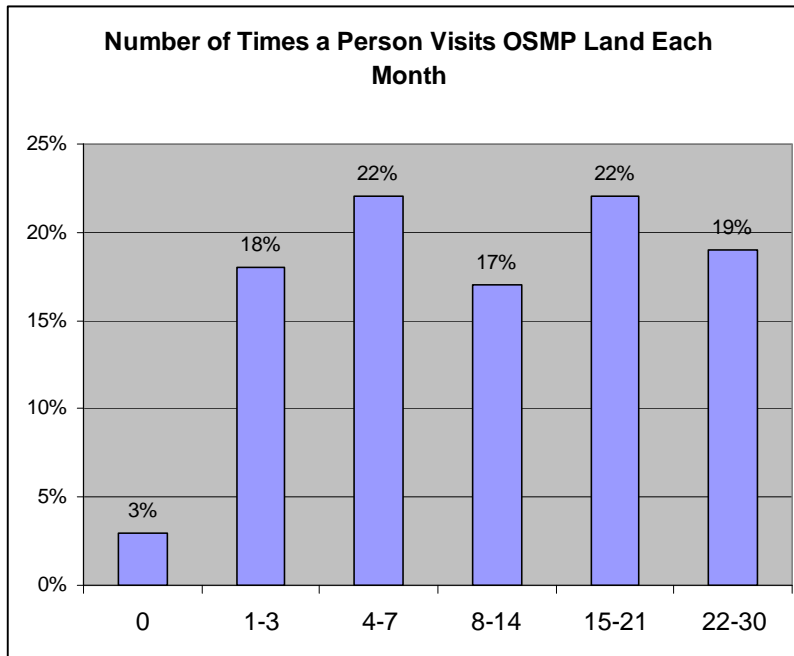
educational programs such as Meadow Music, Fishing for Kids and Roll or Stroll Birdwatching.

- 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

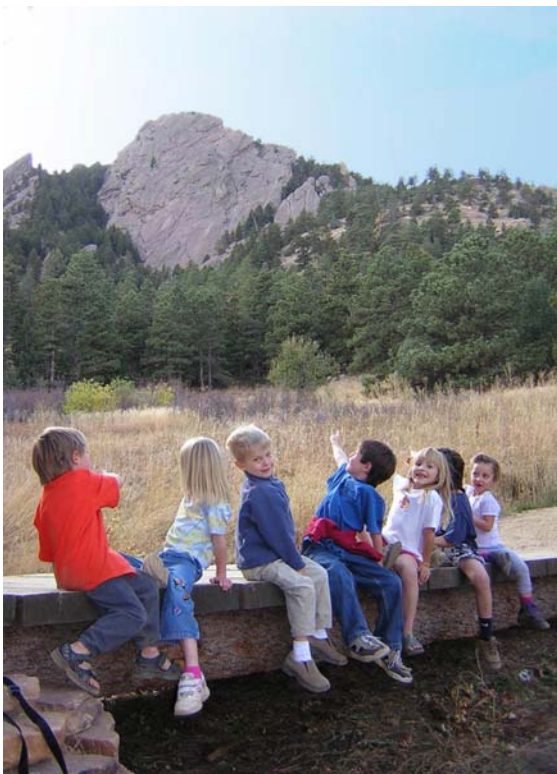
## Recreation Target: Visitor Experience

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.

<b>Current Status of Recreational Activities on Open Space and Mountain Parks</b>			
<b>Allowed on Open Space and Mountain Parks (OSMP) Lands</b>	<b>Allowed only on Designated Trails</b>	<b>Allowed only in Specifically-Designated Areas or Sites</b>	<b>Activities <i>not</i> considered passive recreation</b>
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 <sup>th</sup> -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.

<b>Current Status of Recreational Activities In West TSA</b>			
<b>Allowed on Open Space and Mountain Parks (OSMP) Lands</b>	<b>Allowed only on Designated Trails</b>	<b>Allowed only in Specifically-Designated Areas or Sites</b>	<b>Currently not permitted in the West TSA (are considered passive recreation)</b>
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.

