Voice and Sight Tag Program

Monitoring Report

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Voice and Sight Tag Program
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Executive Summary

OSMP launched the Voice and Sight Tag program in the summer of 2006. The program's goal is to increase compliance with existing voice and sight rules and decrease dog-related conflict on OSMP-managed lands. By the end of the summer of 2010, over 25,000 participants had registered in the program and most (86%) off-leash dogs observed on OSMP had the program's green tag visibly displayed.

Monitoring conducted before, immediately after, and almost four years after the program's launch, as well as other sources of information, indicate that the program achieved some but not all of the program's objectives.

- OSMP increased its voice and sight control outreach to visitors and some visitors report an improved understanding of the voice and sight rules because of the program.
- OSMP observed an increase in compliance with some components of voice and sight rules.
- Dog-related conflict initially decreased following implementation of the Voice and Sight Tag program, but dog-related conflict rates returned to pre-program levels by 2010.
- OSMP did not detect any increase in dog guardians' ability to use voice control following implementation of the program.

OSMP also measured compliance with dog excrement removal rules. Compliance with these rules was generally poor with 46% to 63% of the visitor parties complying with the rules.

Barriers that dog guardians may face when trying to comply with rules include:

- Limited skills (guardians in using voice control, dogs in responding to voice control),
- Weak or no external pressure to persuade compliance,
- Personal beliefs or attitudes, and
- Personal habits or routines.

Recommended management strategies to improve compliance include:

- Testing and/or certifying dog guardians' skill in using voice control before allowing dog guardians voice and sight privileges,
- Increasing enforcement and raising fines for violating rules,
- Reinforcing the desired social norm, and
- Understanding dog guardians' beliefs and attitudes about voice and sight control, off-leash dog recreation, and excrement removal learned via focus groups, interviews, and/or surveys to better target information and education programs or other management strategies.

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1.0 INTRODUCTION

The City of Boulder Open Space and Mountain Parks (OSMP) land has long been a favorite destination for individuals wishing to recreate with their dogs. The popularity of OSMP for dog guardians and their canine companions may be due, at least in part, to the opportunity for dog guardians to recreate with their dogs off-leash. Approximately 60% of OSMP's 144 miles of recreational trails afford visitors the opportunity to recreate with dogs off-leash, provided dog guardians manage their dogs in accordance with the City's Voice and Sight rules. In contrast, many surrounding open space systems, including Boulder County Parks and Open Space, U.S. Forest Service wilderness areas, and Rocky Mountain National Park require dogs to be leashed while on trails or prohibit dogs altogether.

Recent surveys suggest that many OSMP visitors, including many Boulder residents, take advantage of the off-leash dog walking opportunities on OSMP lands. Approximately one third of all OSMP visitors are accompanied by at least one dog (Vaske et al. 2009). When asked specifically about off-leash dog walking, more than half (59%) of Boulder residents who have walked a dog on OSMP lands in the past 12 months said they did so with their dogs off-leash (National Research Center 2010). Further, while most Boulder residents who have walked a dog on OSMP lands in the past 12 months stated they were equally likely to visit OSMP areas where dogs are required to remain on-leash as they were to visit areas where dogs are allowed off-leash, of those residents who stated they ***were more likely to visit one area or the other*** (i.e. leashed areas vs. off-leash areas), more than twice as many said they were more likely to visit areas where dogs are allowed off-leash (National Research Center 2010).

On OSMP lands, dogs can only be managed off-leash if their guardians exercise "voice and sight control" over their dogs. While there is no single "voice and sight" law, the City of Boulder Revised Code (B.R.C.) 1981 outlines the specific requirements of voice and sight control in several locations[1]. B.R.C.6-1-16 requires all dogs to be leashed unless, among other things,

- the dog is in an area where voice and sight is allowed;
- the dog is accompanied by its guardian or keeper and within view and voice control of such person;
- the accompanying guardian or keeper has a leash in his or her immediate possession; and
- the accompanying guardian or keeper has not more than two dogs simultaneously unleashed or unrestrained.

[1] The voice and sight rules outlined in the text here refer to the B.R.C. 1981 before the Voice and Sight Tag program was implemented in 2006. Following adoption of various Voice and Sight Control ordinances, B.R.C. 6-1-16 was amended to include the requirement that dogs under voice and sight control must visibly wear a Voice and Sight Control Evidence Tag; the definition of voice control in Section 6-1-2 was updated and expanded to include sight control; and Chapter 6-13 was added to the B.R.C. 1981.

The B.R.C. 1981 further clarifies the meaning of voice control in Section 6-1-2 by defining it in the following manner:

> "Voice control" means control of the behavior of a dog which is not leashed or otherwise physically restrained by its guardian or keeper sufficient that the dog does not, without regard to circumstances or distractions:
> (1) Charge, chase, or otherwise display aggression toward any person or behave toward any person in a manner that a reasonable person would find harassing or disturbing;
> (2) Charge, chase, or otherwise display aggression toward any dog;
> (3) Chase, harass, or disturb wildlife or livestock; or
> (4) Fail to come to and stay with the guardian or keeper immediately upon command by such person;
> and voice control does not exist unless the guardian or keeper exercises this command authority at all times to keep the dog within the requirements of this definition.

Prior to implementation of the Voice and Sight Tag program, dog guardians meeting the requirements listed above were said to be managing their dogs under voice and sight control.

Despite the existence of codified voice and sight control requirements, the interpretation of the rules and expectations regarding the behavior of off-leash dogs likely varied greatly from visitor to visitor. In an effort to improve the understanding of voice and sight control, and thereby increase compliance with voice and sight rules, Friends of Dogs in Open Space (FIDOS) proposed the creation of an educational video that would "depict realistic and enforceable dog management behaviors" (FIDOS 2005). The video, which was to be viewed by all dog guardians wishing to visit OSMP with their dogs off-leash, was intended to establish a shared understanding of what voice and sight control means and expectations regarding dog behavior while being managed off-leash. Working together, OSMP and the community developed the Voice and Sight Tag program (Tag Program), which included, as its centerpiece, a video that met the general objectives articulated by FIDOS. In 2006, OSMP launched the Tag Program; dog guardians who wish to visit OSMP lands with their dogs off-leash and under voice and sight control must participate in the Tag Program.

1.1 Voice and Sight Tag program goal and objectives

The overall goal of the Voice and Sight Tag program is to:

Increase the proportion of dog guardians visiting OSMP with their dogs who have control over their dogs as required by applicable regulations (B.R.C. 6-1-16)

The program objectives are to:

1. Improve understanding of voice and sight control.
2. Improve compliance with dog control rules.[2]

[2] "Dog control rules" refers to voice and sight related rules. OSMP only evaluated compliance with rules that could be ***observed***. Examples of observable components of voice and sight rules include whether the dog within the guardian's view; whether the guardian attempting to manage more than two dogs under voice and sight control; etc.

3. Increase OSMP outreach to and education of the public with respect to voice and sight control.
4. Decrease conflict involving dogs on OSMP properties.

The centerpiece of the Voice and Sight Tag program is the 15-minute, educational Voice and Sight Tag video. The video describes the City of Boulder's expectations of guardians who use voice and sight control, the rules regarding dog waste, and general trail etiquette. More importantly, the video presents various scenarios that guardians and their dogs may encounter on OSMP-managed lands and shows responses to these scenarios by both well- and poorly-trained dogs. These examples show applicants the level of control the City of Boulder expects of dog guardians who choose to manage their dog(s) off-leash under voice and sight control.

The Voice and Sight Tag program is a voluntary program, but one in which dog guardians must participate if they wish to visit OSMP lands with their dogs off-leash under voice and sight control. Participation in the program includes viewing the Voice and Sight Tag video, registering in the program, and agreeing to manage off-leash dog(s) in the manner described in the video. Payment of a small fee[3] is also required as part of the registration. Following registration, participants receive a green Voice and Sight tag which must be visibly displayed on any dog managed off-leash under voice and sight control.

1.2 Program evaluation

OSMP conducted observational monitoring and visitor interviews to evaluate the success of the Voice and Sight Tag program in achieving its objectives and meeting standards established in the Visitor Master Plan (OSMP 2005). Observational monitoring focused on objectives 2 and 4, specifically examining whether compliance with dog control rules increased and the incidence of dog-related conflict decreased following implementation of the Voice and Sight Tag program. Staff also used observational monitoring to estimate dog guardian compliance with excrement removal regulations and rates of participation in the Voice and Sight Tag program. Lastly, in a separate monitoring effort, staff conducted brief interviews with dog guardians to evaluate compliance with leash possession rules.[4]

Important Note:

It is important to emphasize that the monitoring was designed to evaluate a ***change*** in compliance with dog control rules and a ***change*** in the incidence of dog-related conflict following implementation of the Voice and Sight Tag program.

OSMP staff observed visitor parties for only a small portion of their visit. Therefore the monitoring results are not estimates of compliance or conflict rates for an entire visit. Compliance and conflict rates reported in this document refer only to ***rates within the observation zone***.

[3] Currently, City of Boulder residents are charged $15.00 for the first Voice and Sight tag and $5.00 for each additional tag. Program participants who live outside the Boulder city limits are charged $18.75 for their first tag and $5.00 for each additional tag.

[4] This monitoring was conducted separately because staff could not observe whether a guardian had a leash for each dog being managed under voice and sight control since some leashes were in backpacks or under clothing.

Additionally, because the Voice and Sight Tag program applied to all areas on OSMP lands that allow guardians to manage their dog(s) using voice and sight control, no areas were available to serve as a "control" for the monitoring. Consequently, the results presented below can only suggest a ***correlation*** (or lack thereof) between the Voice and Sight Tag program and any observed change in compliance or incidence of dog-related conflict rather than indicate that the new program ***caused*** any of the observed changes.

2.0 STUDY SITES

Staff evaluated the effectiveness of the Voice and Sight Tag program by observing visitor and dog behavior at 25 sites along trails with medium, high, or very high visitation levels (per Vaske et al. 2009) that allow guardians to use voice and sight control to manage dogs (Figure 1). In order to observe a variety of situations that dogs and their guardians encounter on OSMP land, staff considered the location along the trail when selecting monitoring sites. Slightly more than one third (35%) of the monitoring sites were located at or near the start of a trail with the remaining monitoring sites being located at least 1,500 feet from the start of the trail. Staff also conducted visitor interviews at the same sites, but at different dates and times than the observational monitoring, keeping the two monitoring efforts separate. Additional details on the project's monitoring sites can be found in the project protocol (OSMP 2010) which is available upon request.

While trail visibility (how much of the trail is visible from the monitoring site) was considered in selecting monitoring sites, no sites afforded a view of visitors for a typical visit[5]. On average, staff could view approximately 1,050 feet of trail from a monitoring site. Such a vantage allowed monitoring staff the opportunity to observe visitor parties for approximately four minutes of their trip. This is important in understanding that the compliance rates (and similarly, conflict rates) reported in this document refer only to ***rates within the observation zone*** which typically represent only a small portion of each party's visit. Compliance (or conflict) rates reported here are not, and should not be construed as, compliance ***rates for an entire visit***.

3.0 METHODS

3.1 Observational monitoring

OSMP staff monitored visitor and dog behavior in the spring (March, April, and May) of 2006 prior to implementation of the Voice and Sight Tag program, the spring of 2007 approximately six months after implementation of the program, and the spring of 2010 approximately three and a half years after the program was initiated.

Each month, staff monitored visitor and dog behavior during 28 three-hour monitoring periods. The 28 monitoring periods occurred on ten weekday mornings (7:00-10:00 AM)[6], ten weekday evenings (4:00-7:00 PM), four weekend mornings (7:00-10:00 AM), and four weekend mid-days (10:30 AM-1:30 PM).

[5] The average visit to OSMP is approximately one hour in length (Vaske and Donnelly 2008).
[6] All times are approximate

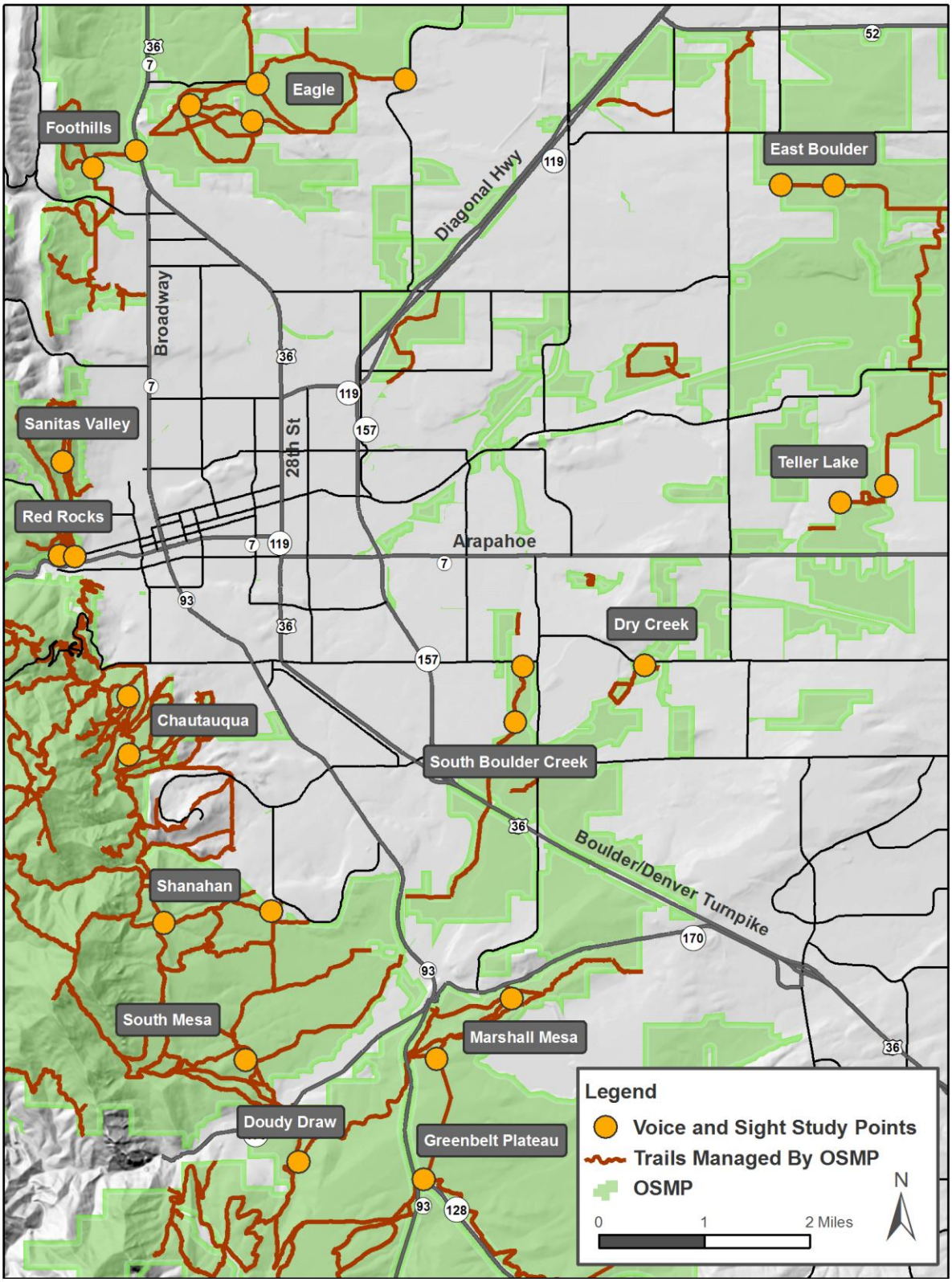

Figure 1: Voice and Sight Tag program monitoring locations.

Each month, staff used a random number sequence to determine which days of the month would be monitored. Once the monitoring days were determined, staff used a second random number sequence to assign study sites to each day. All 25 sites were scheduled to be monitored at least once each month, and three of the sites were scheduled to be monitored twice during the month. Additional details on the project's sampling design can be found in the project protocol (OSMP 2010).

When each monitoring period began, the staff conducting the monitoring observed all visitor parties[7] with a dog that entered the observation zone. Staff continued to observe each visitor party until that party left the observation zone. For each observed visitor party, staff recorded the visitor party characteristics and whether any member of the party engaged in specific dog and guardian behaviors considered conflictive[8]. Appendix A contains a copy of the monitoring data sheet.

Monitoring staff employed several measures to reduce the likelihood that visitors might alter their behavior due to the presence of an OSMP staff member. Staff conducting the observations did not wear clothing that would identify them as OSMP employees. Additionally, at study sites where it was feasible, staff conducted observations from a location that was out of sight to most trail visitors. Finally, OSMP rangers and education staff were informed of the monitoring schedule and avoided study sites during scheduled monitoring periods.

3.2 Guardian interviews

OSMP interviewed dog guardians during a six-week period in the spring of 2006. OSMP selected 28 three-hour interview periods during the six-week period using a sampling design similar to the one described above in section 3.1. OSMP conducted interviews at approximately the same 25 locations that were monitored during the observational component of study. During the interviews, staff wore clothing that identified them as an OSMP employee.

When the interview period began, the staff member conducting the interviews (i.e. the interviewer) observed all visitor parties with a dog that entered the observation zone. For many visitor parties, the leashes for each dog being managed under voice and sight were often visible in the guardians' hands or on their bodies. When all leashes were visible, the interviewer documented that all leashes were visible and did not attempt to contact the visitor party. When no leash was visible or the number of visible leashes was less than the number of dogs being managed under voice and sight, the interviewer asked the guardian if she had a leash for each dog in her party. In these situations, the interviewer recorded whether the visitor party with leashes not visible had a leash for each dog, did not have a leash for each dog, or refused to show the leash(es) to the interviewer. Appendix B contains a copy of the interview data sheet.

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[7] A party or a visitor party is one or more individuals traveling together who, in the opinion of the observer, appears to be visiting OSMP as one unique group

[8] In 2005, OSMP and a community group consisting of FIDOS members and other interested citizens developed an initial list of dog and guardian behaviors that could be observed by an individual and had the potential to create a conflict for OSMP visitors. In 2006, Vaske and Donnelly (2007a and 2007b) surveyed OSMP visitors to establish which behaviors on the initial list truly created a conflict for OSMP visitors. OSMP used Vaske and Donnelly's results to finalize a list of observable, conflictive behaviors. Conflictive behaviors evaluated in this monitoring were all found by Vaske and Donnelly (2007a and 2007b) to create a conflict for OSMP visitors.

3.3 Analysis

For the purposes of this study, the visitor party was the sampling unit; results are reported as percentages of visitor parties complying with the regulations or exhibiting at least one conflictive behavior while in the observation zone. Differences among percentages observed during each of the study years were compared using the χ^2 test statistic in SAS v. 9.2. For all tests, α=0.05. Confidence limits reported in this document were calculated using exact methods (Zar 1999).

4.0 RESULTS

4.1 Observable Voice and Sight requirements

During the observational portion of the monitoring, we studied three specific components of voice and sight control:

1. Whether the visitor party was attempting to manage more than two dogs off-leash per guardian using voice and sight control,
2. Whether all dogs in the visitor party were within the guardian's sight, and
3. Whether all dogs in the visitor party responded appropriately to the guardian's commands.

While few visitor parties had more than two dogs per guardian, compliance with this part of the voice and sight rules was poorest. In 2006, only one (6%) of the 18 visitor parties with more than two dogs per guardian complied with the requirement that only two dogs may be managed off-leash, under voice and sight by a single guardian. Following implementation of the Voice and Sight Tag program, the percentage of visitor parties complying with this requirement increased to about 40% and this level of compliance was maintained in 2010 (Figure 2).

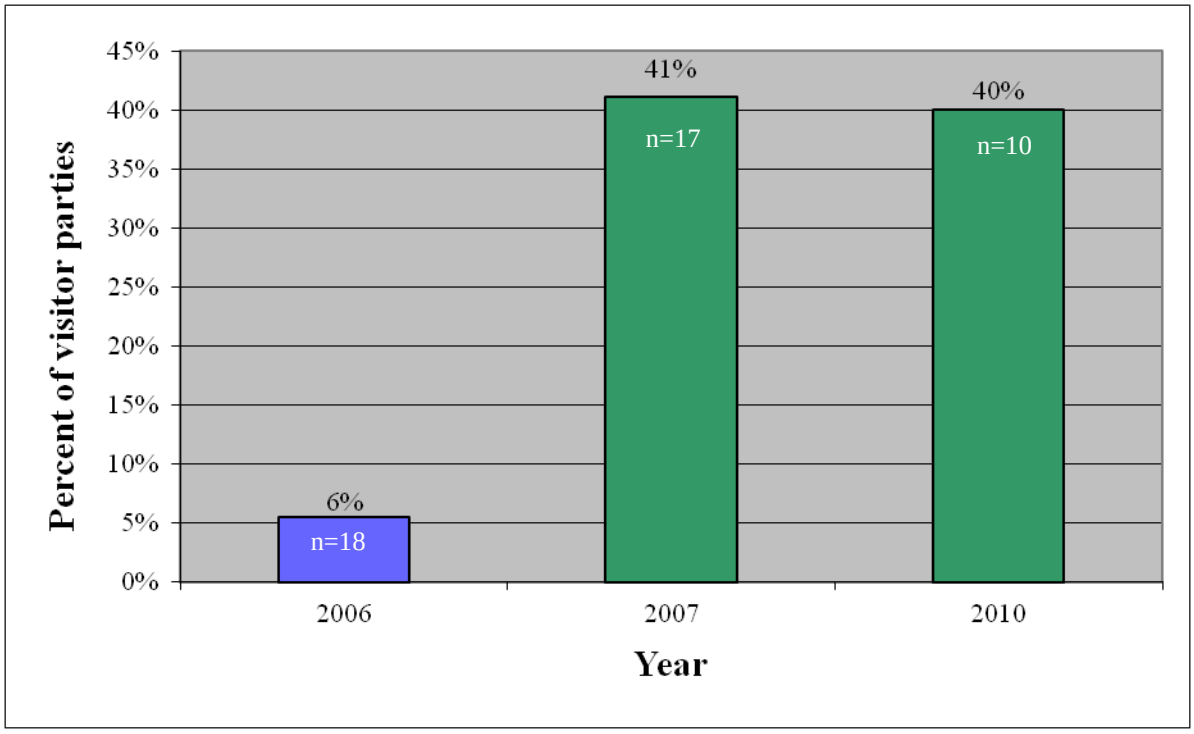

Figure 2: Percentage of visitor parties that complied with the requirement that only two dogs may be managed off-leash, under voice and sight by a single guardian. Different colored bars indicate statistically different percentages.

Visitor party compliance with the provision of the voice and sight rules requiring that dogs remain within the guardian's field of vision improved each year of the study. Approximately 86% of the visitor parties kept their dog(s) within their field of vision[9] in 2006 (Figure 3). This percentage increased to 92% in 2007 and 95% in 2010.

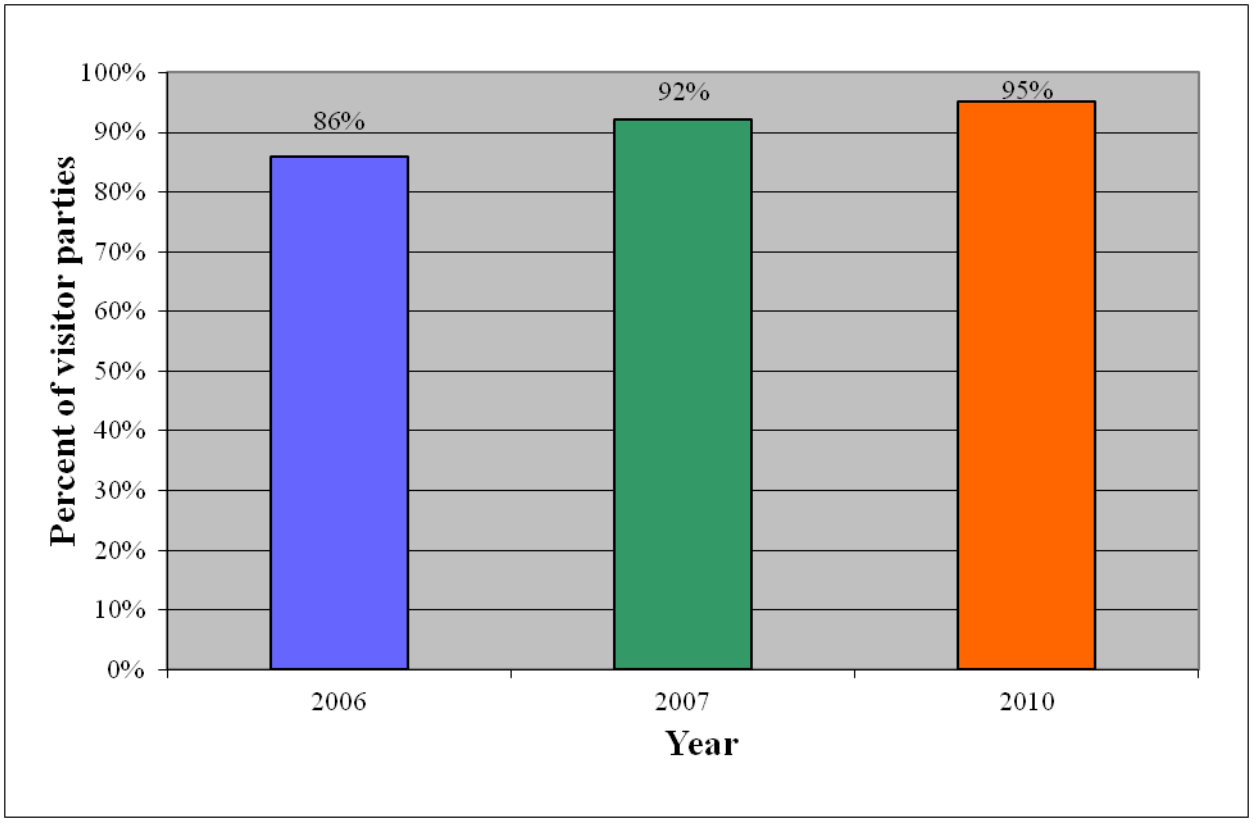

Figure 3: Percentage of visitor parties that complied with the requirement that their dog(s) must remain in their field of vision. Different colored bars indicate statistically different percentages.

[9] For the purposes of this monitoring project, a dog was considered within a guardian's field of vision if the dog was immediately visible to the guardian (i.e. the dog was in front of or to the side of the guardian) or if the guardian could view the dog by simply turning his or her body (i.e. the dog was behind the guardian). Dogs were considered out of sight if the guardian's sightline to the dog was blocked by an object (e.g. a bush or tree) or topography (i.e. dog is over a hill from the guardian).

Of those visitor parties that attempted to use voice control while they were in the observation zone, slightly less than 65% were successful in 2006 and 2007 (Figure 4). The percentage of visitor parties who were successful in using voice control dropped to approximately 56% in 2010, but the decline was not statistically significant (p=0.1582). While the B.R.C. 1981 defines voice control as the ability of guardians to have their dogs respond "immediately" to their commands, for the purpose of this monitoring, visitor parties were considered in compliance with this part of the B.R.C. 1981 or "successful", if the dog(s) responded within ***two*** separate and distinct calls to the "come" or "here" commands or having its/their name(s) called by the guardian.

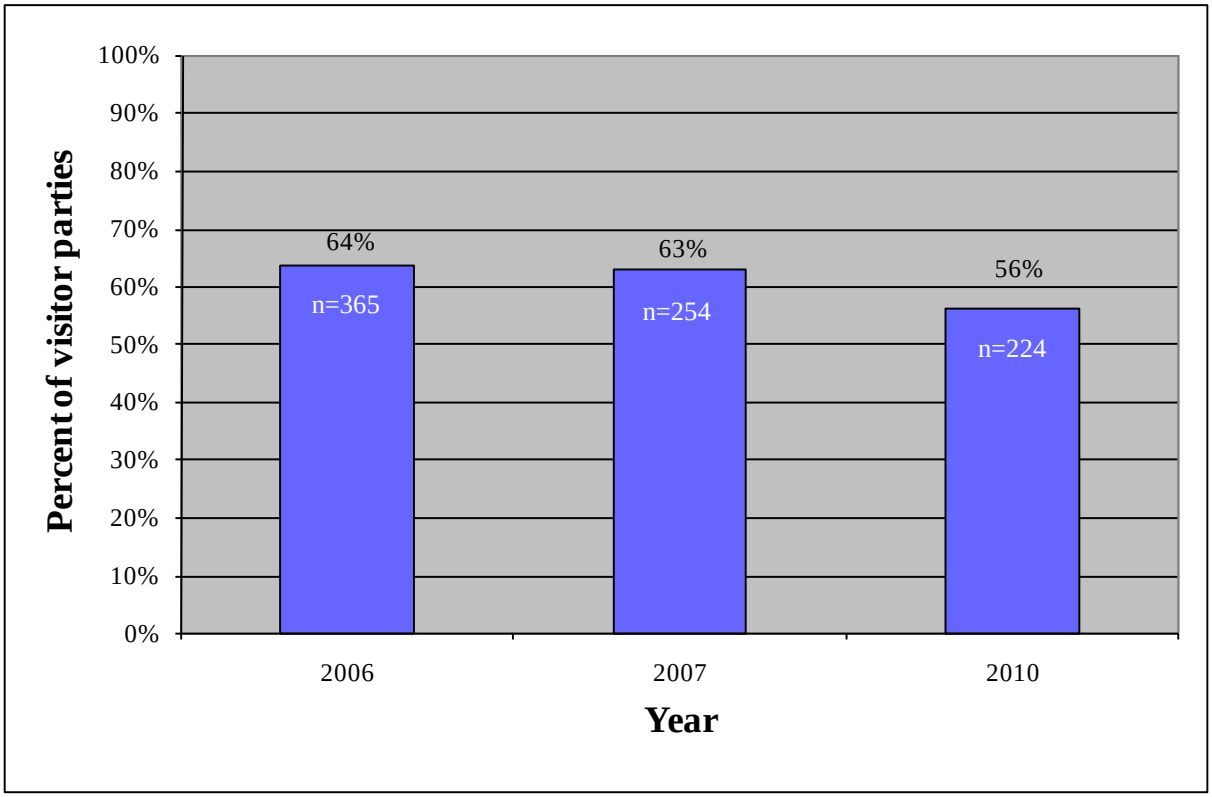

Figure 4: Percentage of visitor parties who were successful in using voice control

4.2 Leash possession requirement

As noted earlier, staff could not always determine whether a guardian had a leash for each dog being managed under voice and sight by simply observing the guardian. Some guardians carry leashes in their backpacks or coat pockets. Thus, staff needed to interview some dog guardians to determine whether the guardian had a leash for each dog being managed under voice and sight control. We observed and/or interviewed a total of 393 dog walking/hiking visitor parties during the interview portion of the study. Compliance with this portion of the voice and sight rules was good, with nearly 93% of the observed and/or interviewed visitor parties having a leash for each dog being managed under voice and sight control[10].

[10] Only four visitor parties refused to show the interviewer their leash(es). These four parties are not included in the estimated compliance rate provided here.

4.3 Conflict

In addition to specific requirements of the voice and sight rules, we compared the incidence of dog-related conflict among OSMP visitors for each study year. Following implementation of the Voice and Sight Tag program, there was a statistically significant reduction in the percentage of visitor parties that participated in at least one conflictive behavior. This reduction was not maintained, and in 2010, the incidence of conflictive behaviors returned to the pre-program (i.e. 2006) level (Figure 5).

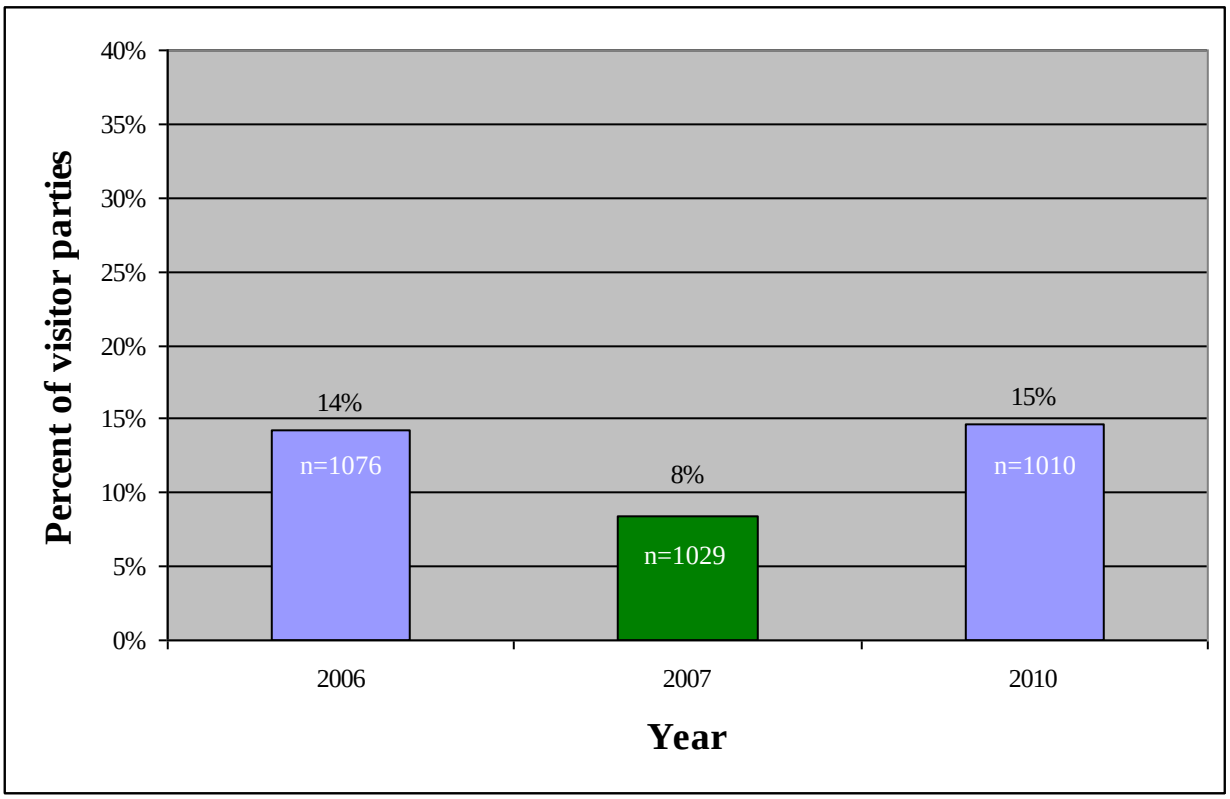

Figure 5: Percentage of visitor parties that participated in at least one conflictive behavior. Different colored bars indicate statistically different percentages.

