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NIGHTTIME ACCESS MANAGEMENT WHITE PAPER ANALYSIS

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NIGHTTIME ACCESS MANAGEMENT WHITE PAPER

APRIL 2012

EXECUTIVE SUMMARY

The Boulder City Council has identified several “overarching issues” concerning the long-term sustainability of Open Space Mountain Parks (OSMP) resources. Many of these issues are associated with the 2005 City of Boulder Open Space and Mountain Parks Visitor Master Plan (City of Boulder 2005). Management of nighttime use was one of these council-identified issues. The purpose of this white paper is to explore the background, issues, examples from other agencies, and management alternatives related to nighttime use of OSMP lands, and to identify and evaluate possible management actions.

BACKGROUND

Access to the nighttime environment of OSMP lands has been enjoyed by generations of visitors and has become increasingly popular in recent years. As a percentage of total visitation, nighttime use has been low (1.4 percent in 2005); but still represents about 70,000 annual visits. Current OSMP regulations prohibit trailhead parking from 11:00 pm to 5:00 am¹, and nighttime access is discouraged but not prohibited in Habitat Conservation Areas (HCAs).

The potential impacts of nighttime use on wildlife are based on a combination of factors. The greatest potential effect of nighttime use on wildlife is the cumulative effect of human-caused nighttime disturbance to animals that are also affected by human-caused daytime disturbances. The magnitude of these effects on individual animals or population health is not known. The effects of nighttime use regulations on visitors are the loss of recreational opportunities on OSMP lands.

NIGHTTIME ACCESS ALTERNATIVES

A nighttime access program consists of a combination of the time access is permitted, the area where nighttime access is permitted, and other management overlay elements that may be needed to protect the visitor experience, natural and cultural resources, or to enforce the law. Five nighttime access programs are analyzed in this paper: 1) maintain current regulation, 2) HCA nighttime closure, 3) HCA and Natural Area nighttime closure, 4) restricted nighttime (one hour before dawn to one hour after dusk) access to all areas, and 5) limited nighttime access on specific trails.

RECOMMENDATIONS

Based on the analysis, either an HCA closure or HCA and NA closure (sunset to sunrise) is recommended. Additional recommended management overlay elements include continuing the 11:00 pm to 5:00 am trailhead/parking closure, area-specific nighttime closures for resource protection, staff-guided access, and monitoring.

¹ The parking lot curfew at Panorama Point and the Halfway House on Flagstaff Mountain begin one hour later. Parking is restricted from 12:00 pm to 5:00 am

NIGHTTIME ACCESS REGULATIONS WHITE PAPER

APRIL 2012

Prepared for: City of Boulder Open Space and Mountain Parks

Prepared by: ERO Resources Corporation

CURRENT SITUATION

RELEVANT OSMP CONDITIONS, PROGRAMS, AND POLICIES

Background

At its March 30, 2011 meeting, Boulder City Council (Council) identified “overarching issues” concerning the long-term sustainability of Open Space Mountain Parks (OSMP) resources. Council selected overarching issues with relevance to long-term and sustainable management of OSMP resources and community services. Many of these issues are associated with the 2005 City of Boulder Open Space and Mountain Parks Visitor Master Plan (City of Boulder 2005). Nighttime use management was one of the council-identified issues.

The review and discussion of the overarching issues provide an opportunity for Council, the Open Space Board of Trustees (OSBT), the community, and staff to discuss how current planning and management practices, existing programs, and new policy considerations could be used to ensure the long-term sustainability of OSMP resources and the continuation of high-quality visitor services. The intent of the nighttime use management analysis is to provide background information and management options for staff, members of the community, and the OSBT to evaluate and use as the basis for recommendations to City Council. City Council will make the final decisions about which actions to take.

Nighttime Trail Access

Nighttime access to many natural areas, open space, and trail systems has occurred for generations and has traditionally been limited to novel experiences such as full-moon hikes, wildlife viewing, or stargazing. Recently, nighttime access to open space for activities such as running and mountain biking has become increasingly popular. Supported by the availability of more powerful and affordable lighting systems, the increase in nighttime trail use can be attributed to athletes training for 24-hour endurance events, individuals seeking to extend trail-based recreation in the shorter days of fall and winter, or those simply seeking a new type of experience. There is also evidence that visitors access closed areas or use trails for prohibited uses at night as a way to escape detection by others, especially law enforcement personnel. In general overall nighttime use in natural areas and on open space is thought to be much lower and more irregular in comparison to daytime use.

Nighttime use on OSMP, as a percentage of total visitation, was quite low at the time of data collection in 2005 (Vaske et al. 2009); however, the absolute numbers were estimated at approximately 70,000 annual visits (1.4%) between the hours of 11 pm and 6 am. This level of visitation is sufficient for OSMP to consider the implications of this level of use for meeting goals associated with resource conservation and visitor services.

Nighttime Defined

It is important for this discussion to define “nighttime,” as it varies seasonally. In Boulder, during the summer months the sun sets at 8:00 pm or later, while in the early winter it sets before 5:00 pm. For the purposes of this paper, nighttime is defined to be the time between sunset and sunrise, and is synonymous with “darkness.”

GUIDANCE FROM MANAGEMENT PLANS, POLICIES AND STRATEGIES

Boulder’s City Charter, the Boulder Valley Comprehensive Plan, and the Open Space Long Range Management Policies establish the broad vision, overarching goals and priorities for OSMP. The OSMP Visitor Master Plan (VMP) describes policies and strategies to deliver high quality visitor services and sustainable facilities in a manner consistent with the conservation of natural, agricultural and cultural resources.

The VMP and other plans including resource management plans and trail study area plans provide specific management actions (see Figure 1).

Visitor Master Plan and Trail Study Area Plan Guidance

The VMP provides the policy direction, management strategies, and funding approaches to achieve the goals of enhancing the visitor experience, improving access, protecting resources, and partnering with the community. Elements of the VMP guidance relating to nighttime activities are as follows.