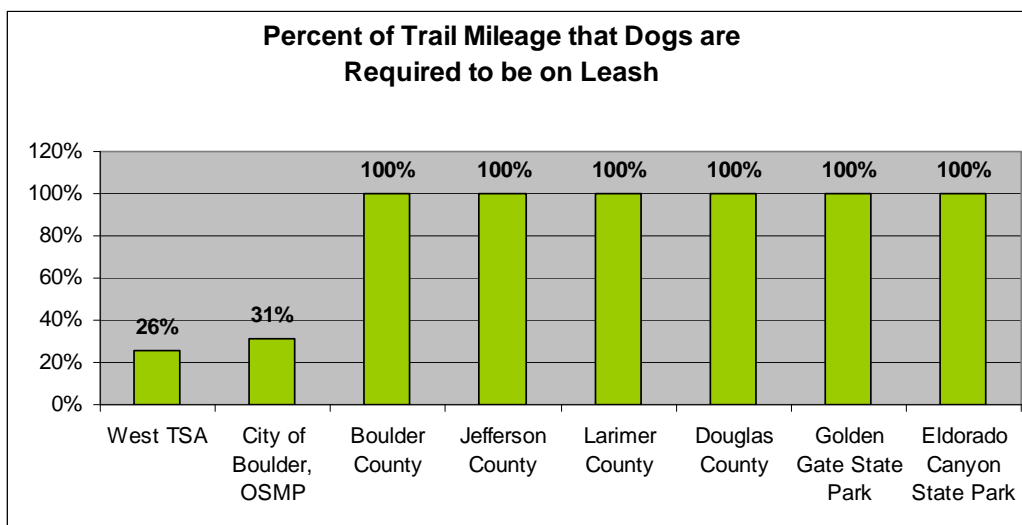
The agencies used for the peer agency review were:

- 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

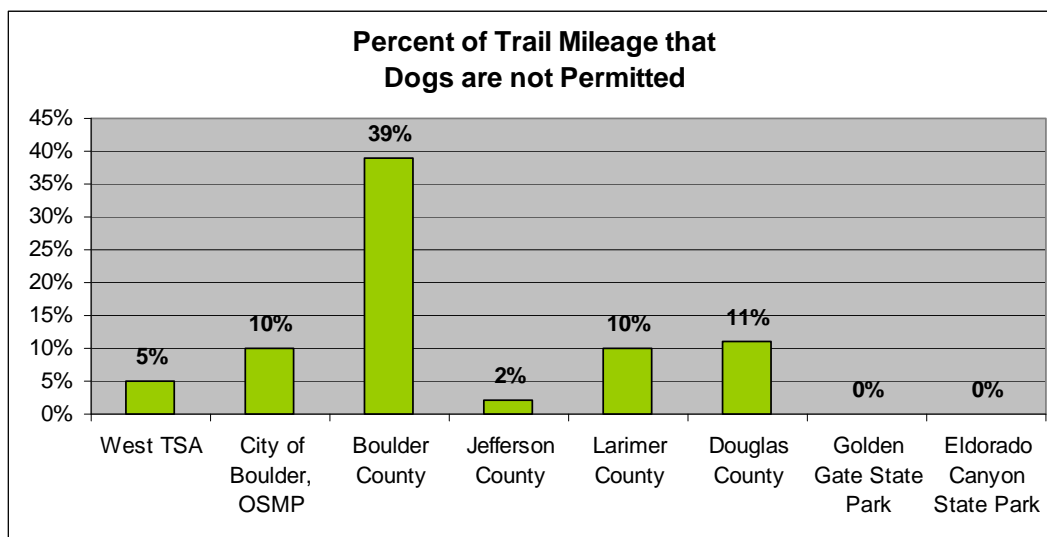
[Appendix B](#) contains the agency data used in the comparisons. Each agency’s data was obtained from their website, compiled, and sent to the respective agencies for review. Changes were made to reflect agency responses. Greenways and regional trails were not included in the analysis. [Appendix B](#)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

OSMP is interested in a comparison of:

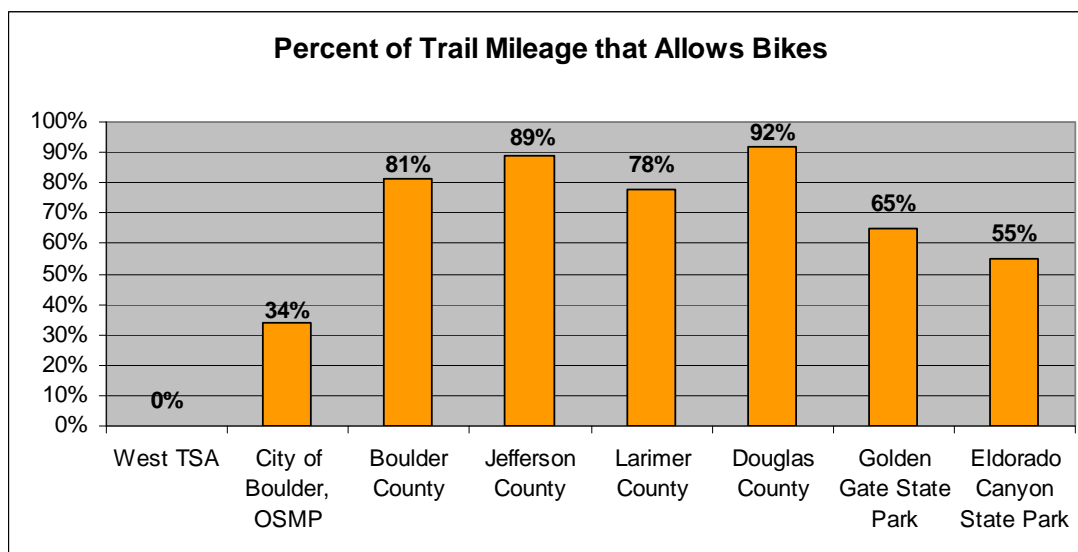
- Dog Management
- Bicycling
- Horseback Riding
- Annual Wildlife Seasonal Closures



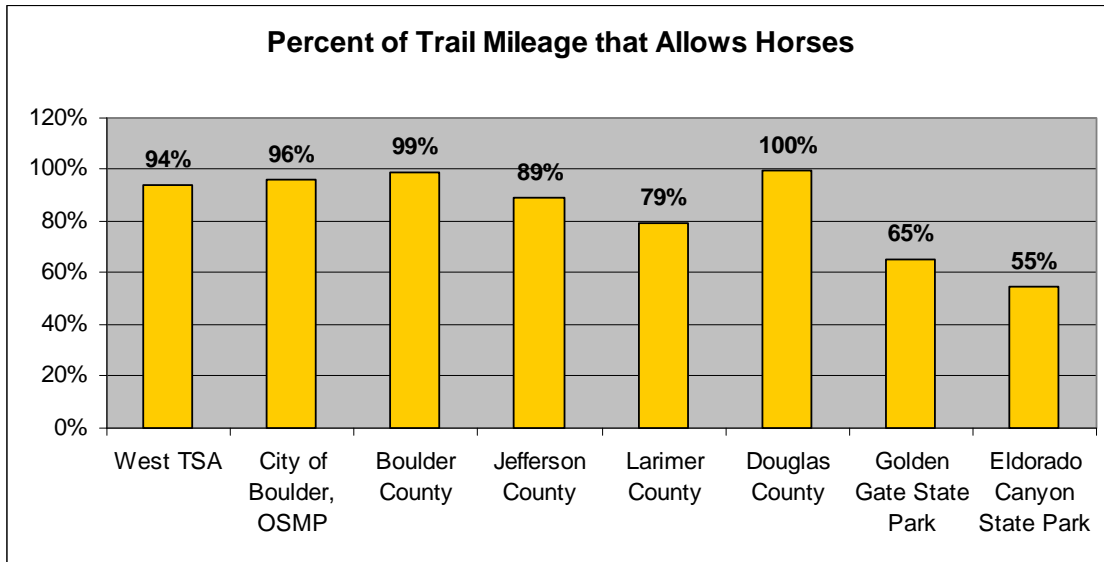
- Among the agencies surveyed, none allow dogs off-leash on trails. However, some agencies do have relatively small dog parks where dogs are allowed off-leash.
- OSMP is the only agency where dogs are allowed off-leash, under voice and sight control, on a significant portion of the trail system.