4.4 Excrement removal

Compliance with Boulder's excrement removal law (B.R.C. 6-1-18) requires immediate removal of any excrement. For dog guardians on OSMP-managed lands, this generally means picking up the excrement and taking the excrement with them. As part of the monitoring, staff observed and recorded guardian behavior with respect to both elements of excrement removal. Staff considered guardians in compliance with B.R.C. 6-1-18 if they picked up their dog's excrement ***and*** took the excrement with them. If the guardian failed to do both steps, we considered the guardian out of compliance with the law.

Compliance with the excrement removal requirement was generally low. Just over 63% of the visitor parties complied with the law in 2006 compared to 50% in 2007 and 45% in 2010 (Figure 6). The reduction in compliance from 2006 to 2007 was statistically significant, but the reduction from 2007 to 2010 was not statistically significant.

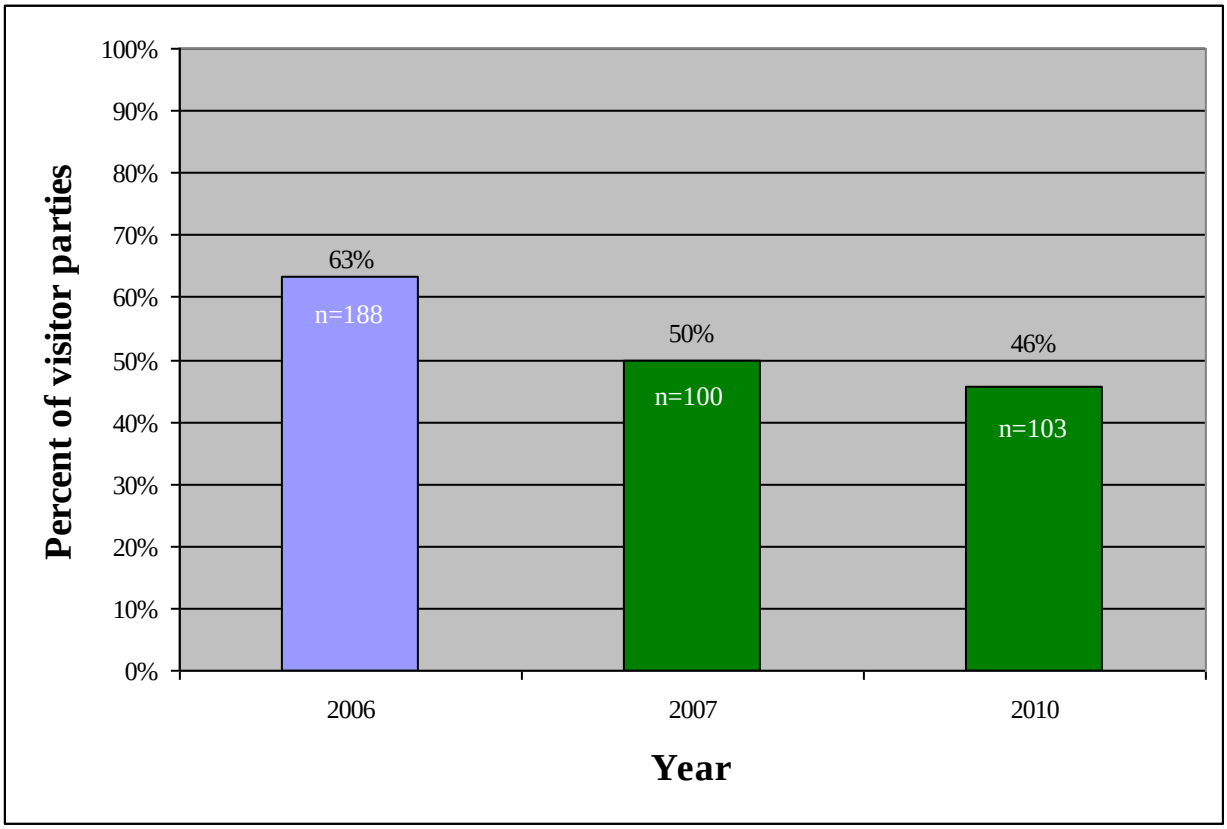

Figure 6: Percentage of visitor parties that complied with the excrement removal rules. Different colored bars indicate statistically different percentages.

In 2007, most visitor parties that failed to comply with the excrement removal law failed due to the fact that they did not take the excrement-filled bags with them (Figure 7). By comparison, in 2006 and 2010, a higher proportion of visitor parties were simply not picking up the excrement.

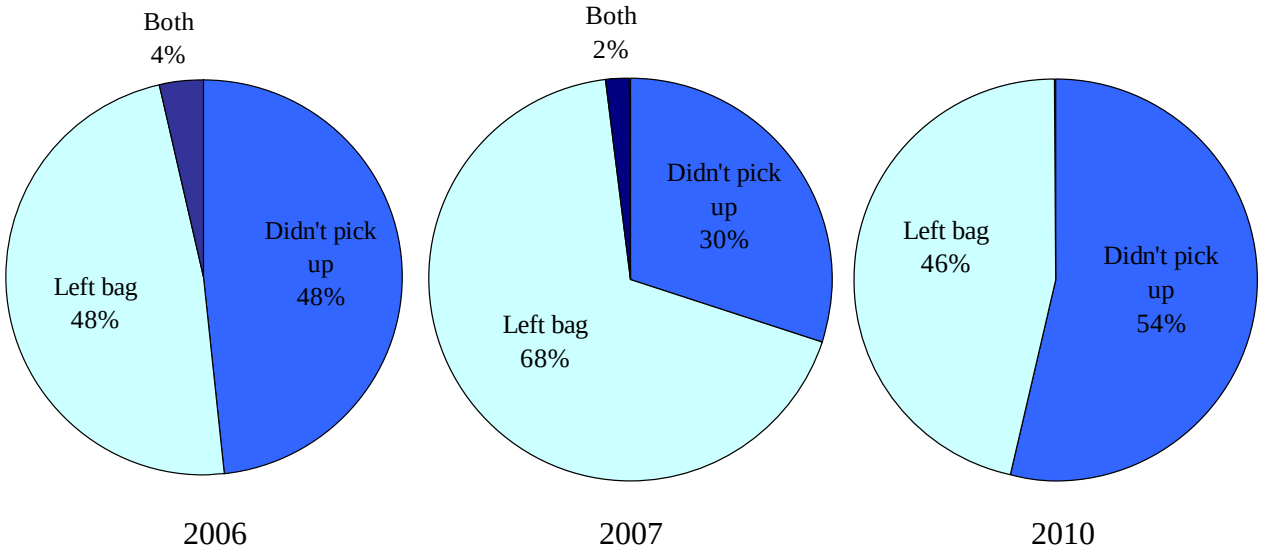

Figure 7: Distribution of visitor parties by reason for failing to comply with the excrement removal rules. Visitor parties either did not pick up the excrement or picked up the excrement but left the excrement-filled bag on the trail. In rare cases, visitor parties did both when there were multiple excrement events.

4.5 Program participation and compliance with tag requirement

Since the Voice and Sight Tag program's inception in the summer of 2006, approximately 26,000 participants from approximately 15,000 households have registered in the program. Approximately 10,000 participants registered in 2006 and the number of participants in the program has grown at a relatively steady rate, adding approximately 4,000 participants per year in 2007, 2008, 2009, and 2010 (Figure 8).

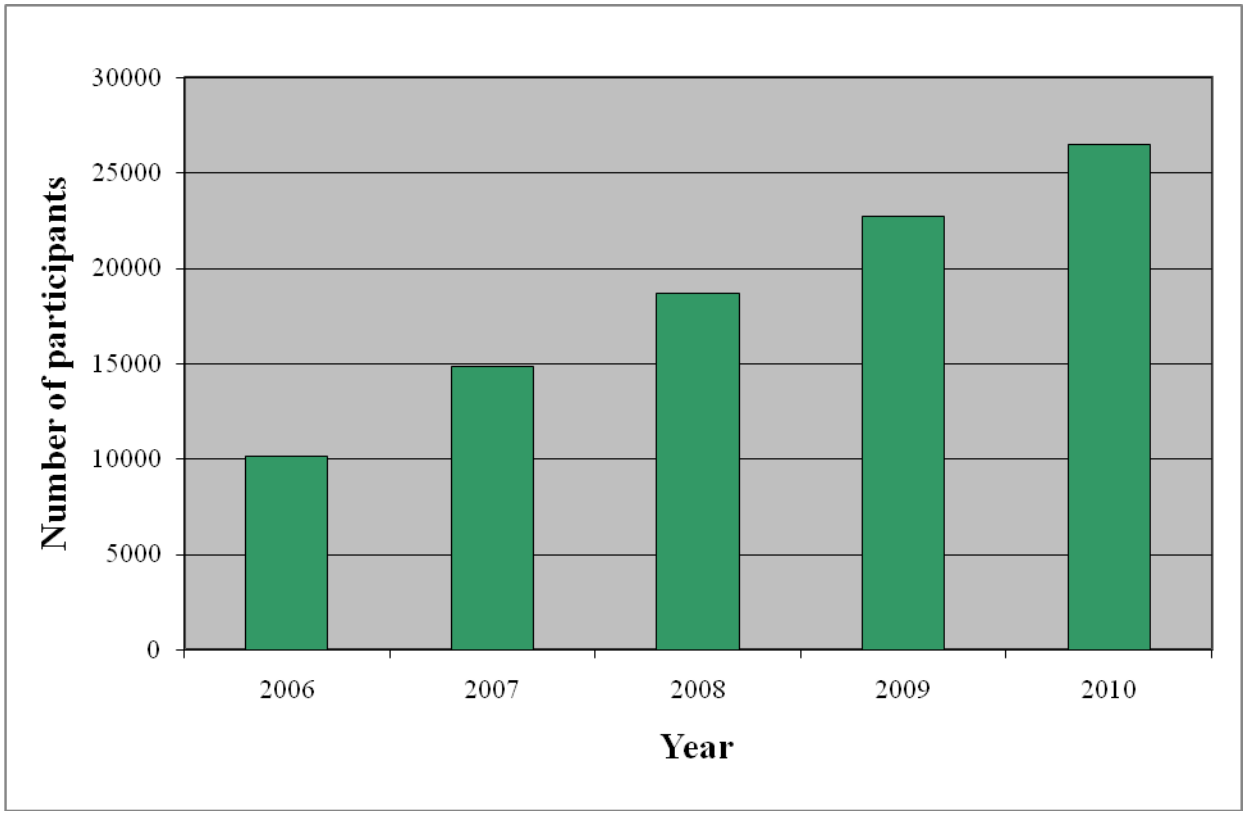

Figure 8: Cumulative number of participants in the Voice and Sight Tag program since the program inception in 2006.

Over the same time frame (i.e. program inception through December 31, 2010), OSMP has issued approximately 25,000 green tags[11]. Fees collected for the tags have totaled just over $300,000. Colorado residents have purchased all but 100-150 of the approximately 25,000 tags. Boulder residents have purchased many of the green tags; however, OSMP has also issued a large number of tags to program participants from Denver, Longmont, Lafayette, and Louisville.

The percentage of visitor parties complying with the requirement that off-leash dogs have a visibly displayed, green Voice and Sight tag has increased from the program's inception. In 2007, an estimated 79% of visitor parties with off-leash dogs complied with this requirement. By 2010, this percentage increased to an estimated 86% with a 95% confidence interval spanning from 83% to 88%. The observed increase is statistically significant ($p<0.0001$).

[11] This does not mean that there are 25,000 dogs with green tags. Some of these 25,000 tags are likely replacements for lost or damaged tags.

5.0 DISCUSSION

5.1 Effectiveness of the program in achieving objectives

As noted in Section 1.1, the Voice and Sight Tag program has four objectives:

1. Improve understanding of voice and sight control.
2. Improve compliance with dog control rules.
3. Increase OSMP outreach to and education of the public with respect to voice and sight control.
4. Decrease conflict involving dogs on OSMP properties.

As described below, the Voice and Sight Tag program achieved some, but not all, of these objectives.

5.1.1 Objective 1: Improve understanding of voice and sight control

The monitoring described in this document was not designed to evaluate whether or not dog guardians' understanding of voice and sight control improved because of the Voice and Sight Tag program. However, results of a recent survey of Boulder residents suggests residents who visit OSMP lands are aware of the Voice and Sight Tag program and have at least a somewhat better understanding of voice and sight control as a result of the program. Nearly 70% of the respondents surveyed in 2010 said they had heard of the Voice and Sight Tag program (National Research Center 2010). Dog walkers, particularly those who have walked their dogs off-leash on OSMP lands, were very likely to be aware of the Voice and Sight Tag program; 85% of dog walkers and 93% of dog walkers who have walked their dog off-leash stated they had heard of the program. Of those who said they had heard of the program, about half indicated that they had at least a somewhat better understanding of voice and sight control as a result of the Voice and Sight Tag program.

Some ancillary data from the observational monitoring ***may*** suggest visitors understanding of voice and sight control has improved is the observed increase in leash use. Prior to implementation of the Voice and Sight Tag program, approximately 15% of the visitor parties had all the dogs in their party on-leash while in the observation zone, despite the fact that they were traveling in a voice and sight-allowed area. Following implementation of the Voice and Sight Tag program, the percentage of visitor parties that kept their dogs on-leash while in the observation zone jumped to 25%.

It is ***possible*** that the increase in leash use is due to a better understanding by dog guardians of the level of control expected by the City. Some dog guardians may have believed they could not meet the standards outlined in the video and have chosen to leash their dog rather than use voice and sight to manage their dog. Alternatively, an increased awareness of the expectations associated with voice and sight may have led some dog guardians to leash their dogs at certain times or places during their visit. For example, after seeing some of the scenarios in the Voice and Sight Tag video, some guardians may have voluntarily leashed their dogs in the presence of small children, when traveling through prairie dog colonies, or in other situations where the guardians may have felt they could not control their dog sufficiently without a leash. We do not know for sure why more guardians were leashing their dogs in the observation zone, but an improved understanding of the rules and expectations associated with voice and sight control may have contributed to the increase.

5.1.2 Objective 2: Improve compliance with dog control rules

The observational monitoring results indicate that compliance with some elements of the dog control regulations improved, and compliance with other elements did not change. The percentage of visitor parties keeping their dog(s) within view increased after implementation of the Voice and Sight Tag program. Similarly, the percentage of visitor parties with three or more dogs per guardian that only allowed two of the dogs off-leash at any given time increased after implementation of the Voice and Sight Tag program. However, compliance with this rule is generally low (an estimated 41% compliance rate), despite the fact that it has improved.

The monitoring results show there was no improvement in guardians' use of voice control to manage their dog(s). In each of the study years, 55-65% of the visitor parties were successful in having their dog(s) respond to the guardians' commands. Staff did not observe any statistical change in visitor parties' level of success in using voice commands to manage their dog(s) following implementation of the Voice and Sight Tag program.

5.1.3 Objective 3: Increase OSMP outreach to and education of the public with respect to voice and sight control

The monitoring described here was not designed to evaluate whether OSMP has ***increased*** outreach to and education of the public. However, staff initiated various one-time and on-going outreach efforts in addition to implementing some education related infrastructure changes as part of the Voice and Sight Tag program.

Two major outreach and educational components of the Voice and Sight Tag program were the Voice and Sight Tag video and the "Tag Wag". As described earlier, the Voice and Sight Tag video is a 15-minute, educational video that reviews the City of Boulder's expectations of guardians who use voice and sight control, the rules regarding dog waste, and general trail etiquette. The goal of the Voice and Sight Tag video is to establish a shared understanding of what voice and sight control means and the expectations of dog guardians who choose to manage their companion animals under voice and sight control.

The Tag Wag was a community outreach event designed to showcase the new Voice and Sight Tag program and provide dog guardians an opportunity to register in the program. Held on Saturday July 22, 2006 from 9 AM to 3 PM in downtown Boulder, the Tag Wag included demonstrations by the Humane Society of Boulder Valley, Guide Dogs for the Blind, Boulder County Sheriff's Department K-9 unit, Front Range Rescue Dogs, and STORM – Scent Trackers of the Rocky Mountains; free dog massages; and sing-alongs with OSMP staff (see Appendix C for a flyer advertising the Tag Wag). OSMP staff were available throughout the day to explain the new program and assist dog guardians with online and paper registration. During the event and 30 days immediately

following the Tag Wag, more participants (approximately 4,500 individuals) registered in the program than any other 30-day period to date.

In addition to specific Voice and Sight Tag outreach and education, voice and sight control was often the focus of many on-going outreach and educational efforts. OSMP's on-going outreach efforts include trailhead outreach, in which an outreach specialist staffs a small table at the most popular trailheads during busy times of day providing information and communicating specific messages to OSMP visitors. In addition OSMP also staffed outreach booths at the Boulder Farmers' Market and various Boulder community festivals such as Creek Fest. Finally, the Voice and Sight Tag program was a focus of conversation at OSMP "visitor centers" (i.e. the Ranger Cottage and Flagstaff Summit Visitor Center). Education and Outreach Coordinator, Steve Mertz (personal communication), estimates that, in 2005 and 2006, voice and sight control was the focus of approximately 70% of these on-going outreach efforts.

Efforts to educate visitors about the Voice and Sight Tag program and voice and sight control were not limited to educational or outreach programs or contacts. As part of the effort to increase awareness of and compliance with voice and sight rules, OSMP increased the number of signs and sign structures on OSMP-managed lands. OSMP placed approximately 50 "dog stations" at major access locations that are popular with dog walkers. A "dog station" consists of four 4-inch x 4-inch posts bolted together (Figure 9). Signs conveying dog-specific rules are posted on dog stations. Dog stations also have brochure holders that are typically stocked with the Voice and Sight Tag program brochures (Appendix D) and maps showing dog-specific regulations in the area. Additionally, dog stations have bag dispensers (the bags are used by visitors to collect dog excrement) attached to them. OSMP designed dog stations to serve as "one-stop" locations for obtaining dog-related information. Each dog station cost approximately $225-$250 to construct and install for a total cost of approximately $11,250 to $12,500 for all 50 stations.

Figure 9: Dog station

OSMP's staff created the Voice and Sight Tag program brochure to convey information to visitors regarding voice and sight control using yet another medium, (Appendix D). The brochure describes voice and sight control and outlines the Voice and Sight Tag program. It also answers some frequently asked questions about the Voice and Sight Tag program. To increase the reach of the brochure, OSMP printed versions in English and Spanish. To date, OSMP has printed and distributed 50,000 brochures at a cost of approximately $10,000 (Lauri Weaver, Estey Printing Company, personal communication).

OSMP extended outreach efforts to the internet as well, creating the Voice and Sight Tag Program web page (www.bouldercolorado.gov/index.php?option=com_content&task=view&id=5562&Itemid=411) The page includes information on the program as well as links to the Voice and Sight Tag video and online registration for the program. The Voice and Sight Tag program web page is one of the most popular pages on OSMP's web site, and consistently ranks as one of the top ten pages viewed on the OSMP web site.

One way to measure the outreach and educational efforts is to consider the number of hours staff spent on the project. In 2006, the year OSMP launched the program to the public, OSMP Education and Outreach Specialists logged over 2,000 hours in outreach efforts associated with the Voice and Sight Tag program. These hours largely reflect time spent directly on Voice and Sight Tag outreach, such as planning for and holding the Tag Wag. Similarly, OSMP's Ranger/Naturalists focused over 3,000 hours of their time in 2006 on the Voice and Sight Tag program, with most of their time spent making educational contacts with visitors on OSMP-managed lands immediately following formal implementation of the Voice and Sight Tag program. Over 50 individual staff members devoted at least some time to the development and implementation of the Tag Program. In total, OSMP staff spent nearly 7,500 hours on tasks directly related to the Voice and Sight Tag program in 2006, making it the most labor intensive project of the year. By comparison, in 2006, staff spent approximately 6,300 hours on trail maintenance, 5,200 hours on development of the Eldorado Mountain Dowdy Draw Trail Study Area Plan, and 1,500 hours on development and implementation of the Off-trail Permit Program. Collectively, these data suggest OSMP may have achieved the program objective of increasing outreach to and education of the public with respect to voice and sight control.

5.1.4 Objective 4: Decrease conflict involving dogs on OSMP properties

The observational monitoring results suggest the Voice and Sight Tag program was not effective in achieving this objective. We observed an initial decline in the incidence of dog-related conflict in 2007 following implementation of the Voice and Sight Tag program. However, in 2010, the incidence of dog-related conflict had returned to the pre-Voice and Sight Tag program level.

5.1.5 Summary of program effectiveness in achieving its objectives

In summary, the available evidence suggests that the Voice and Sight Tag program improved visitors understanding of voice and sight control (Objective 1) and enabled OSMP to increase its outreach to and education of the public with respect to voice and sight control (Objective 3). The program failed to decrease conflict involving dogs on OSMP properties (Objective 4) and achieved mixed results with respect to improving visitors' compliance with dog control rules (Objective 2).

5.2 Meeting established standards

OSMP's Visitor Master Plan (VMP) (OSMP 2005) contains two standards that are relevant to the visitor behavior observed during this study. Under the Resource Protection Initiative, the VMP proposes a standard of at least 90% compliance with dog control requirements. Similarly, the VMP proposes a standard of at least 90% of off-leash dogs "participating" in the Voice and Sight Tag program under the User Conflict Reduction Initiative. The available data suggest dog

guardians are not meeting either standard. Staff only observed compliance with **four *specific components*** of the voice and sight rule rather than compliance with the rule in its entirety. Monitoring results indicated that an estimated 95% of visitor parties complied with the requirement to keep dogs within their vision and an estimated 93% of the dog guardians surveyed had a leash with them. However, compliance with the other two components measured (whether the visitor party was attempting to manage more than two dogs off-leash per guardian using voice and sight control and whether all dogs in the visitor party responded appropriately to the guardian's commands) was well below the 90% standard (2010 estimates were 40% and 56% in 2010 respectively). With respect to the participation in the Tag program, the 2010 estimated percentage of participation (86%) was below the 90% standard proposed in the VMP.

The VMP does not propose a standard for compliance with dog excrement removal rules. However, a survey of OSMP visitors suggests visitors have very low to no tolerance for non-compliance with dog excrement removal rules. Only 9% of respondents in a 2006 survey indicated that it wasn't a problem to them if dog owners did not pick up after their dog(s). Conversely, 57% of respondents labeled owners no picking up after their dog an "extreme problem" (Vaske and Donnelly 2007a, 2007b). These data suggest the excrement removal compliance rate observed in this study of 46%-63% likely does not meet the typical OSMP visitor's personal norms regarding excrement removal.

5.3 Barriers to compliance with Voice and Sight rules

The data collected over the past several years and described above indicate that, while there has been some improvement in compliance with voice and sight rules, compliance does not meet the standards established in the VMP. In order to improve compliance with voice and sight rules, OSMP could work to understand what barriers to compliance exist for some dog guardians. Once the barriers to compliance are understood, OSMP, working together with dog guardians and the community, can develop and implement management strategies that remove these barriers.

The scientific literature examining human dimensions of natural resources has highlighted some of the barriers visitors face in trying to comply with park rules and suggestion management actions to remove the barriers. Several researchers have proposed frameworks to classify reasons why visitors engage in depreciative behavior such as failing to remove their dog's excrement (Widner-Ward and Roggenbuck 2003) or violating park rules (Gramann and Vander Stoepp 1986, Nesbitt 2006). These researchers then offer management strategies to address the specific reasons for non-compliance. Other researchers have categorized the actions themselves rather than the reasons behind the action in an effort to explain visitor behavior and propose management strategies to change the behavior if it is unacceptable (Hendee and Dawson 2002). In trying to understand possible barriers to compliance with the voice and sight rules, it may be most useful to draw from a framework developed by Stern (2000).

Stern's framework identifies four causal factors or variables that influence behavior. Stern applies this framework to understanding why people engage or do not engage in environmentally significant behavior, which may include behaviors such as compliance with rules and regulations. However, the variables Stern identifies are broad in nature and could help explain why people engage in any type of behavior. Stern's four variables are:

1. ***Personal capabilities***: A person's ability to perform the action or behavior
2. ***Contextual factors***: Factors, such as regulations or enforcement of those regulations, which may be operating in the environment or background while a person is performing an action or behavior.
3. ***Attitudinal factors***: A person's beliefs and attitudes about a behavior or action as well as any personal norms related to the behavior.
4. ***Habit and routine***: A person's standard operating procedure with respect to an action or behavior as well as his or her past history performing or not performing the specific behavior.

Each of Stern's variables likely plays a role in influencing a dog guardian's compliance with voice and sight rules.

5.3.1 Personal capabilities

Stern defines personal capabilities as a person's ability to perform the action or behavior, which in this case is compliance with voice and sight rules. A significant amount of personal skill and attention is required of dog guardians to manage their dogs using voice control. Similarly, the dogs themselves must possess a certain level of skill to successfully respond to guardian commands. During the observation period, staff observed some dog guardians who exhibited a strong ability to manage their dogs using both voice control and non-verbal hand signals. However, some dog guardians did not exhibit the same skills. In 2010, 70% of the dog guardians who failed to comply with voice and sight rules while within in the observation zone failed, at least in part, because they did not successfully use voice control to manage their dog. This observation suggests that some dog guardians may not have the personal skills necessary to comply with voice and sight rules. [12]

In contrast, no specialized skill is required to comply with some of the other components of the voice and sight rules. Nearly all dog guardians are physically capable of keeping their dogs within view, managing only two off-leash dogs at a given time, and having a leash available for each dog they are managing under voice and sight. Guardians who fail to comply with these components of voice and sight likely do so for reasons other than a lack of personal capabilities.

5.3.2 Contextual factors

Contextual factors that may be relevant to shaping dog guardian behavior with respect to voice and sight are the presence of OSMP rangers, the cost of fines[13] associated with violations of voice and sight rules, and social norms held by dog guardians and other visitors. The presence of these factors may encourage compliance with voice and sight rules; however, the absence of these factors may serve as a barrier to improving compliance with voice and sight rules.

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[12] We do not know why the dog guardians did not succeed in calling their dog. It is possible that some dog guardians have greater skill than was represented by their actions in the observation zone.

[13] For most dog-related violations of the Boulder Revised Code 1981, only municipal judges, not OSMP, may set "fines" associated with the violation. When an OSMP ranger issues a summons (to appear in court) for most dog-related violations of the B.R.C. 1981, the summons has a bond associated with it. If the violation is minor, the person receiving the violation may resolve the issue by mailing the amount of the bond to the municipal court. In that sense, the bond amount may be considered a "fine" by most visitors and it is in this sense that the term fine is used here.

Although there is no data to estimate how often visitors encounter an OSMP ranger, the odds of a visitor party encountering a ranger on a given visit are small. There are few rangers on patrol relative to the number of acres managed by OSMP. In addition there are few rangers relative to the number of visitors on OSMP-managed lands. OSMP currently employs 14 full-time rangers. Approximately half of these rangers work during the first part of the week and half cover the second part of the week. Consequently, on a typical day, there may be only five or six OSMP rangers on duty. These five or six rangers are responsible for patrolling the approximately 43,000 acres of non-contiguous land. In addition, OSMP rangers assist with resource protection, respond to emergencies, and lead educational efforts, further minimizing their available time to conduct standard patrols and reducing the likelihood that visitors encounter a ranger on a given visit. This reduced likelihood of encountering a ranger could weaken any external pressure dog guardians may feel to comply with voice and sight rules.

Similarly, existing fines may not be large enough to effect compliance. The maximum fine established in the B.R.C. 1981 for violating Section 6-1-16 Dogs Running at Large Prohibited is $50 when it is a first offense and the infraction occurs on park land or open space. The fine increases to $100 for a second offense within 24 months. Given the general affluence of the Boulder community (U.S. Census Bureau 2011)[14], it is reasonable to question whether a $50 fine is a strong external factor encouraging compliance with voice and sight rules.

Social norms are a third external factor that could influence dog guardian behavior with respect to compliance with voice and sight rules. A norm is an evaluative standard that describes how a person ***ought*** to behave (Donnelly et al. 2000); a social norm is a social standard held by a group of people, such as dog guardians or visitors to OSMP, that describes expected behavior under specific conditions. The Voice and Sight Tag program itself attempts to establish a social norm around how dog guardians and their companion animals ought to behave on OSMP-managed lands. OSMP provides a visual demonstration of this norm with the Voice and Sight Tag video.

This study did not identify social norms among dog guardians who visit OSMP with dogs or evaluate the strength of these social norms. It is possible, however, that dog guardians may ***not*** believe they should maintain the level of control shown in the Voice and Sight Tag video. Dog guardians' standard for expected behavior may be more lenient than the level of control shown in video. If this is true, this social norm would be a barrier to compliance with voice and sight tag rules.

Alternatively, OSMP may have been successful in establishing a social norm proposed in the video, but the norm may simply lack strength. Heywood (2002) suggests the strength of a norm is a function of the obligation to comply with the norm and intensity of any sanctions that occur when the norm is violated. Both are positive relationships; the more strongly obliged a visitor feels to behave in a certain way and/or the higher the intensity of the sanction, the stronger the norm. In his work, Heywood found the norm against littering was strong because visitors felt a strong obligation to dispose of waste properly and would feel ashamed, guilty and/or embarrassed if they did not do so. Shame, guilt and embarrassment are internal, or self-imposed, sanctions. Conversely, cyclists in Heywood's study felt obligated to warn other visitors when

[14] The U.S. Census Bureau reports the median family income from 2005-2009 in Boulder, Colorado is $92,413 while the median family income from 2005-2009 in the U.S. is $62,363. Both figures are 2009-inflated adjusted.

they passed, but they did not feel guilty if they didn't warn upon passing (i.e. they lacked an internal sanction). As a result, the norm to warn other visitors that a faster moving cyclist is approaching visitors from behind is a weaker social norm compared to littering.

With respect to voice and sight control, dog guardians may feel obliged to control their dogs, but maybe not to the level of control demonstrated in the video. Additionally, dog guardians may not feel guilty or ashamed if they don't achieve the level of control shown in the video. This lack of obligation and internal sanctions would lead to a weaker, or possibly, ineffective norm. The low probability of encountering an OSMP ranger on a given visit and the relatively low cost of fines for failing to comply with voice and sight rules, both of which are external sanctions, may further reduce the strength of the social norm OSMP hoped to establish.

5.3.3 Attitudinal factors

Closely related to social norms described above as contextual factors are attitudinal factors. Attitudinal factors, which include a person's beliefs and attitudes about a behavior or action as well as any personal norms related to the behavior, can play a significant role in shaping visitor behavior (Marion et al. 2008). In fact, in the absence of strong contextual factors, such as enforcement or steep fines, attitudinal factors are largely responsible for determining visitor behavior (Stern 2000, Williams et al. 2009). Given this, dog guardians' beliefs and attitudes derived from those beliefs should not be overlooked as potential barriers to compliance with the rules.

Understanding visitors' beliefs, attitudes, and norms and the role these play in shaping visitor behavior has been the subject of extensive research in the human dimensions of natural resources literature. For example, various researchers have explored visitors' attitudes and beliefs behind the reasons visitors travel off-trail in park settings (Hockett et al. 2010, Park et al. 2009). Others have focused on the role visitor attitudes and beliefs play in complying with leash laws on parkland (Nesbitt 2006, Williams et al. 2009). Marion et al. (2008) recently examined attitudes and beliefs behind feeding wildlife in parks where such behavior is prohibited.

Because of its focus on the role of dog guardians' attitudes and beliefs in influencing compliance with dog regulations, the works of Nesbitt (2006) and Williams et al. (2009) may help shed some light on how specific attitudes and beliefs, ***if*** held by dog guardians visiting OSMP, may shape compliance with voice and sight rules. For example, Williams and others found that dog owners felt less obliged to comply with the leash laws when the owners believed strongly in the benefits of off-leash exercise for their dogs. If some dog guardians visiting OSMP believe the benefits of off-leash recreation outweigh the benefits of maintaining OSMP's recommended level of dog control, their belief may reduce their willingness to exert control over the dogs. Conversely, Williams and others noted dog owners were more likely to feel obliged to leash their dogs if they felt their own dog could negatively impact other visitors or wildlife. If dog guardians visiting OSMP believe their dog could be viewed as threatening or scary, guardians may be more likely to ask other visitors if their dog may approach them, an expectation stated in the Voice and Sight Tag video.

In his work at William B. Umstead Park in North Carolina, Nesbitt (2006) concluded that the most significant motivation influencing park visitors to allow their dogs off-leash despite posted

leash laws was a perceived justification for why the leash law did not apply to them, in general or under specific conditions. Applying this to voice and sight control on OSMP, some dog guardians ***may*** believe they should not be required to be able to have their dog respond immediately upon command. They may believe it is acceptable if their dog responds to their commands ***most*** of the time, given the amount of training that could be required to achieve the level of control shown in the Voice and Sight Tag video and the numerous distractions that vie for their dog's attention on OSMP.

The monitoring described in this document did not include an examination of dog guardians' attitudes or beliefs making it impossible to know whether dog guardians' attitudes and beliefs serve as a barrier to or help encourage compliance with voice and sight rules. It is likely that some beliefs and attitudes held by dog guardians visiting OSMP encourage compliance while others may discourage it. Further exploration of dog guardians' attitudes or beliefs about voice and sight control may provide insight into effective outreach messages and/or management strategies that could be employed to improve voice and sight control.

5.3.4 Habit and routine

Personal habitats and/or routines of dog guardians can also serve as a barrier to compliance with voice and sight rules. Dog guardians who walk their dogs on OSMP are frequent visitors to OSMP; about two-thirds of dog guardians who choose to walk their dogs on OSMP do so at least once a week or more. As regular visitors, dog guardians likely have well-developed habits associated with the level of control they exert over their off-leash dogs. In some cases, the level of control that dog guardians are in the habit of exerting may not fall short of the level of control demonstrated in the Voice and Sight Tag video. If the dog guardian does not perceive a problem with their routine way of controlling their dog, changing the habit is extremely difficult (Hendee and Dawson 2002). Even if the dog guardian believes she should exert the control demonstrated in the video, changing a habit is difficult and can serve as a significant barrier to compliance with voice and sight rules.