Under the summary of key problems, and opportunities for resource protection and preservation, increasing nighttime activities in sensitive areas was identified as a problem needing attention; therefore, staff identified a resource protection opportunity to “retard significant growth in nighttime activities and associated wildlife impacts.”

In 2005, as part of the VMP process, staff suggested a nighttime curfew throughout OSMP or as an alternative just in Habitat Conservation Areas (HCAs). Council rejected both proposals, stating a concern about using an approach as restrictive as mandatory closures of OSMP at night. At that time, Council concluded that *encouraging* a nighttime curfew in HCAs was sufficient.

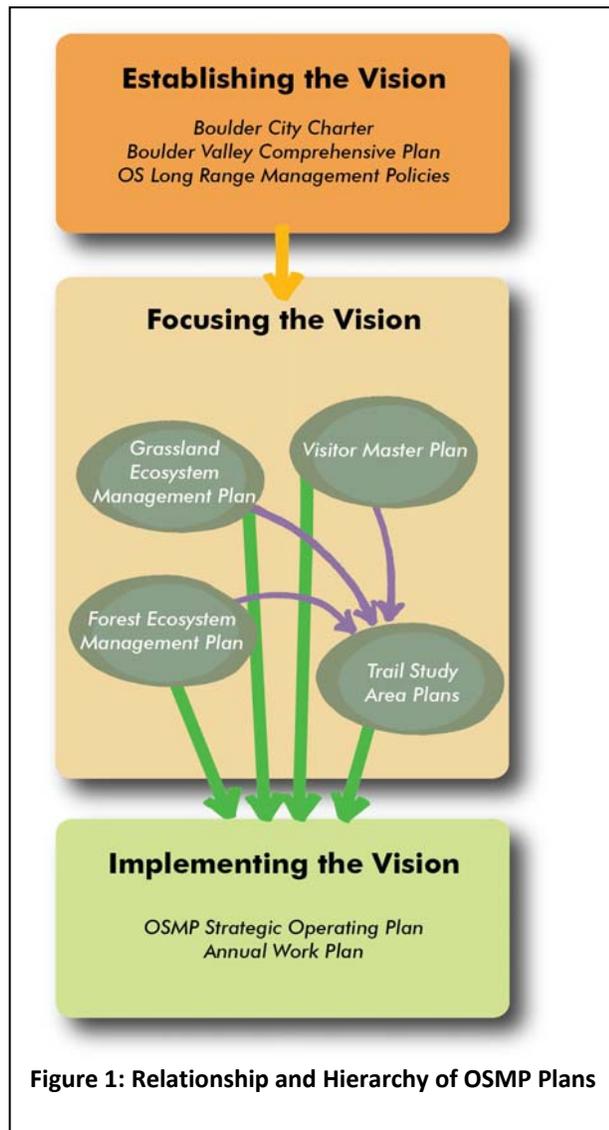


Figure 1: Relationship and Hierarchy of OSMP Plans

Open Space and Mountain Parks Visitor Master Plan (2005)

Resource Protection Initiative

Nighttime Curfews. Continue nighttime parking curfew and encourage a nighttime curfew in Habitat Conservation Areas. This action aims to provide a higher level of resource protection in Habitat Conservation Areas. It is intended to reduce visitor use and impact on wildlife sensitive to human presence during the nighttime hours, since many animals use nighttime as solace and refuge from humans.

In 2011, Council members expressed an interest in reexamining OSMP's policies on nighttime access as part of the Overarching Issues discussion.

Current OSMP Regulations

Current OSMP nighttime visitation regulations apply only to trailhead parking. Trailhead parking is prohibited from 11:00 pm to 5:00 am². As indicated above, a nighttime curfew is encouraged in HCAs one hour after dusk to one hour before dawn.

Regulation on City of Boulder Parks, Parkways, or Recreation Areas

A recently enacted regulation (approved in January 2012) prohibits anyone from remaining in city parks, parkways, or recreation areas, with the exception of bicyclists and pedestrians who are passing through the areas. Individuals remaining between the hours of 11:00 pm and 5:00 am are in violation of the city's trespassing rule and are subject to receiving a summons or being arrested. The regulation is intended to address illegal encampments that may cause site impacts, safety concerns and co-opt sections of parks, parkways, or recreation areas at the exclusion of others. This ordinance does *not* apply to City of Boulder OSMP lands.

Nighttime Visitor Safety and Enforcement Issues on OSMP

Rangers do not have regular nighttime patrol shifts and patrol schedules typically begin or end just before or after sunrise and sunset. Rangers do have an on-call ranger to respond to reported criminal activities and emergencies for hours outside of standard patrol shifts. Accordingly, rangers also have limited nighttime patrols to observe or enforce illegal trail or off-trail activities.

Reported and observed nighttime safety and law enforcement issues on OSMP lands are generally concentrated at the urban interface. Trailheads, areas prone to illegal camping, and vehicle-accessible sites such as the pull-offs along Flagstaff Road are where rangers are most likely to encounter criminal activity or receive reports of criminal activity. Since most individuals engaging in criminal activity are not aware of or concerned about OSMP regulations, it is unlikely that changes in the nighttime policy will deter most of this activity. Existing regulations prohibiting camping, tents and structures, off-trail travel in HCAs without a permit, and damaging natural resources provide rangers with adequate regulatory authority to address problems they encounter.

² The parking lot curfew at Panorama Point and the Halfway House on Flagstaff Mountain begin one hour later. Parking is restricted from 12:00 pm to 5:00 am.