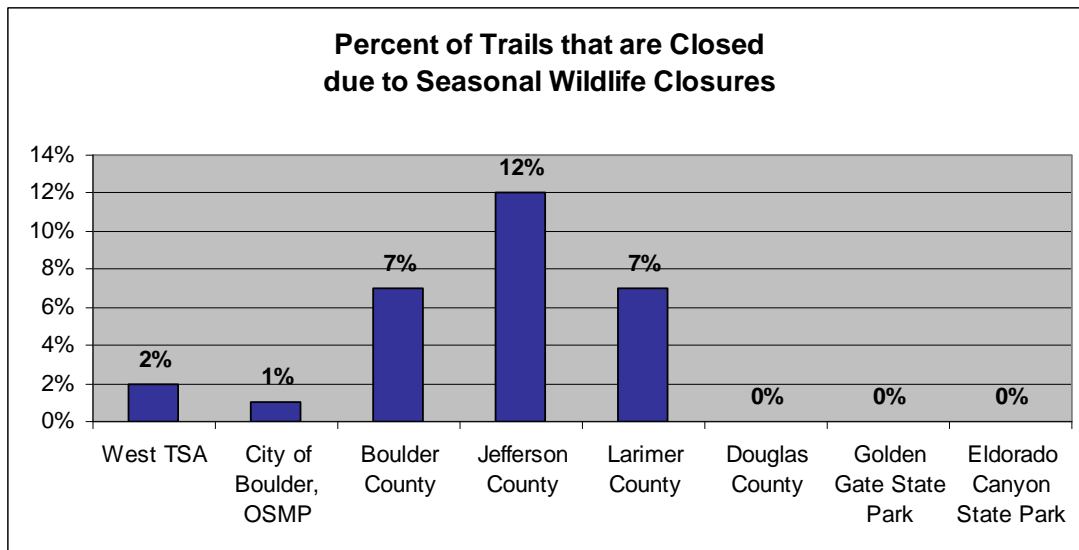
- All of the Open Space agencies (does not include State Parks) prohibit dogs on some portion of the trail system.
- Although a commonly used strategy, not allowing dogs is typically restricted to a small portion of the trail system.
- Boulder County had the highest percentage (39%) of trails where dogs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

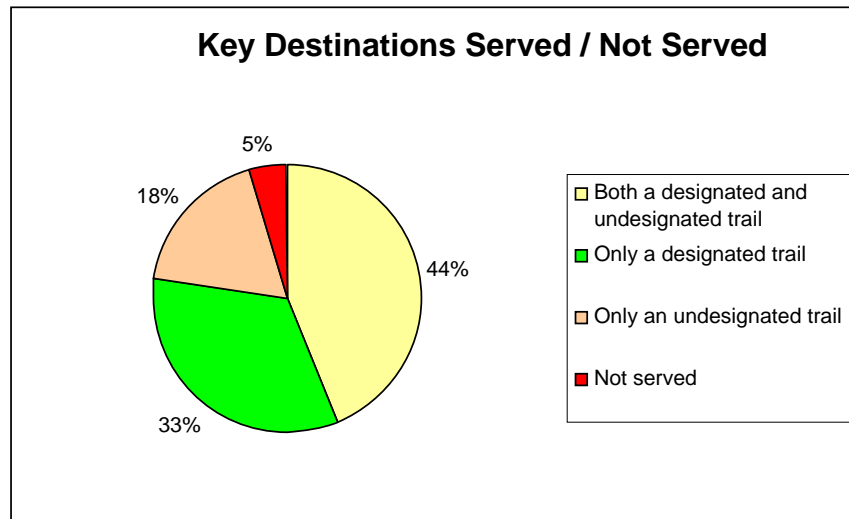
- Infrequent = 1 to 100 visits/year
- Moderate = 100 to 500 visits/year
- Popular = over 500 visits/year

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.