5.4 Barriers to compliance with dog excrement removal rules

While it is unlikely the typical dog guardian visiting OSMP lacks the skills necessary to comply with the dog excrement removal rules, each of the other variables Stern (2000) identifies may play a role in influencing dog guardian behavior with respect to excrement removal. For example, the extremely small likelihood of an OSMP ranger observing a dog guardian failing to comply with the excrement removal rules may not be sufficient external pressure to influence a dog guardian to comply with the rules. Similarly, some dog guardians may simply not be in the habit of picking up after their dog.

Among the four variables Stern outlines as influencing behavior, dog guardians' attitudes or beliefs likely have the most influence on whether the guardian will comply with the excrement removal rules. Guardians who view excrement as a "natural" part of the environment may not understand some of the reasons for the excrement removal rules and therefore lack the motivation to remove excrement. The numerous and highly visible colored bags lining some trails may suggest to uninformed dog guardians that leaving excrement filled bags is acceptable or at least justifiable since "everyone is doing it". Conversely, many dog guardians visiting

OSMP likely hold very strong attitudes and beliefs that influence them to comply with the excrement removal rules and encourage other visitors to do the same.

6.0 RECOMMENDATIONS

Stern (2000) notes that, to achieve a change in behavior, management strategies must be multi-pronged, addressing each of the four casual factors described above (personal capabilities, contextual factors, attitudinal factors, and habit/routine). In the case of compliance with voice and sight rules, different dog guardians likely face different barriers to compliance and some dog guardians may face several barriers simultaneously. Therefore, using a multi-prong management approach, including the actions below, is recommended to improve compliance with voice and sight rules on OSMP-managed lands.

6.1 Verify and/or increase dog guardians' and their dogs' voice control skills

Any effort to increase compliance with voice and sight rules should include a strategy to increase some dog guardians' and their dogs' skill at using voice control. When attempting to use voice control to manage their dog, only 55-65% of the visitor parties were successful in each of the study years. In 2010, over 70% of the visitor parties that failed to comply with voice and sight rules did so because the guardians' were not successful in using voice control. These observations suggest that some dog guardians and their dogs may not have the skills necessary to comply with voice and sight rules. If this is true, increasing guardians' and their dogs' skill in using voice control should improve compliance with voice and sight rules.

Currently, the Voice and Sight Tag program requires dog guardians to confirm via a check box during registration that they have sufficient skill to use voice control as described in the video to properly manage their dogs. Increasing compliance with voice and sight rules may require a means of ***ensuring*** that dog guardians can manage their dog. Several options include: requiring dog guardians to take (and pass) a specific dog obedience class or requiring dog guardians to demonstrate their skills before issuing a voice and sight tag. While the idea of testing and/or certifying dog guardians' ability to use voice control may not appeal to all OSMP visitors, the majority of Boulder residents (65%) believe testing and certifying dog obedience before dogs are allowed under voice and sight control is a somewhat or very appropriate management strategy on OSMP (National Research Center 2010). The percentage of Boulder residents voicing this opinion has grown from 60% in 2004 (Public Information Corporation 2004).

In support of increasing both dog guardians' and their dogs' voice control skills, OSMP could sponsor specific dog training classes aimed at promoting control skills that could improve voice and sight control. Training sessions could be organized by OSMP as part of the department's outreach and education efforts working in conjunction with experienced dog trainers to teach and relate common control challenges and possible training techniques to improve control.

6.2 Increase external sanctions for failing to comply with voice and sight and excrement removal rules

Strong external sanctions can influence a person to change his or her behavior regardless of a person's beliefs about that behavior (Stern 2000). To strengthen external sanctions, OSMP should increase enforcement of the existing voice and sight rules, if possible. Some OSMP visitors and Boulder residents have voiced support for increased enforcement of existing rules in

various surveys. Another way to increase external pressure would be to change the fine structure outlined in the B.R.C. 1981. Increasing the fine would provide a stronger external pressure to comply with voice and sight rules. The temporary or even permanent loss of voice and sight privileges after two violations or possibly even after a single violation of voice and sight requirements would be a third way of increasing sanctions. While direct management strategies such as increasing enforcement and/or raising fine limits is not typically favored by park visitors, they are the only strategies that are successful for visitors with certain beliefs and attitudes (Hendee and Dawson 2002, Marion and Reid 2007).

Another, perhaps more palatable, way to increase external pressure would be to reinforce the social norm that OSMP hoped to establish with the Voice and Sight Tag program. OSMP could explore the development of a program in which well trained dogs provide a "live demonstration" of how dogs and their guardians ought to behave. Having more visitors modeling desired behavior may influence those dog guardians who do not meet the City's dog management expectations to change their behavior.

Strengthening the external sanctions for failure to remove dog excrement by increasing enforcement and/or fines might also result in improved compliance with excrement removal rules.

6.3 Understand dog guardians' underlying beliefs and attitudes about off-leash recreation, voice and sight control, and excrement removal

Because visitor behavior is at least partially driven by attitudes and beliefs (Marion et al. 2008), understanding these beliefs is a necessary precursor to any successful attempt at changing or influencing visitor behavior. OSMP could establish an understanding of dog guardian's attitudes and beliefs about off-leash recreation, voice and sight control, and excrement removal by convening focus groups, conducting interviews, or administering surveys to dog guardians. Information learned during the interviews or surveys could be used to design targeted education and information programs, or other management strategies when education and information programs are not appropriate.

7.0 SUMMARY

OSMP launched the Voice and Sight Tag program in the summer of 2006. The program's goal is to increase compliance with existing voice and sight rules and decrease dog-related conflict on OSMP-managed lands. By the end of the summer of 2010, over 25,000 participants had registered in the program and most (86%) off-leash dogs on OSMP-managed lands had the program's green tag visibly displayed. Monitoring conducted before, immediately after, and almost four years after the program's launch indicated that the program achieved some but not all of the program's objectives. OSMP had increased its outreach to visitors regarding voice and sight control and some visitors report improved understanding of the voice and sight rules because of the program. OSMP also observed an increase in compliance with some but not all components of the voice and sight rules. In contrast, although OSMP noted an initial decrease in dog-related conflict following implementation of the Tag program, dog-related conflict rates had returned to pre-program levels by 2010. Additionally, OSMP did not detect any increase in dog guardians' success in using voice control following implementation of the program.

Although it was not one of the objectives of the Voice and Sight Tag program, OSMP also measured compliance with dog excrement removal rules. Compliance with these rules was generally poor with 46% to 63% of the visitor parties complying with the rules.

Barriers that dog guardians may face when trying to comply with voice and sight rules include limited skills (theirs and/or their dogs), or limited willingness to use their skills, in managing their dog with voice control, weak or no external pressure, personal beliefs or attitudes, and personal habits or routines. Management attempts to improve visitor compliance with voice and sight rules should address these barriers.

Because no specialized skill is needed in order to comply with the excrement removal rules, it is likely that external pressures, personal beliefs or attitudes, and personal habits or routines play a larger role in influencing compliance with the rules. Management attempts to improve visitor compliance with excrement removal rules should address any barriers associated with these factors.

Possible management strategies to improve compliance include testing and/or certifying dog guardians' skill in using voice control, increasing enforcement, raising fines, reinforcing the desired social norm, and understanding dog guardians' beliefs and attitudes about voice and sight control and off-leash dog recreation learned via focus groups, interviews, and/or surveys to better target information and education programs or other management strategies.

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Appendix A

Voice and Sight Tag Program

Observation Data Sheet

Voice and Sight Video and Tag Project Monitoring Data Sheet (Component 2 - Observational study)

Date (mm/dd/yy):

Weather:

Time (24-hour):

Location:

Observer:

Obs. #	Visitor data						Presence/absence of listed behaviors involving dogs			Off trail use				Voice and Sight Compliance				Excrement				
	People (0-n)	Dogs (0-n)	# Leashed thru entire area (0-n)	Unleashed dogs with tag (0-n)	Unleashed dogs no tag (0-n)	Unleashed dogs unsure (0-n)	Opport for interaction (Y/N)	Other(s) present	Behavior observed	People off trail (0-n)	Leashed dog off trail (0-n)	Unleashed dog off trail (0-n)	Party on social trail (Y/N)	Out of sight (0-n)	Response to call		More than two dogs off leash (Y/N)	Poop (# of times, 0-n)	Picked up	Did not pick up	Took bag	Left bag
															Obeys (0-n)	Does not obey (0-n)						

Notes:

Behavior Codes

No listed behavior observed

0. No listed behavior observed

No physical contact by dog

1. Flushing or fleeing wildlife (requires 2 of the 4 modifiers)
    a. Dog is leashed
    b. Dog is unleashed
    c. Dog is within 10' of trail
    d. Dog is more than 10' from the edge of the trail
2. Chasing
    a. Dog on dog (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
    b. Wildlife
    c. Livestock
    d. Person other than member of party (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
3. Repeated barking (If possible notes should describe why the dog is barking)

Physical contact by dog

5. Physical contact NOT initiated by a visitor and not resulting in injury (requires at least 1 modifier) (Notes should describe the interaction.)
    a. Jumping on
    b. Licking
    c. Pawing
    d. Sniffing
    e. Other
6. Physical contact resulting in injury (requires at least 1 modifier)
    a. Person,
    b. Another dog,
    c. Wildlife
    d. Livestock

Incidents of the following behaviors by dog guardians or other visitors

7. Repeatedly calling the dog (more than two times)
8. Yelling/verbal confrontation
9. Kicking, hitting or "macing" of dogs by humans

Other

10. Other (Notes should describe the interaction/situation)

Appendix B

Voice and Sight Tag Program

Interview Data Sheet

Voice and Sight Tag Project Monitoring Data Sheet (Interview)

Date (mm/dd/yy): _____

Time (24-hour): _____

Location: _____

Observer: _____

Weather: _____

_____

Dog Walkers/Hikers

Total # of dog walking parties: _____

# of parties with leash visible for each dog: _____

If leash is not visible:

# of parties that had leashes _____

# of parties that didn't have leashes _____

# of parties that refuse to show leash _____

Runners/Cyclists

Total number of parties not able to stop _____

# of parties with leash visible for each dog _____

# of parties with leash NOT visible for each dog _____

Notes:

Appendix C

Voice and Sight Tag Program

Tag Wag Flyer

The Voice & Sight Tag Program has been designed by the City of Boulder to help dog guardians better understand Voice & Sight control standards. Understanding and meeting these standards will help reduce conflicts that occur between dogs, visitors and wildlife. Having dogs off-leash under Voice & Sight Control is a privilege earned through patient and consistent training.

To participate in this program, dog guardians must:

1. Watch the Voice & Sight Control video;
2. Register with City of Boulder Open Space & Mountain Parks and purchase tags;
3. Display Voice & Sight tags on dogs under Voice & Sight Control

Thank you for coming to the Tag Wag. We are proud to work with everyone **to help make** our Open Spaces and Mountain Parks special, safe and fun!

Tips of the Tail for a Great Tag Wag

- All dogs must be leashed.
- Dogs displaying aggression towards people or animals will be asked to leave the event.
- Dog guardians must pick up after their pets.
- Please leave puppies under 6 months old at home.
- Have a waggity good time!

Schedule of Events

9:00
Guide Dogs for the Blind
Ruff Flyball Demonstration

9:30
STORM -- Scent Trackers of the Rockies

10:00
Dog Songs & Howl-a-longs!
Ruff Flyball Demonstration

10:30
Humane Society Training Demonstration

11:00
Ruff Flyball Demonstration

11:30
Dog & Guardian Look-a-like Contest

12:00
Boulder County Sheriff's K-9
Ruff Flyball Demonstration

12:30
Boulder County Sheriff's K-9
Ruff Flyball Demonstration

1:00
Front Range Rescue Dogs

1:30
Tail Wagging Contest

And don't miss the tail wagging contest!

Other fun events include:
Meeting Coyote Bob and Ranger Paula
The OSMP Voice and Sight Video!
Free and Fun Canine Caricatures
All Day Dog Free Massages

Appendix D

Voice and Sight Tag Program

Program Brochure

Is the tag a "license" or unique to a specific dog?

The tag signifies that the dog guardian has registered and is participating in the program. The tag is not specific to a dog.

Do I have to renew my registration at some point?

No.

What if I change my mind and no longer want to be registered?

Dog guardians who no longer wish to participate in the program may call OSMP at **(303) 441-3440** to have their registration discontinued.

How can I find out more about the program?

Dog guardians can learn more about the Voice and Sight Dog Tag program by visiting our website at **www.osmp.org** or calling **(303) 441-3440**.

For information visit:
www.osmp.org
or call
(303) 441-3440
or write
Open Space & Mountain Parks
P.O. Box 791
Boulder, CO 80306

January, 2006-??M

Voice and Sight Dog Tag Program

City of Boulder

ENJOY. PROTECT.

Properly trained, a man can be dog's best friend.

— Corey Ford

City of Boulder Voice and Sight Dog Tag Program

The city of Boulder is one of only a few systems on the Colorado Front Range which allow dog guardians to walk dogs off-leash. This opportunity is possible only if dogs are not required to be on-leash and are responsibly controlled under voice and sight control. It is a tough standard for both dogs and guardians.

A new Voice and Sight Dog Tag Program has been designed by the city of Boulder to help dog guardians understand voice and sight control standards and to reduce conflicts which can occur with visitors, other dogs and wildlife.

What is voice and sight control?

Voice and sight control means the dogs you are responsible for must be within your sight and under your verbal command at all times, regardless of distractions which can occur during a walk. If your dog cannot immediately obey verbal command, your dog must remain on-leash. Also, keep in mind that dogs under voice and sight control are not allowed to charge, chase or display aggression towards other people or dogs or chase, harass, or disturb wildlife and livestock.

What is the Dog Tag program?

The new city of Boulder Voice and Sight Dog Tag program requires dog guardians to watch a video about voice and sight control, register with OSMP and display a special program tag on dogs they wish to walk off-leash. This program only applies to City of Boulder properties where voice and sight control is allowed.

Is this a requirement or just a request?

It is the law. Participation in the program is a new requirement of voice and sight control as stated in city ordinance Boulder Revised Code (BRC) 6-1-16 and 6-13-2 through 6-13-5. Dog guardians may review these ordinances by visiting the OSMP website at **www.osmp.org** or the City of Boulder website at **www.ci.boulder.co.us**. Violations include not registering for the program and/or having a dog under voice and sight control without displaying a tag.

How do I participate in the program?

For your convenience, the City of Boulder is offering several methods of registration, including registration through our website or visiting the OSMP administrative offices in person.

STEP 1.
The city of Boulder has produced a video which illustrates the requirements of voice and sight control and realistic, enforceable dog management behaviors.
The short, instructional video can be viewed on the OSMP website, www.osmp.org, on Channel 8, or by acquiring a copy of the video on DVD.

Watching the video is a required step in the registration process. After watching the video, dog guardians are expected to know the regulation and understand how it applies to managing dogs using voice and sight control.

Before registering for the program, you will be asked to affirm that you watched the video and agree to control your dogs off-leash under voice and sight control in the manner described in the video.

STEP 2.
Dog guardians can either register for the program on-line or by visiting the OSMP Administration building at 66 South Cherryvale Road. You and every member of your household who wishes to walk your dogs under voice and sight control must register for the program.

STEP 3.
After you and other members of your household have seen the video and registered in the program, you may purchase the voice and sight dog tag in a couple of ways. You may purchase tags through the OSMP website with your credit card. The OSMP staff will process your order the next business day (please allow 3-5 business days for arrival). You may also come to the OSMP Administration building at 66 South Cherryvale Road to purchase your tags with check, cash or credit card and you will be issued the tags upon payment.

STEP 4.
Ensure that voice and sight program tags are displayed on all dogs when using voice and sight control on City of Boulder lands where voice and sight control is allowed.

Frequently Asked Questions about the Voice and Sight Dog Tag Program

Does everyone in the family or household have to register?

Yes. Every member of the family who wishes to walk a dog under voice and sight control must register in the program. The first registrant must be an adult (over 18). Minors may register as part of the same household. Each participant must watch the instructional video and agree to manage off-leash dogs under voice and sight control on City of Boulder lands where voice and sight control is permitted. There is no extra charge for registering additional members of the household.

What if I don't agree to register and get a dog tag?

If a dog guardian chooses not to register with the voice and sight tag program and display voice and sight dog tags, dogs must be kept on-leash at all times.

Am I protected from getting a ticket if my dog has a voice and sight dog tag?

No. A dog guardian who participates in the program and walks a dog under voice and sight control in areas where it is allowed may still be issued for any violation of the following standards:

- The dog guardian is walking more than two dogs under voice and sight control;
- The dog guardian is not carrying a leash for each dog being walked under voice and sight control;
- The dog guardian fails to display voice and sight tag on dog;
- The dog is not within the guardian's sight and under voice control at all times;
- The dog does not come to and stay with the guardian immediately upon command;
- The dog charges, chases or otherwise displays aggression towards any person, or behaves in a way that any reasonable person may find harassing or disturbing;
- The dog charges, chases or otherwise displays aggression towards any dog;
- The dog chases, harasses or disturbs wildlife or livestock.

What are the penalties?

The maximum penalty for a first violation is a fine of $50. For a second violation within 24 months the maximum penalty is a fine of $100. A third violation within the same 24 months will result in a fine of not less than $200 and revocation of the privilege to use voice and sight control.

When is revocation of voice and sight privileges possible?

When an individual has three convictions of Boulder Revised Code (BRC) 6-1-16, "Dogs Running at Large Prohibited" on city OSMP or Parks and Recreation lands within 24 months based on the date of the first violation revocation will occur. Violations of voice and sight control and dogs off-leash in leash only areas are violations of BRC 6-1-16.

Can I get back the privilege to use voice and sight control?

Voice and sight control privileges may be reinstated if the dog guardian proves attendance at a city of Boulder certified training on voice and sight control, and written proof of successful completion of a voice and sight control certification course approved by the City of Boulder. Dog guardians must pay a reinstatement fee of $50 plus the $15 registration fee, as well as the cost of attending the certification program. Dog guardians must also again agree to control any dog accompanying the guardian without a leash in a manner described in the voice and sight video.

In what areas does voice and sight control apply?

The new city of Boulder voice and sight tag program only applies on city Parks and Recreation and OSMP lands which do not require dogs to be on-leash. Dogs are required to be on-leash inside Boulder city limits, unless they have been specified to allow voice and sight control. Voice and sight control requirements also apply to Howard Heuston Dog Park.

What if I need to add someone to my household registry?

Dog guardians who wish to add members of the household to the dog tag program must come in person to the OSMP administration building at 66 South Cherryvale Road.

Does everyone in the household have to watch the video?

Yes. Everyone who wishes to walk the dog under voice and sight control must see the video and agree to the terms and conditions of the voice and sight control requirements. Members of the household who do not walk the dog or choose to walk the dog on-leash do not need to see the video and register as part of the household.

What if I lose a tag or need more?

Dog guardians can come in person to the OSMP administration building at 66 South Cherryvale Road to buy additional tags. Guardians will not be required to pay the registration fee again but will be charged $5 for each new tag.

Staff recommends that changes to the Tag Program should focus on the objectives where the Tag Program did not achieve its objectives with an emphasis upon the reduction of conflictive behaviors by dogs, and compliance with the requirement that dogs come when called.

OSBT Feedback and Key Issues

The OSBT held a study session on January 11, 2012 to discuss a range of possible enhancements for the Tag Program. OSBT members discussed problems with the Tag Program that they considered most important (Table 9). The OSBT emphasized the need to reduce conflict and improve voice control, but did not identify the rate of Tag Program participation as an important area for improvement. The OSBT's areas for improvement are the basis for the goals and objectives for enhancements to the program.

Table 9: Areas for Tag Program Improvement identified by the Open Space Board of Trustees

Compliance, Safety and Awareness Oriented
➧ City of Boulder spent a significant amount of time and resources on the program and compliance with voice and sight control is not increasing. Lack of compliance with: • excrement removal • keeping dogs on leash where required • voice and sight control requirements
➧ Compliance objectives established in the Visitor Master Plan have not been achieved.
➧ Penalties for noncompliance may not be sufficient or matched to the nature of the violation.
➧ Lack of fairness for people who do control/manage their dogs well when there are guardians with poor control.
➧ There is no proof of vaccination (or license) currently required for all dogs. Identified by City Council as an important change to integrate into the Tag Program.
➧ There is no demonstration of capability or testing that dog guardian and dog have the ability to conform to voice and sight rules.
➧ There is no accountability that guardians have actually watched the video.
➧ Unable to adequately track the individual dogs and guardians actively participating in the Tag Program along with regulation violations.
➧ Improve the ability of Tag Program participant information to be available to staff in the field.
Community Oriented
➧ Improve communication with all OSMP visitors and dog guardians about opportunities and issues.
➧ City Council's interest in the program is reflecting concerns heard from the community.
Long-Term Sustainability
➧ Impact to resources and drawing connections with relevant research and monitoring done by staff.

Table 8: Findings of the Voice and Sight Tag Program Monitoring Project. Row shading indicates an area where the program objectives were not achieved.

Corresponding Objective	Monitoring Finding	Objective Met?
Improve understanding of voice and sight control.	Some visitors reported an improved understanding of the voice and sight rules because of the program[7].	YES
Improve compliance with dog control rules. (90% compliance)	Variable (see components below)	
• Dogs must be in sight	Approximately 86 percent of the visitor parties complied in 2006. This percentage increased to 92 percent in 2007 and 95 percent in 2010.	YES
• Dog must come when called (voice control)	Slightly less than 65 percent were successful[8] in 2006 and 2007. The percentage of visitor parties who were successful dropped to approximately 56 percent in 2010.	NO
• No more than two dogs per guardian under voice and sight control	Prior to the Tag Program, only six percent of the visitor parties with more than two dogs per guardian complied with this requirement. After the Tag Program, the percentage increased to about 40 percent.	YES (however rates of compliance remain below 50%)
• Leash possession requirement	Nearly 93 percent of the observed and/or interviewed dog guardians had a leash for each dog.	YES
Increase OSMP outreach to and education of the public with respect to voice and sight control.	OSMP increased its voice and sight control outreach to visitors[9].	YES
Decrease conflict involving dogs on OSMP properties	There was a statistically significant reduction in the percentage of visitor parties that participated in at least one conflictive behavior immediately after the tag program began. By 2010, the incidence of conflictive behaviors returned to the pre-program level.	NO
Ninety percent of dogs off leash will be participating in the Voice and Sight Tag Program	Most (86%) off leash dogs on OSMP had a green tag visibly displayed.	NO (however rates of compliance are close to VMP standard)

[7] Results derived from the 2010 OSMP Resident Survey.

[8] Visitor parties were considered in compliance with this requirement if the dog(s) responded within ***two*** calls to the "come" or "here" commands or having its/their name(s) called by the guardian.

[9] Results derived from time-tracking records.

Notes on NPS trip to Boulder Open Space & Mt. Parks
Voice and Sight Tag Program
September 12 and 13, 2007

Similarities Between Boulder and GGNRA Dogwalking Situation

- Rapid growth of the Denver Metro area has "irrevocably destroyed habitat and scenic areas along the Front Range", urgently compelling OSMP to consider how to manage what's left.
- Increasing conflicts in parks and resource degradation as population and use increased
    - This led to Visitor Management Plan – one element of which was the Voice and Sight Tag Program
- Open Space and Mountain Parks is the only public land agency on the Front Range that allows extensive off-leash opportunities for dogs.
    - Voice and sight dogwalking had been allowed in some OSMP areas for many years, but had not been regulated – essentially was "off leash" use.
- Proposed leash requirement (in draft Visitor Management Plan) major cause of formation of FIDOS (Friends Interested in Dogs and Open Space)
- Became a political and highly emotional issue
- Dog-related issues:
    - resource impacts by increasing dog use
    - unwanted dog encounters with other visitors
    - insufficient pick-up of dog waste
    - growing levels of conflicts with dogs/guardians, dog-on-dog conflicts, equestrians with dogs.
    - harassment of wildlife by domestic dogs
- Not enough staff to be at all sites at all times
- Decision to include new dogwalking programs (Trailhead leash program, leash restrictions in Habitat Conservation Areas and Voice and Sight Tag Program) in Visitor Master Plan came from recognition of increased number of users, conflicts and resulting tickets.
    - OSMP worked with citizen groups when planning those programs
- FIDOS initially protested those restrictions
    - Dogwalkers, as with virtually every user group in OSMP, identifies the need to protect the resources, but feels its activity has minimal impact on resources.
- "A considerable segment of the public seeks greater opportunities to use OSMP without the conflicts they associate with dogs. Some also feel that the impacts of dogs to environmental resources are unacceptable. These members of the community support additional restrictions on dogs, such as no-dog areas as well as on-trail and dog on-leash requirements. Others do not support additional restrictions, because they prefer the existing conditions, or because they do not believe conditions warrant them." (from Visitor Master Plan)

Applicable Guiding Principles from Boulder Visitor Master Plan

- **Least-Restrictive Management Approach**. Use the least-restrictive means possible to achieve management goals. More restrictive solutions will be incrementally implemented if less restrictive solutions are ineffective.
- **Flexible, Adaptive Management**. Implement an adaptive management approach that: monitors visitor experience, visitor infrastructure, and resource conditions, assesses the effectiveness of management actions, and revises them based on new information gained from research and experience.
- **Resource Protection**: Where recreational activities may, will, or could harm the environment, OSMP shall avoid, minimize, and mitigate impacts. Restricting visitor activities will be a last resort.
- **Protection of Sensitive Areas.** Direct visitor use to appropriate areas and away from sensitive areas. Some uses or levels of visitor use may need to be limited or not allowed, in order to protect natural, agricultural, and cultural resources
- **Designation of Activity Areas.** Designate appropriate areas for specific passive recreational activities and identify areas where specific activities are not appropriate and will be prohibited, in order to protect the quality of visitor experience and preserve and protect resources.
- **Conflict Reduction among Visitor Activities.** Provide education and outreach services, publicize and enforce regulations, and construct infrastructure improvements that reduce conflict among visitors.
- **Targeted Areas for Conflict Reduction.** Target efforts aimed at reducing visitor conflicts to areas with concentrated visitor use or congregation of specific activities that may lead to conflict.
- **Partnerships.** Collaborate and partner with community groups to provide services and infrastructure that support passive recreational activities and use of low-impact techniques.
- **Dogs-on-Leash Requirement. Require dogs to be on-trail and on-leash in Habitat Conservation Areas** to provide a high level of habitat protection and preserve large habitat blocks. This will be the default management strategy. Dogs also may be prohibited within Habitat Conservation Areas.
    - Exceptions will be considered to on-leash requirements in Habitat Conservation Areas to meet special circumstances. These may include seasonal restrictions, on-corridor voice-and-sight dog management, no dogs, and others. The corridor width for on-corridor voice-and-sight control is 20 feet on either side of the designated trail.

Elements of Boulder Dogwalking Program

As Described in the Visitor Master Plan:

"Implement a dog voice-and-sight video education and tag program that would be required for all dog guardians who wish to take advantage of voice-and-sight control privileges. The video will depict realistic and enforceable dog management behaviors to meet the voice-and-sight dog management regulations. Upon completing the video education requirement and agreeing to keep their dogs under control, dog guardians will be issued a highly visible tag that must be worn by all off-leash dogs; without this

evidence dogs would be required to be on-leash. This voice-and sight control tag requirement will be phased in."

- ....Open Space and Mountain Parks would collaboratively determine the standards and work with the Boulder Valley Humane Society, dog trainers, other qualified providers, and others to implement the program.

- **Trailhead Program**
  - First to be instituted
  - Started at 5 busiest trailheads (out of 32)
  - Requires on leash in parking lots and short distance up trail (varies from 100 ft to 100 yards depending on conditions/resources at each site
  - Worked with citizen group for input in planning.
  - Results – less feces left/ better behavior/fewer problems/off trail travel near trailhead declined.

- **Voice and Sight Tag Program**
  - 130 miles of trail/70% voice and site, 20% require leash, 6% voice and site in corridor, 3% leash seasonally, 1% no dogs.
  - Habitat Conservation Areas used to be entirely off leash; now are on leash.
  - Elements of V&S Tag program were agreed to with input of dog community
    - Web based registration (make it easy and easily accessible)
    - Hand-held computers for enforcement staff to provide real time registration information and citation/warning data
    - Development of web site (plus video) and database for hand-helds
  - Initial cost $232k (personnel and non-personnel expenses).
    - program doesn't make money – but might pay off initial costs in a few more years
    - Registration fees are kept to support program
    - Revenue from violations goes to general city fund
    -

<u>Implementation Timeline</u>

- 2005 –
  - April - OSMP Visitor Master Plan is approved by city council. The VMP contains a number of management strategies to reduce dog-related conflict and improve guardian control over their dog(s).
  - August - OSMP asks a number of stakeholders who had previously expressed comments on the dog-related issues in the VMP to form a "Dog Monitoring Group" to provide input on monitoring protocols associated with measuring the effectiveness of any dog management strategies.
  - August-September - OSMP conducts pre-project implementation monitoring for the Trailhead Leash program. Because reducing conflict is one of the objectives of the Trailhead Leash program, OSMP had to define what dog and/or guardian behaviors were conflictive. The Dog Monitoring Group disagreed over which behaviors were conflictive, so OSMP commits to conducting a visitor community survey (at trailheads) to determine what the OSMP visitor community thinks.

  - October - Trailhead Leash regulation is implemented in phased approach: intensive education with trailhead staff contacts, newspaper outreach and brochures followed by enforcement- warnings then summonses.
- 2006
  - March-May - OSMP conducts pre-project implementation monitoring for the Voice and Sight Tag program.
  - Late May - June - OSMP conducts post-project implementation monitoring for the Trailhead Leash program.
  - Spring/early summer - OSMP contracts with CSU to conduct a visitor community survey regarding dog/guardian behaviors committed to in October 2005.
  - August - OSMP rolls out Voice and Sight Tag program in phased approach: intensive education followed by enforcement - warnings then summonses.
- 2007
  - March-May - OSMP conducts post-project implementation monitoring for the Voice and Sight Tag program.
  - Spring - OSMP uses results of CSU survey to better define conflictive behavior and releases Trailhead Leash monitoring report. Dog monitoring group also given opportunity to meet with CSU researchers to discuss their findings and conclusions.
  - Summer - OSMP analyzes results of Voice and Sight Tag program.
- Into the future - OSMP hopes to write report regarding results of Voice and Sight Tag program by end of 2007.

- **Monitoring Program**

From Visitor Master Plan: The proposed adaptive management framework in the Visitor Master Plan is based upon three levels of monitoring:

    - Implementation--"Did we do what we said we were going to do?"
    - Effectiveness--"Did our strategies and actions have the intended effect?"
    - Research--"Did the system respond according to our predictive models?
  - Need to determine to what degree will they allow impacts on resources
  - No triggers established in program for noncompliance
  - Can't measure some things: odors from dog feces and urine, uninvited encounters (no consistency in public response)
  - Pre-implementation surveys
    - conducted to support need for dogwalking restrictions
    - elicited response that some locals had changed their behavior in response to conflicts – had stopped visiting some OSMP areas.
  - Implementation monitoring
    - 2 FTE plus 2 seasonals for 6/7 months for trailhead program monitoring
    - 2 FTE - 3 months prior to implementation of Voice and Sight Tag program

- Invited dog group reps to join staff when they were monitoring for Trailhead Leash program – they did join staff to see how monitoring was conducted and what info they were looking for.
    - During initial discussions on process, dog group stakeholder members (dog reps, humane society, others who represent enviro. and other user groups) questioned what should be considered "conflictive" behavior.
    - 1 year after implementation of the Trailhead Leash program, and just before the Voice and Sight Tag program, OSMP contracted with CSU for community-wide survey about which dog and/or guardian behaviors the larger visitor community considered conflictive.
- Effectiveness monitoring
    - 2 FTE - 3 months following implementation of Voice and Sight Tag program
    - Results showed improvement in compliance in all but excrement reg. – note that results applied only to observation area.
- Prior to each monitoring project (Voice and Sight and Trailhead Leash) and prior to the CSU survey, the Dog Monitoring Group met (at least once - sometimes more often) to discuss monitoring protocol and the survey instrument (in the case of the survey).
    - Some changes were made to both monitoring protocols and survey instrument as a result of feedback from the Dog Monitoring Group.
    - When the survey results came back, the Dog Monitoring Review group members were asked to provide their own interpretation of the results - particularly if they differed from the CSU researchers' interpretations.
    - The Dog Monitoring Group members have also been provided the raw data sets from OSMP's monitoring of the Voice and Sight Tag and Trailhead Leash program's, thus giving them a chance to do their own analysis if they desire and to present their own interpretation of the results. (Most members of the group have not looked at the data, but OSMP wanted to give them the opportunity.)

- **Education/Outreach**

From Visitor Master Plan: Continue focused education efforts to increase compliance with dog management regulations (includes placing informational/regulatory signs at trailheads and along trails, conducting dog management classes (often in collaboration with other agencies), trailhead and trail outreach contacts, and focused dog excrement pick-up education, i.e., "1+1 pick-up" program).

- They didn't invite the dog groups to do education as the one group they did invite wanted to change/control program
- Next step will include asking dogwalking groups to partner on outreach

- **Staff required:** (OSMP total staff -69 FTE – 32,000 acres open to public use)
    - Outreach staff - 2FTE and 15 part time staff dedicated to outreach

- Education staff –4 FTE
- Administrative staff – 1 FTE for registration/data plus additional help during implementation
- Enforcement Staff - 13

How Successful Is It?

- **Tags issued:** approx. 12,000
- **Users registered:** 7,700
  - Only 2 days of the year that no one has registered
- **Compliance Stats:**
  - 11% increase in Voice and Sight behavior violations
    - not sure if this is due to more people moving to area who aren't aware of program or more dogs in park
  - First year results:
    - 168 citations for no tag displayed (default citation)
    - 350 citations for voice and sight violations (compared to 314 the previous year)
- **Monitoring results:**
  - Noticeable improvements in all categories except removal of excrement.