OSMP Nighttime Visitation Data

The 2004–2005 OSMP visitation study estimated the number of visits at 39 locations throughout the trail system and provided information on visitor behaviors and trends (Vaske et al. 2009). Tracking use and access by time of day demonstrated that a small proportion of overall use occurred at night. Of 4.7 million estimated annual visits overall:

- 1.5 percent of visits occurred between 8:00 pm and 9:00 pm (~ 70,500 annually);
- 1.4 percent of visits occurred between 11:00 pm and 6:00 am (~ 70,000 annually);
- Approximately 0.9 percent of visits occurred between 9:00 pm and midnight (~ 42,000 annually);
- Approximately 0.5 percent of visits occurred between midnight and 5:00 am (~23,500 annually); and
- More nighttime use, per night, occurs on weeknights than on weekends or holidays.

LITERATURE REVIEW

The areas of study most relevant to this analysis are: 1) the effects of trail use on natural resources, 2) the effects of lighting upon wildlife, 3) the specific effects of nighttime trail use upon wildlife, and 4) the recreational values and patterns of nighttime outdoor activities.

The likely impacts to natural resources of nighttime use that are distinct from the impacts of daytime use are largely focused on wildlife. The body of literature describing the effects of trails and trail use on wildlife continues to grow, although the findings are variable depending on species, location, and study design. Likewise, the effects of permanent artificial lighting on wildlife have been the subject of a moderate number of biological studies. However, the effects of temporary light exposure and nighttime trail use on wildlife are not well documented. This section steps through the general effects of recreation, trails, and lighting on wildlife, and then focuses on what is believed to be the core issue related to nighttime use – the cumulative effect of nighttime disturbance on wildlife that has already been displaced or disturbed by human activity during the daytime.

GENERAL TRAIL USE IMPACTS

The number of studies looking at the effects of trail-based recreation on wildlife and habitat continues to grow. These effects are summarized in this analysis.

Wildlife sensitivities to recreational use vary by species, habitat type, and location. The presence of people on trails can influence the behavior of deer and elk at distances between 30 and 400 meters (98 and 1,312 feet), and grassland birds at distances of about 75 meters (246 feet) (Miller et al. 2001; Taylor and Knight 2003; Cassirer et al. 1992; Sisk 1989; Germaine et al. 2006). Based on these and other studies, this zone of influence (whereby wildlife behavior is altered or individual animals are motivated to flee) is greater when humans travel off-trail rather than on-trail, and is larger in open habitat than wooded areas.

The distinctions among effects from various types of trail activities are even more nuanced. Wildlife responses to hikers and mountain bikers are generally similar. Travelers on-foot are more likely to travel off trail or directly approach wildlife, while mountain bikers are more likely to extend disturbances over greater distances, and may be less predictable due to their faster speeds and quieter approach (Taylor and Knight 2003; George and Crooks 2006; Stake 2000; Stankowich 2008; Knight and Cole 1995; Jordan 2000).

For many types of wildlife, the addition of dogs can exacerbate effects. Some species (such as large and small mammals, ground-nesting birds, and amphibians) perceive dogs as predators and avoid predators and areas of predator sign. Carnivores can also be influenced by barking or scent marking (urine and scat) (Lenth et al. 2008; George and Crooks 2006). While some dogs remain within five meters of the trail, others do not (Bekoff and Meaney 1997), and the presence of dogs may greatly expand the zone of influence of a trail (Lenth et al. 2008; Miller et al. 2001; Bekoff and Ickes 1999). In 2004-2005, dog visitation to OSMP was estimated at 1.86 million dog visits per year (Vaske et al 2009), making the magnitude of these impacts on some species significant.

IMPACTS OF LIGHTING ON WILDLIFE

The number of studies on the effects of permanent, stationary lighting on wildlife is growing. Permanent stationary lighting is generally not an issue on OSMP compared with temporary nighttime lighting and disturbance from trail activities. However the studies on permanent lighting do provide additional context and understanding of nighttime effects upon wildlife. Studies summarized in Rich and Longcore 2006 describe changes to foraging and breeding behaviors, increased predation, disruption of circadian rhythms and disruptions in dispersal patterns and melatonin production. More relevant to the issue of nighttime recreation in OSMP are the potential effects of short-term exposure to high-intensity lighting. This can relate to accidental lighting of wildlife by nighttime trail users' flashlights, headlamps or bike lights, intentional "spotlighting" (viewing nocturnal wildlife with spotlights), or other similar activities.

In a study of the impacts of nature-based tourism on vegetation and wildlife, Wolf (2009) noted that "bright, white lights, can dazzle animals and temporarily impair their night vision which may augment predation risk or cause disruptions to natural patterns of movement and foraging." In describing the potential impacts of spotlighting in Australia, Higgenbottom (2004) wrote that spotlighting can cause delayed emergence time by nocturnal wildlife, and it could limit an animal's time foraging. Frequent light-based disturbances could translate into long-term changes in behavior or vigor. High intensity lighting may also increase the distance at which wildlife perceive and react to humans using open space at night. Laboratory experiments on dark-adapted frogs found that rapid increases in illumination left them temporarily blinded and unable to react to prey, predators, or competitors (Buchanan 2002). While several studies demonstrate the immediate effects of short-term lighting on individual animals, the long-term effects of frequent and repeated short-term light exposure are poorly understood.

WILDLIFE HABITUATION AND DISPLACEMENT

There is substantial research and anecdotal observation related to both habituation and temporal displacement of wildlife in high-use areas. Habituation refers to a situation where animals no longer react to human disturbances that are predictable and nonthreatening (e.g., ravens nesting near a highway). Temporal displacement describes conditions where animals shift their overall activity or use of a certain area from one place or time to another (e.g., daytime to nighttime), to avoid negative stimuli (e.g., interactions with humans). These concepts are important in understanding the potential effects of nighttime use on wildlife.

Habituation

In urbanized or high-use areas, some animals may become habituated to predictable and recurrent use of trail corridors (Whittaker and Knight 1999 in George and Crooks 2006).