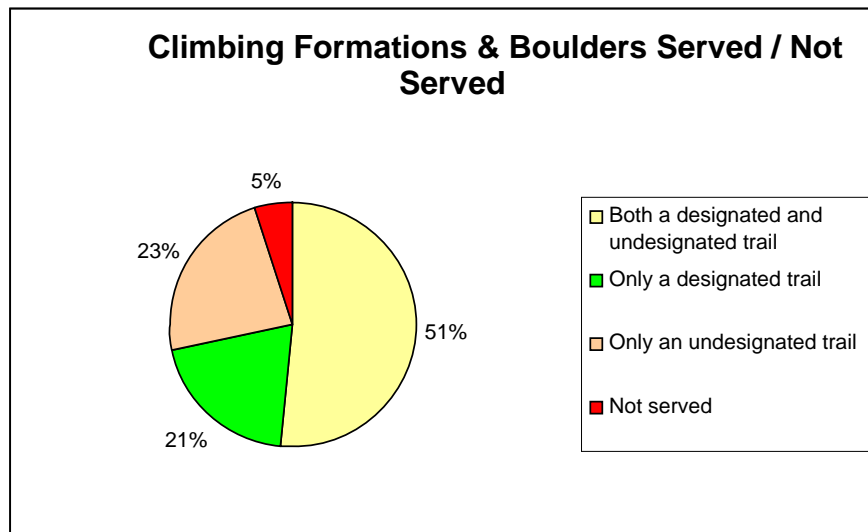
See [Appendix C](#) for a list of the key destinations, what they are, and how they are served (i.e. by both a designated trail and undesignated trail, only a designated, only an undesignated trail, and those not served).

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:**

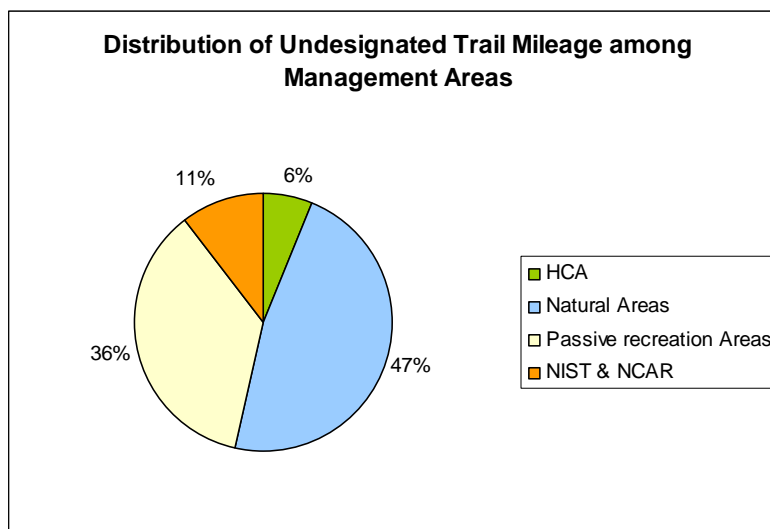
Miles of Undesignated Trails in each Management Area	
Management Area	Miles of Undesignated Trails
Habitat Conservation Area	3.5
Natural Area	27.7
Passive Recreation Area	20.9
NIST & NCAR	6.2
Total	58.3

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.



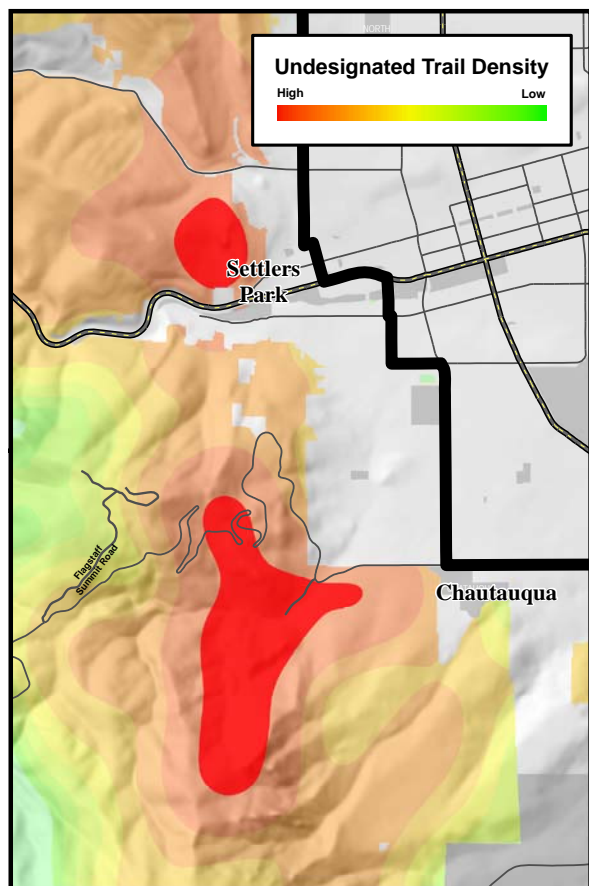
- 83% of the undesignated trails in the West TSA are located in the Natural Areas and Passive Recreation Areas.