Summary

- **Trailhead Program**
  - Less feces left behind
  - Better behavior by dogwalkers
  - Fewer problems
  - Off trail travel near trailheads has declined
  - Safety in parking areas has improved

- **Voice and Sight Tag**
  - Front end delivery working well (education and registration)
  - Providing data to enforcement staff has not been successful; have defaulted to use of access database on handhelds.
    - Shows only registration info, not LE data
  - Graduated fine not really working – too many are too able to pay.
    - Better solution is revocation of privileges
  - Voice and Sight program works better in more dispersed use areas – e.g. Dry Creek is heavily used by dogwalkers who know each other and don't object to some of the behavior that V&S is trying to eliminate.

Elements of Boulder Program that Can Work at GGNRA

- They believe that increased education has resulted in increased compliance
- Outreach Tables at trailheads, farmers markets, etc.
- "Community will only take a strategy as seriously as the agency takes it"
- From Visitor Master Plan:
  - **Author/Publisher Outreach.** Work with authors and publishers of maps and outdoor recreation guides to ensure OSMP opportunities are

appropriately placed and described. Information and guidance from third parties can play a constructive role in promoting Leave-No-Trace principles and encourage responsible stewardship of Open Space and Mountain Parks lands.

What Doesn't Work at Boulder

- This program isn't the magic wand to solve all dog management problems (violations still exist)
- They didn't anticipate the staff hours/time needed to put program into effect
- Cost of program more than anticipated-may recover costs in a few years if no other changes are made in program
- Problems encountered with technology for officers and still can't solve that problem
- Enforcement still based on complaints for the most part, as they don't have enough enforcement staff

What Would They Do Differently?

- Start with a goal or expectation of what level of response to program would equal success.
- They would recommend the education program and video and probably not move forward with the tag program as designed
    - Only issue is that tag regulation was the hook to get people to view video
    - Perhaps attach video/behavior training to some existing requirement for pets – dog licenses, or ???
- They would have more time to implement – est. 2 years
    - Video took over a year or so to produce
- Build an advertising program into budget
- They would build a small core volunteer program from the beginning
- Extend outreach to more trailheads and cover more hours.
- Graduated fines not particularly helpful; suggest replacing with revocation of privileges.

Partnerships

- Educational outreach on regulations--they can partner with NPS (*WHO CAN?)*
- Bay Area open space/park agencies work together to agree on proper etiquette in parks/open spaces
    - Together fund video/training/outreach to get information to public (dog groups can conduct classes specifically on this type of etiquette or find the right organization to do this and SPCAs/Humane Societys/Dog Rescue Groups
- Video on regulations and dog etiquette—partner organizations can help get out to public through their web sites.

City of Boulder
Open Space and Mountain Parks
Visitor Master Plan Management
February 28, 2006

Monitoring Protocol for the Voice and Sight Dog Tag Program

1.0 Background

The Voice and Sight Dog Tag Program (VST) is a management strategy within the Education and Outreach Initiative of the Visitor Master Plan. Under the VST program, visitors wishing to have their dogs off leash and under voice and sight control are required to have a tag visibly displayed on their dogs. To obtain a tag, a visitor must view a video describing the requirements of voice and sight control and complete a registration form. Visitors not registered in the program or who do not have a tag on their dog must keep their dog on leash while visiting OSMP and other City of Boulder properties where voice and sight control applies.

2.0 Project Goal and Objectives

The overall goal of the VST program is to:

Increase the proportion of dog guardians visiting OSMP with their dogs who have control over their dogs as required by applicable regulations (BRC 6-1-16)

The program objectives are to:

1. Improve understanding of voice and sight control.
2. Improve compliance with dog control regulations.
3. Increase OSMP outreach to and education of the public with respect to voice and sight control.
4. Decrease conflict involving dogs on OSMP properties.

3.0 Monitoring

Effectiveness monitoring will be conducted to determine whether the VST program is achieving objectives 1, 2, and 4, while implementation monitoring will be conducted to track progress toward objective 3. The effectiveness monitoring will consist of three components.

3.1 ***Component 1*** of the monitoring effort is a brief survey. The survey is designed to evaluate program participants' understanding of the City's Voice and Sight ordinance before they register in the VST program and some point after registration. (Throughout this document, "program participants" refers to visitors that register for and purchase a tag.)

The survey will be conducted twice, once prior to program implementation and once 3-4 months following the program's start. The initial survey will be linked to the project web site such that program participants who use the web site to watch the Voice and Sight video will have to complete the survey

before being able to view the video. Approximately 3-4 months after the VST program starts, OSMP staff will administer the same survey to willing program participants visiting OSMP trailheads. The results from the initial survey linked to the web site registration will be compared to the results from the second survey conducted approximately 3-4 months after the program starts to evaluate any change in program participants' understanding of the City's Voice and Sight ordinance.

Sampling objective: Estimate the proportion of VST program participants that can describe all elements of the City's Voice and Sight ordinance with the existing dog regulations with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure

- Responses to question regarding elements of the City's Voice and Sight ordinance

Statistics

- Proportion of VST program participants that can describe all elements of the City's Voice and Sight ordinance
- Proportion of VST program participants that can describe a specific part of the City's Voice and Sight ordinance. For example:
  - Proportion of VST program participants that can describe the requirement that guardians must have a leash for each dog being managed under voice and sight
  - Proportion of VST program participants that can describe the requirement that guardians may only manage 2 dogs per guardian under voice and sight at one time
  - Proportion of VST program participants that can describe the requirement that dogs must not fail to come and stay with their guardian upon command
  - Proportion of VST program participants that can describe the requirement that dogs being managed under voice and sight must be within view of their guardians

3.2 ***Component 2*** of the monitoring effort is an observational study. The observational study is designed to evaluate program participants' compliance with specific, observable aspects of existing dog regulations including the Voice and Sight ordinance. The observational study will also evaluate the level of conflict involving dogs on OSMP property. There are three sampling objectives associated with Component 2.

3.2.1. *Sampling objective 1*: Estimate the proportion of dog-containing visitor parties that comply with the existing dog regulations with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure
Number of
- dogs out of their guardians' sight
- dog guardians with more than two dogs off leash
- incidents where dogs fail to respond appropriately to guardians' commands
- incidents where a guardian demonstrates failure to comply with excrement removal regulations

Statistic
- Proportion of dog-containing visitor parties which comply with existing dog-related regulations

3.2.2. *Sampling Objective 2*: Estimate the proportion of dog-containing visitor parties that are involved in dog-related conflict with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure
Number of incidents of the following dog, guardian, or other visitor behaviors:
- dog flushes or causes wildlife to flee
- dog chases another dog, wildlife, livestock, and/or person other than a member of the dog's party
- dog barks repeatedly
- dog makes physical contact with another visitor and that contact was NOT initiated by a visitor and does not result in injury
- dog makes physical contact with another visitor and that contact results in an injury
- guardian repeatedly calls the dog
- guardians engage in yelling or verbal confrontation related to dog activity
- visitor(s) kick, hit, "mace" or otherwise attempt to or actually harm a dog
- other behaviors by dogs, guardians, or other visitors that might be considered conflictive and involve dogs

Statistics
- Proportion of dog-containing visitor parties in which at least one potentially conflictive behavior is observed
- Proportion of dog-containing visitor parties in which dog or guardian engages in a specific potentially conflictive behavior

3.2.3 *Sampling Objective 3*:
a. Estimate the proportion of dog-containing visitor parties where leashed/unleashed dogs and/or people in the party leave the trail tread

with 90% confidence intervals that are no greater than ± 10% of the estimated true value.
b. Estimate the proportion of dog-containing visitor parties that use an undesignated trail with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure
Number of:
- unleashed dogs/party that leave the trail tread
- leashed dogs/party that leave the trail tread
- people in parties with dogs that leave the trail tread
- dog containing visitor parties that use an undesignated trail

Statistics
- Proportion of dog-containing visitor parties in which at least one leashed dog leaves the trail tread
- Proportion of dog-containing visitor parties in which at least one unleashed dog leaves the trail tread
- Proportion of dog-containing visitor parties in which at least one person leaves the trail tread
- Proportion of dog-containing visitor parties that use an undesignated trail

3.3. Component 3 of the monitoring effort is a visitor interview. Visitors will be interviewed to ascertain the level of compliance with aspects of the Voice and Sight ordinance that are not necessarily observable. Specifically, during the interviews, visitors will be asked to show the interviewee (an OSMP staff member) a leash for each dog they are managing under voice and sight control and to call their dog to their side to demonstrate voice and sight control.

Sampling objective: Estimate the proportion of dog containing visitor parties that comply with the existing dog regulations (being measured) with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure
Number of
- dog guardians in possession of a leash for each dog in their party
- dog guardians that cause their dog(s) to come to and stay by their side upon command

Statistics
- Proportion of dog-containing visitor parties in which the guardian(s) has a leash for each dog in the party

- Proportion of dog-containing visitor parties in which the guardian(s) can get their dog(s) to come to and stay by their side upon command
- Proportion of dog-containing visitor parties which comply with both dog-related regulations being measured

4.0 Study Sites

Monitoring sites were not randomly selected. Rather, several variables influenced the selection of monitoring sites. First, a list of all trails in the OSMP system that allowed voice and sight management of dogs was created. Next, the number of trails on the list was reduced by eliminating trails where visitation levels are expected or known to be (based on the 2005 Visitation Study) low or very low. In an effort to maximize the number of visitor parties observed during each monitoring period and therefore increase efficiency of OSMP resource use, monitoring sites were only selected at trails where visitation levels are expected or known to be medium, high, or very high.

Trails on the list described above were field checked for potential monitoring sites. In the field, visibility, location along the trail, and the presence/absence of a potentially challenging situation for implementing voice and sight control were considered when selecting monitoring sites. Monitoring sites were also selected at locations where visibility was generally high. Additionally, because some models suggest dog behavior is different at the start of a trail (e.g. dogs are excited about being out and may exhibit excited behavior that could be considered conflictive to others; dogs are more likely to poop at the start of their excursion; etc.), monitoring sites were selected at locations at or near the start of trails ***and*** at various distances from the start of trails. Slightly more than half of the monitoring sites (56%) are located along the trail, and slightly fewer than half (44%) are located at or near the start of a trail. Finally, the presence/absence of a potentially challenging situation for implementing voice and sight control such as proximity to a prairie dog town or water affected site selection. Monitoring sites that include a potential challenge (37% of the sites) and ones that do not include an obvious challenge were selected (63% of the sites).

It is important to note that the monitoring study is designed to gain an understanding of the level of compliance with voice and sight and other existing regulations across the system. Results from the study sites will be pooled, and the individual study sites will not be compared to each other. This design allows data to be collected efficiently and therefore with the minimum amount of resources.

5.0 Methods

Component 1

The Component 1 survey will be administered to program participants as they register for the VST program via the program's web site. The survey appears on the web site prior to the opportunity to view the video. Survey responses

obtained during the period from mid March 2006 to mid June 2006 will be collected in an electronic database for analysis.

The survey will be administered for a second time at randomly selected OSMP trailheads from which extend trails that allow voice and sight management of dogs. Trailheads that receive low to very low visitation will not be included in the pool from which trailheads will be selected for survey administration. The second survey is tentatively scheduled for July 2006.

During July 2006, OSMP staff will administer the survey only to those visitor parties in which at least one dog is displaying a green VST tag indicating that the guardian is likely a VST program participant. (The staff member administering the survey will confirm if the guardian is a VST program participant.) The survey will be administered during two three-hour periods over the course of 15 weekdays and 6 weekend days. (If the survey is administered on July 4, this will be considered a weekend day rather than a weekday.) On weekdays, surveys will be administered in the morning (approximately three hours after sunrise) and the late afternoon/early evening (approximately three hours prior to sunset). On weekend days, the survey will be distributed in the morning (approximately 7-10 AM) and during midday (approximately 10:30 AM -1:30 PM). If sufficient personnel are available, 2 staff members will administer the survey, each one at a different location. This would allow for a total of 84 survey periods over the course of July.

Responses from surveys administered in July will be analyzed to determine the frequency of visitation among survey respondents. It is expected that more surveys will be administered to frequent OSMP visitors since frequent visitors are more likely to be encountered at the trailheads than infrequent visitors.

OSMP will normalize the two data sets (the mid March 2006 to mid June 2006 set and the July set) for frequency of visitation. By doing this, OSMP hopes to eliminate one factor that could affect a person's understanding of the voice and sight ordinance, the metric OSMP is trying to evaluate. Once the distribution of visitation frequency is known for the surveys administered in July, this distribution will be used to guide selection of a sample of surveys obtained via the web site from mid March 2006 to mid June 2006. For example, if OSMP obtains 1000 completed surveys during July and finds that 70% of survey participants visit OSMP 3-5 times a week and 30% visit OSMP daily, OSMP staff will randomly select 700 surveys from the pool of surveys administered on the web site from mid March to mid June in which the respondents note they visit OSMP 3-5 times a week and 300 surveys in which the respondents note they visit OSMP daily. This subset of surveys from the mid March to mid June period will be compared to the surveys completed at the trailheads in July.

Scheduling of monitoring sessions for Components 2 and 3

During the months of March, April, and May 2006, the Component 2 monitoring will be conducted by two people, each monitoring on 7 days (5 weekdays and two weekend days) during the each month for a total of 14 days of monitoring each month. Each day consists of two three-hour monitoring periods. On the weekdays, monitoring will occur in the morning (approximately three hours after sunrise) and the late afternoon/early evening (approximately three hours prior to sunset). Generally, in March and April, the morning monitoring periods will last from 6:15-6:45 to 9:15-9:45 AM, while the late afternoon monitoring periods will last from 3:00-3:15 to 6:00-6:15 PM. In April, following the switch to daylight savings time, the late afternoon monitoring periods will last from 4:30 to 7:30 PM. In May, the monitoring period will last from 6:15 to 9:15 AM and the later afternoon period will generally last from 4:45 to 7:45 PM. Weekday monitoring period times are summarized in Table 1. On weekend days, monitoring will occur in the morning (approximately 7-10 AM) and midday (approximately 10:30 AM -1:30 PM).

Table 1. Weekday monitoring period times

Month	Morning	Evening
March	6:15-6:45 to 9:15-9:45 AM	3:00-3:15 to 6:00-6:15 PM
April	6:15-6:45 to 9:15-9:45 AM	4:30 to 7:30 PM
May	6:15 to 9:15 AM	4:45 to 7:45 PM

Similarly, during the months of March, April, and May 2006, Component 3 monitoring will be conducted by two people, each monitoring on 7 days (5 weekdays and two weekend days) each month for a total of 14 days of monitoring each month, using the same monitoring periods described above.

Each month, the monitoring project scheduler will use a random number sequence to determine which days in the month Component 2 monitoring will be conducted. Once the Component 2 monitoring days have been assigned, the scheduler will generate a second random number sequence to determine which days Component 3 monitoring will be conducted. If a number in the second random number sequence corresponds with a day that is already scheduled for the Component 2 monitoring, the scheduler will use the next number in the sequence to schedule the Component 3 monitoring.

Once the Component 2 and 3 monitoring days have been scheduled, the scheduler will randomly select sampling sites, with replacement, for each day on which monitoring is scheduled. This process will be repeated each month so that monitoring staff will have a monitoring schedule prior to the start of each month.

If monitoring does not occur on a day scheduled for monitoring (e.g. monitoring staff is ill, weather is not appropriate for sampling, etc.), “make up” monitoring sessions will be completed on the next available day.

At the end of May 2006, the number of observations from Component 2 and interviews from Component 3 will be evaluated to determine if additional monitoring should be scheduled for June 2006.

The monitoring will be repeated from March to May or June of 2007. Results from 2007 will be compared to results from 2006 to gauge whether the project objectives are being achieved.

Component 2 field procedures

Field personnel will arrive at the monitoring site at least five minutes prior to the start of the monitoring period. (Some monitoring sites require a short hike from the trailhead or other parking area.) Field personnel will ***not*** wear attire that identifies them as OSMP staff. Field personnel will bring at a minimum, a datasheet (Attachment 1), clipboard, and pencil to each monitoring session. For monitoring sites that are set off some distance from the trail(s) being observed, field personnel will also bring binoculars to the monitoring session. Upon arrival at the monitoring location, the observer will enter the header information in the datasheet. This includes the date, time, and location of the monitoring session, the initials of the observer, and the weather at the time of the monitoring session. Details about the weather at the time of the monitoring session should include the approximate temperature at the start and end of the session, cloud cover, wind level, precipitation, and any other weather information that may be important in understanding visitation levels that day and time.

Once the monitoring session begins, the observer will observe the first dog containing visitor party that enters the observation area. The observer will record the number of dogs and people in the visitor party. The observer will watch the visitor party the entire time the party remains in the observation area.

The observer will record the following attributes of the visitor party:

1. The observer will note the number of dogs in the visitor party that are leashed the entire time the visitor party is in the observation area.
2. For dogs that are unleashed for at least some portion of the observation area, the observer will note the number of dogs with and without a green VST tag and the number of dogs for which no determination could be made regarding whether they were wearing a VST tag or not. (Due to the location of the some of the monitoring sites and the characteristics of some dogs (e.g. dogs with shaggy coats), monitoring personnel may not be able to determine whether a dog is wearing a VST tag.)
3. The observer will note whether there are others in the observation area that may present an opportunity for interaction. The observer will characterize the others as other visitors (H), other dogs (D), livestock (L), or wildlife (W) are present. (While the monitoring personnel will likely be able to determine if other visitors, other dogs, or livestock are present in the observation area, it is acknowledged that monitoring personnel may not be able to readily observe all wildlife in the observation area.) When

wildlife are observed in the observation area, the species or general category of wildlife will be noted in the “Notes” section.

4. The observer will record all listed behaviors observed. (Attachment 2 provides a list of dog, guardian, and visitor behaviors to be recorded.) The observer will record any pertinent notes regarding the behavior observed in the “Notes” section of the datasheet. (e.g. if the observer notes that a dog was barking repeatedly, the observer will record his/her speculation regarding what the dog is barking at, or if a dog jumps on another dog, the observer will record the guardians’ reaction to the incident.) If no listed behaviors are observed, the observer will record a “0” in the “Behavior Observed” column of the datasheet.
5. The observer will record the number of people, unleashed dogs, and leashed dogs that leave the trail.
6. The observer will record whether the visitor party used a social trail while in the observation area.
7. The observer will record the number of dogs that are not within view of their guardians. Within view means the guardian can see the dog immediately or by turning his or her head. Tall vegetation, topography, and winding trails are possible reasons why a dog is not within view. The reason the dog is not within view should be noted in the “Notes” section of the datasheet.
8. If the guardian issues any commands to the dog(s) in the party, the observer will note number of the dogs that obey all commands issued and the number of dogs in the party that do not obey at least one of the commands. The guardian is given two chances to obtain the appropriate response from the dog before the observer records that the dog did not obey the guardian’s command. For example, if the guardian says “Here *Griswald*.” and the dog does not come, the observer will not record anything. If the guardian says “Here *Griswald.*” again and the dog fails to come after this second calling, the observer will record that the dog did not obey guardian’s commands. If the guardian says “Here *Griswald.*” and the dog comes to the guardian, the observer will consider that obeying the guardian’s commands. If the guardian does not issue any commands to the dog(s) while in the observation area, “NA” will be recorded in both columns under “Response to call” on the datasheet.
9. The observer will note whether or not there were more than two unleashed dogs per guardian in the visitor party.
10. The observer will note the number of times the dog(s) in the visitor party poop in the observation area. If none of the dogs in the visitor party poop while in the observation area, the observer will record a “0” in the first column under “Excrement” on the data sheet and a “NA in the four following columns under “Excrement”. For each poop incident, the observer will note the whether the guardian picked up the excrement or not. If the guardian picked up the poop, the observer will note whether the guardian took the poop with him or her out of the observation area or

whether the guardian left the poop, presumably in a bag, in the observation area.

11. The observer will record anything unusual about the observation or anything that helps explain data entered in specific columns of the datasheet about the observation.

Once the dog-containing visitor party that is being observed leaves the observation area, the observer will begin observing the next dog-containing party that enters the observation area repeating the process described above. (It is possible that a dog-containing visitor party will have entered the observation area while the observer was already observing a dog-containing visitor party that entered the observation area first. This dog-containing visitor party will not be observed since the observer would not have had the opportunity to view this party the entire time.)

Component 3 field procedures
Field personnel will arrive at the monitoring site at least five minutes prior to the start of the monitoring period. (Some monitoring sites require a short hike from the trailhead or other parking area.) Field personnel ***will*** be attired in field gear that identifies them as OSMP staff. Field personnel will have a small pocket notebook and a pencil with them.

When the interview session begins, the interviewer will approach the first dog-containing visitor party encountered in the interview area and in which the dog(s) in the party is at least 15-20 feet from the guardian(s). The interviewer will ask the party's willingness to engage in an interview using a script similar to the following:

Hello. My name is interviewer's name*. I am with OSMP. We are in the field today conducting visitor interviews to help us get an understanding of the conditions in the field and improve our management related to these conditions. I was wondering if you would be willing to help us by answering 1 or 2 questions.*

If the visitor declines to participate in the interview, the interviewer will thank them. If the visitor agrees to participate, the interviewer will continue with the interview using a script similar to the following:

The questions are related to dog management so before I ask them I want you know that I am not a ranger; I'm not going to ask your name; and I can't and won't be issuing a summons for any answers you give. We are simply trying to understand the current conditions on the ground.

If the visitor still appears willing to participate, the interviewer will ask:

1. *Would you show me a leash for each of your dogs you are managing under voice and sight control?*

2. *Would you call your dog(s) to your side?*

If during the initial part of the interview process the dog(s) in the visitor party approach the guardian such that it is no longer 15-20 feet from the guardian, the interviewer will only ask the first of the two interview questions.

After the interview, thank the visitor for his or her time and willingness to help OSMP. If the visitor party did not have a leash for each dog in the visitor party, the interviewer will offer the visitor party the appropriate number of complementary OSMP leashes. Once the visitor party leaves the interviewer and party continues their hike, the interviewer will record the following in his/her pocket notebook:

1. the number of dogs in the visitor party and the number of leashes
2. the number of dogs the guardian was able to get to immediately return to his or her side
3. notes regarding the guardian's attempt to call the dog(s) to his or her side – specifically
    a. the number of calls the guardian made for each dog before the dog returned to the guardian's side
    b. the approximate distance of the dog(s) from the guardian
    c. the location of the dog(s) – i.e. whether the dog(s) was on trail or off trail; whether the dog(s) was in front of, or trailing the guardian
    d. what the dog appeared to be doing at the time – i.e. looking at the guardian; sniffing something, watching wildlife, other visitors, or other dogs; swimming or wading in water; engaging another dog in play; etc.
    e. conditions that may have affected the dog's ability to respond to the guardian – i.e. the dog was likely too far away to hear the guardian's call; the dog had to go around some obstacle in the trail to get to the guardian
    f. comments from the guardian
    g. anything else that may be important to explain the event
4. notes regarding anything the guardian refused to do or specific interactions with the guardian regarding the interview

After the interviewer has completed recording his/her notes from the interview, the interviewer will approach the next dog-containing visitor party encountered in the interview area and repeat the process.

Attachment 1: Data sheet for Component 2 – Observational Study

Voice and Sight Video and Tag Project Monitoring Data Sheet (Component 2 - Observational study)

Date (mm/dd/yy): Weather:

Time (24-hour): Location: Observer:

Obs. #	Visitor data						Presence/absence of listed behaviors			Off trail use			Voice and Sight Compliance				Excrement				
	People (0-n)	Dogs (0-n)	# Leashed thru	Unleashed dogs	Unleashed dogs	Unleashed dogs	Opport for interactio	Other(s) present	Behavior observed	People off trail (0-n)	Leashed dog off	Unleashed dog	Out of sight (0-n)	Response to call: Obeys (0-	Response to call: Does not	More than two dogs	Poop (# of times, 0-n)	Picked up	Did not pick up	Took bag	Left bag

Notes:

Attachment 2
List of potentially conflictive behaviors with associated data sheet code

No listed behavior observed
0. No listed behavior observed

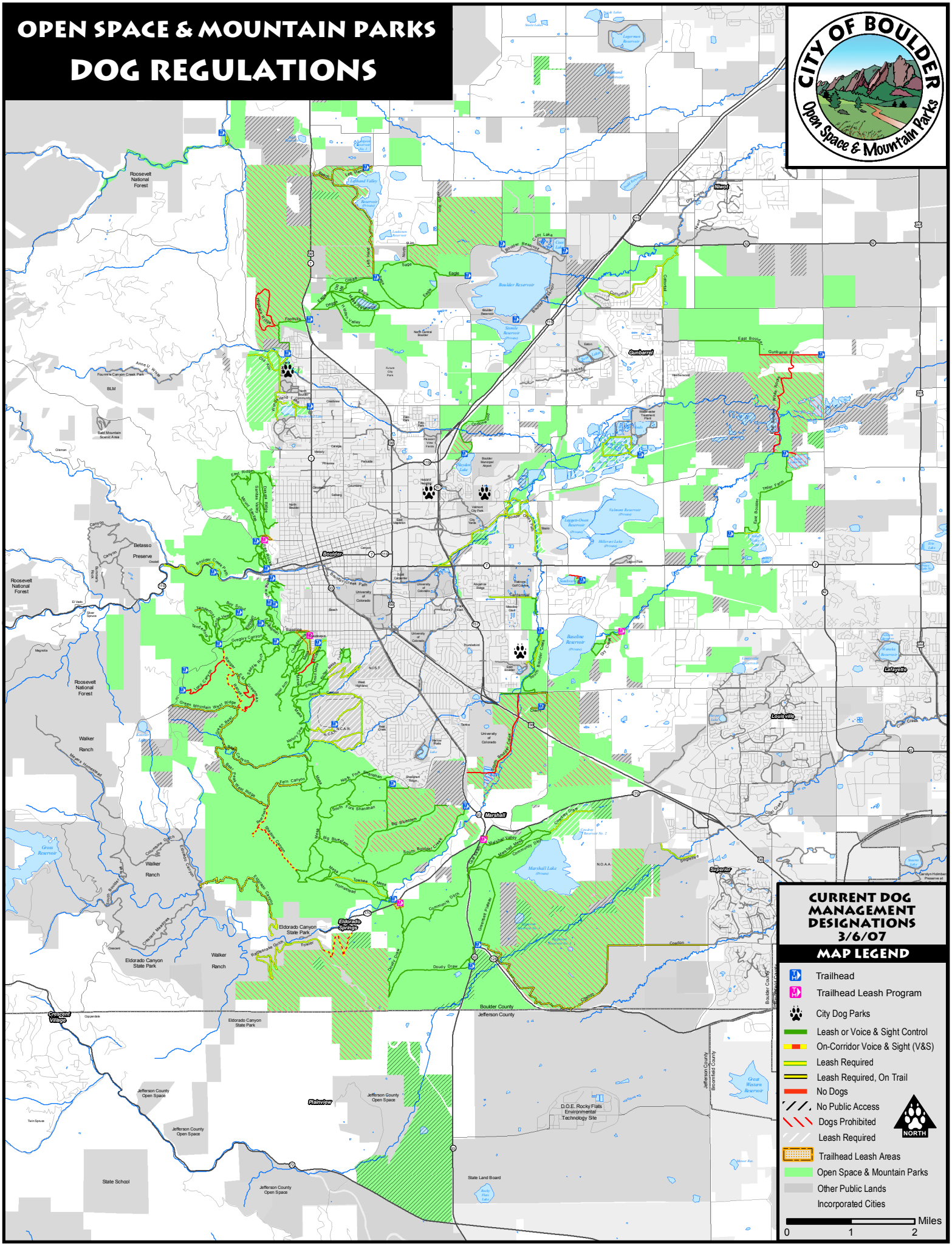
No physical contact by dog
1. Flushing or fleeing wildlife (requires 2 of the 4 modifiers)
    a. Dog is leashed
    b. Dog is unleashed
    c. Dog is on trail
    d. Dog is off trail
2. Chasing
    a. Dog on dog (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
    b. Wildlife
    c. Livestock
    d. Person other than member of party (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
3. Repeated barking (more than 7 barks in succession)

Physical contact by dog
5. Physical contact NOT initiated by a visitor and not resulting in injury (requires at least 1 modifier) (Notes should describe the interaction.)
    a. Jumping on
    b. Licking
    c. Pawing
    d. Sniffing
    e. Other
6. Physical contact resulting in injury (requires at least 1 modifier)
    a. Person,
    b. Another dog,
    c. Wildlife
    d. Livestock

Incidents of the following behaviors by dog guardians or other visitors
7. Repeatedly calling the dog (more than two times)
8. Yelling/verbal confrontation
9. Kicking, hitting or “macing” of dogs by humans

Other
10. Other (Notes should describe the interaction/situation)

OPEN SPACE & MOUNTAIN PARKS
DOG REGULATIONS



Is the tag a "license" or unique to a specific dog?

The tag signifies that the dog guardian has registered and is participating in the program. The tag is not specific to a dog.

Do I have to renew my registration at some point?

No.

What if I change my mind and no longer want to be registered?

Dog guardians who no longer wish to participate in the program may call OSMP at **(303) 441-3440** to have their registration discontinued.

How can I find out more about the program?

Dog guardians can learn more about the Voice and Sight Dog Tag program by visiting our website at **www.osmp.org** or calling **(303) 441-3440**.

For information visit:
www.osmp.org
or call
(303) 441-3440
or write
Open Space & Mountain Parks
P.O. Box 791
Boulder, CO 80306

January, 2006-??M

Voice and Sight Dog Tag Program

City of Boulder

ENJOY. PROTECT.

Properly trained, a man can be dog's best friend.

— Corey Ford

City of Boulder Voice and Sight Dog Tag Program

The city of Boulder is one of only a few systems on the Colorado Front Range which allow dog guardians to walk dogs off-leash. This opportunity is possible only if dogs are not required to be on-leash and are responsibly controlled under voice and sight control. It is a tough standard for both dogs and guardians.

A new Voice and Sight Dog Tag Program has been designed by the city of Boulder to help dog guardians understand voice and sight control standards and to reduce conflicts which can occur with visitors, other dogs and wildlife.

What is voice and sight control?

Voice and sight control means the dogs you are responsible for must be within your sight and under your verbal command at all times, regardless of distractions which can occur during a walk. If your dog cannot immediately obey verbal command, your dog must remain on-leash. Also, keep in mind that dogs under voice and sight control are not allowed to charge, chase or display aggression towards other people or dogs or chase, harass, or disturb wildlife and livestock.

What is the Dog Tag program?

The new city of Boulder Voice and Sight Dog Tag program requires dog guardians to watch a video about voice and sight control, register with OSMP and display a special program tag on dogs they wish to walk off-leash. This program only applies to City of Boulder properties where voice and sight control is allowed.

Is this a requirement or just a request?

It is the law. Participation in the program is a new requirement of voice and sight control as stated in city ordinance Boulder Revised Code (BRC) 6-1-16 and 6-13-2 through 6-13-5. Dog guardians may review these ordinances by visiting the OSMP website at **www.osmp.org** or the City of Boulder website at **www.ci.boulder.co.us**. Violations include not registering for the program and/or having a dog under voice and sight control without displaying a tag.

How do I participate in the program?

For your convenience, the City of Boulder is offering several methods of registration, including registration through our website or visiting the OSMP administrative offices in person.

STEP 1.
The city of Boulder has produced a video which illustrates the requirements of voice and sight control and realistic, enforceable dog management behaviors.
The short, instructional video can be viewed on the OSMP website, www.osmp.org, on Channel 8, or by acquiring a copy of the video on DVD.

Watching the video is a required step in the registration process. After watching the video, dog guardians are expected to know the regulation and understand how it applies to managing dogs using voice and sight control.

Before registering for the program, you will be asked to affirm that you watched the video and agree to control your dogs off-leash under voice and sight control in the manner described in the video.

STEP 2.
Dog guardians can either register for the program on-line or by visiting the OSMP Administration building at 66 South Cherryvale Road. You and every member of your household who wishes to walk your dogs under voice and sight control must register for the program.

STEP 3.
After you and other members of your household have seen the video and registered in the program, you may purchase the voice and sight dog tag in a couple of ways. You may purchase tags through the OSMP website with your credit card. The OSMP staff will process your order the next business day (please allow 3-5 business days for arrival). You may also come to the OSMP Administration building at 66 South Cherryvale Road to purchase your tags with check, cash or credit card and you will be issued the tags upon payment.

STEP 4.
Ensure that voice and sight program tags are displayed on all dogs when using voice and sight control on City of Boulder lands where voice and sight control is allowed.

Frequently Asked Questions about the Voice and Sight Dog Tag Program

Does everyone in the family or household have to register?

Yes. Every member of the family who wishes to walk a dog under voice and sight control must register in the program. The first registrant must be an adult (over 18). Minors may register as part of the same household. Each participant must watch the instructional video and agree to manage off-leash dogs under voice and sight control on City of Boulder lands where voice and sight control is permitted. There is no extra charge for registering additional members of the household.

What if I don't agree to register and get a dog tag?

If a dog guardian chooses not to register with the voice and sight tag program and display voice and sight dog tags, dogs must be kept on-leash at all times.

Am I protected from getting a ticket if my dog has a voice and sight dog tag?

No. A dog guardian who participates in the program and walks a dog under voice and sight control in areas where it is allowed may still be issued for any violation of the following standards:

- The dog guardian is walking more than two dogs under voice and sight control;
- The dog guardian is not carrying a leash for each dog being walked under voice and sight control;
- The dog guardian fails to display voice and sight tag on dog;
- The dog is not within the guardian's sight and under voice control at all times;
- The dog does not come to and stay with the guardian immediately upon command;
- The dog charges, chases or otherwise displays aggression towards any person, or behaves in a way that any reasonable person may find harassing or disturbing;
- The dog charges, chases or otherwise displays aggression towards any dog;
- The dog chases, harasses or disturbs wildlife or livestock.

What are the penalties?

The maximum penalty for a first violation is a fine of $50. For a second violation within 24 months the maximum penalty is a fine of $100. A third violation within the same 24 months will result in a fine of not less than $200 and revocation of the privilege to use voice and sight control.

When is revocation of voice and sight privileges possible?