Habituation is a common mechanism by which animals minimize or cease their reaction to a repeated and predictable stimulus, thereby avoiding unnecessary energy expenditure (Blanc et al. 2006). Habituation occurs when an animal learns to respond to stimuli less because it is constant and nonthreatening. While habituation to human disturbance can reduce stress, it can have deleterious effects on wildlife in urban interface areas due to increased attraction to human food sources (e.g., trash, gardens, or house pets) (George and Crooks 2006). In addition this may also increase potential direct conflict between visitors, dogs, and wildlife on OSMP. In addition to adverse impacts on wildlife, these behaviors are nuisances or even hazards for humans, and a management issue for wildlife agencies. Habituation is also species- and location-specific. For the purposes of this analysis, habituation by some species may explain the lack of a flight response to human presence along defined trail corridors, and it also helps explain the potential for a greater response and impact of unpredictable visitor use such as off-trail travel or travel along trails during unusual times (e.g., at night).

Displacement

Researchers have documented the temporal shift from daytime to nighttime activity by wildlife either in high human use areas or by sensitive species in response to even low levels of human use. In areas close to human activity, elk and deer are known to use the more productive and open habitats at night (Canfield 1999; Yarmoloy et al. 1988; Posthumous 2012), along with black bears (Beecham and Rohlman 1994). In a study of wildlife/recreation effects in Southern California, George and Crooks (2006) were consistent with other studies in their finding that bobcats and coyotes shifted toward nocturnal use of more fragmented and developed habitat areas. Several studies have documented such a shift in waterfowl and shorebirds, finding that birds that are frequently disturbed during the day increase their nighttime feeding to take in adequate food (Riddington et al. 1996; Bélanger and Bédard 1990; Blanc et al. 2006; Burger 1993). This temporal compensation is different from habituation (reduced response to predictable stimuli), because animals learn to compensate for lost feeding opportunities by increasing food intake after disturbance has ceased (Blanc et al. 2006). Displacement may carry survival costs for wildlife such as increased predation or decreased feeding efficiency at night for some species.

FRONT COUNTRY VS. BACKCOUNTRY EFFECTS

Another component in understanding nocturnal wildlife effects is the distinction between high-use (“front country”) and lower-use (“backcountry”) areas. In general, both habituation and displacement occur in front country settings, while in backcountry settings wildlife are more likely to retain a natural flight response to disturbance (described above under *General Trail Use Impacts*).

A biologist with Jefferson County (CO) Open Space (Posthumous 2012) has observed the following pattern for relatively common wildlife observed with automated cameras:

- Elk activity is almost exclusively at night in front country areas, with the opposite pattern (daytime activity) in backcountry areas
- Black bear are much more active during the day in backcountry areas, while they concentrate their activity at night in front country areas
- Coyote are active at all times, regardless of location

In high-use front country areas, it is likely that many wildlife species either habituate to human disturbance, move to less disturbed areas, or shift toward nighttime activity to avoid human disturbance. Based on this understanding, nighttime use in high-use areas can have an additional effect on wildlife by further disturbing animals during their adapted activity time. In backcountry areas, nighttime human disturbance within a potentially larger “zone of influence” from trails or humans could have adverse effects on individual animals. These effects are similar to or greater than those described for daytime use – with nighttime human disturbance causing some animals to flee from resting areas, resulting in greater energy expenditure and greater exposure to predation.

These two types of impacts – cumulative disturbance to displaced animals (front country) and new nighttime disturbance to some animals (backcountry) – are likely the consequences to wildlife of increased nighttime recreation on OSMP. What is less clear, however, is the magnitude of effects that occasional nighttime trail users may have on individual animals or populations. (Recall that 1.4 percent of all trail use – about 70,000 visits per year – occurs between 9:00 pm and 5:00 am (Vaske et al. 2009).)

HUMAN DISPLACEMENT

Some agencies and organizations, including the National Park Service, National Wildlife Federation, and state and local park systems, promote nighttime outdoor activity as a fun and exciting way to view wildlife, learn about astronomy, and enjoy the nighttime environment (Beeco 2009; AGF 2011; NWF 2011; NPS 2007). Recently, a Boulder-area naturalist wrote about our collective loss of connection to the nighttime environment, “the most magical and spiritually powerful part of the 24-hour cycle” (Jones 2012). Nighttime activities can be specialized and legitimate forms of outdoor recreation (Beeco 2009).

Public responses received during the recent process (January 2012) to restrict nighttime access to Boulder parks provides an indication of the public sentiment regarding nighttime open space access. Many of the respondents who objected to the perceived or potential loss of open space access, did so for the following reasons (City of Boulder 2012):

- Value recreational access (e.g., full-moon hikes and rock climbing activities, wildlife viewing, photography, stargazing, viewing sunrise, trail runs, or bike rides)
- Access open space at night due to work or family schedule
- Avoiding daytime heat during the summer or muddy trails during the winter
- Value opportunities for interaction with the nighttime environment in a natural setting
- Should focus on addressing specific issues rather than blanket closures
- Value freedom of choosing when to visit OSMP

These general concerns are relevant to any new restriction on nighttime access to OSMP. In addition to these general concerns, some community members who are unable to visit OSMP during the day could be unfairly affected by nighttime access restrictions. Other members of the community are likely to express objections to any changes to the VMP, believing that changes to compromises and agreements made during the VMP should result in a reexamination of the entire plan—not just individual parts

SUMMARY OF FINDINGS

Potential effects of nighttime trail-based recreation on wildlife involve the combination of factors described above – general impacts of trail use, impacts of permanent and temporary lighting, and the tendency of wildlife in high-use areas to shift activity to the night. Based on this analysis, the potential effects on wildlife stem from the cumulative effect of additional nighttime disturbance on already displaced animals in front country settings or new nighttime disturbances to resting animals in backcountry settings. The severity and scope of impact to individual animals or populations is uncertain.