### 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).

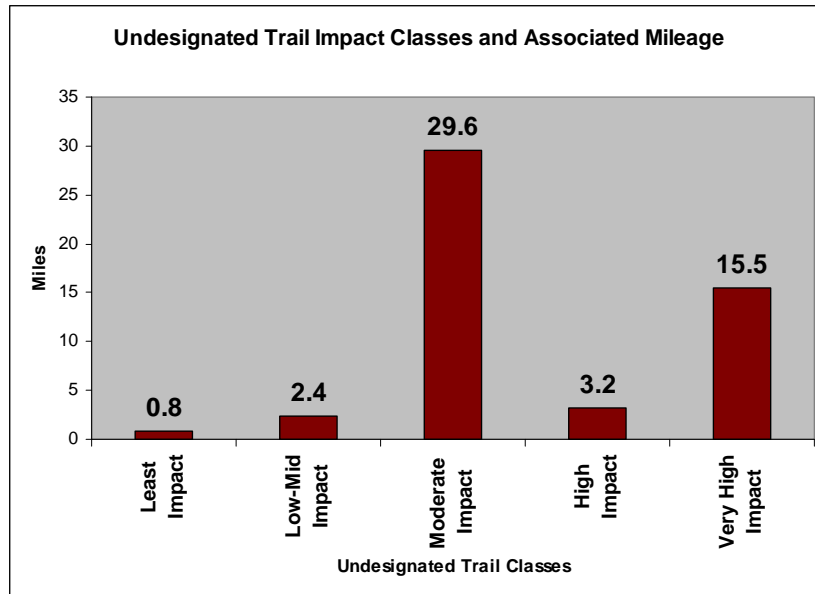
In 2006 a system-wide mapping of undesignated trails was undertaken by OSMP (City of Boulder, 2009), using methods highlighted in [Appendix D](#). Data from this system wide mapping was used to create West TSA specific maps and summaries, illustrating undesignated trail locations.

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.



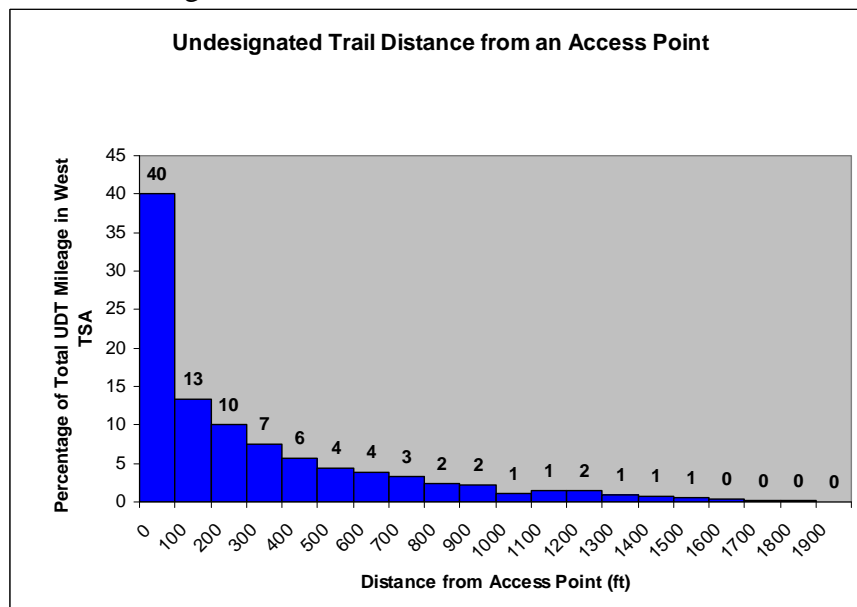
In the West TSA, undesignated trail density was found to be the highest in the vicinity of Chautauqua Meadow, Flagstaff, the 1<sup>st</sup> and 2<sup>nd</sup> Flatirons, and Settlers Park.