When an individual has three convictions of Boulder Revised Code (BRC) 6-1-16, "Dogs Running at Large Prohibited" on city OSMP or Parks and Recreation lands within 24 months based on the date of the first violation revocation will occur. Violations of voice and sight control and dogs off-leash in leash only areas are violations of BRC 6-1-16.

Can I get back the privilege to use voice and sight control?

Voice and sight control privileges may be reinstated if the dog guardian proves attendance at a city of Boulder certified training on voice and sight control, and written proof of successful completion of a voice and sight control certification course approved by the City of Boulder. Dog guardians must pay a reinstatement fee of $50 plus the $15 registration fee, as well as the cost of attending the certification program. Dog guardians must also again agree to control any dog accompanying the guardian without a leash in a manner described in the voice and sight video.

In what areas does voice and sight control apply?

The new city of Boulder voice and sight tag program only applies on city Parks and Recreation and OSMP lands which do not require dogs to be on-leash. Dogs are required to be on-leash inside Boulder city limits, unless they have been specified to allow voice and sight control. Voice and sight control requirements also apply to Howard Heuston Dog Park.

What if I need to add someone to my household registry?

Dog guardians who wish to add members of the household to the dog tag program must come in person to the OSMP administration building at 66 South Cherryvale Road.

Does everyone in the household have to watch the video?

Yes. Everyone who wishes to walk the dog under voice and sight control must see the video and agree to the terms and conditions of the voice and sight control requirements. Members of the household who do not walk the dog or choose to walk the dog on-leash do not need to see the video and register as part of the household.

What if I lose a tag or need more?

Dog guardians can come in person to the OSMP administration building at 66 South Cherryvale Road to buy additional tags. Guardians will not be required to pay the registration fee again but will be charged $5 for each new tag.

Condition, Compatibility & Trends

An Analysis of Visitor Experience and Infrastructure and their Compatibility with Resource Conservation

City of Boulder
Open Space and Mountain Parks Department
Visitor Master Plan

The Open Space and Mountain Parks Department preserves and protects the natural environment and land resources that characterize Boulder. We foster appreciation and use that sustain the natural values of the land for current and future generations.

-- Open Space and Mountain Parks Department Mission Statement --

Introduction

The purpose of the Visitor Master Plan is to outline policies and actions for OSMP to provide a high quality visitor experience consistent with the long-term sustainability of natural, agricultural and cultural resources. This goal echoes Boulder's Charter provisions which establish a multiple use mandate for Open Space and Mountain Parks lands. The Visitor Master Plan describes ***environmentally sound*** strategies for meeting the need for quality visitor experiences (Connection Ecology 2003). Managing for multiple, often conflicting uses can be complex and requires a carefully thought out and strategic approach.

The approach used here was adapted from the Conservation Project Management approach developed by The Nature Conservancy (TNC 2000, 2003a). The approach begins with the translation of the Visitor Master Plan goals into specific **planning targets**. The next step is documenting the **condition** of the targets and **trends** that affect them during the Visitor Master Plan ten year planning horizon. The condition and trends analysis prepares Open Space and Mountain Parks for the next step—strategy development. **Strategies** are developed to address restoration needs, ensure that critical on-going management activities continue, and guide changes in management to avoid or correct management issues. Finally, a **monitoring program** will be developed to measure the effectiveness of the strategies in improving or maintaining the condition of the planning targets.

Identifying Planning Targets

Translating the Visitor Master Plan goals to on-the-ground strategies requires several intermediate steps. Developing effective strategies requires an understanding of the specific planning targets that must be managed to achieve the Plan's goals. Based upon a summary of public comment, the results of the Visitor Plan Advisory Committees, review of many other visitor use and recreational plans and planning protocols, Open Space and Mountain Parks staff developed the following list of planning targets for the Visitor Plan:

1. The Visitor Experience
2. The Visitor Infrastructure
3. Ecological Systems
4. Agricultural Operations
5. Cultural Resources

The **visitor experience** is the focus of the Visitor Plan. It describes the Open Space and Mountain Parks program's closest and most critical link to the people we serve--the citizens of the City of Boulder and visitors to the area.

The **visitor infrastructure** is closely related to the visitor experience. The infrastructure includes the trails, trailheads, parking lots and other facilities that are provided to help provide a high quality visitor experience and protect other resources. The visitor experience and the visitor infrastructure are related, but they are also distinct and sometimes vary independently of each other. In other words, visitors can report a high quality experience in an area where trail conditions are not sustainable. Separating the infrastructure from the experience allows for thorough consideration of each.

The Visitor Plan will be the primary document describing how the visitor experience and visitor infrastructure will be managed on Open Space and Mountain Parks lands; and this document attempts to describe in detail the current conditions and trends relevant to these targets. In addition, the Visitor Master Plan must also address compatibility of visitor use with other OSMP resources. These other resources have been summarized as ecological systems, agricultural operations and cultural resources. The Visitor Master Plan offers guidance to reduce significant adverse impacts of visitor use upon these resources.

Ecological systems include a wide variety of species and communities. Ecological systems include dominant cover types such as prairie grasslands and foothills forests, as well as smaller patches of shrublands, wetlands, aquatic systems and linear riparian areas. Nested within each of these ecological systems are smaller patches, habitat types and species. Prairie grasslands for example, include wet and dry tallgrass prairie communities, as well as black-tailed prairie dog colonies. The forested foothills are a mosaic of montane meadows and shrublands, cliff faces, talus slopes, and spring fed hollows rich with rare plants in a matrix of ponderosa pine and Douglas fir forests.

Agriculture operations in the Boulder Valley are dominated by cattle grazing (including rangeland, pasture and hayfield management) as well as some farming (mostly small grains). The Open Space and Mountain Parks department was established in part to preserve agricultural operations in the Boulder Valley. The water rights and delivery infrastructure has a tight relationship with agricultural use and is nested within this planning target as are the practices and people needed to achieve sustainable agricultural operations.

Cultural resources includes sites, structures, districts, landscapes, objects, and documents associated with or representative of people, cultures, and human activities and events in the past.

Evaluating the Current Status of the Planning Targets

Identifying Key Attributes[1]

Among the goals of the Visitor Master Plan are to provide a high quality visitor experience and a sustainable visitor infrastructure. But what is "high quality"? What makes a system of trails and other facilities "sustainable"? In preparing answers to these questions, OSMP staff relied upon information gathered from community groups and interested members of the public, conversations with the Open Space Board of Trustees, the first Visitor Plan Advisory Committee and review of published reports and plans to identify a set of key attributes for each of the planning targets.

The key attributes for a planning target are those factors that most clearly define or characterize the target, or describe a range of conditions over which that target may vary.

These factors are "key", because when any are eliminated or significantly altered, the planning target either ceases to exist or changes into something else, typically something less desirable. Key factors for the five planning targets of the Visitor Plan are listed in the table below. Each of these key attributes is described below.

[1] The "key attribute" concept described here was described by The Nature Conservancy (2003a)

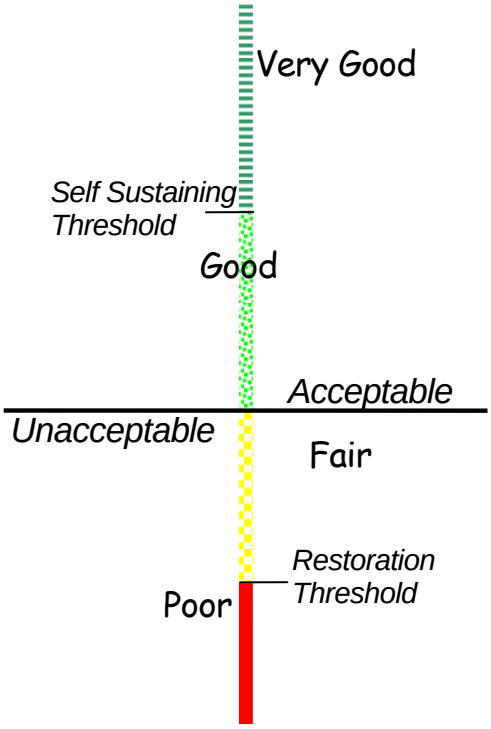
Key Attributes for Planning Targets: Open Space and Mountain Parks Visitor Plan

Quality of the Visitor Experience	Sustainability of the Visitor Infrastructure	Integrity of Ecological Systems	Sustainability of Agricultural Operations	Integrity of Cultural Resources
• Connection with the land • Access to destinations • Aesthetics • Conflict • Safety • Remoteness • Variety of activities	• Physical sustainability • Maintenance condition • Engendering stewardship	• Size/Abundance • Composition • Landscape Context	• Agricultural productivity • Agricultural efficiency	• Abundance of Material & Context • Condition

Assessing Condition Using the Key Attributes

The quality, integrity or sustainability of the planning targets is a function of the key attributes. The factors were rated as "Very Good", "Good", "Fair" or "Poor." "Very good" and "good" are given when the status of the key attribute is acceptable. That is, maintaining the conservation target at this level for this attribute would allow for the continued healthy existence of the target at least until the end of the planning period.

"Fair" and "Poor" are used to indicate unacceptable status for a key attribute. Key factors rated "very good" are those that have reached a near-optimal condition. On the other hand, key attributes that are rated "poor" lie below the restoration threshold. The restoration threshold indicates a level of performance or condition that cannot practically be restored to an acceptable condition. "Fair" is a ranking used to describe an unacceptable state that could be restored to either "Good" or "Very Good". The figure on the right shows the relationship of the integrity ratings to thresholds of acceptability, sustainability and restorability (TNC 2003a).



Relationship of Thresholds & Integrity Ratings (after TNC 2003a)

There are currently no established standards for the quality of the visitor experience and sustainability of the visitor infrastructure. Consequently, there are no accepted benchmarks against which we can compare data collected in the field.

Determining the condition of planning targets in the absence of standards requires reliance upon formal surveys, scientific literature, and feedback gained during public meetings and technical expertise within and outside the Department to substantiate our ratings. Every effort was made to find and use the best available information, and supplement sparse data with conceptual models and professional judgment.

In the pages that follow, we present an assessment of the current condition of the planning targets. We provide ratings for each of the key attributes and an explanation of how the ratings were determined.

The OSMP land system is diverse, and the ratings given here are meant to reflect the condition of key attributes across the entire system. In some cases, this results in an overall rating that could be lower than would be given to a particular area of the land system. For example, there are some places where aesthetics are not significantly compromised and other places where they are. An overall rating of "good" would result in the analysis ignoring the areas where the condition of the aesthetics was unacceptable. A rating of "fair" however indicates that there is an issue that needs to be addressed. In some cases, where critical information would be lost by blending very different states of a key attribute, two ratings are given with an explanation.

Linking Conditions and Trends with Strategies

The conditions and trends analysis is not meant as an academic exercise, but rather a way to identify management needs. Key attributes that are rated as acceptable ('Good" and "Very Good") usually indicate that successful management techniques are in place. In those cases, the level of quality is maintained by continuing or enhancing the existing management activities. For example, the quality of the visitor experience is due in part to the connections that visitors can build with the natural setting of OSMP. We have rated this key factor ("Connections with the Land") as "Very Good". This rating is based upon the availability of resources, information and programs designed specifically to foster a sense of connection with the natural world. Therefore, an objective of the Visitor Master Plan is to continue or enhance programs that support this key attribute, thereby contributing to the quality of the visitor experience.

On the other hand, the key factor "safety" was rated as "Fair", indicating an unacceptable condition. One of the chief reasons for the unacceptable rating is the number of potentially dangerous road crossings that visitors to OSMP might encounter. Consequently an objective of the Visitor Master Plan is to identify management actions (e.g. build underpasses or install traffic signals) to address this issue.

In some cases, new initiatives will be needed to address existing unacceptable conditions or head off changes in the future which could adversely affect the planning targets.

PART I: CONDITION

The Visitor Experience

Everything that visitors do, think, sense and feel on OSMP makes up their experience. Land managers have the responsibility to provide legal and appropriate use of OSMP. We cannot fully describe how various people enjoy Open Space and Mountain Parks—a satisfactory experience comes in infinite sizes and shapes.

This visitor experience is complex, subjective and therefore, difficult to assess. The "big picture" suggests the overall level of satisfaction with the visitor experience is high and the land system is a popular destination. In 1999, 93% of Boulder citizens surveyed expressed satisfaction with the visitor experience on Open Space lands (PIC 1999), rating their experience as either "excellent" (58%) or "good" (35%). Estimates of annual visitation have increased from approximately 250,000 in 1980 to 3.5 million in 2002.

These numbers are unsurprising and perhaps not especially informative. To paraphrase a popular bumper sticker, "A bad day on OSMP is better than a good day at the office." Boulder's trends are part of a nation-wide pattern. Natural areas near cities are among the most popular destinations for outdoor recreation (Cordell 1999).

OSMP managers know that these lands are popular destinations where people generally have a fun and enjoyable time. But managers also need to know if the quality of the experience is steady, improving or declining over time; and be able to determine the most critical actions to maintain, enhance or if necessary restore a high quality experience. Levels of visitation and general satisfaction don't provide enough sensitivity to monitor change before it is too late, or to set management priorities.

In an attempt to better understand the visitor experience, the Open Space and Mountain Parks programs worked with the community to identify the attributes most useful for determining and measuring the quality of the visitor experience on Boulder's public lands.

Sources of Public Comment used to Select Key Attributes

- Open houses and forums for the Mountain Parks Resource Protection and Visitor Use Plan
- Forums and workshops for the Open Space Visitor Use Plan
- Public workshop for the Open Space and Mountain Parks (OSMP) Visitor Use Plan
- E-mail, hotline, letter, and reply form comments from citizens
- Notes from meetings with community groups
- Information submitted by various user groups
- Informal contacts with citizens by Open Space and Mountain Parks staff
- 2000 and 2003 Visitor Plan Advisory Committee processes

In addition to information derived from local sources, the National Park Service (Anderson et al. 1998, NPS 1997), Parks Canada (Environment Canada 1985), and the U.S. Forest Service (Stankey et al. 1985, McCool and Cole 1997) have addressed the quality of the visitor experience in management plans and procedural guidance. Open Space and Mountain Parks staff used these external sources to develop the key attributes for the visitor experience (below).

Key Attributes for the Visitor Experience

- **Connection to the land**
- **Access to destinations**
- **Aesthetic attractiveness**
- **Conflict**
- **Safety**
- **Remoteness**
- **Variety of activities**

Key Attribute: Connection with the Land — Rating: Good

Boulder has a long tradition of public support for local initiatives to preserve the natural environment. The Open Space and Mountain Parks system is the result of that support. It is also a key reason for the sustained public advocacy for natural systems conservation here. OSMP lands offer huge opportunities for community members to build connections with the natural world and to appreciate the importance of resource stewardship. Such connections have long improved the quality of life for Boulder residents. OSMP has many programs to encourage these relationships. This important community service is reflected in the Department's mission statement, ". . . *to foster appreciation and use that sustain the natural values of the land for current and future generations."*

Interpretation

While some visitors may be primarily interested in directions to destinations, trail mileage, elevation gain and the applicable rules and regulations--interpretation goes far beyond providing simple information. OSMP uses interpretation not only to convey facts but also to build connections between the personal interests of the visitors and the many meanings of the OSMP system, answering questions like:

- Why was this area set aside from development and made available for the public?
- What are the essential stories about this place (geological, ecological, cultural, and historical)?
- What experiences are available for the public to enjoy?

OSMP currently provides several interpretive programs and outreach initiatives.

- The administrative services staff at the "front desk" answers thousands of questions each month on a wide variety of topics

- "Natural Selections" is an ongoing series of educational programs on topics including ecology, wildlife, local history, astronomy, children's programs, etc. All programs are widely advertised, free and open to the public.

- Open Space and Mountain Parks staff and volunteers provide hikes and presentations for schools and community groups. Hikes and slide show presentations are available on over 30 wide-ranging topics.

- Open Space and Mountain Park's staff and volunteers offer informative displays, brochures, maps and answers to questions most summer weekends at public events such as the Farmer's Market, year round at select community events, and on duty at the Summit Center on Flagstaff Mountain and OSMP's cottage adjacent Chautauqua meadow.

- Rangers education staff and volunteers provide assistance, offer information and raise awareness about "current events" in the natural world at trailheads and on the trail.

The OSMP website provides up-to-date access to OSMP activities, management practices, and OSBT meetings as well as on-line access to a great deal of information about the land system, its history and management.

Rangers

Rangers provide emergency response, law enforcement, scheduled or impromptu interpretation and other services to assist visitors. OSMP rangers are skilled interpreters and resource conservation professionals. In addition to being certified law enforcement officers, rangers encourage positive interactions among people, wildlife and agricultural operations, using appropriate approaches to ensure the safety of visitors and the protection of resources.

Signs

Signs and information boards are used to inform visitors about their surroundings help them navigate to their destinations and encourage stewardship by highlighting features sensitive to disturbance.

Volunteer Program

Volunteer programs on OSMP enhance the connection of community members with the natural world through several offerings. Some of the many volunteer programs are highlighted here.

- Volunteers monitor the progress of cliff nesting raptors. These raptor monitoring volunteers become spokespeople for the community benefit from and importance of seasonal wildlife protection.

- Much of what OSMP knows about the occurrence and distribution of plants is a result of a dedicated group of volunteers who have been collecting and preparing plant specimens for over 15 years.

- Naturalist volunteers are not only deepening their own connection with OSMP, but introducing others to some of the stories the land has to tell. Their work includes presenting programs, and hosting and providing information at the farmer's Market, Flagstaff Nature Center, Chautauqua Cottage and many public and community events.

- The volunteer Stewardship Program offers families, individuals, businesses and organizations a chance to connect with OSMP and help maintain or monitor areas. They two-year commitment ranges from annual clean-up/maintenance/education projects to weekly service.

- The volunteer members of the Open Space Board of Trustees are appointed by City Council to five year terms. The OSBT typically meets twice monthly and provides opportunities for public comment on all items to be considered for a vote. In addition, the Board welcomes public participation for items not on the agenda for a particular meeting. The Board makes recommendations to City Council and staff on the acquisition and management of Open Space.

Junior Rangers

"Junior Rangers" is a youth employment program which incorporates the building of a responsible work ethic, environmental awareness, stewardship values, and personal growth within the setting of service learning. Since 1965, Open Space and Mountain Parks has been providing a means for students to engage in meaningful work that makes a difference to our open lands, parks, and community.

Not only do Junior Rangers gain in-depth experiences with Boulder's natural land system, they also learn what it takes to ensure a high quality visitor experience by maintaining the trail system. The Department has relied upon the Junior Rangers to accomplish a significant portion of the trail maintenance on the system. Much of the work is physically demanding. Job duties include general maintenance tasks, noxious weed removal, and other clean-up and upkeep projects.

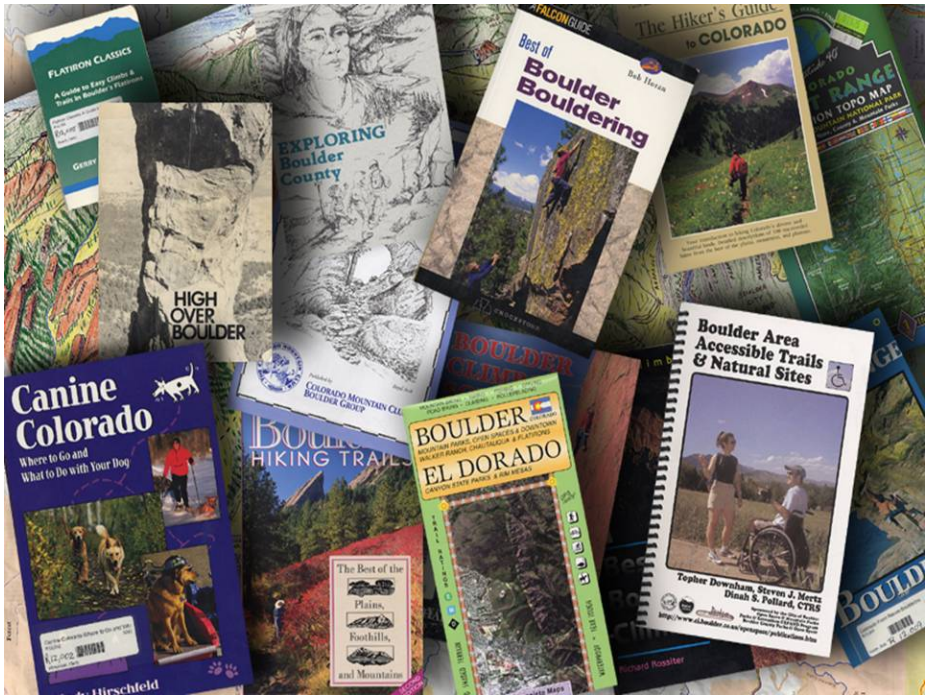
The junior rangers program also includes environmental education and team building activities that round out the work experience. Participants are encouraged and supported in exploring the land around them—defining their connections and opinions about the land on which they work and live.

Justification for the rating (Good)

The current situation is acceptable. OSMP provides a high level of service in the provision of services related to education and outreach, enforcement, volunteer opportunities, and junior rangers. A considerable amount of public support exists for these programs. OSMP has the opportunity to develop a system to measure the effectiveness of these programs in building the type of connections with the land that motivate changes consistent with good land stewardship.

Key Attribute: Access to destinations **Rating: Good (Fair for cyclists)**

There are currently 130 miles of designated trails, approximately 1,000 named rock climbing routes, hundreds of bouldering "problems," 38 trailheads and 75 other designated access points. The system of trails is well distributed over the Open Space and Mountain Parks land system. The location of Open Space and Mountain Parks properties is shown on a high quality map produced and distributed by the Open Space and Mountain Parks Department. The map is also available on the Open Space and Mountain Parks web site and at many retail locations. In addition there are many guidebooks directing people to the Open Space and Mountain Parks land system.



A sample of the guidebooks which identify OSMP lands as a recreational destination

Many non-motorized activities are allowed on Open Space and Mountain Parks lands without qualification. The most significant restriction affecting all users is the seasonal area closures to protect raptors and bats. These closures affect all activities, on trail and off. Although the Open Space and Mountain Parks Department encourages visitors to stay on trails, individuals and small groups are allowed to travel almost anywhere on city-owned Open Space and Mountain Parks lands.

Undesignated trails are an important aspect when considering access to destinations on OSMP. There are many undesignated access points and over 300 miles of undesignated trails on Open Space and Mountain Parks lands. The management of these undesignated trails is one of the core issues facing OSMP land managers.

The positive side to undesignated trails is they provide access to destinations. However, undesignated trails usually come to be without design and persist without management. The result is considerable impact to the land and potentially huge restoration costs for the OSMP program.

Undesignated trails emerge for several reasons:

- Access to designated trails from neighboring properties
  Open Space and Mountain Parks has a diffuse boundary with hundreds, perhaps thousands of neighboring properties. Many adjacent homeowners and businesses have created trails from their fence across otherwise untrailed areas of OSMP to connect with the system of designated trails. Existing policies to minimize access from adjacent properties have not been effective.

- Access to destinations
  The proliferation of undesignated trails on OSMP is a good indicator that the designated trail system doesn't provide access to some of the places visitors want to go. For example, most of the staging areas for rock climbing on OSMP are served only by undesignated trails.

- Ease of establishment and persistence
  Even low levels of off-trail activity lead to the establishment of undesignated trails. This is consistent with the conclusions of recreational researchers (Hammitt and Cole 1987:62-3, Marion and Sober 1987). Once established, undesignated trails tend to persist for a long time because of slow rates of vegetation recovery in our arid climate.

- Curiosity
  Some undesignated trails attract visitors, curious about where they lead. This stimulates use which even if sporadic, can perpetuate a trail.

Resolving the dilemma of undesignated trails requires that OSMP recognize both the contribution these trails make to the visitor experience by providing access to destinations ***and*** a consideration of the associated expense and ecological impact of these trails.

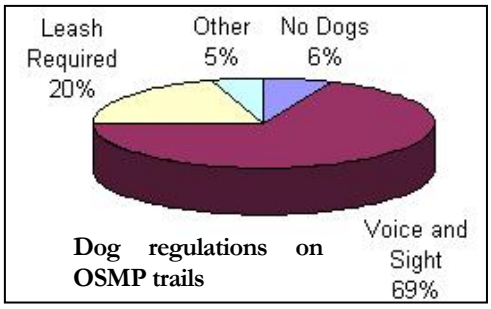
Activity Specific Access

Pedestrians

Pedestrians have considerable access to destinations on OSMP. Hiking, jogging, running and other pedestrian trail activities are allowed throughout the trail system. Although keeping to trails is encouraged through the LNT principles, visitors are not *required* to remain on the trail in most places.

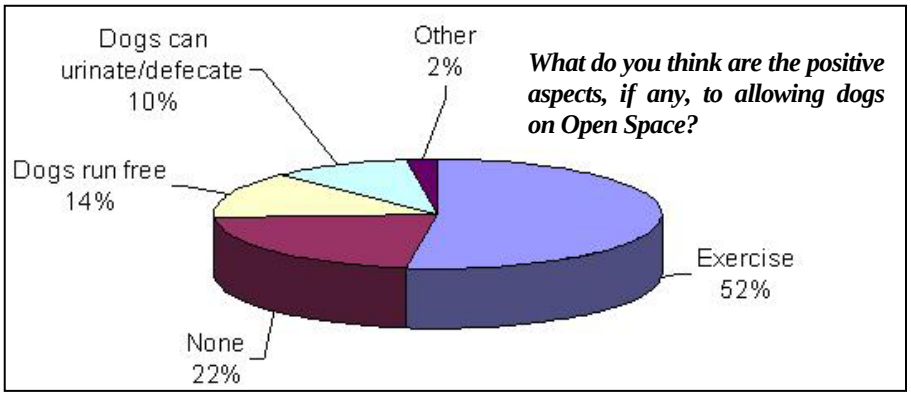
Walking of dogs

The City of Boulder is the only municipal land management agency in the Denver metropolitan area which allows dogs to be unleashed if they are kept in sight and under voice control. The majority of trails outside of city limits are open to dogs under "voice and sight" regulations. Consequently, Boulder's OSMP offers much opportunity for dogs to accompany their guardians on a hike or run. Dog walking is currently managed under the provisions of Boulder's dog management program (City of Boulder 1996). The figure to the right gives a breakdown of dog access on OSMP trails. As with other pedestrian use, dog owners are encouraged to stay on the trail. However, in the majority of the OSMP system, dogs are allowed to accompany their guardians off trails.



Dog regulations on OSMP trails

A public opinion survey was conducted in 1993 involving 1221 Boulder residents. Respondents indicated that exercise, a place to run free, and a place for dogs to relieve themselves were the most important aspects of allowing dogs on Open Space (see figure).



Climbing/Bouldering

Boulder is a popular destination for bouldering. Long a popular training component for climbers, bouldering has grown into a popular sport in its own right due in part to the growth of climbing gyms, marketing by magazines and recreational equipment companies, and the fact that it is a relatively inexpensive sport. Most of the many climbing routes and bouldering problems on Open Space and Mountain Parks are not served by designated trails. However, access to these areas is allowed. With the exception of seasonal wildlife closures, and some area closures, climbers and boulderers have currently unrestricted access to a wide range of destinations.

New trails are being formed as visitors find and popularize climbing routes and bouldering areas. The establishment and maintenance of a designated trail system serving climbing destinations would be a significant improvement to the visitor experience for climbers and boulderers.

Equestrian Use

The City Charter states that OSMP should provide specifically designated areas for horseback riding. As a matter of practice, very nearly all OSMP trails are open to equestrian use[2]. As with pedestrian uses, equestrians are encouraged to stay on trails. However, equestrians are not prohibited from off trail travel. Properties that are open to visitor use, but lack adequate horse trailer parking or pedestrian gates are functionally unavailable to equestrian use.

Bicycling

Bicycling is an exception to the rule of open access. Unlike most other activities, bikes are only permitted on trails and only on those trails that are designated for their use. About one third of the trail system (41 miles) is open to bicycles. There is very little steep or mountainous terrain or single track trails available to bicyclists. This diminishes the quality of the visitor experience for cyclists. A large system of bicycle trails is available at destinations to the west of OSMP (Boulder County's Walker Ranch and U.S. Forest Service lands). The quality of the visitor experience would be significantly improved if trail linkages were built from Boulder to the west.

Hang/Paragliding

Like climbing, these activities are reliant upon steep terrain. Hang gliders require access to ridgelines, cliffs or hills as launch sites. Hang gliders also have indicated a lack of opportunity for their activities. A temporary administrative ban on hang gliding is currently in effect with only one area open for use. Designating hang-gliding launch sites to offer a range of challenge levels would improve the visitor experience for this group.

Fishing

Fishing, like cycling and equestrian use, is allowed where specifically designated. Fishing is currently allowed in creeks and selected ponds and lakes. Fishing is enjoyed in Boulder and South Boulder Creeks as well as Sawhill Ponds, Wonderland, Teller and KOA lakes, and scattered other ponds. OSMP cooperates with the Colorado Division of Wildlife to manage local fisheries. This includes improving access to selected fishing areas while using some ponds as natural "hatcheries" for declining native fish species.

Connectivity

Another issue for those seeking access to destinations is the lack of internal connectivity at some places in the existing system of designated trails. As described above under bicycling, gaps in the trail system fragment the continuity of the visitor experience. Some other "missing links" are listed in the table below.

[2] The single exception, a section of the South Boulder Creek trail at the Bobolink trailhead is closed to equestrian use. A separate, equestrian only trail has been established to provide access to destinations in this area.

Open Space and Mountain Parks Internal Trail Connections*
from the *Boulder Valley Comprehensive Plan* (City of Boulder 2001)

Name	Start	End
East Boulder Trail	Baseline Reservoir Area	Teller Farm
Coalton Connector	Greenbelt Plateau Trailhead	Coalton Trail
Greenbelt Plateau/Flatirons Vista	Greenbelt Plateau Trailhead	Flatirons Vista Trailhead
Marshall-Superior Connector	Marshall Mesa	Town of Superior
Valmont-Gunbarrel Connector	Valmont and South Boulder Creek	63rd St. and Andrus Road

** A comprehensive trails assessment (City of Boulder 2003) has been prepared showing the approximate locations of the trail alignments listed here.*

For pedestrians, the Open Space and Mountain Parks trail system is moderately well-linked with other trail systems. Boulder Reservoir and Coot Lake, Eldorado Canyon State Park and Boulder County's Walker Ranch are directly connected via the trail system. Several of the City of Boulder Tributary Greenways trails run through Open Space and Mountain Parks providing connection with the extensive system of Boulder's Greenways. However, there are opportunities for more linkages with other trail systems. The Boulder Valley Comprehensive Plan trails map identifies proposed alignments that link the Open Space and Mountain Parks land with external trail systems.

Proposed Trail Alignments Adjacent to Open Space and Mountain Parks* from the *Boulder Valley Comprehensive Plan* (City of Boulder 2001)

- U.S. 36 (Bear Creek to Superior)
- 51st St. (Jay Road to Eagle Trailhead)
- Coal Creek Drive (Marshall to Superior)
- Eldorado Springs Drive (Mesa Trail South Trailhead to Eldorado Canyon State Park)
- Gunbarrel Ditches/Canals (Boulder Creek @ Jay to IBM)
- Boulder Feeder Canal (Boulder Reservoir to Lyons)
- Union Pacific Railroad (Boulder Creek eastward)
- Burlington Northern Railroad (IBM to Louisville)
- Eldorado Canyon to Walker Ranch (multi-use)
- Highway 93/Jefferson County

** A comprehensive trails assessment (City of Boulder 2003) has been prepared showing the approximate locations of the trail alignments listed here.*

In addition to the *Boulder Valley Comprehensive Plan* alignments presented here, Open Space and Mountain Parks has received suggestions for other new trails. A map and table describing these is available in the *Trail Assessment and Prioritization Report* (City of Boulder 2003).

Parking

As levels of use on OSMP have increased, it has become increasingly common for trailhead parking lots to fill up, especially during the cool and sunny weekends of early fall and late spring. In some areas, such as the south trailhead of the Mesa Trail, visitors are routinely turned away from the parking lots. Many visitors choose to park along roadsides creating potentially dangerous situations and conflicts with OSMP neighbors.

Disabled Access

Most of the Open Space and Mountain Parks Department's efforts towards access for the disabled have been focused upon those with physical, mostly mobility impairments. Some examples of ways in which access for the disabled has been addressed are parking spaces at all Open Space and Mountain Parks parking lots, trails at an appropriate grade for use by those in wheelchairs, a wheelchair accessible fishing dock, the production and distribution of the *Boulder Area Accessible Trails and Natural Sites Guide* (Downham et al. 2000) and accessibility information on the department-produced trails map. In addition, OSMP leases the equestrian facility at Cherryvale Ranch to Rocky Mountain Riding Therapy, a private, non-profit organization that provides services to people with a variety of disabilities.

Although OSMP is continually vigilant about providing passive recreational opportunities for all, no formal assessment has been conducted of how Open Space and Mountain Parks could better meet the needs of those with disabilities.

Transit

Boulder citizens have expressed an interest in reaching Open Space and Mountain Parks trails via public transit. Unfortunately, travel to trailhead by bus is difficult. Of the 38 trailheads, 18 are served by public transportation (see table below). Several of those are served by buses that are infrequent and scheduled to serve weekday commuters. Buses run most frequently from 7am until 7pm Monday through Friday. Peak Open Space and Mountain Parks use is on the weekend and weekday evenings. Current demand for transit to OSMP trailheads is too low for the Regional Transportation District (RTD) to modify service levels.

Justification for the rating (Good--Fair for cyclists and hang gliders)

The current situation is acceptable to visitors, with the exception of bicyclists. OSMP currently provides an extensive system of designated trails that provide a high level of access. OSMP also provides a great deal of freedom to visitors to travel off trail to destinations, which has had the unintended result of an extensive network of undesignated trails. This key attribute could be improved by providing more convenient or safer access to destinations in some locations, providing trails that diversify opportunities for bicycling, hang gliders and experiences for disabled populations and upgrading transit service to trailheads.