The primary potential effects of nighttime use restrictions on OSMP visitors are the lost recreational opportunities and constrained times when activities may be enjoyed on OSMP lands. There are also contrasting community views valuing the benefits for wildlife that nighttime restrictions may bring. Community values regarding nighttime use will be an important component to consider when developing management actions most likely to succeed.

MANAGEMENT EXAMPLES AND STRATEGIES

Nighttime access and closure policies were reviewed for other similar open space agencies (Table 1). Of the reviewed agencies, all agencies close open space areas to public use at night, although the closure regulations vary. The most common regulations provide public access: sunrise-sunset, one hour before sunrise/after sunset, or fixed hours (e.g., 5:00 am to 10:00 pm).

Table 1. Nighttime Access Regulations from Other Agencies

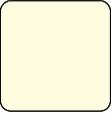
Agency/Site	Regulation
Boulder Open Space and Mountain Parks	Trailhead parking closed 11:00 pm to 5:00 am; open space itself is open at all times
Boulder County Parks and Open Space	Open sunrise to sunset
Jefferson County Open Space	Open one hour before sunrise/after sunset
Larimer County Parks and Open Lands	Open 6:00 am to sunset
City of Fort Collins	Open 5:00 am to 11:00 pm
Douglas County Open Space	Open one hour before sunrise/after sunset
Marin County Parks and Open Space	Open sunrise to sunset
City of Lakewood – Green Mountain	Open 5:00 am to 10:00 pm
Chatfield, Cherry Creek, and Golden Gate Canyon State Parks	Open 5:00 am to 10:00 pm
Roxborough State Park	Open 8:00 am to 5:00 pm in winter; variable by season

ELEMENTS OF AN OSMP NIGHTTIME ACCESS PROGRAM

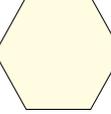
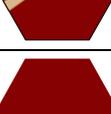
A nighttime access management program consists of three elements:

1. **Time** – the time of day and night when open space and trails are open or closed (e.g., sunrise/sunset or 11:00 pm to 5:00 am)
2. **Area** – the geographic areas that time regulations apply to (e.g., all OSMP lands, management areas, or defined trails)
3. **Management Overlay** – other modifications that address specific management needs

Each of these elements is described below in Figure 2. Any access program is a combination of time and area, while the management modification can be overlaid as needed.

Time	
	Open <i>(no nighttime restrictions)</i>
	Open one hour before sunrise to one hour after sunset
	Open sunrise to sunset
	Open 5:00 am to 11:00 pm <i>(Closed 11:00 pm to 5:00 am)</i>

A nighttime access program must include the **time + area** elements. Any program may also include any number of **management overlay** elements.

Area	
	All OSMP open <i>Open to nighttime activities</i>
	HCA closed <i>Habitat Conservation Areas closed; no restrictions on other OSMP</i>
	HCA/NA closed <i>Habitat Conservation Areas and Natural Areas closed; no restrictions on other OSMP</i>
	HCA/NA/AG closed <i>Habitat Conservation Areas, Natural Areas, and Agricultural Areas closed; no restrictions in Passive Recreation Areas</i>
	Trail-specific <i>Designated trails open at night; all other areas closed</i>
	All OSMP closed <i>All areas closed to nighttime activities</i>

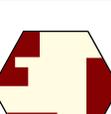
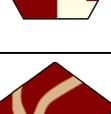
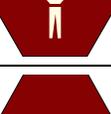
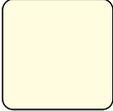
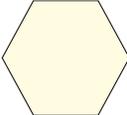
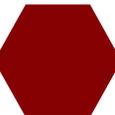
Management Overlay	
	11:00 pm to 5:00 am trailhead/parking closure <i>Consistent with current management</i>
	Site/area-specific nighttime closure (such as remote, or stand-alone areas) <i>Allows for management flexibility</i>
	Trail-specific nighttime closure <i>Allows for management flexibility</i>
	Staff-guided access <i>Allows access for nighttime programs</i>
	Nighttime access by permit only <i>Allows preapproved access for groups or programs</i>
	Nighttime on-trail requirement <i>Limits access to designated trails</i>
	Monitoring <i>Targeted monitoring to track effects or effectiveness of any access program</i>

Figure 2: Elements of a Nighttime Access Program

NIGHTTIME ACCESS ALTERNATIVES

A range of nighttime access programs, based on logical combinations of the key elements (time and area) are defined below. Note that these are not the entirety of programs available, but represent combinations along a spectrum of possibilities.

Program	Management Overlay	Description
 	11:00 pm to 5:00 am trailhead/parking closure Voluntary HCA restriction	<p>Maintain current regulation. All trails and areas are open at night, while OSMP trailheads are closed to parking from 11:00 pm to 5:00 am. Access to HCAs is <i>discouraged</i> from one hour after sundown to one hour before sunrise.</p> <p><i>This approach is the least restrictive with open nighttime access to trails and OSMP land, and is also the least protective.</i></p>
 	11:00 pm to 5:00 am trailhead/parking closure Area-specific nighttime closure Trail-specific nighttime closure Staff-guided access Monitoring	<p>HCA nighttime closure. All HCAs would be open sunrise to sunset. Nighttime access as part of staff-guided programs or by permit would be allowed. All other areas would remain open to nighttime use.</p> <p><i>This approach is similar to the current regulation, except that HCA closures would be mandatory. Most of the areas that are desirable for nighttime access would remain open.</i></p>
 	11:00 pm to 5:00 am trailhead/parking closure Area-specific nighttime closure Trail-specific nighttime closure Staff-guided access Monitoring	<p>HCA and NA closure. HCAs and Natural Areas (NAs) would be open during the day (sunrise to sunset) while Passive Recreation and Agricultural Areas would be open for nighttime use.</p> <p><i>This approach would provide reasonable access to front-country areas, while limiting nighttime disturbance to other areas. The most popular and highest use areas would remain open.</i></p>