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:**

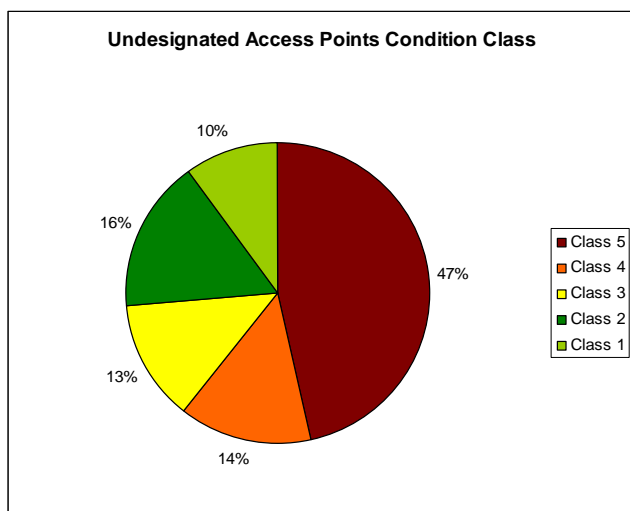
- 79% of designated access points along the urban interface are within ½ mile of another designated access point.

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



9"x12"

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.

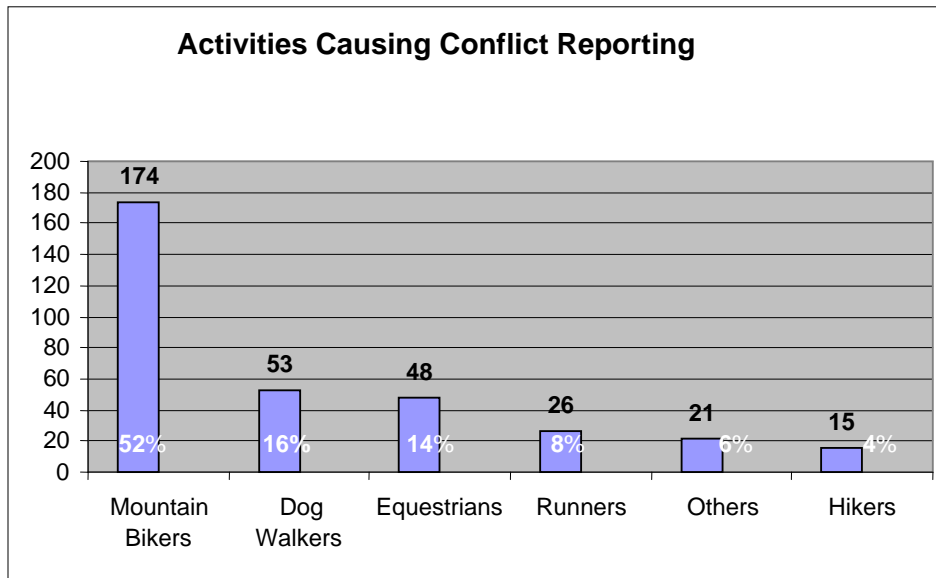
#### ***Indicators for Conflict***

- *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**

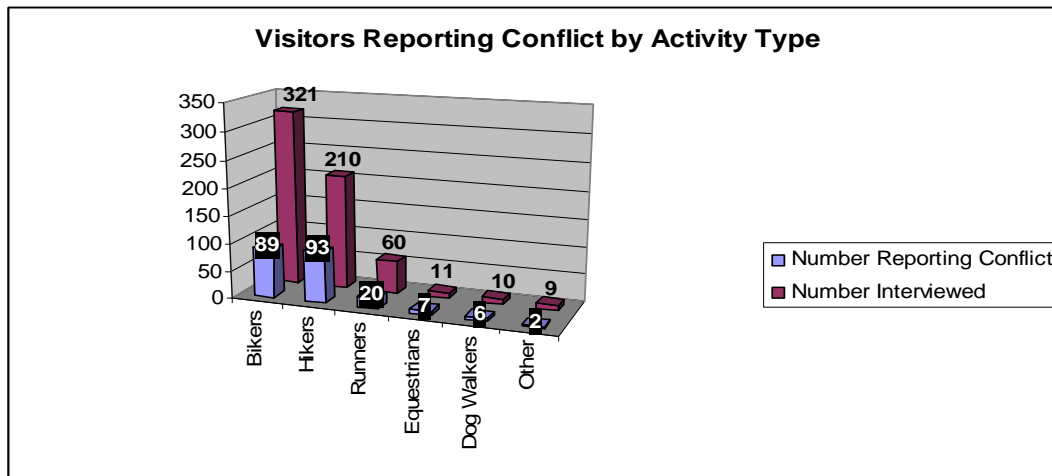
**Boulder County Parks and Open Space Recreation Conflict Study**

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.

<b>Reported Behavior</b>	<b>Percent of respondents who observed the behavior that day</b>
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 1<sup>st</sup>/2<sup>nd</sup> 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).

<b>The West TSA contains the following proportion of the system-wide total for each of the patrol groups:</b>	
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.

<b>Concentrated Use Areas in the West TSA</b>			