Key Attribute: Aesthetic Attractiveness Rating: Very Good (coarse scale) Fair (fine scale)

Many visitors to OSMP come to experience the sights, sounds, smells and environments that only exist in wild places. The potential to see a hunting fox from a forest trail is intriguing and inviting. These lands offer myriad vistas and intricacies to captivate the eye, mind and heart.

Overall Setting

The dominant aesthetic element on OSMP is the expansive and open vistas. Whether viewed from the eastern plains westward to the foothills and the Front Range, or from the hogbacks eastward, OSMP lands afford panoramic views and a sense of expansiveness and openness.

Trail Setting

Trails should be woven into an area to provide close contact with nature rather than merely passing through an area. A great deal of visitors' enjoyment is dependent upon the quality of their travel along a trail. Satisfying trail experiences emerge from siting and design aimed at providing a consistently pleasing experience. This includes considerations of trail surface, alignment, length and difficulty. Well designed trails include variety, build suspense and cultivate a sense of curiosity and exploration. Many Open Space and Mountain Parks trails meet these conditions.

Some trails are located in settings with low aesthetic appeal. These include trails built adjacent to a busy roadway, under power lines, near backyards of residential lots or in narrow (<100' wide), fenced corridors. A recent review (Jones and Armstead 2002) of Open Space and Mountain Parks trails shows that approximately

eight percent (8%) of the trail system met one or more of these criteria. In some cases, trail placement in unattractive areas was unavoidable to address resource concerns.

Animal Excrement

The failure of some dog guardians to remove dog waste is an aesthetic issue on OSMP. Many visitors do not clean up after their pets. In a recent study (Mertz 2002), observers recorded the number of defecating dogs along several OSMP trails. The observer recorded whether or not the excrement was picked up and deposited in a trash can. Forty-one percent of those observed with defecating dogs failed to pick up after their dogs. The intensity of this situation has been documented in a local study that reported over 1,400 piles of dog excrement over a distance of approximately one mile on the Sanitas Valley trail (Murphy 2003). In a 1993 citizen survey, the failure of dog owners to remove dog feces was identified by 31% of respondents as a negative aspect of allowing dogs on open space (City of Boulder 1993). The aesthetic impact of dog excrement most degrades the visitor experience along several of the most popular trails.

In addition to the concern over dog excrement, a few visitors have expressed concerns about the aesthetic impact of cow and horse manure on trails. On narrow trails, manure piles can be difficult to step around while keeping to the trail. For some, the presence of horse manure degrades the condition of their experience.

Erosion/Gullying

The visual impact of erosion and gullying detracts from the aesthetic attractiveness of the visitor experience. Trampling and soil compaction caused by visitors and livestock have resulted in bare and eroded ground in heavily used areas. The effect is most dramatic where high levels of use, cattle grazing, poorly constructed trails, highly erodable soils and steep terrain coincide.

Litter

Litter is an isolated problem, confined mostly to trailhead parking lots and pull-offs along Flagstaff road where beer and liquor bottles are left behind and at picnic areas where visitors sometimes fail to clean up after themselves. Littering is typically not a problem along trails.

Other

Vandalism and noise (amplified music, barking dogs) can degrade the aesthetic qualities of natural areas. However, these are uncommon and isolated occurrences.

Justification for the rating: Very Good (coarse scale); Fair (fine scale)

OSMP lands offer world class scenery and vistas. Much of the attractiveness of the land system as a recreational destination stems from the beauty of the surroundings. However, at a finer scale, the current situation for aesthetic attractiveness requires improvement. Dog excrement degrades the visitor experience in localized areas, especially near trailheads. Trail improvements are also needed to eliminate trail erosion / gullying in key areas.

Key Attribute: Conflict — Rating: Fair

Conflict results when behaviors of one or more visitors interfere with others visitors' ability to achieve desired experiences. Conflict degrades the quality of the visitor experience. In a recent survey, only 13% of those interviewed responded that they considered that conflicts among recreational activities were minimal (PIC 1999). Twelve percent of those interviewed either did not use open space or chose not to answer this question (PIC 1999). More striking is the fact that 75% of respondents indicated there were notable conflicts between recreational activities.

The effects of this conflict have not been well described. The same 1999 survey asked if people were using particular areas less often or if people had stopped using areas because of conflict. The majority (80%) of respondents indicated that they had not changed their use patterns. Those who did either reduce (9%) or stop (10%) using areas gave the reasons listed below for their change in behavior.

Reasons for Change in Use
from PIC 1999

Reason	Percent of those who altered use	Percent of all respondents
Getting too crowded	36	6.84
Dog issues	19	3.61
Miscellaneous	10	1.90
Conflicting activities	7	1.33

These results suggest that crowding and conflict account for the majority of change in use patterns. The numbers of visitors changing their patterns of use are low is not insignificant. Assuming that the survey uniformly reflects the population of users, 478,000 visits to OSMP were affected by one or more of these factors. While some natural redistribution among visitors is expected, these numbers represent an unacceptably high number of disruptions in use patterns.

Several studies of multiple-use trails have investigated the question of user conflict. A survey of 83 managers of rail-to-trail projects reported “no” or "few if any" conflicts. The most common type of conflicts reported was between hikers and bikers, followed by conflicts between equestrians and bikers. Conflicts involving in-line skaters, cross-country skiers, and dogs were also reported (Moore et al. 1992, cited in Moore 1994). The same study also interviewed trail users and included the question "What things did you like least about the trail?" Of 2,128 comments, 316 (about 15%) related to the behaviors of others. The most common comment (239) was about bicyclists being inconsiderate, riding two-abreast, passing with no warning, going too fast, and other unspecified concerns about cyclists. In 1999 (PIC 1999), citizens of Boulder were asked an open ended question to identify specific activities in conflict on Open Space lands. The results are given below.

Survey response

Question: *What specific recreational activities would you say are in conflict with other specific activities?*

Reported cause of conflict	Respondents indicating conflict	Percent of Open Space and Mountain Parks visitors engaged in activity
Mountain Bikers	27%	11%
Dogs/Dog guardians	26%	20%
Horses/Equestrians	6%	1%

Conflicts with bikers were most associated with passing without warning, failing to yield, failing to staying on trail, and traveling at high speed. Dog-related conflicts were typically attributed to guardians not complying with the City of Boulder’s dog control ordinances[3]. Conflicts with horses focused upon the large size of horses, their perceived unpredictability, and the presence of horse manure on the trails.

Mountain Biking

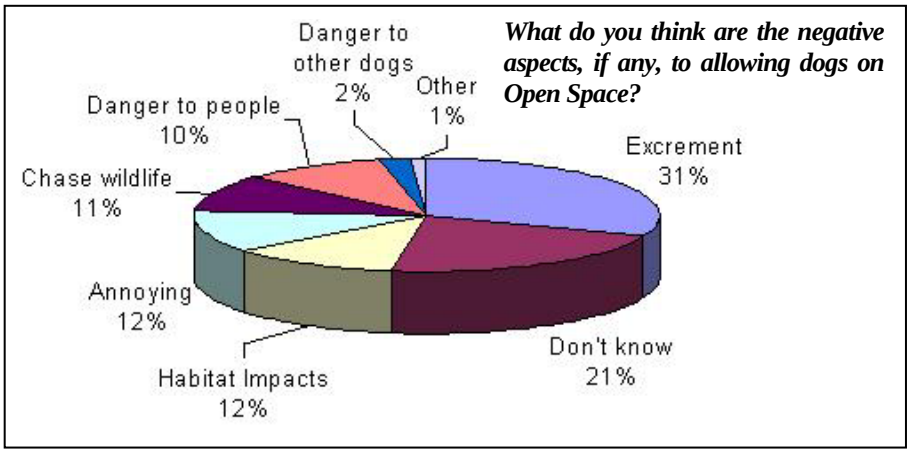
Cycling on OSMP is restricted to approximately one third of the OSMP trail system. Trails are open to cyclists where the opportunity for conflict with other uses was considered to be lowest. As with other visitor groups, most cyclists follow the “rules of the road.” However, fast cyclists and those who do not provide warning of their approach can create unsafe conditions. OSMP rangers report occasional collisions between hikers and cyclists. There are three areas where safety issues are most pronounced: 1) Marshall Mesa trailhead, 2) Foothills Trail near the railroad grade and 3) Foothills Trail as the trail approaches Wonderland Lake from the north. Each of these locations is at the bottom of a hill where bikes tend to be moving fastest.

[3] Although the survey identified “dogs” as the focus, the concern was actually over the behavior of dog guardians. Specific concerns were failing to keep dogs from approaching or jumping on other users or dogs, allowing dogs to chase/harass wildlife and failing to pick up dog excrement.

Behavior of Some Dog Guardians

Like all users, dog guardians seek to avoid conflict with others. Many OSMP visitors enjoy interacting with dogs or having their dogs interact with other dogs. However, when not properly controlled by their guardians, dogs can disturb, jump upon, knock over, frighten, and injure visitors or their companion animals.

A public opinion survey was conducted 1993 involving 1,221 Boulder residents. The respondents most frequently indicated that excrement, and conflicts with visitors and other dogs (annoying, danger to people, danger to other dogs) were negative aspects of allowing dogs on Open Space (see figure below). The impacts of non-compliance with excrement removal regulations is discussed under the key attribute "aesthetics".



In an observational study (Mertz 2002) at seven trailheads, investigators found that 5% of dogs observed charged, chased, or showed aggression towards people or other dogs.

The City's dog management plan, adopted in 1996, called for long-term monitoring to measure the success of the program and provide information for future decisions. Unfortunately, a monitoring system was not developed that could assess the effectiveness of the dog management program's goals. City staff did develop a method for tracking summonses, warnings, public comment and incident reports[4]. Unfortunately this database cannot be used to reliably estimate the rate of conflict with dogs. .

However, the database does provide documentation that the behavior of some dogs and some dog guardians results in conflict. These types of conflict occur and OSMP considers them to be significant issues, even if they may not be the dominant experience.

Dog/Human Conflicts

- Dog/human conflicts range from a temporary scare to the inconvenience and expense of an emergency room visit.

- Some dogs approach, paw, lick, run into and jump upon people, who do not wish them to. These are special problems for the young, elderly and infirm. Conflict of this sort has several different outcomes including frightening visitors, soiling or damaging their clothing, injuring them, and some visitors require medical attention after being knocked over by a dog.

- Some dogs bite people. Some dog bites do not break the skin, but result in bruising or tearing of clothing. In other instances visitors require medical attention. Dog bites carry with them the danger of rabies and the uncertainty of the rabies danger if the dog can not found or identified. Serious injuries can result in loss of time at work and leisure activities.

Dog/Dog Conflicts

- Some dogs attack other dogs and other companion animals. Sometimes the attacks spook or frighten the owners or their companion animals. Sometimes the attack results in an injury. Sometimes the attack results in injuries necessitating veterinary care with the associated costs and inconveniences.

[4] "Incident" is a term used by rangers to describe an event requiring their attention or a response that is either of complexity or scale to require formal documentation. Incident reports are typically used to document the response and actions of the rangers, Department, and other agencies (e.g. ambulance, sheriff, fire departments).

Other Dog-related Conflicts

- Some visitors' experience is degraded by the unsettling nature of dogs harassing or attacking other visitors, other dogs, farm animals and wildlife.

- Some incidents with dogs can result in altercations between people. Sometimes this is merely an unpleasant verbal exchange, however it can also result in individuals hitting dogs or assaulting each other.

Horses

Equestrians also seek to reduce the likelihood of safety issues. However, visitors are intimidated by the bulk and perceived unpredictability of horses. Visitors have occasionally been injured, sometimes seriously by horses. Equestrian use of the OSMP system is relatively low, estimated at approximately 6%.

Justification for the rating: Fair

The current situation needs improvement. While most visitors do not feel that conflict with other users detracts from the quality of their experience in OSMP, survey results show that over 400,000 visits each year may be degraded to the point visitors change their behavior. The major improvements needed include reducing the number of adverse visitor contacts with dogs, reducing cyclists' speed and increasing the frequency of warnings to other visitors.

Key Attribute: Safety — Rating: Fair

OSMP promptly addresses localized and avoidable safety issues which come to the attention of the department. The Department in general, but the rangers and trails maintenance staff act upon public safety concerns as the number-one priority.

Risks are inherent in agricultural and wildland settings. Poisonous snakes, lightning, disease-bearing animals, mountain lions, black bear, and hypothermia can seriously injure or kill people. Barbed wire, poison ivy and stinging insects also pose significant but somewhat less serious risks. Whenever and wherever possible, the OSMP Department seeks to reduce the likelihood that visitors will encounter hazardous situations. The Department staff provide, among other services, placement and maintenance of warning signs and law enforcement and emergency response on OSMP lands. From January 2000 through July 2003, OSMP rangers responded to 168 law enforcement incidents, 103 medical emergencies, participated in 32 search operations and responded to 30 reports of fire. OSMP staff also contributes to public safety by teaching and providing written material about how visitors can avoid dangerous situations.

Conflict and safety overlap. Some safety concerns associated with particular uses are presented in the discussion of the key attribute "conflict."

Criminal Activity

Criminal activity is very rare and tends to be localized on Open Space and Mountain Parks. There are approximately 20 to 30 vehicle break-ins in parking lots each year (S. Armstead pers. comm.). Thefts resulting in property damage (smashed vehicle windows) or loss significantly degrade a visitor's experience. Permanent signs are posted at many trailhead parking lots, advising people about how to reduce the likelihood of break-ins. In addition, OSMP, in cooperation with the Boulder County sheriff's office, provides this same information in periodic press releases. There are approximately10 to 20 reports of indecent exposure on OSMP lands each year in recent years. OSMP rangers respond to these reports because of concerns for visitor safety.

Historic Mining

There are no known unsecured mine openings on OSMP lands. Historic mining activities in the Marshall area created conditions where ground subsidence is possible. Conversations with staff at the Colorado Department of Natural Resources, Division of Mining and Geology (DMG) suggest that there are no easily queried databases that would provide information to assess hazards associated with mining activity. DMG staff further suggested that subsidence dangers in the Marshall area are possible, but it would be difficult to predict where and when subsidence may occur.

Trail Crossings

There are several places where designated trails cross roadways at grade (e.g. East Boulder Trail at Valmont Road, Foothills Trail at Lee Hill Road, Community Ditch Trail at Colorado State Highway 93, and multiple crossings of Flagstaff Road and on the Flagstaff Trail). There are additional locations where no crossing is recommended, but visitors often choose to cross a roadway to use another section of the OSMP trail system. These crossings require navigating busy roads or highways. The table below lists the road crossings for existing trails and the current status of improvements to address visitor safety (e.g. striped intersection, warning signs along roadway). Addressing these problems will require notification of and action by the governmental entities that own and manage the roads and rights of way (e.g. Boulder County, the State of Colorado).

Crossings*

Trail	Road Crossing	Existing Crossing Improvements
Sanitas/Centennial Trailheads	Sunshine Canyon Drive	Stripes
Cottontail Trail	Mineral Road (Hwy. 52)	None
Cottonwood Trail	Independence Road	None
East Boulder Trail	Valmont Road	Stripes/signs on roadway
Foothills Trail	Lee Hill Road	Stripes/signs on roadway
Fourmile Canyon Creek Trail	Diagonal Highway	Informal use of Fourmile Canyon Creek underpass
Fourmile Canyon Creek Trail	Burlington Northern RR	None
Flagstaff Trail	Flagstaff Rd	Stripes/signs on roadway
South Boulder Creek Trail	Highway 93	None
Flagstaff parking areas	Flagstaff Road	
South Mesa Trailhead /Doudy Draw Trail	Eldorado Springs Drive	None
Greenbelt Plateau Trail	Highways 121/93	None
Community Ditch Trail	Highway 93	None

** A comprehensive trails assessment (City of Boulder 2003) has been prepared showing the approximate locations of the road crossings listed here.*

Roadside Parking

Visitors commonly park along roadsides to access Open Space and Mountain Parks properties. Many informal roadside parking areas have become heavily used. Because of poor sight lines and high traffic volume and speed, some of these areas are of concern (Flagstaff Road, Baseline Road near the Bobolink and Dry Creek trailheads, Eldorado Canyon, Hwy 93 near Community Ditch, and Marshall Road near the Marshall Mesa trailhead). As with crossings, resolution of this concern will require notification of, consultation with and action by the entities which own and manage the roads and rights-of-way.

Livestock

Livestock can injure OSMP visitors. However, most livestock tend to shy away from human activity. The greatest potential for safety issues arises where grazing areas are not segregated from trails by fences. The unpredictability of livestock is higher during calving season when cows are more likely to interpret human activity as a threat to their young.

Visitors have occasionally reported concerns about aggressive livestock since the start of the Open Space program. In some cases, people have been concerned about bulls or cattle with long horns in fields adjacent to trails. Other people have reported concerns about how closely cattle have approached them. However, until recently, there were no reports of livestock coming into unwanted contact with trail users or other OSMP visitors.

In 2003 there were two such reports. One visitor alleged that she was injured when a cow knocked her down. Another visitor reported that he had been butted by two cows. Both of these incidents involved nursing cows in fields where the trails are not separated from grazing areas by fences.

Justification for the rating (Fair)
The current situation needs improvement. While most visitors may not perceive significant threats to their safety, significant improvements can be made in providing safe trail crossings across busy roads and better management where parking overflows from OSMP lots onto busy roads.

Key Attribute: Remoteness — Rating: Very Good

This factor is related in part to crowding but especially addresses the visitors' desire to leave their fast-paced lives behind. At the western edge of the City land slopes upward dramatically and grows wilder. Exchanging a road for a trail at the edge of town can lead to opportunities to see a black bear or hear the call of a falcon hailing its mate. Elsewhere on OSMP, visitors can lose themselves in extensive grasslands out of sight of roads or human settlement where hawks hunt prairie dogs and coyotes lope through the mosaic of grasslands. This proximity to truly wild life, carrying on wild lives, is unusual. It is an accomplishment based on the foresight of citizens who started protecting this land. Many visitors revel in the remote experience and consider the protection of these nearby lands with pride.

While the Open Space and Mountain Parks land system may not be wilderness, it does provide an uncommonly good opportunity near an urban area for visitors to get far from built up areas and other people. An hour long walk into the foothills can still provide a visitor with a near-wilderness experience. In some places even shorter hikes lead to quiet refuges dominated by natural sights, sounds and smells.

The large number of surrounding cities and neighborhoods limits the degree to which OSMP can be truly remote. With each year of increasing use, the likelihood of not seeing others on a hike decreases, leading some visitors further away from trailheads.

Justification for the rating (Very Good)
The current situation is acceptable or better for most visitors. Given the proximity of OSMP natural and agricultural lands to urban and suburban development, OSMP lands offer considerable opportunities for getting away from city life, experiencing nature, and recreating in uncrowded situations. These opportunities are possible because of the physical remoteness of mountain terrain, large open stretches of land, and management that has preserved remnant patches of nature.

Key Attribute: Variety of activities — Rating: Very Good

Boulder's Charter states that Open Space lands are intended for certain purposes. Among them is "passive recreation use". Hiking, photography and nature studies are given as examples of passive recreation. Bicycling, horseback riding, and fishing are also listed in the Charter as examples of passive recreation "if specially designated". The first Visitor Plan Advisory Committee deliberated on the concept on "passive recreation" and provided the following definition for passive recreation (City of Boulder 2000b):

Non-motorized activities that:

- Offer constructive, restorative, and pleasurable human benefits that foster appreciation and understanding of Open Space and its purposes
- Are compatible with other passive recreational uses

- Do not have significant adverse impacts to natural, cultural, scientific, or agricultural values
- Occur in an Open Space setting, which is an integral part of the experience
- Require only minimal visitor facilities and services directly related to safety and minimizing passive recreational impacts

The first Visitor Plan Advisory Committee also developed a methodology for reviewing activities not mentioned in the Charter to determine if they should be considered passive recreation. A wide range of passive recreation activities are allowed on Open Space and Mountain Parks lands (see tables below).

Recreational Activities on OSMP Lands August 2003

These activities are subject to seasonal, or site specific restrictions

Activities currently allowed on OSMP lands

- Hiking
- Running
- Nature study
- Photography
- Picnicking
- Cross-country skiing and snowshoeing
- Rock climbing
- Bouldering
- Dog walking

Activities currently allowed where specially designated

- Fishing
- Sledding
- Boating*
- Horseback riding**
- Bolted climbing
- Hang/paragliding
- Wading (in streams only)
- Wheeled Vehicles
  - Bicycles
  - Horse-drawn wagons or sleds
  - Dog sleds (wheeled)
  - Strollers / joggers
  - In-line skates
  - Skateboards

Activities currently prohibited on OSMP lands

- Motorized vehicles (including motorized boats)
- Hunting
- Competitive events
- Organized sports
- Use of firearms, including bows and paintball guns
- Collection of natural features
- Swimming
- Wading (in ponds, lakes and reservoirs)
- Hot air ballooning
- Camping (except at 4th-of-July campground)
- Golfing

**Currently allowed unless an area is posted as closed to boating. Boats must not exceed 17 feet in length.*
***Under the provisions of the City Charter, horseback riding is allowed where designated. Horseback riding is currently allowed throughout Open Space and Mountain Parks lands*

Participation in Selected Activities on OSMP (2001 Estimates)

Activity	Open Space Percent*	Mountain Parks Percent*	Overall Percentage of Visits*
Hiking	29%	71%	47%
Jogging/Running	39%	7%	26%
Exercising pets	21%	19%	20%
Bicycling	17%	3%	11%
Wildlife viewing	2%	19%	9%
Scenic driving/viewing	0%	13%	6%
Photography	<1%	9%	4%
Contemplation/meditation	<1%	8%	3%
Climbing	<1%	7%	3%
Nature study/appreciation	0%	6%	2%
Picnicking	0%	3%	1%
Horseback riding	2%	<1%	1%
Fishing	1%	0%	1%

Activity	Open Space Percent*	Mountain Parks Percent*	Overall Percentage of Visits*
Social gathering	0%	1%	1%
Hang gliding, paragliding	<1%	0%	<1%
Radio controlled gliders	<1%	0%	<1%
Other	4%	2%	3%

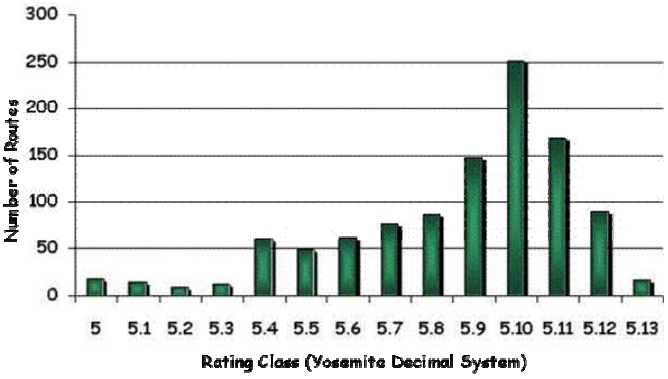
*Columns do not add to 100% because respondents could select more than one activity

Challenge Levels

In addition to providing a variety of activities, the diverse terrain of Open Space and Mountain Parks offers most visitors a range of challenge levels.

Runners, hikers, joggers and dog walkers can choose the level terrain of the plains, steep trails in the foothills or a mixture of both. Equestrians enjoy a wide variety of experiences on OSMP lands.

Climbing routes on Open Space and Mountain Parks offer a wide distribution of difficulties (see figure). A similarly wide range of bouldering problems are offered on OSMP lands. Recently a pilot program has been established to increase sport climbing opportunities in the Dinosaur Mountain area.



Climbers choose from routes that cross the spectrum of difficulty on Open Space and Mountain Parks (higher numbers are more difficult routes).

The diversity of plants and animals can provide a lifetime of challenge and interest for naturalists. Changing season and weather overlay the wide variety of natural and agricultural settings and a sprinkling of historic sites to offer an endless variety for photographers, painters and other artists inspired by OSMP. OSMP continues a long term relationship with the Colorado Division of Wildlife to develop a variety of ecologically compatible sport fishing opportunities in OSMP lakes and creeks.

As described under the key attribute: **access to destinations,** the extent and variety of cycling and hang gliding opportunities are limited. The Department is working with to identify sites or access to areas managed by others that will provide a range of challenge levels without creating significant resource impacts.

Justification for the rating (Good) (Fair for cycling and hang gliding)

The current situation is acceptable or better for most visitors. In its diverse natural and agricultural terrain, OSMP offers wide variety in the type and challenge level of recreational and educational opportunities. There is a demand for expanding the extent and challenge level of some activities, such as bicycling and hang/ paragliding.

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The Visitor Experience: Future Trends

The Visitor Master Plan has a ten year planning horizon. Therefore it is necessary to consider the relevant trends as well as the current condition. Important trends affecting the visitor experience all point toward increasing recreational use of OSMP.

Local and regional population has been growing rapidly over the past decades. For example, from 1980-2000, the population of Boulder County increased by 53% (State of Colorado 2003). Population changes for the City of Boulder and nearby municipalities from 1970-2000 and 1990-2000 are provided in the table below (note the values are ***percentages***.)

Percent Change in Populations (DRCOG 2003a)

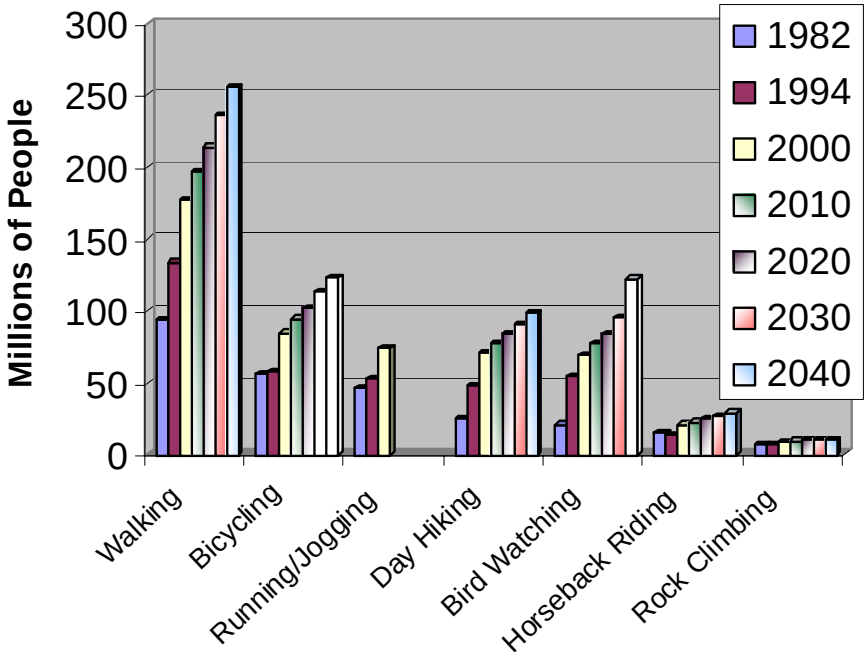
City	1970-2000	1990-2000	City	1970-2000	1990-2000
Boulder	42	14	Louisville	686	53
Arvada	105	14	Broomfield	427	55
Golden	75	31	Lafayette	563	59
Westminster	417	35	Erie	477	400
Longmont	206	38	Superior	5,170	3,434

Despite the recent softening of the economy, continued growth is predicted for the Front Range and the Denver metropolitan area (DRCOG 2003b). Population forecasts for the regional statistical areas around Boulder are provided in the table below. The state demographer has estimated a 16% increase in the population of Boulder County between 2000 and 2010 (State of Colorado 2002)

Regional Population Forecast, by Regional Statistical Area (DRCOG 2003b)

Area	2000 Population	Population Forecast 2020	Change	Forecast *Annual* Growth Rate
Arvada	72,003	82,417	10,414	0.72%
Boulder - Mountains	16,959	20,127	3,168	0.93%
Boulder - TriCities	74,929	108,731	33,802	2.26%
Boulder City - North	40,172	43,098	2,926	0.36%
Boulder City - Periphery	26,977	33,107	6,130	1.14%
Boulder City - South	51,880	57,857	5,977	0.58%
Golden	27,562	47,094	19,532	3.54%
JeffCo - Northwest	5,282	8,997	3,715	3.52%
Longmont	75,940	92,992	17,052	1.12%
Standley Lake	84,152	100,124	15,972	0.95%

National trends in recreational activities indicate that higher percentages of the population are recreating now than in the past (Cordell 1999, 2002a 2002b). This is due in part to the health benefits associated with an active lifestyle, marketing and promotion by the outdoor equipment industry, and the increasing availability of access information through traditional publications and the internet. This trend is expected to continue. (Cordell 1999, 2002a, 2002b). The figure below summarizes some information about the growth and growth trends of selected recreational activities.



Historical and projected trends in outdoor recreation.
from Cordell 1999, 2002a, 2002b

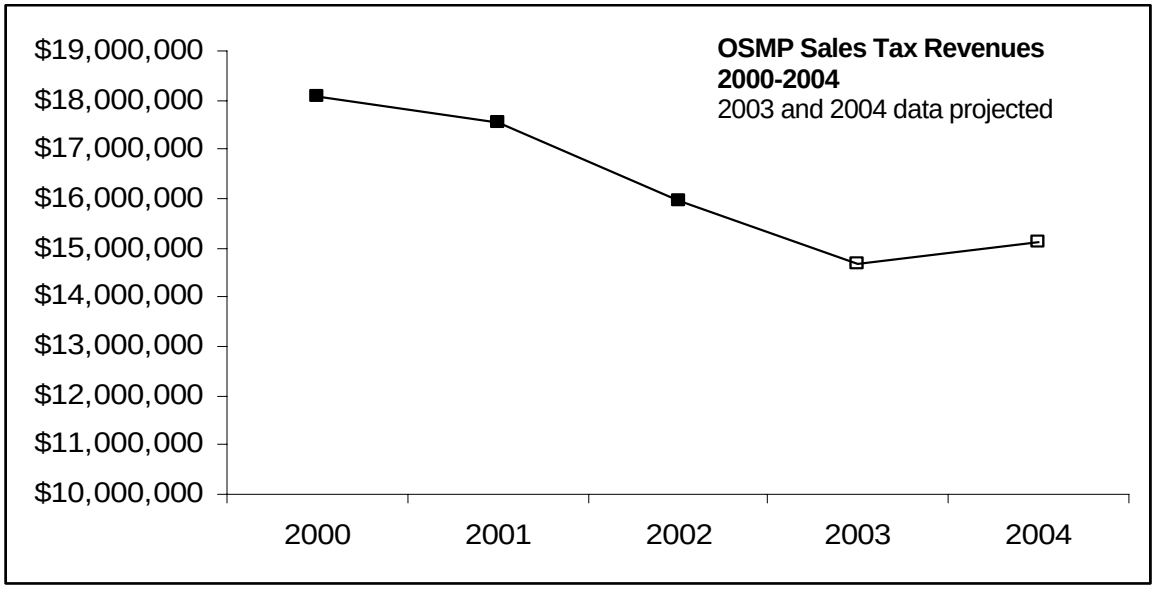
Increasing population and interest in outdoor recreation are part of the demand side of the equation. A third trend is apparent when examining the supply side. Regionally, the open space land base has been growing much more slowly than demand for passive recreation. Undeveloped lands are disappearing as residential and commercial land uses are developed in communities surrounding Boulder. The recent explosive residential growth of Superior and commercial development in Broomfield are two obvious examples of this trend. Land values continue to increase. Most communities, even those with open space programs, find themselves unable to make purchases to adequately satisfy the recreational needs of their own residents. The result is that Boulder and other communities with well-developed open space programs become regional providers of outdoor recreation for other communities.

Increasing use will generate new demands on OSMP programs. Education staff will face the need to not only increase offerings but develop new techniques to reach different and larger audiences. It is likely that law enforcement and emergency response will increase at least in proportion to visitation. New law enforcement issues may also emerge with increasing numbers of visitors. Maintaining acceptable aesthetic conditions through education and enforcement will be more difficult with more visitors and more dogs. It may become a greater challenge to provide opportunities for solitude as visitors compete for remote settings. Conflicts among users are also likely to increase.

An indication of the need for management strategies to address future conflicts has been described in *The Daily Camera* (Reid and Butler 2003). The newspaper article described a trend referred to as “recreational rage.” The authors describe this phenomenon as visitors acting aggressively toward each other. Some of the causes

suggested are, high levels of stress, little ability among the general population to manage stress, and increasing numbers of interactions among people on the trail system. When there is a perceived failure in trail etiquette, people can respond angrily. Records of aggressive behaviors by visitors on OSMP lands are uncommon. However it is unclear how often incidents or rage occur or what percentage of them is reported to authorities. The authors cite anecdotal evidence that "rec rage" may be increasing.

Economic trends in Boulder have reduced the capacity of OSMP to provide visitor services. The OSMP Department is almost fully funded from sales tax revenues. Over the past three years, the department's sales tax revenues have declined nearly 19%. A large portion of this revenue is used for non-discretionary payments for prior real estate purchases, leaving flexibility only in matters of new land acquisition and management. A very slight recovery is projected for 2004, but such increases will not restore revenues to year 2000 levels.



Summary: The Visitor Experience

The visitor experience can be described in terms of seven key factors: connection with the land, access to destinations, aesthetics, remoteness, conflict, variety of recreational activities, and safety. Currently, the quality of the visitor experience is quite high. OSMP is a popular destination for citizens of Boulder and surrounding communities. The system receives millions of visits--more than Rocky Mountain National Park. Citizen surveys consistently conclude that the quality of the visitor experience is very high.

This analysis identifies programs and policies that are currently supporting the quality visitor experience as well as new initiatives needed to address unacceptable conditions or head off trends which may adversely affect the visitor experience.

Maintaining the "Good" and "Very Good" Ratings

The OSMP provides a number of facilities and services to maintain the quality of the visitor experience. A key element in supporting all of the key factors is the systems of trails and trailheads. This infrastructure provides safe access to a variety of environments and recreational destinations *while* facilitating connections between people and the land. OSMP also offers programming focused upon sharing information about the OSMP lands and deepening the connections between people and the landscape through interpretive events, volunteerism, a youth work program, community outreach and ranger activities.

OSMP policies also support the quality of the visitor experience. Visitors highly value the current policy of open access to the land system, and the opportunity to have their dogs accompany them off leash.