Program	Management Overlay	Description
 	Nighttime on-trail requirement Staff-guided access Nighttime access by permit Monitoring 11-5 trailhead closure	<p>Limited nighttime access. A limited number of trails would be open for nighttime use based on habitat and access considerations, while the remainder would be closed at night (sunset to sunrise). Trails that are designated <i>open</i> for nighttime use would be those that are: a) located within Passive Recreation, Natural, or Agricultural Areas, b) provide key connections, c) do not excessively disrupt important wildlife habitat or corridors, d) do not traverse difficult or dangerous terrain, or e) are situated to create large patches of habitat that are left with no nighttime human disturbance. All HCA access would be closed at night.</p> <p><i>The approach would provide meaningful but limited nighttime trail access while maintaining large tracts of habitat where disturbance would not occur.</i></p>
 	Staff-guided access Nighttime access by permit Monitoring	<p>Restricted nighttime access. All OSMP trails, off-trail areas, and trailheads would be open to public access from one hour before sunrise until one hour after sunset.</p> <p><i>This uniform approach is consistent with many other open space agencies and enables users to enjoy trails at dawn and dusk while limiting human use at night.</i></p>

ALTERNATIVES ANALYSIS

Nighttime Access Management Approaches

The following nighttime access management approaches are analyzed below:

1. Maintain Current Regulation
2. HCA Nighttime Closure
3. HCA and NA Closures
4. Limited Nighttime Access
5. Restricted Nighttime Access

Analysis and Comparison

Table 2 summarizes the analysis of nighttime access management approaches for resource protection, enforcement/compliance, feasibility, management efficiency, and fairness:

- **Resource Protection** – Ability to protect resources

- **Compliance/Enforcement** – Likelihood of compliance, ability to address law enforcement (compliance, safety, or criminal activity) concerns
- **Feasibility** – Logic of approach, ease of implementation, and ease of understanding by users (appeals to motivations of community)
- **Management Efficiency/Cost** – Need for new facilities, signage, enforcement, or other management programs
- **Fairness** – Equitable approach to provide access for existing and new visitors, and between types of visitors

Table 2. Analysis of Nighttime Access Approaches

Model	Resource Protection	Compliance/ Enforcement	Feasibility	Management Efficiency/Cost	Fairness
Current regulation	Low	High	High	High	High
HCA closure	Moderate	High	High	High	High
HCA and NA closure	High	Low	Moderate	Moderate	Moderate
Restricted access	High	Moderate	Moderate	Moderate	Low
Limited nighttime access	Moderate	Low	Low	Low	High

Discussion

Resource Protection. The resource protection benefits under the current regulation are low, since there are no measures to protect sensitive habitats. The Restricted Access and HCA and NA closure approaches would have the greatest resource protection benefit, since they would significantly reduce or eliminate nighttime visitor use to OSMP. The HCA closure would have a moderate resource protection benefit, restricting access to the most sensitive resource areas, while the limited access model would have moderate resource protection benefits by restricting nighttime access to prescribed areas and trails that avoid sensitive areas and retain large blocks of undisturbed habitat.

Compliance/Enforcement. The current regulation has high levels of compliance, since there are no access regulations to comply with, and enforcement is limited to easily accessible trailhead areas. Compliance would be high under the HCA closures, since HCAs are well-signed and understood, and most HCAs are remote and already have very low levels of nighttime use. The restricted access (+/- one hour) model would have moderate compliance and some need for enforcement – the uniform closure would be easy to understand, but would also result in more violations from those who are not aware of or object to the restriction. The HCA and NA closures would likely have low compliance since most of the OSMP system would be closed and many NAs are adjacent to neighborhoods. Compliance with the limited nighttime access approach would be low, due to confusion over which trails/areas are indeed open as well as those who choose to disregard the area-specific closures.

Feasibility. The current regulation has high feasibility, as it is easy to implement and appeals to many in the community’s desire for access. The HCA closure model also has high feasibility, since it is logical and straightforward, and appeals to the community’s recognition that HCAs

require a higher level of protection. Restricted access would be easy to implement and understand, but would not be consistent with the community’s desire for nighttime access to OSMP. The HCA and NA closure would have low feasibility, since it would be difficult to define and communicate closure boundaries, and it would not be consistent with the desire for access. The limited access model would provide meaningful access at prescribed locations, but would be very difficult to implement and for visitors to understand.

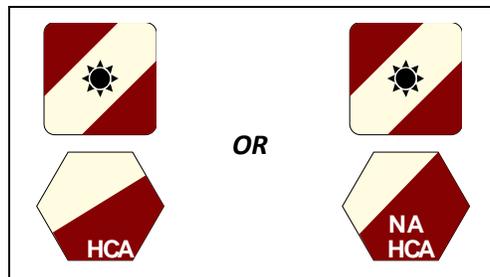
Management Efficiency/Cost. Both continuation of the current regulation and the HCA closures would, in the short term, be the most efficient from a management and cost perspective – the current regulation is the status quo, and HCAs are already signed and understood. Both the HCA/NA closure and restricted nighttime access would require moderate levels of management effort and cost due to additional signs, education and outreach, and enforcement. Limited nighttime access on a trail-by-trail basis would be the least efficient as it would require substantial effort to identify open trails, sign open and closed trails, and conduct the necessary outreach and enforcement.

Fairness. Most of the management approaches would be equitable to the extent they apply equally to all types of visitors, and maintain some level of nighttime access. However, the HCA and NA closure would greatly limit nighttime access (moderate fairness), and restricted access approach would eliminate nighttime access (except for one hour before or after daylight), resulting in a low ranking for fairness.

Based on this analysis, the strongest models for managing nighttime access are the HCA closure or the HCA and NA closure. The HCA closure approach would be expected to have moderate resource protection benefits, with high levels of compliance, feasibility, management efficiency, and cost. The HCA and NA closure would provide a higher level of resource protection with a moderate level of feasibility and cost.