<b>Type of Concentrated Use Area</b>	<b>Description</b>	<b>Estimated Use</b>	<b>Count</b>
<b>Trailheads</b>			<b>14</b>
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
<b>Access Points</b>			<b>33</b>
AP 1	Access to trails	Very Low Use	25
AP 2		Medium to High Use	5
AP 3		Very High	3
<b>Recreational Facilities</b>			<b>4</b>
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
<b>Total</b>			<b>51</b>

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

<b>Indicator Results:</b>				
<b>Concentrated Use Areas in the West TSA</b>				
<b>Type</b>	<b>Class</b>	<b>Total Number</b>	<b>Total that Comply with Standard</b>	<b>Total % that Comply</b>
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.

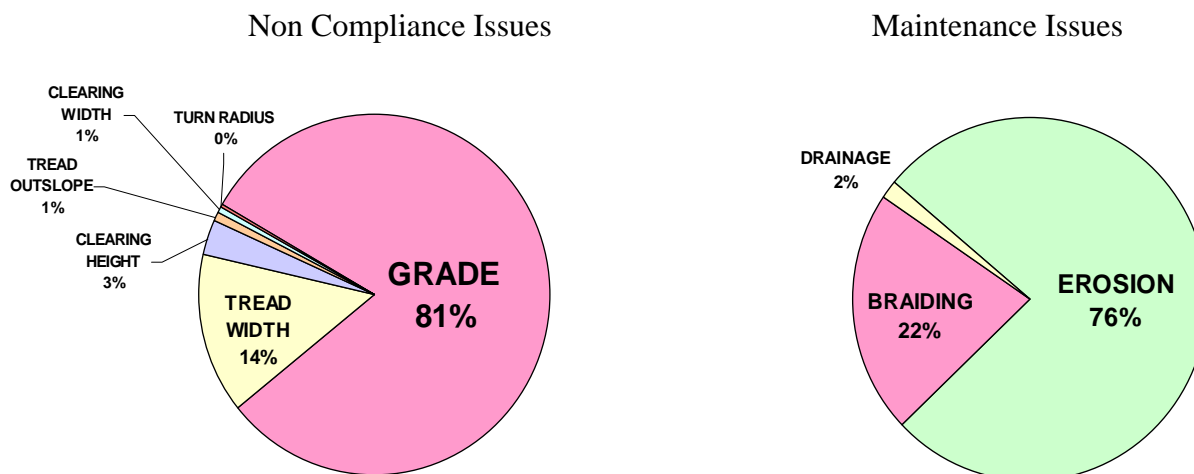
The following are trail compliance characteristics and maintenance issues for the West TSA trails system.



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

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

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).



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