Improving the "Fair" Ratings

The most significant issues affecting the quality of the visitor experience are

- gaps in the trail system,
- safety issues related to road crossings,
- lack of variety in the experiences available to cyclists and hang gliders,
- impacts of dog excrement upon aesthetic attractiveness, and
- conflicts among visitors, especially conflicts involving cyclists who do not follow proper trail etiquette and non-compliance with dog voice and sight regulations

Anticipating the Future

Given trends for increasing demands for outdoor recreation and no increases in regional supply, OSMP will face increasing numbers of visitors. If OSMP's role as a regional recreation destination increases, we face the opportunity to build environmental connections with a larger and more diverse audience. We also expect to see an increase in the severity of those issues that are closely related to use levels. For example, the rates of conflict and aesthetic impacts are likely to increase with higher levels of visitation. Increasing number of OSMP visitors will put new pressures on existing programs and may require that we reexamine the ways in which we offer education and enforce regulations.

Visitor Infrastructure: OSMP Trails

Open Space and Mountain Parks uses a system of trails, trailheads and other facilities to enhance the visitor experience and help ensure that recreational use does not have a significant adverse effect upon other resources. The ways in which trails are designed, constructed and maintained have implications for both the quality of the visitor experience, and the compatibility of that experience with resource conservation. Properly designed, constructed and maintained trails encourage visitors to stay on them because they provide the easiest and safest routes to their destinations (Byers et al. 2000)

There are currently, 130 miles of designated trails, 1,000 named climbing routes, 38 trailheads as well as two nature centers, fishing piers, several interpretive trails, picnic areas, restrooms, trashcans, and other miscellaneous facilities. Public opinion surveys and summaries of public comment have not revealed significant concerns about the availability of most facilities. The most consistent comment has been a desire for restrooms at more trailheads.

The greatest concerns about OSMP infrastructure concern the sustainability of trails. Public comment and staff concern are squarely focused upon this as a critical component for the Visitor Master Plan. Clearly, trails and the visitor infrastructure are related. Consider the key attribute descriptions for the visitor experience. “Access to destinations,” “aesthetics,” “safety” and “variety” are closely linked to the OSMP trail system. Despite their close association, it appears that visitors can express a high level of satisfaction in the experience provided by a trail system that is in poor condition. Trails were separated out as a separate planning target because the condition of the visitor experience and the condition of the trail system can vary independently of each other.

Our goal is for a sustainable trail system. Trail sustainability can be characterized by three key attributes, **physical sustainability, maintenance condition and engendering stewardship.**

Key Attributes for the Visitor Infrastructure

- **Physical Sustainability**
- **Maintenance Condition**
- **Engendering stewardship**

Key Attribute: Physical Sustainability **Rating: Fair**

A trail or other facility is physically sustainable when it is able to continually accommodate all physical forces acting upon it, both natural and human-caused, with regular maintenance and without damage to the surrounding area (Parker in prep.).

The composition of the trail tread, slope and aspect are environmental variables which control the physical sustainability of a trail. Compaction, displacement and erosion are important processes that can lead to the degradation of trails. The relationships among these factors can be used to anticipate and resolve trail sustainability problems.

On the Open Space and Mountain Parks system this relationship is played out in the contrast between some trails on the plains and those in the foothills. On the flat terrain of the prairie grasslands, trails are often converted farm roads on generally level terrain. Although subject to compaction, these trails are not as erosion prone as the steeply pitched trails built upon the highly erodable gravelly soils of the mountain backdrop. However, trails on level terrain are susceptible to “cupping” or deepening and may need special design to prevent incremental widening. Many trails lack the structures and tread design needed to accommodate the types and level of use that they receive. This creates an unsustainable situation, as trail tread deepens it becomes an attractive course for water to drain after rain or during snowmelt, further entrenching the trail. As the trail gets deeper it becomes a more efficient water course increasing rates of erosion and deposition.

Boulder’s land managers have known for several years that many of the trails, particularly those in the mountain backdrop, are not physically sustainable (City of Boulder 1983, Brown, et al. 1992). In 2003, OSMP re-

assessed the physical sustainability of the trails system. A staff team involved in this project identified over 16 trail miles spread over 31 trails that are not physically sustainable. All are in need of reconstruction or relocation. Almost all are located in the mountain backdrop (City of Boulder 2003).

In addition to designated trail mileage that is not physically sustainable, there are many unsustainable **un**designated trails as well. Some of these trails are the only access to popular destinations, but were never properly designed or constructed. Staff has identified 38 areas with concentrations of undesignated trails, many of which are unsustainable. Each of these areas poses complex management decisions about whether and how to provide access, stabilize disturbed areas and reclaim closed areas. In recognition of the difficulty of improving the situation in these places, they have been referred to as "management challenge areas" (City of Boulder 2003).

Trailheads, access points and picnic areas have been also been evaluated for physical sustainability. The evaluation found that degradation is widespread. As with trails, the least physically sustainable facilities are located in the mountain backdrop.

More information about the physical sustainability assessment for trails and other facilities as well as maps showing their locations can be found in the *Trail Assessment and Prioritization Report* (City of Boulder, 2003)

Justification for the rating: Fair
The current situation needs significant improvement quickly. Extensive portions of the trail system and other facilities are significantly degraded. The degradation is so severe and widespread that OSMP considers this key factor to be close to "Poor". While restoration is possible, it will continue far beyond the ten-year horizon being contemplated in the Visitor Master Plan.

Key Attribute: Maintenance Condition — Rating: Fair

Lack of maintenance alone does not imply that a trail is physically unsustainable. However, a trail or portion of a trail might be in unacceptable condition because it has not been regularly maintained. "Maintenance condition" is a key attribute that refers to the degree to which a trail receives adequate repairs to ensure its long term sustainability. Maintenance includes minor repairs and preventative measures designed to avoid more serious problems later. Typical maintenance activities include cleaning and repairing drainage features, maintaining side slopes to minimize erosion, filling low areas where water pools, defining the trail edge, clearing the trail of debris, etc. (City of Boulder 2003).

An inventory of maintenance condition is undertaken each spring to identify and prioritize maintenance needs. At this time no consolidated inventory reports are available. However, information on annual expenditures of time and money has been summarized (City of Boulder 2003). About 29,000 hours and $350,000 are required annually to maintain the existing system of OSMP **designated** trails. The majority (approximately 80%) of these resources are needed to maintain mountain trails.

In addition to trail maintenance, OSMP maintains trailheads and parking areas. Trailhead maintenance includes a wide variety of time consuming tasks (see below).

Trailhead Maintenance Tasks

- Mowing
- Outhouses (cleaning, painting, repair)
- Fencing (replacing/repair corral fencing, repairing gates)
- Potholes
- Education/Information board repair
- Trash cans (regular trash haul, replacement of cans)
- Dog excrement bag dispensers
- Graffiti removal
- Benches (sand and repaint)
- General repairs from wear and tear/vandalism

Trailheads and parking areas have been a maintenance priority for OSMP because of their role in greeting visitors. Since the merger of the Open Space and Mountain Parks Programs there have been staff and funding reductions making it necessary to divert funding from a variety of OSMP projects to cover the expenses and staff time needed to maintain trailheads.

Beginning with the merger of the Open Space and Mountain Parks Programs and continuing because of more recent budget restrictions staffing levels for trail construction and maintenance have dropped precipitously. Wear and tear from increasing use and decreasing capacity for maintenance and reconstruction has resulted in deferred maintenance over much of the trail system for several years.

Maintenance work has historically been undertaken by seasonal adult trail crews and seasonal junior ranger crews. The seasonal workforce dedicated to trail maintenance and construction has been reduced significantly since the merger of the Open Space and Mountain Parks programs. Capacity for trail maintenance was further diminished by the reallocation of adult trail crew coordinators to other projects, primarily trailhead maintenance.

As trail maintenance staffing levels have fallen, the relative amount of time spent addressing unavoidable emergencies increases, further reducing trail maintenance capacity.

Justification for the rating: Fair
The current situation needs significant improvement. Open Space and Mountain Parks lacks the staffing and financial capacity to adequately maintain the existing system of trails at current levels of use.

Key Attribute: Engendering Stewardship — Rating: Fair

Facilities that engender stewardship provide a satisfying experience for the visitor while simultaneously serving to encourage care for the resources around them. Trails that engender stewardship also seek to modify our attitudes towards trails and natural resources. (Parker in prep.). A trail or other facility that does not provide satisfaction, encourage care, or modify attitudes about the relationship of trails and natural systems does not engender stewardship. For example a trail that winds through a riparian area may be extremely pleasing, but does not seek to minimize environmental impacts. Engendering stewardship overlaps somewhat with "aesthetics" and "connection" that were considered key attributes for the visitor experience.

In order for trails to engender stewardship they should be enjoyable for their intended purposes. This can be done by providing frequent, small-scale experiences to notice nature and to react to subtle changes along the trail. Ensuring that there *are* changes in elevation, slope, direction, vegetation and shape provides dynamic contact with nature and can heighten awareness (Parker in prep.)

Holding interest requires careful design. Most of the current trail system on OSMP was not designed using modern standards. Much of the system evolved from the conversion of historic roads and by formalizing footpaths that had been in use for decades. Farm and mining roads were typically built without consideration of aesthetics, looking for the quickest way to a destination. Informal trails arising from patterns of wear also followed the quickest routes, lacked engineered solutions, avoided obstacles and typically ignored ecological impacts or erosion problems.

Open Space and Mountain Parks has not directly measured the degree to which the designated trail system engenders stewardship. However, our experience from new trail construction projects and trail re-routes suggest that trail design and siting ***can*** be used effectively to keep people on the trail and engender stewardship. For example, the Towhee Trail was historically located in the bottom of the lower Shadow Canyon drainage along a small seasonal creek. In an attempt reduce the impact to the montane riparian and wetland system; much of the trail was removed from the drainage. The result was improved ecological conditions and a pleasing alternative alignment which held the visitors' interest because of its setting, including the excellent view of the drainage. Similar projects in Long Canyon and at the approach to Mallory cave have improved the quality of the visitor experience through design and siting. Newly constructed trails such as the Lefthand trail have been designed to provide access and connections while avoiding rare plant habitat, wetlands and other significant resources.

Justification for the rating: Fair
The current situation for engendering stewardship needs improvement. Some trails in the OSMP system are unlikely to encourage use because they lack the design features that will attract and retain interest. Some of these "design-less" trails are also physically and ecologically unsustainable. The aesthetics of the visitor experience, physical condition of the trails, especially the occurrence of "management challenge areas" and degree of resource impact (see compatibility discussion of ecological systems and agricultural operations) suggest that the trail system could be designed to better engender stewardship.

Visitor Infrastructure: Future Trends

The trends leading to an increase in use levels have direct consequences for the visitor infrastructure. The primary effect of increasing rates of visitation will be more physical wear and tear on trails and other facilities. For some facilities, standards for construction or replacement intervals may need be adjusted to address increased use levels. Trail and facility maintenance will probably require more time unless facilities are hardened or otherwise redesigned to withstand increased levels of use.

Using the trails to engender stewardship may become increasingly difficult if visitation becomes dominated by people who are unaware of the multi-use purposes of OSMP and perceive only the recreational value of these lands.

Trail maintenance and construction, especially in the steep and inaccessible mountain backdrop requires considerable manual labor. It is therefore time consuming and expensive. The existing level of resources dedicated to these activities is insufficient to create acceptable conditions. In fact, there is a general consensus among OSMP staff that conditions grow worse each year as maintenance is deferred. Forecasts suggest that local short-term economic recovery is unlikely.

Climate and Patterns of Use

Rates of trail use appear to be directly correlated with weather. Cool sunny days and evenings appear to attract the largest numbers of visitors. When it is very hot, snowing or raining, visitation tends to decrease.

Winter is the time when most of our precipitation falls and when trails are most vulnerable to impact because of rain and melting snow. Trail users active during wet and muddy conditions have far more impact on trails than they do at other times.

Skiing is one of the most popular outdoor recreation activities for active people in the Front Range. However, Denver metropolitan residents appear to be less willing to drive to Summit County because of the congestion on Interstate 70. Some people are doing their skiing during the week. The numbers of people looking for local outdoor activities on the weekends is probably increasing.

In recent years, Boulder seems to be experiencing increasingly mild winters—perhaps an effect of climate change. Mild weather on OSMP and congestion on I-70 could lead (or already be leading to) increases in visitor use during the times when trails are most sensitive to impact.

Summary: The Visitor Infrastructure

The visitor experience can be described in terms of three key factors: physical sustainability, engendering stewardship and maintenance condition. The condition of the visitor infrastructure is variable, but there are significant areas, mostly in the mountain backdrop that are not physically sustainable, that do not engender stewardship and that have not been consistently maintained. Already below capacity, the trails program faces significant challenges in maintaining the infrastructure as use levels are forecast to increase and sales tax revenue will be slowly increasing at best.

Improving the "Fair" Ratings

Investments of significant capital will be needed to improve the physical sustainability of the trail system. These reconstruction projects will also increase the degree to which these trails engender stewardship. It is likely that projects which increase the physical sustainability of trails will take priority over redesign to engender stewardship on trails that are already physically sustainable. A location and extent report of trail maintenance

needs would complement the existing inventory and would be useful in helping to set priorities and assess the capacity needs for an effective on-going trail maintenance program.

Existing capacity (staffing and funding levels) is not sufficient to improve the ratings of these key attributes over the planning horizon. Significant resources will be needed to provide this service and alternative funding and labor sources may need to be developed to improve conditions.

Part II: Compatibility

Ecological Systems

The preceding analysis focused upon the **visitors** (experience and infrastructure); this section deals with the **residents**. We know for example that natural systems, plants and animals provide much of the basis for a visitor experience that is "Open Space-dependent." The enjoyment of natural systems, plants and animals builds support for the conservation and protection of these areas. In addition, the Visitor Master Plan calls upon OSMP to ensure that the visitor experience and the visitor infrastructure do not have significant adverse impacts upon other resources.

Ecological systems are complex and we do not fully understand the impacts of recreational use upon them. Like many multiple use management agencies, OSMP is guided by the precautionary principle. This principle dictates that the management agency has a duty on behalf of the community to anticipate harm to resources held in the public trust and take action to prevent such harm. In addition, the precautionary principle places the burden of proof that an activity has no significant impact upon the proponent of the activity, rather than necessarily requiring that the management agency demonstrate an activity causes significant impacts.

Boulder's Open Space and Mountain Parks are home to an unusual diversity of living things. One quarter (over 800 species) of the vascular plants found in Colorado occur on Open Space and Mountain Parks (A. Armstrong pers comm.). Wildlife biologists estimate approximately 500 vertebrate species use Open Space and Mountain Parks lands for some portion of their lives. This represents a little less than half the number of vertebrates in Colorado. The Colorado Breeding Bird Atlas project found that Boulder contained the greatest number of species of breeding birds (101) and habitat types (15) of 1,745 places across the state. Included in this diversity are 48 species considered rare or imperiled by the Colorado Natural Heritage Program and nine other species of concern to OSMP ecologists.

Species and Communities of Concern for Open Space and Mountain Parks Lands

Animals (28)

<u>Vertebrates (19)</u>
American peregrine falcon * LE
American white pelican*
Bald eagle* ST
Black-necked stilt*
Black-tailed prairie dog* CT
Bobolink*
Burrowing owl* ST
Ferruginous hawk*
Fringed myotis*
Green-back cutthroat trout* LT ST
Lewis's woodpecker*
Northern leopard frog*
Northern redbelly dace*
Northern goshawk*
Ovenbird*
Plains sharp-tailed grouse* SE
Preble's meadow jumping mouse* LT
Smooth green snake*
Western (Townsend's) big-eared bat *
Wilson's phalarope*

Plants (39)

Alaskan orchid
American groundnut*
Bell's twinpod*
Black spleenwort*
Blue toadflax
Broad-leaved twayblade*
*Carex oreocharis**
Carrionflower*
Chaffweed*
Common moonwort*
Dwarf wild indigo*
Forktip three-awn*
Frostweed*
Golden showers
Grass-fern*
Mingan moonwort*
Mountainspray
Narrow-leaved milkweed*
Paper birch*
Pictureleaf wintergreen*
Prairie dropseed
Prairie violet *
Rattlesnake fern
Reflected moonwort *

Plant Communities (11)

Foothills riparian shrubland*
Foothills shrublands*
Great Plains mixed grass prairies*
Mixed foothills shrublands*
Montane riparian forests*
Parry's oatgrass montane grassland *
Ponderosa pine/king fescue savannas
Ponderosa pine/mountain mahogany scrub woodlands*
Salt meadows*
Wet prairies*
Xeric tall grass prairie*

Species and Communities of Concern for Open Space and Mountain Parks Lands

Animals (28)	**Plants (39)**	**Plant Communities (11)**
<u>Invertebrates (8)</u>	Rock polypody	
Arogos skipper *	Rocky mountain sedge*	
Cross-line skipper *	Showy prairie gentian	
Hops feeding azure (butterfly) *	Small-headed rush*	
Moss's elfin (butterfly) *	Sprengle's sedge*	
Mottled dusky wing (butterfly) *	Toothcup*	
Regal fritillary (butterfly) *	Torrey sedge*	
Snow's skipper *	Ute ladies'-tresses orchid LT *	
Two-spotted skipper*	Waterthread pondweed*	
	Wavy–leaf stickleaf*	
	Weatherby's spike-moss	
	White adder's mouth*	
	Wood lily*	
	Wright's cliff-brake*	
	Yellow hawthorn*	

* = tracked by Colorado Natural Heritage Program,
LE = Listed Endangered (federal status),
LT = Listed Threatened (federal status)
CT = Candidate for Threatened (federal status)
SE = Listed Endangered (state status)
ST = Listed Threatened (state status)

Rather than assessing condition, this analysis examines compatibility, focusing upon those key attributes most likely to be affected by passive recreation. This analysis considers how, where and under what conditions recreational activities have an impact upon the ecological systems of Open Space and Mountain Parks.

Key Attributes for Assessing Recreational Use Impacts upon Ecological Systems

- **Size/Abundance**
- **Composition**
- **Landscape Context**

Key Attribute: Size — Rating: Fair

The examples below refer to ways in which recreational use affects the natural communities and species. For communities this factor refers to patch size or geographic coverage. For animal and plant species, size takes into account the size of a population or the number of individuals

<u>Communities</u>

Forested foothills and prairie grasslands are extensive on the landscape and visitor use has not resulted in significant reductions in these dominant landscape scale communities. However, some habitats occur only as smaller patch types and are much less common on OSMP lands. Some examples of common patch types are wetlands, riparian areas, and shrublands. These each account for between two and three percent of the OSMP system. Tallgrass prairie and shale barrens are less common patch types that together cover less than one percent of the land system. Because of their relative rarity, these patches are vulnerable to the impacts of visitor use.

Riparian areas are extremely popular destinations for visitors. The shade, moisture and diversity of plant and animal life attract people to these areas. Most creeks and draws on Open Space and Mountain Parks have

associated trails. In these areas, especially the steep intermittent drainages, the band of riparian vegetation is narrow and trampling can locally destroy herbaceous vegetation, shrubs and tree seedlings. The cumulative effect of this impact is significant. In addition to being imperiled communities themselves, riparian areas provide habitat for more species than **any other** habitat type in the state. In the Boulder Valley, they are critical for the survival of two species protected under the provisions of the U.S. Endangered Species Act (Ute ladies'-tresses orchid and Preble's meadow jumping mouse). Many of the rare plants listed on page 30 occur in riparian areas.

Trails also cross tallgrass prairie. Trail widening and the establishment of undesignated trails have reduced the extent of tallgrass prairie on Open Space and Mountain Parks.

Rock and cliff faces are another patch type. The removal of some vegetation on rock and cliff faces is unavoidable by the very act of climbing. In addition, some climbers purposely remove vegetation and soil to improve conditions for climbing. A local climbing website explains a classification system for "modified climbing routes." Although the authors acknowledge that such activity may be illegal and encourages climbers to limit their impact, the classification characterizes cleaning lichens off the rock and cleaning grass from cracks as "okay."

Little is known about the distribution and composition of rock and cliff face communities on Open Space and Mountain Parks lands. Two ferns, both uncommon, grow in crevices of boulders and rock faces. The Open Space and Mountain Parks staff is concerned about the impact of climbing upon these plants and has general concerns about the extent of climbing and its potential impact upon plant communities on cliff faces and at the base of cliffs. Although no studies have been performed locally, researchers at Joshua Tree National Park found greater species richness on rock faces and at the base of rock faces where there was no evidence of climbing activity (Camp and Knight 1998). There level of impacts of climbers needs more study.

Despite the limited regional value of the Open Space and Mountain Parks land system by itself, the lands are part of a larger complex of protected and undeveloped areas that is considered one of the best opportunities to conserve many ecological features within the Southern Rocky Mountain ecoregion (Neely et al. 2001). These include species of plants and animals, plant communities and ecological systems.

Black-tailed prairie dogs have been designated by the U.S. Fish and Wildlife Service as a candidate for listing as threatened under the provisions of the Endangered Species Act. They are also an example of a species affected by the behavior of dogs.

Some visitors to Open Space and` Mountain Parks consider it acceptable to allow their companion dogs to chase prairie dogs (an illegal activity) because they perceive the likelihood of their dog capturing a prairie dog to be quite low.

Prairie dogs **are** effective at evading dogs, but disturbance by dogs alters prairie dog behavior and may still pose a real threat to the survival of individual prairie dogs, family groups and even colony persistence. A recent study documented changes in prairie dog behavior at an Open Space and Mountain Parks property where prairie dogs and domestic dogs interact regularly. The researchers found that prairie dogs significantly reduce the time they spend foraging while avoiding dogs (Bekoff and Ickes 1999). This can affect their ability to overwinter and reproduce.

As a species, prairie dogs face the threats of habitat destruction, poisoning and exotic diseases. Prairie dog Habitat Conservation Areas have been established on Open Space and Mountain Parks lands to conserve populations locally and to inform the community about their ecological role and threatened status.

Species

At the species scale, trampling can affect populations of rare plants. Plants within a few meters of the trails edge are most vulnerable to trampling effects. Rare plants such as Bell's twinpod and some montane orchids grow near OSMP trails in several areas. Brittle woody plants like shrubs and tree seedlings are especially sensitive to trampling impacts.

Recreational use can also result in animal mortality. As visitors move through a landscape animals respond in a number of ways. Many flee. Young animals in nests and dens abandoned, even temporarily by their parents can die from exposure. Even slightly older animals that have recently left their nest or den may be especially vulnerable to human activity because as they run, they expose themselves to predators. Repeated

disturbances increase the likelihood that these animals will be found by predators. The role of human disturbance in increasing juvenile susceptibility to predation has been documented in a number of studies (none on Open Space and Mountain Parks) (Sime 1999, Joslin and Youmans 1999)**.**

Studies on OSMP have documented a number of relationships suggesting that recreational trails are correlated with higher levels of mortality.

- Avian nest predators attacked more nests near trails than away from trails. (Miller and Hobbs 2000)
- Higher rates of nest parasitism by brown-headed cowbirds occur near canopy gaps formed by trails (Chace and Cruz 1999, Chace et al. 2000)
- In grasslands, nests are less likely to occur near trails versus away from trails (Miller et al 1998)
- In grasslands and forests, nest survival increased with increasing distance from trail (Miller et al 1998)

Dogs are allowed to be off leash on most OSMP lands as long as they are in sight and under voice control. However, there is a wide range of interpretation among dog guardians about what voice and sight control means. Even with a shared community understanding and clear standards, there are those owners who may not be able to or choose not to obey regulations. The result is that some dogs chase and kill wildlife. Occasionally OSMP staff members observe dogs killing wildlife or these incidences are brought to the attention of a ranger by a concerned citizen.

Other direct impacts of visitors and their pets are the increased mortality associated with free-roaming dogs. . Dogs chase and harass indigenous wildlife (Office of Technology Assessment 1993) and disturb ground-nesting birds by attacking adult birds, and consuming eggs and hatchlings (U.S. Forest Service 1999, Miller and Leopold 1992). Free-ranging dogs prey upon the threatened gopher tortoise and destroy gopher tortoise burrows (U.S. Fish and Wildlife Service 1990 and Causey and Cude 1978). Dog-related deaths are the second most frequent cause of human induced mortality for the endangered Key deer (U.S. Fish and Wildlife Service 1999).

There are 141 records in the OSMP data bases documenting dogs chasing or attacking wildlife. Dogs most commonly chase prairie dogs, deer, waterfowl and coyotes. Although no studies have been conducted on the frequency or effects of dogs as predators on Open Space and Mountain Parks lands, studies elsewhere have concluded that dogs played a significant role in increasing mortality of native ungulate (moose, deer and elk) populations (collected in Sime 1999). Many of the existing studies focus upon the effects of dogs running without their owners. Both dogs off leash and out of control and dogs at large (away from their owners) have been known to chase wildlife on OSMP.

The impact of dogs on ground nesting birds may be especially severe because of the likelihood that nests will be found and the contents (eggs and chicks) destroyed by dogs “mousing” along the ground. Dog predation on waterfowl nests and disturbances caused by trampling (by dogs and people) in wetlands and shorelines is of special concern because of the relative rarity of waterfowl and shorebird nesting habitat in the Boulder Valley.

Studies show that even when dogs are unsuccessful in catching an animal, the potential prey has had to expend significant energy during the pursuit. In many cases, especially during late winter, animals do not have large reserves of fat. The effort of a chase can be significant and may weaken the animal increasing the likelihood of starvation or vulnerability to other predators. Pregnant wildlife and juveniles are also especially susceptible. (review by Sime 1999)

Justification for the rating: Fair
Recreational use has had a widespread effect upon the abundance of riparian vegetation. Impacts of visitation upon ground nesting birds have not been studied comprehensively on OSMP lands, but the cumulative effect may be significant. Until a clearer picture emerges, the precautionary principle suggests that OSMP manage conservatively, providing undisturbed habitat and other protections for potentially sensitive species, communities and ecological systems most at risk.

Key Attribute: Composition — Rating: Fair

Composition refers to the number and type of species found in a natural community, or the number and type of communities found in an ecological system.

The invasion of native ecosystems by non-native species is now widely regarded as a top threat to biological diversity worldwide. Weeds typically have the advantage of establishing themselves quickly in disturbed areas. Once established, weeds alter the composition of natural systems by out competing native species for space, water, light or soil nutrients.

Trail sides and other areas of focused recreational use (such as hang/paragliding launch and landing sites, and climbing and bouldering staging areas) provide disturbed areas that serve as germination sites for weeds. A recent study conducted on Open Space and Mountain Parks demonstrated that not only are trail sides weedy, but that the number of weed species is higher on older trails (Potito 2000). Open Space and Mountain Parks managers are concerned that trails coupled with trail users, dogs and horses may act as conduits and vectors, delivering weed seeds into otherwise weed-free areas.

Species displacement caused by visitor use can also alter the composition of animal communities. A common trend is the exchange of habitat specialists for habitat generalists. In a study partially on OSMP lands, researchers found that robins were most abundant near trails; and magpies and house finches were only found along trails (Miller et al. 1998). These three species are habitat generalists--capable of living in a variety of natural and human dominated habitats. On the other hand, three grassland specialists, (birds that require grassland habitat) were far more abundant away from trails. A similar pattern was repeated in the forest where five forest specialists were found to be much more abundant away from trails (Miller et al. 1998). Breeding bird studies show that ground-nesting songbirds have virtually disappeared from heavy use areas such as Chautauqua meadow.

Roosting bats, such as the Western (Townsend's) big-eared bat are extremely sensitive to human presence, and have been known to abandon roost sites following limited disturbance (Graham 1966). Human disturbances to cliff nesting raptors can lead to missed feedings of young, predation on eggs or chicks, overheating, chilling or drying of eggs or young (Porter et al. 1973, Postovit and Postovit 1987 and see Richardson and Miller 1997 for a review of human disturbance on raptors).

Studies on the effects of recreational use on OSMP lands have demonstrated that recreational use can displace predators from an area. In one study mammalian predators were found to avoid trails (Miller and Hobbs 2000). Researchers have shown that some effects of trails extend outward from the trail (or visitor moving off trail) creating a zone of influence of as much as 250 feet. (Miller et al. 1998).

Justification for the rating: Fair
Given the abundance and distribution of undesignated trails, the effect of trails on altering the composition of ecological systems is quite widespread on Open Space and Mountain Parks. The cumulative impacts may be severe, especially locally where trails are concentrated and heavily used. Until a clearer picture emerges, the precautionary principle suggests that OSMP manage conservatively, providing undisturbed habitat for potentially sensitive species, communities and ecological systems.

Key Attribute: Landscape Context — Rating: Fair

Fire, wind and drought are the ecological process most important in structuring the forested ecosystems of the Open Space and Mountain Parks system. Fire suppression relates to providing a visitor experience relatively safe from wildfire. However even in the absence of trail users and other visitors, vigorous control of forest fires would continue. In general, visitor use has little impact upon disturbance regimes or controlling processes. Visitor use of the Open Space and Mountain Parks system has limited direct effect upon climate patterns responsible for high wind events or drought.

Some animals prefer to inhabit the central portions of large, relatively continuous blocks of habitat. These so-called interior species may be sensitive to the conditions found at the edges of habitat blocks or require extensive areas for foraging or other of purposes. Some examples of these interior species are large mammalian predators like lynx, but other smaller-bodied species may also have these sorts of habitat requirements. For example, grasshopper sparrows are considered a grassland-interior species and ovenbirds (a ground nesting warbler) a forest-interior species. There is little information about the effects of trails on interior species. The largest habitat blocks on Open Space and Mountain Parks lands that are not divided by trails are between 700 and 1400 acres.

Isolation increases with increasing distance between a patch and its next nearest neighbor. Isolation may control bird populations, such as some woodpecker species. In some woodpeckers, the ability of young birds to disperse and establish new territories is reduced when patches are isolated from each other. It is unlikely that hiking trails or other visitor use facilities present obstacles to the dispersal of vertebrate species such as woodpeckers. High levels of use associated with these trails may create barriers. Some research indicates that trails can fragment habitat for smaller animals (Collinge and Formann 1998).

Justification for the rating: Fair
There are relatively few large blocks of habitat unbroken by trails or roads on OSMP. The cumulative effect of trails on the landscape context of ecological systems may be widespread and severe. Until a clearer picture emerges, the precautionary principle suggests that OSMP manage conservatively, protecting the remaining blocks of undisturbed habitat.

Future Trends: Natural Systems

Direct effects of visitation such as trampling and increased predation will increase with increasing levels of use. It is likely that increasing numbers of people will create more undesignated trails in areas that currently serve as refuges for interior species and habitat specialists. These trails may disrupt environmental conditions, creating opportunities for parasites, predators and competing species, reducing the extent of effective habitat.

Decreasing revenues suggest that any inventory and monitoring projects proposed be inexpensive. This could restrict the range of information that can practically be gathered and increase reliance upon students and volunteers. The Department needs efficient and effective tools to communicate to an ever growing audience the critical role OSMP lands play as habitat for rare species and in the conservation of plant communities and representative pieces of even larger scale ecological systems.

Summary: Natural Systems

Natural systems and visitation are not wholly compatible. Although species, communities and ecological systems can respond to natural disturbances and fluctuations, they did not evolve with recreational pressures. Natural systems can withstand some level of direct trampling and predation but frequent and repeated impacts by visitors or dogs can overwhelm natural rates of reproduction and regrowth. Portions of OSMP lands offer a refuge for certain species that best succeed with low levels of human disturbance. Unrestricted access by people and dogs could reduce the extent and function of these areas as refuges by affecting patterns of predation and reproduction. Ecologists know too little to describe the vulnerabilities of all species, or define appropriate visitor use levels to conserve communities. In the absence of specific direction about how best to conserve natural systems, a conservative approach is needed. This approach should offer protection for large habitat blocks, representative areas of all ecological systems (common and rare), and the habitats of rare plants and animals. This approach should be coupled with a policy of actively promoting research to answer questions about vulnerability of species and systems to recreational use.

Agricultural Operations

For some visitors, agricultural operations provide the vistas, scenery and experiences that contribute to their satisfaction with the OSMP program. Agriculture uses include small grain production (mostly barley) and cow-calf operations (hay, pasture, range). Agriculture is a historic land use in the Boulder Valley and is identified specifically in the City Charter as a purpose of OSMP. OSMP and the Boulder County Parks Open Space Department own the majority of the agricultural land in the Boulder Valley. In the increasingly developed landscape the opportunity to see a farm or ranch in operations has become an "open space dependent" activity. The enjoyment of agricultural landscapes builds support for the conservation and protection of these areas as open space.

However, agricultural operations are not merely amenities for visitors. They are businesses. The 16,000 acres of Open Space and Mountain Parks leased to local farmers and ranchers are managed under the provisions of leases with the City of Boulder. Agricultural operations generate revenues in the form of lease payments. Lease revenues average approximately $150,000 annually.

Where visitor use and agricultural operations co-occur there is the potential for conflict. The Open Space and Mountain Parks Department has found that coexistence of agriculture and passive recreation is possible. However, it is important to recognize the ways in which the visitor experience and agricultural land uses affect each other. This analysis provides consideration of the effects of passive recreation upon the sustainability of agricultural operations.

The effects of agricultural operations upon visitors are discussed on pages 13 and 17.

Key Attributes for Agricultural Operations

- **Productivity**
- **Efficiency**

Key Attribute: Productivity Conflicts — Rating: Good

Agricultural productivity is "the bottom line" for farmers and ranchers. Visitors to OSMP affect agricultural productivity in two ways. Some visitors walk or ride through crops and hayfields during the growing season reducing the farmer's yield. Some dogs harass livestock even when accompanied by guardians.

Visitors affect agricultural productivity when they use hayfields, pastures and grain fields in a manner that damages or destroys the crop. The most common complaint heard from agricultural lessees is that equestrians will use vulnerable fields during the growing season to exercise their horses, developing trails that destroy a portion of the crop. Visitors leave internal gates open allowing livestock to wander into pastures or hayfields, reducing or destroying the yield of the affected pasture.

The potential risk for dogs harassing livestock is higher where the dogs are off leash. Livestock are especially vulnerable when cows have calves in the spring.