RECOMMENDATION

Nighttime use of trails on OSMP lands is a very small proportion of overall use, though it represents a substantial number of visits each year and is becoming more common. While nighttime trail use has the potential to impact wildlife, it is unknown if or when the impacts of these disturbances have or will become a large-scale management problem. However, there are inferences from scientific study that the continued expansions of nighttime access could become a problem in the foreseeable future.



Considering this context, two recommended nighttime access management models are recommended for consideration: HCA closure or HCA and NA closure (each from sunset to sunrise). Either model could be further strengthened and balanced with some of the additional management overlay elements, described below.

MANAGEMENT OVERLAY ELEMENTS

The recommended HCA nighttime closure can be further strengthened with the following management overlay elements.

1. **11:00 pm to 5:00 am parking closure** – This approach would maintain the current regulation for trailheads and parking areas, would limit overall nighttime access, and would continue to be a tool to limit or manage criminal activity.
2. **Area/trail-specific nighttime closure** – In addition to uniform HCA closures, OSMP staff would retain the ability to close specific areas for resource protection or management purposes.
3. **Staff-guided access** – Staff-guided nighttime access to HCAs would allow for special programs, educational opportunities, or research.
4. **Monitoring** – Ongoing monitoring of nighttime visitor activity, compliance, and resource effects will be important to evaluate the long-term effectiveness of this program (see below).

Monitoring

Under any approach, some level of monitoring would be useful to track trends in nighttime visitor use locations, trends, and compliance. The strategic deployment of existing remote-sensing technology such as trail counters and motion-sensitive cameras, combined with periodic staff monitoring and outreach to user groups can be useful in understanding where nighttime use is concentrated and how that may evolve over time. Future system-wide visitation studies (similar to the 2004-2005 visitor study) should also include a nighttime use component.

Understanding nighttime impacts and wildlife responses through monitoring should also be considered. Remote cameras can indicate where wildlife are active during the night, and other wildlife monitoring efforts may add to this understanding. More intensive scientific studies that are specifically designed and implemented for this purpose are possible, but would be significantly more costly and time consuming.

Law Enforcement Considerations

New nighttime access regulations may not be necessary to address issues related to existing criminal activities which generally occur at trailheads or camping which is already prohibited and regularly enforced by rangers. However, changes to the *status quo* may require additional enforcement capacity, and would almost certainly require adjustments to the rangers' existing schedules. This is less of a concern with the recommended model, since HCAs are signed, mapped, and already have distinct rules for access.

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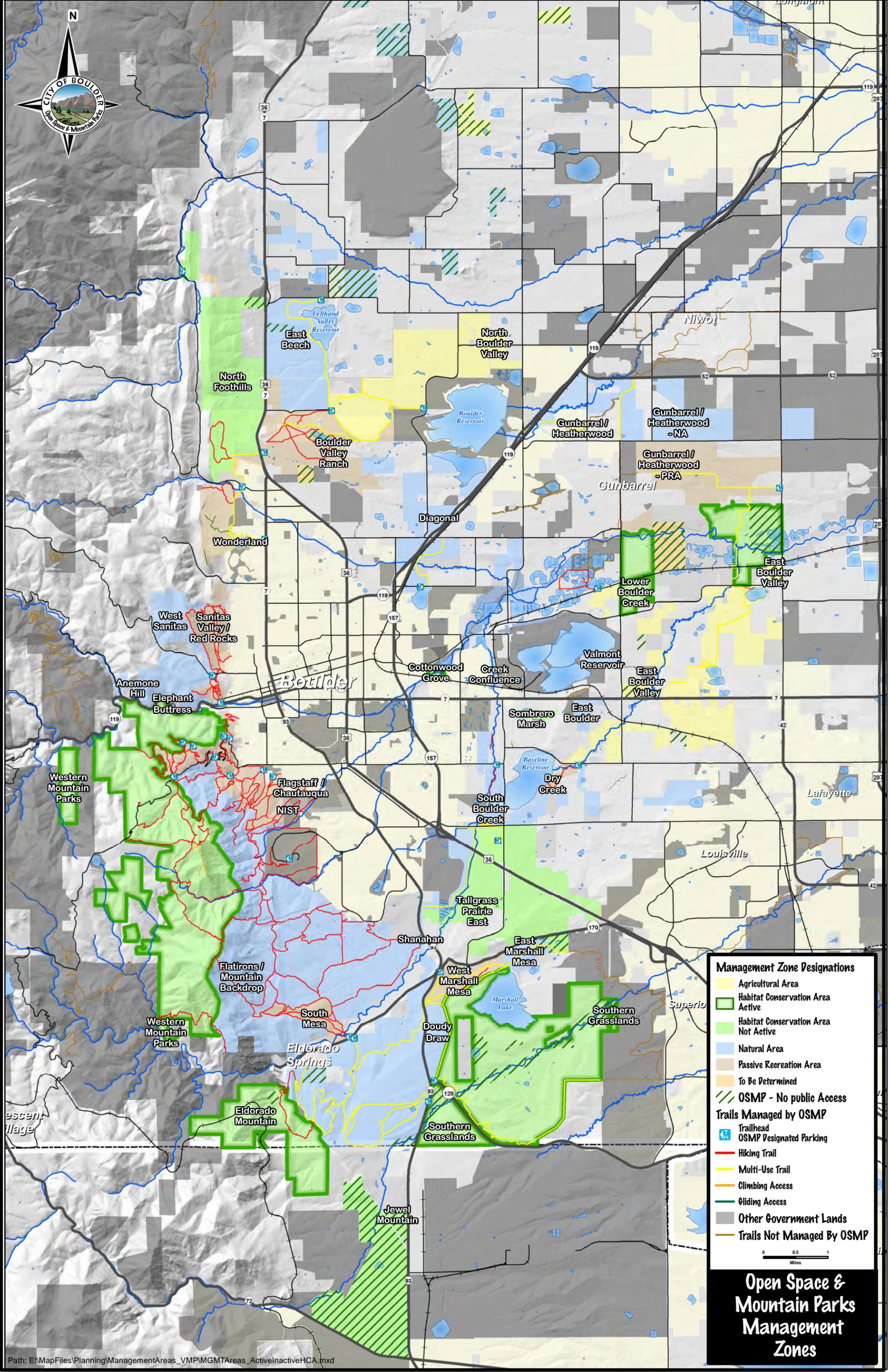
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ATTACHMENT 1: OSMP MANAGEMENT ZONE AND TRAIL MAPS



Management Zone Designations

- Agricultural Area
- Habitat Conservation Area Active
- Habitat Conservation Area Not Active
- Natural Area
- Passive Recreation Area
- To Be Determined
- OSMP - No public Access

Trails Managed by OSMP

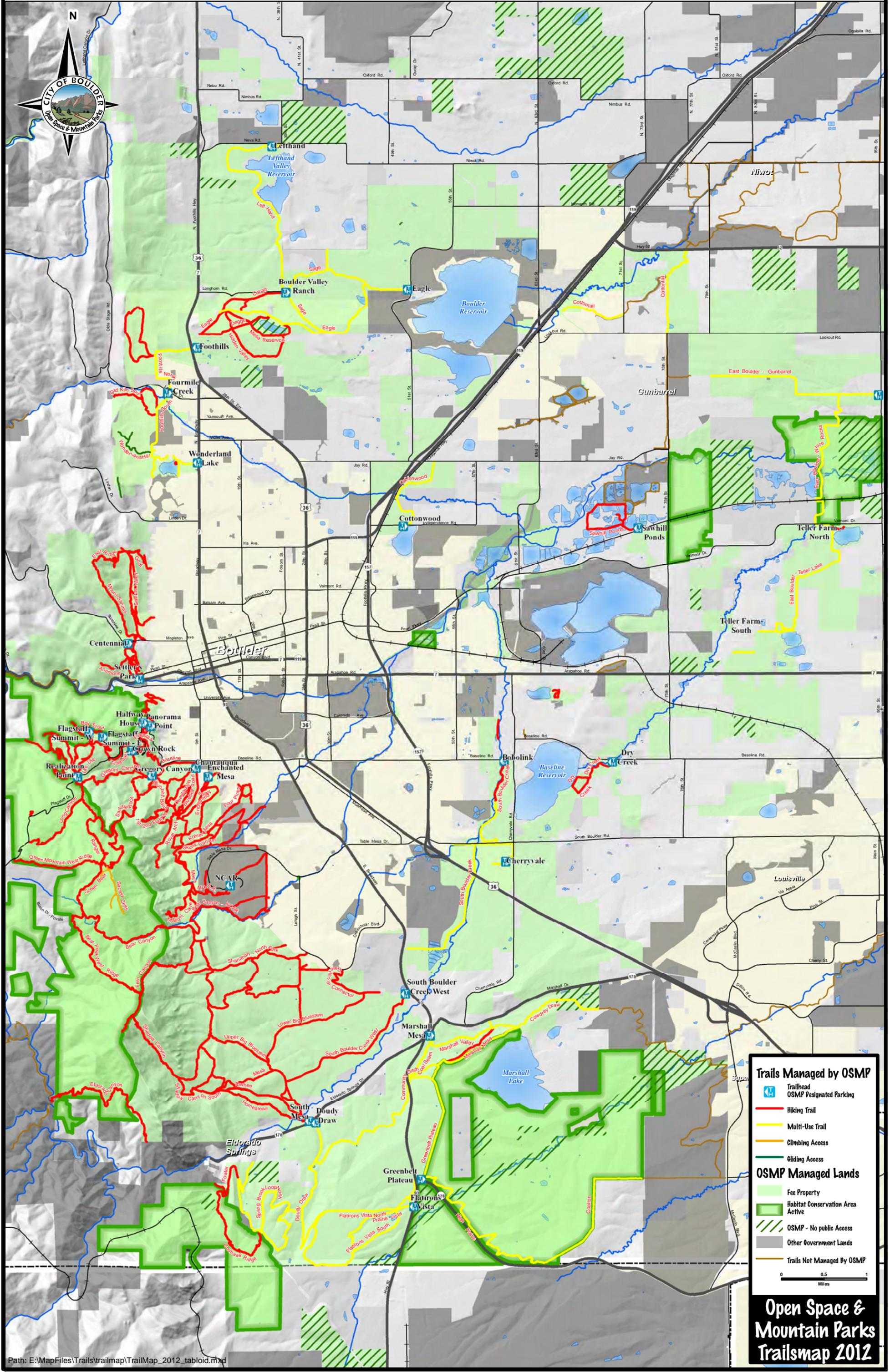
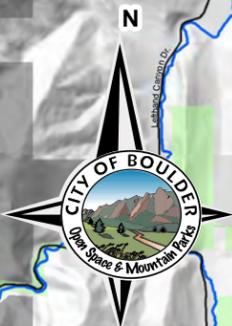
- Trailhead
- OSMP Designated Parking
- Hiking Trail
- Multi-Use Trail
- Climbing Access
- Gliding Access

Other Government Lands

- Trails Not Managed By OSMP

0 0.5 1
Miles

Open Space & Mountain Parks Management Zones



Trails Managed by OSMP

- Trailhead
- OSMP Designated Parking
- Hiking Trail
- Multi-Use Trail
- Climbing Access
- Gliding Access

OSMP Managed Lands

- Fee Property
- Habitat Conservation Area Active
- OSMP - No public Access
- Other Government Lands
- Trails Not Managed By OSMP

0 0.5 1
Miles

Open Space & Mountain Parks Trailsmap 2012