Trail construction has direct impacts on the operation and sustainability of agricultural operations. Some trail designs include a trail separated from the surrounding landscape by a fence. This serves to isolate a portion of the range or pasture from agricultural use. This always reduces the available forage and may require modifications to the lease or payments. More significantly is the impact on the ecological condition of the isolated area. These areas, removed from the lessee's responsibility receive little attention. Removing grazing from an area with historic grazing pressure can (and has) resulted in the explosive growth of weed species which can spread into adjacent lease areas. This compromises the ecological and agricultural integrity of the surrounding landscape.

An informal survey conducted in 2003 of the four lessees who manage OSMP with significant visitor use showed they have had minimal direct financial losses over relatively long periods (15 to 25+ years). Losses included two calves and several chickens killed by dogs as well as several calves injured by dogs. Although losses have been relatively low, lessees uniformly identified dogs chasing cattle as their chief concern.

Justification for the rating: Good
Impacts to productivity have not had a significant adverse effect on the economics of agricultural operations. It will be important to develop "early detection" tools and anticipate changes in the state of this key attribute as visitation increases and becomes even more comprised of people unfamiliar with agricultural practices. The situation could be improved by responding to localized dog/livestock conflicts.

Key Attribute: Efficiency Conflicts — Rating: Good

Explanation of Rating
Approximately one quarter (30 miles) of the OSMP trail system crosses lands with active agricultural management. These trails traverse many fields and pastures requiring visitors to open and shut gates as they move from one field to another. When gates are left open, livestock can move freely off of Open Space and Mountain Parks lands, onto private property and roadway creating hazards for themselves and the public. Users sometimes cut perimeter fences to reach or gain more ready access to preferred destinations. This behavior has the additional consequence of requiring the lessee to locate and repair the damage to the fence.

Responding to dogs harassing livestock, gates left open, livestock in the road or in neighbor's yards, and fences intentionally cut by visitors takes a farmer away from the central business of agricultural production. To some degree this extra effort is expected and accepted by lessees willing to run their operations in the Boulder area. These sorts of conflict are likely to increase with increasing levels of use and may eventually reach a threshold at which point it will be difficult to find farmers or ranchers interested in leasing Open Space and Mountain Parks lands.

The survey of lessees revealed that most spent between 10 and 40 hours a year responding to problems they considered caused by visitors. The lessees mentioned dogs chasing livestock and gates being left open as the biggest problems.

Justification for the rating: Good
Visitors use may create extra work for ranchers and farmers. Because agricultural operations have traditionally dealt with many uncertainties, lessees tend to accommodate occasional inconveniences. While less than ideal, the status of this key attribute is acceptable. This attribute could be improved by localized and seasonal dog management efforts and improving signage or design to ensure proper gate closure.

Future Trends: Agricultural Operations

The trends leading to an increase in use levels have consequences for the agricultural operations. Absent preventative measures, increased visitation will probably result in more wear and tear on trails and other facilities. For some facilities, standards for construction or replacement intervals may need be adjusted to address increased use levels. Trail and facility maintenance will probably require more loss of livestock to dogs, and more time spent dealing with visitor related problems. Over time it is likely that a greater percentage of visitors will be unfamiliar with agricultural practices, increasing the likelihood that they will inadvertently create problems for lessees.

Summary: Agricultural Operations

Visitor activities are generally compatible with agricultural operations on OSMP lands. OSMP and lessees have made changes in management practices to reduce the likelihood for conflict in several areas. Despite a variety

of management techniques to improve the situation, dog harassment of livestock continues to be a problem at Boulder Valley Ranch (BVR). Management focused at BVR would resolve much of the current conflict.

Annual lease reviews could include annual monitoring of the effects of visitor use to provide early warning of conflicts so they can be addressed before they become significant issues.

Cultural Resources

Uninhabited cabins, hidden foundations, abandoned quarries, coal mines, old farmhouses and barns dot the OSMP landscape suggesting different customs and different times. These features contribute to the visitor experience by providing a starting point for the imagination about the people who once lived and made a living here. In some places the story is clarified by interpretive signs that provide detail about the nature and extent of human activity.

In addition to their interest for visitors, cultural sites and artifacts are important from cultural, religious and scientific perspectives. Although not included as a purpose of Open Space in the charter, the OSBT adopted cultural resource protection as part of the Long Range Management Policies in 1995 (City of Boulder 1995). All OSMP projects with the potential to affect cultural resources are required to check existing inventories for potential impacts or provide a site specific survey by a qualified archaeologist describing the cultural resources in the area.

The integrity of cultural resources is related to the degree to which the form, substance and quantity of a resource can be used to explain behaviors and ideas. Cultural resources have integrity when they retain material attributes associated with their social values. Integrity includes the following attributes:

- Abundance, sufficient quantities of material need to be available to draw conclusions or contribute to a large scale understanding about a culture
- Condition Includes: the material aspect of a resource , the ways in which materials were put together and the relationship between different parts of a resource and the aesthetic qualities that resulted
- Context, the exact geographic location of a resource and the nature of its setting

For the purposes of this analysis context and abundance are combined. The most significant impact for both of these key attributes is the removal of artifacts.

Key Attributes for Cultural Resources

- **Abundance of Material & Context**
- **Condition**

Key Attribute: Abundance of Material and Context — Rating: Good

One of the values of cultural resources to the community is the information they can impart about past cultures. A certain amount of cultural material is required to paint a picture of the customs, land use practices and way of life of historic or prehistoric people.

Enough local historical information and cultural material have been recovered or described to recommend the establishment of historic districts on Open Space and Mountain Parks lands. Similarly archaeologists and historians have recommended historic contexts and themes for Open Space and Mountain Parks lands based largely on locally recovered or recorded cultural resources. Historic contexts and themes are delineated by time periods and geographic areas. They serve as frameworks for understanding important historical events, trends or cultural patterns. These themes and contexts also provide a useful setting within which individual resources can be evaluated.

The known prehistoric material from Open Space and Mountain Parks, taken by itself, does not provide enough information to draw many conclusions about the local prehistoric inhabitants or cultures of the Boulder Valley. However, Open Space and Mountain Parks cultural materials have contributed to an understanding of some regional prehistoric contexts.

It is reasonable to assume that visitors collect some portion of the cultural materials they encounter while using Boulder's Open Space and Mountain Parks. Artifacts such as projectile points (arrowheads), or small bottles are especially attractive and small enough to be placed in a pocket or pack. Some places, especially where artifacts were more abundant or concentrated, may have attracted illegal collection. It is not uncommon to hear about the collections of cultural resources in the possession of private individuals, especially families of early settlers in the Boulder Valley.

Over the past century of use on former Mountain Parks, the incremental impact of focused and casual collecting could be quite high. On lands purchased as Open Space the story is probably different. Because this program did not start until the late 1960's, the majority of collecting had probably occurred before the City's purchase.

OSMP has no formal agreement with a museum or university to curate small, theft prone artifacts. When such items are brought to the attention of OSMP staff, it is common practice for the items to be collected, tagged with the date, location and collector and stored in a secure location.

An analysis of cultural resources conducted for the Visitor Master Plan (City of Boulder 2002) identified162 sites that lie within 100 feet of trails, trailheads or other focal points of recreational activity on OSMP lands. A review of cultural history reports identified 340 cultural sites in proximity to trails, trailheads and other focal points of visitor activity. The majority of sites and artifacts are Euroamerican not prehistoric. Many of the sites have been significantly disturbed or are roads, trails and ditches in good condition, and not particularly susceptible to impacts from visitors.

Justification for the rating: See next key attribute.

Key Attribute: Condition — Rating: Good

The City of Boulder Open Space and Mountain Parks department has contracted with professional archaeologists to conduct cultural resource surveys over 75 percent of the land system (> 30,000 acres). Most of these surveys have identified cultural resources that have been evaluated according to the standards of the Colorado Historical Society's Office of Archaeology and Historic Preservation. One part of that evaluation is determining the *condition* of a site. Only a quarter of the sites on record with the OAHP are in good or excellent condition.

Most of the degradation or destruction of sites is unassociated with visitor use. Deliberate destruction or disturbance (vandalism) of cultural sites is uncommon on Open Space and Mountain Parks lands. Structures (e.g. cabins, barns and outbuildings) are vulnerable to vandalism because they are so obvious. These structures provide a canvas for graffiti "artists" and hiding places for people to engage in illegal activities (underage drinking, drug use, etc.). Structures in sight of a trail or other high use areas are also more likely to be vandalized. Twenty-six standing or partially standing structures on Open Space and Mountain Parks were identified as vulnerable to impacts from visitor use. The attribute information provided from site forms and compiled by the OAHP notes vandalism as a factor affecting 12 of the 146 sites. The bulk of the vandalized sites are buildings.

Justification for the rating:
Abundance of Material & Context: Good
Condition: Good
Over the past century, there has almost certainly been a significant reduction in the number of cultural resources on OSMP lands. Visitors are more likely to encounter large historic buildings, rather than pocketable prehistoric artifacts. Recent analysis of cultural resource data indicates the potential for further loss or degradation of cultural resources. However, until the risks are better defined, the precautionary principle suggests that OSMP manage conservatively. These attributes could be improved by increasing the protection of structures, periodic monitoring of sites or artifacts "at risk" by volunteer archaeologists, and grant-funded interpretive, protection and monitoring in collaboration with local and state officials

Future Trends: Cultural Resources

Cultural resources could be affected by increasing use levels and reduced management capacity. With more people using the trails, there is a greater likelihood of illegal collection or vandalism. OSMP will continue to conduct cultural resource surveys as necessary in association trail construction and management projects.

Summary: Cultural Resources

Little is known about the compatibility of visitor activities and cultural resources. Recent analysis has reviewed monitoring and management issues that could reduce the potential impact of visitor use on potentially vulnerable sites and artifacts. OSMP currently lacks on-staff expertise, or funding capacity to develop or undertake a monitoring or protection program. In the short term, the most vulnerable sites should be identified for protection and monitoring.

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Paw Patrol Program Rationale and Justifications

Program Background: This program was first piloted at Cuyahoga Valley NP (CUVA) in early 2010. The park utilized local resources and volunteer funds to support the program. The goal of the program was to utilize volunteer handlers and their pets as a way to reach out to pet owners utilizing the park, create an ice breaker and means to engage park visitors and to provide additional trail patrols in the park (eyes and ears on the ground). The program has been hugely successful and has grown to over 40 volunteers, each contributing at least 40 hours per calendar year. They feel the program was so successful largely because CUVA is one of very few parks that allow dogs on trails and it was a way to spread goodwill to pet owners through the NPS and because it let dog owners know that they were welcome in the park. It has also been observed that there is a segment of park visitors, whether dog owners or not, that tend to gravitate towards dogs and that these animals serve as excellent "grabbers" or conversation starters.

Justification: Devils Postpile National Monument (DEPO) and the surrounding Inyo National Forest (INF) are heavily used by dog owners. The Reds Meadow Valley specifically sees dogs on the shuttle buses and on the trails. Due to the different regulations in the monument and on the forest there is significant confusion among dog owners in the area as to pet regulations. There is also a perception in the local community that dogs are not permitted in the Reds Meadow Valley or at DEPO due to both misconceptions related to the shuttle bus and DEPO being a National Park Service Unit, which may exclude a potential local user group, particularly in the off-season when the shuttle buses are not operational. This program would accomplish a number of things at DEPO:

- Provide additional presence on DEPO trails to assist with visitor services, emergency services, and PSAR.
- Serve as an outreach program to the local community to engage locals in the national monument.
- Provide a link between NPS/USFS regulations and pet owners by having the information come from people who are not only locals, but also pet owners.
- Provide an innovative "grabber" to initiate visitor contacts.
- Reduce dog off leash instances, working toward further protecting park resources.
- Encouraging more dog owners to be responsible stewards of public lands while enjoying them with their dogs.
- Encourage repeat volunteerism by providing training, valuable opportunities, and specifically opportunities that target personal interests of the volunteers.
- Create connections and relationships with local dog groups through recruitment efforts, further educating the public about responsible dog ownership on public lands.
- Increase the number of informal visitor contacts and over all NPS presence in the valley.

Program Requirements:

- Handlers and dogs must successfully pass the AKC Canine Good Citizen (CGC) class or be currently certified through a recognized therapy dog training program.

- Handlers and dogs must pass the NPS specific testing items (see Paw Patrol Position Description).
- Handlers must commit to 30 hours of volunteer service in a season.
- Handlers must complete all required visitor and emergency services training and NPS orientation (see Paw Patrol Position Description for a list of the required training sessions).

Liability Issues:

It is important to remember that negative interactions with pets on DEPO trails are infrequent. All participating dogs must pass the AKC CGC test which does test them for aggression towards both people and animals. The testing is rigorous and nationally recognized. The AKC CGC test is often a prerequisite for therapy dog certification. Volunteers will be asked to carry a walking stick, which will provide a barrier between their dog and aggressive dogs. Volunteers will be trained in handling aggressive dogs. If the volunteer's dog is an instigator or aggressive in any way, it WILL NOT pass the CGC test. Dogs and handlers will also be evaluated by NPS staff for any potential issues that were not caught during testing (see PAW Patrol Position Description). Volunteers will be covered by the NPS workers compensation an d personal liability policies while performing their official duties should any injury occur during work time. *(Per D.O. #7: **8.1** VIPs will be treated as Federal employees for the purposes of (1) compensation for work-related injuries (see 5 USC 8101(1)(B) and 16 USC 18i(c)); (2) immunity from liability pursuant to the Federal Tort Claims Act (see 28 USC 2671 and 16 USC 18i(b)); and (3) claims for damage to or loss of personal property incident to service (see 31 USC 3721 and 16 USC 18i(d)).*

Volunteers may be required to sign a release of liability with respect to their pets. We can check with CUVA to see how they have handled that situation. The JHA addresses the most common safety issues associated with the position and includes inspection of the dogs prior to the hike to maximize the performance and safety of the dog. Part of the CGC program evaluates health and general well being of the animal as well. Any dog that shows any sign of aggression for whatever reason will be immediately removed from the program; however, given the rigorous testing, this is unlikely. CUVA has yet to have any "incidents" involving their Paw Patrol volunteers.

Devils Postpile National Monument

Division: Interpretation

Volunteer Position Title: Paw Patrol

Direct Supervisor(s): Maureen Finnerty

BRIEF DESCRIPTION - Like other volunteers, the Paw Patrol will act as representatives of the park and obey and model all rules and laws relating to themselves and their dogs. They will assist visitors in finding visitor centers, suggest trails related to dog and visitor experience and inform visitors with general information. The Paw Patrol will inform visitors about the laws and rules of having a dog in the park in a friendly manner. The Paw Patrol will make appearances at park sponsored events and programs. The Paw Patrol will also be additional eyes and ears in the park to assist visitors, report problems, and assist staff when necessary.

RECRUITMENT PERIOD	MONTHS ACTIVE	SHIFTS AVAILABLE	TIME COMMITMENT
February-April 2011	June-October	*-weekday/weekend* *-morning/afternoon/evening*	30 Hours per year

☒ Age Minimum*: __16___

☒ Good volunteer opportunity for families

DUTIES AND RESPONSIBILITIES

- Volunteers will provide informal interpretive contact opportunities for visitors using companion dogs as a model for proper canine behavior within Devils Postpile NM.
- Volunteer will need to maintain control of their companion dog at all times, demonstrating the safe and appropriate practices of a good dog owner.
- Both canine and human volunteers will be trained in handling a variety of situations including, but not limited to: First-aid emergency (within scope of training), heavy traffic days on trails and at Visitor Contact Stations/Ranger Station, interpretive contacts with other dog owners.
- Volunteer will be able to use a park radio (BK Digital) to communicate with park staff and be confident handling emergency situations within scope of training.
- Volunteers will have the opportunity to participate in programs and activities on behalf of Devils Postpile NM. (Parades, demonstrations, special programs, etc.)
- Volunteer will maintain American Kennel Club Canine Good Citizen® certification standards throughout the course of their volunteer service.
- Attend all mandatory trainings or meetings.

DUTY LOCATIONS/STATIONS

- Devils Postpile Ranger Station
- Valley trails in and surrounding Devils Postpile including Postpile Trail, Rainbow Falls Trail, Minaret Falls area, and the JMT/PCT.
- Adventure Center/Bus Loading Area
- On Board Shuttle Buses

WORK ENVIRONMENT - (Attach Safety Analysis)
-See Safety Analysis

REQUIRED TRAINING/LEARNING OPPORTUNITIES
- Monument Orientation
- Fundamentals of Interpretation
- Informal Interpretive Contacts
- Principles of Operational Leadership/Emergency Ops/Radio Procedures
- AKC Canine Good Citizen® training and certification (unless previously certified)
- American Red Cross First-Aid/Heartsaver CPR (Optional)
- Eppley Trainings (As time allows)

QUALIFICATIONS/SKILLS REQUIRED (AREA KNOWLEDGE MAY BE ACQUIRED ON THE JOB)
-Valid Driver's License
- Canine Good Citizen® Certification
- First-Aid/CPR (Optional)
- Ability to hike DEPO and USFS hiking trails
- Knowledge of DEPO and USFS regulations
-*Primary handlers must be at least 16 years of age; however, younger volunteers will be permitted to participate with a parent/guardian.

UNIFORM
- Standard VIP uniform with chosen articles appropriate for weather conditions and activities engaged in
- Canine VIP vest will be worn by dog at all times to designate that they are an official NPS VIP.

EVALUATION PROCESS
Specify the evaluation process for this volunteer position.

All volunteers/handlers will be evaluated on the quality of visitor contacts, ability to outreach to park visitors, and communication skills with both visitors and park staff.

**Note: For canine volunteers The AKC Canine Good Citizen certification will be the evaluation standard, however, certified therapy dogs will also be accepted with presentation of certification and any corresponding documentation. Therapy dogs and handlers must pass the NPS specific testing elements. Certified therapy dogs may have the opportunity to participate in other interpretive/outreach programs as opportunities arise.*

AKC's Canine Good Citizen® (CGC) Program

Training/Testing: CGC Test Items

Before taking the Canine Good Citizen test, owners will sign the **Responsible Dog Owners Pledge**. We believe that

responsible dog ownership is a key part of the CGC concept and by signing the pledge; owners agree to take care of their dog's health needs, safety, exercise, training and quality of life. Owners also agree to show responsibility by doing things such as cleaning up after their dogs in public places and never letting dogs infringe on the rights of others.

After signing the Responsible Dog Owners Pledge, owners and their dogs are ready to take the CGC Test. Items on the Canine Good Citizen Test include:

Test 1: Accepting a friendly stranger

This test demonstrates that the dog will allow a friendly stranger to approach it and speak to the handler in a natural, everyday situation. The evaluator walks up to the dog and handler and greets the handler in a friendly manner, ignoring the dog. The evaluator and handler shake hands and exchange pleasantries. The dog must show no sign of resentment or shyness, and must not break position or try to go to the evaluator.

Test 2: Sitting politely for petting

This test demonstrates that the dog will allow a friendly stranger to touch it while it is out with its handler. With the dog sitting at the handler's side, to begin the exercise, the evaluator pets the dog on the head and body. The handler may talk to his or her dog throughout the exercise. The dog may stand in place as it is petted. The dog must not show shyness or resentment.

Test 3: Appearance and grooming

This practical test demonstrates that the dog will welcome being groomed and examined and will permit someone, such as a veterinarian, groomer or friend of the owner, to do so. It also demonstrates the owner's care, concern and sense of responsibility. The evaluator inspects the dog to determine if it is clean and groomed. The dog must appear to be in healthy condition (i.e., proper weight, clean, healthy and alert). The handler should supply the comb or brush commonly used on the dog. The evaluator then softly combs or brushes the dog, and in a natural manner, lightly examines the ears and gently picks up each front foot. It is not necessary for the dog to hold a specific position during the examination, and the handler may talk to the dog, praise it and give encouragement throughout.

Test 4: Out for a walk (walking on a loose lead)

This test demonstrates that the handler is in control of the dog. The dog may be on either side of the handler. The dog's position should leave no doubt that the dog is attentive to the handler and is responding to the handler's movements and changes of direction. The dog need not be perfectly aligned with the handler and need not sit when the handler stops. The evaluator may use a pre-plotted course or may direct the handler/dog team by issuing instructions or commands. In either case, there should be a right turn, left turn, and an about turn with at least one stop in between and another at the end. The handler may talk to the dog along the way, praise the dog, or give commands in a normal tone of voice. The handler may sit the dog at the halts if desired.

Test 5: Walking through a crowd

This test demonstrates that the dog can move about politely in pedestrian traffic and is under control in public places. The dog and handler walk around and pass close to several people (at least three). The dog may show some interest in the strangers but should continue to walk with the handler, without evidence of over-exuberance, shyness or resentment. The handler may talk to the dog and encourage or praise the dog throughout the test. The dog should not jump on people in the crowd or strain on the leash.

Test 6: Sit and down on command and Staying in place

This test demonstrates that the dog has training, will respond to the handler's commands to sit and down and will remain in the place commanded by the handler (sit or down position, whichever the handler prefers). The dog must do sit AND down on command, then the owner chooses the position for leaving the dog in the stay. Prior to this test, the dog's leash is replaced with a line 20 feet long. The handler may take a reasonable amount of time and use more than one command to get the dog to sit and then down. The evaluator must determine if the dog has responded to the handler's commands. The handler may not force the dog into position but may touch the dog to offer gentle guidance. When instructed by the evaluator, the handler tells the dog to stay and walks forward the length of the line, turns and returns to the dog at a natural pace. The dog must remain in the place in which it was left (it may change position) until the evaluator instructs the handler to release the dog. The dog may be released from the front or the side.

Test 7: Coming when called

This test demonstrates that the dog will come when called by the handler. The handler will walk 10 feet from the dog, turn to face the dog, and call the dog. The handler may use encouragement to get the dog to come. Handlers may choose to tell dogs to "stay" or "wait" or they may simply walk away, giving no instructions to the dog.

Test 8: Reaction to another dog

This test demonstrates that the dog can behave politely around other dogs. Two handlers and their dogs approach each other from a distance of about 20 feet, stop, shake hands and exchange pleasantries, and continue on for about 10 feet. The dogs should show no more than casual interest in each other. Neither dog should go to the other dog or its handler.

Test 9: Reaction to distraction

This test demonstrates that the dog is confident at all times when faced with common distracting situations. The evaluator will select and present two distractions. Examples of distractions include dropping a chair, rolling a crate dolly past the dog, having a jogger run in front of the dog, or dropping a crutch or cane. The dog may express natural interest and curiosity and/or may appear slightly startled but should not panic, try to run away, show aggressiveness, or bark. The handler may talk to the dog and encourage or praise it throughout the exercise.

Test 10: Supervised separation

This test demonstrates that a dog can be left with a trusted person, if necessary, and will maintain training and good manners. Evaluators are encouraged to say something like, "Would you like me to watch your dog?" and then take hold of the dog's leash. The owner will go out of sight for three minutes. The dog does not have to stay in position but should not continually bark, whine, or pace unnecessarily, or show anything stronger than mild agitation or nervousness. Evaluators may talk to the dog but should not engage in excessive talking, petting, or management attempts (e.g, "there, there, it's alright").

Equipment

All tests must be performed on leash. For collars, dogs should wear well-fitting buckle or slip collars made of leather, fabric, or chain. Special training collars such as pinch collars, head halters, and electronic collars are not permitted in the CGC test.

As of November 4, 2010, body harnesses may be used in the CGC test. The evaluator should check to make sure the

harness is not of a type that completely restricts the dog's movement such that it could not pull or jump up if it tried.

We recognize that special training collars such as head collars and no-jump harnesses may be very useful tools for beginning dog trainers, however, we feel that dogs are ready to take the CGC test at the point at which they are transitioned to equipment that allows the evaluator to see that the dog has been trained.

The evaluator supplies a 20-foot lead for the test. The owner/handler should bring the dog's brush or comb to the test.

Encouragement

Owners/handlers may use praise and encouragement throughout the test. The owner may pet the dog between exercises. Food and treats are not permitted during testing, nor is the use of toys, squeaky toys, etc. to get the dog to do something. We recognize that food and toys may provide valuable reinforcement or encouragement during the training process but these items should not be used during the test.

Failures – Dismissals

Any dog that eliminates during testing must be marked failed. The only exception to this rule is that elimination is allowable in test Item 10, but only when test Item 10 is held outdoors. Any dog that growls, snaps, bites, attacks, or attempts to attack a person or another dog is not a good citizen and must be dismissed from the test.

NPS specific testing scenarios:

1. Have visitor approach volunteer and ask for directions with dog off lead but under control. Visitor should continue a conversation with volunteer about the park. The visitor is unaware that dogs must be on lead in DEPO. At the end of the conversation the visitor thanks the volunteer for their time and walks away. This test looks for people skills and tests the volunteer's judgment to inform the visitor of the dog rules in the park.

2. A jogger runs by with their dog off lead. No interaction is prompted by the visitor. This test is looking for the initiative of the volunteer to stop a visitor and inform them about the rules and the manner in which they communicate these with visitors.

3. A visitor walks by with dog off lead but under control and says "good afternoon" as they pass.
    - If the volunteer begins talking to the visitor about putting their dog back on the lead, the visitor will begin getting mouthy with the volunteer and tells them that they don't have to put their dog on a lead because it's a good dog and so on and so on. This test looks for volunteer patience with unruly visitors, how they will defuse the situation and how they debate with the visitor. This test is also a good test to judge the dog's reaction when their handler is being verbally harassed.

4. Volunteers see that a visitor is not going to pick up their dog's waste. Visitor does not have any poop bags with them and does not see the point since we are in nature and other animals poop in the woods. The visitor does not want to do it and rudely asks the volunteer "why do I need to?" This test looks for volunteer knowledge of why we pick up after dogs and not just leave it lay; as well as mediating a medium-level unruly visitor.

Volunteer Position Safety Analysis

Division: **Interpretation**

Volunteer Position: **Paw Patrol**

Direct Supervisor(s): **Maureen Finnerty**

Required Standards and General Notes:	Hiking/Walking, Obedience Trained and Certified Canine, Visitor Service
Required Personal Protective Equipment:	Walking Stick, Sunglasses, Sunscreen, Water (for human and canine), Collapsible Water Bowl, Sturdy Outdoor Shoes, Jacket, Hat, Weather & Activity Appropriate Clothing
Tools and Equipment:	Walking Stick, Radio, First Aid Kit, Paw Patrol Give-A-Ways, Park Maps, Newspapers, Junior Ranger Books, Mutt Mitts, Water

Sequence of Job Steps	Potential Hazards	Safe Action or Procedure
Drive to/from sign-in/gear-up site and to trailheads, parking lots, worksite, and other project areas.	Normal traffic hazards	Exercise caution, obey all traffic laws
Pre-patrol & post-patrol inventory/inspection of equipment and canine.	Equipment in poor condition which could contribute to inability to perform the duties of the position or to communicate emergency messages, handler or dog unfit for duty due to injury or illness,	Check condition of canine, check supplies in first aid kits, conduct radio checks prior to each patrol & before storing equipment. Check that clothes & footwear are suitable for expected conditions. Check that there are adequate supplies of sunscreen & insect repellant, etc. Check for adequate supplies of water and food for handler & canine.
Work outdoors where conditions may be at hot/cold extremes as well as possible rain, bright sunlight, or thunderstorms.	Thunderstorms, eye strain, heat illnesses, rain, cold illnesses	In the event of thunderstorms head for shelter. Make sure to wear proper equipment, bring plenty of water and sunscreen. On cold days wear proper equipment.

Must be able to hike up to 5 miles at a time over rolling terrain at elevations above 7,000 feet.	Fatigue, sprains, getting lost on trail, Tripping, falling hazards, Uneven terrain, Back strain, sunburn/heat-related illnesses, wet feet, blisters, insect bites, altitude sickness.	Walk with care, learn the trails, carry a map, be in good walking condition, wear correct footwear for hiking, be ready to react to changes in your surroundings, bring adequate drinking water for canine and handler and drink it frequently/rest as needed, wear appropriate clothing, sun block, and use insect repellant if needed. Drink plenty of water and monitor for signs and symptoms of altitude related illness. Discontinue patrol if symptoms are present.
Ability to carry out a pack containing Paw Patrol equipment.	Back Strain	If unable to perform duties let supervisor know.
Informing visitors of park canine rules and regulations, Handling difficult people	Abusive language/behavior, Noncompliance	Take *Foundations of Interpretation.* Be familiar with park rules and regulations, be conscious of visitor behavior/attitudes; call for help as needed.
Out of control/ over-excited/ aggressive dogs	Scratches, bites, nips, bruises, being knocked to the ground	Approach other handlers and dogs with caution, making keep walking stick between the other dog and yourself, maintain calm attitude. Call for help as needed. Follow steps outlined in training.
Performing CPR/First Aid (Optional)	Exposure to blood-borne diseases and other risks associated with performing CPR/First Aid	Attended First Aid/CPR Training, be familiar with DEPO Bloodborne Pathogen program, Remain Calm. Always wear exam gloves and use a CPR face mask if performing CPR. Follow procedures outlined in First Aid/ CPR training, Call dispatch.
Carry box(es) of supplies to and from set-up area (not more than 15 lbs).	Back strain due to improper lifting & hauling, tripping on uneven terrain	Lift using leg muscles. Carry appropriate weight, make as many trips as necessary to set up and take down. Ask for help when necessary.

Paw Patrol Budget and Associated Costs				
Item	**Vendor**	**Number**	**Cost (Each)**	**Total Cost**
Gulpy Gulpy Portable Water Dispenser	REI	10	$9	$90.00
Paw Patrol Working Dog Vest w/embroidery	houndgear.net	10	45	$450.00
Embroidered Leash (Green) (PAW PATROL VOLUNTEER)	L.L. Bean	5	18.95	$94.75
Portable Waste Bags (880ct)	Amazon	2	26.99	$53.98
Leash Clip Bag Container	Amazon	5	4.99	$24.95
Cainine Good Citizen Training and Evaluation (6 weeks)	Nancy Hardy	10	145	$1,450.00
T-Shirts	CustomInk.com	10	13	$130.00
Total				$2,293.68

Devils Postpile National Monument Paw Patrol

Name: Date:

Dog's Name: Breed:

Age: Weight (lbs.): Sex: Male

City/County where licensed:

License Number: Expiration Date:

Expiration dates for current vaccinations:

Rabies:

Other (please list):

Has the dog received formal training? Yes

Is the dog obedience trained on leash? Yes

Has the dog had any other training? If so, please list:

GOLDEN GATE NATIONAL RECREATION AREA

Dog Management Education and Public Involvement Plan

PURPOSE

The fundamental purpose of the public participation plan is to educate the public on new dogwalking regulations, to provide clarity on the regulations and to increase compliance with regulations.

The plan will target a wide range of audiences—multiple user groups, individuals, professional dogwalking groups, environmental groups, civic groups, business groups, agency staff and leaders, appointed/elected officials, representatives on the Negotiated Rulemaking Committee and others.

The history of dogwalking in GGNRA has led to confusion on the part of visitors and staff as to the regulations regarding dogwalking and the areas where they can walk their dogs. At this current time, there are areas of the park where dogs are not allowed, where they are allowed on-leash and where they are allowed off-leash (due to U.S. v. Barley). The Dog Management Education and Public Involvement Plan must clarify the new regulation and educate visitors as to where dogwalking is allowed in GGNRA as well as appropriate dogwalking behavior that is expected when they visit a national park.

The park will identify different venues to educate the public to ensure that visitors have an understanding of the new regulations in each area of the park where dogs are allowed. Through these varied venues, information will be made readily accessible both to regular visitors and those who may only visit the park periodically.

PUBLIC INVOLVEMENT COMPONENTS

The Dog Management Education and Public Involvement Plan includes the following components:

I. VENUES FOR COMMUNITY OUTREACH:

- **Mailing Database**
  GGNRA maintains a database of persons, groups, and agencies interested in notification of updated general park information as well as a special mailing list developed for dog management. The park will initiate a conversion to an email list as soon as staff availability permits.

- **Open Houses**

The public will be invited to attend quarterly park Open House meetings. Dog Management information materials will be available and the public will have the opportunity to ask questions on dog management. The meetings are open to the public and noticed through the GGNRA public affairs office.

- **Written Materials:**

New materials will be developed that will include but not be limited to: brochures, a comprehensive guide to dogwalking at GGNRA with maps and pad maps specifically for dogwalking for each of the 3 counties of the park.

- **Signage:**

New signage will be developed that is clear and concise so the public can understand the regulations.

- **Education by NPS Staff**

All field staff will be educated on the new regulations and will discuss them with the public. It will be the primary role of the Interpretation Division to disseminate information through visitor centers and educational and public programs. All law enforcement personnel will be clearly briefed and will educate the public as well as enforce the regulation, as NPS law enforcement are trained to gain compliance through education. A separate law enforcement strategy will be developed.

- **Continued Updates to Adjacent Agencies and Community Leaders**

Written information will be shared with above community leaders so they can share it with constituents.

II. NEW EDUCATIONAL COMPONENTS:

- **Outreach staff—like Boulder (fill in)**

Comment [MBE1]: Seems like the outreach staff idea is already addressed in the other areas.

- **Current Dogwalking Events in the Park:**

NPS staff will attend current cleanup days at Fort Funston and Crissy Field at least once/year to discuss the regulation and gather feedback. The dogwalking communities in Marin and San Mateo Counties will be asked to develop cleanup days at least once per year and NPS will attend those events.

- **Comprehensive Guide To Dogwalking**

A guide will be developed that informs the pulbic of the regulations in each area of the park, including maps of each area where dogwalking is allowed. It will also include desired dogwalking behaviors.

- **Ads In Area Newspapers:**

Ads will be placed in community newspapers as funding allows in order to educate community residents who use the park on aregular basis.

- **Link to Dogwalking Websites**

Dogwalking groups will be asked to link their websites to the GGNRA website so their constituents and members will have access to the new regulation and plan. The *National Park Service Parameters and Scope of Negotiated Rulemaking Discussion* (July 31, 2006), which was distributed to all Negotiated Rulemaking Committee members, stated that "Dogwalking groups must be active partners in management of dogwalking in the park including disseminating accurate information to constituents regarding dog management regulations.

~~Link to Dogwalking Websites~~
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- **Partnerships**

Partnerships with other land managing agencies and dogwalking groups are key to ensuring that visitors are informed of the new regulation. GGNRA will partner with Bay Area park agencies to develop a video/training/outreach on proper dogwalking etiquette in parks and open spaces, which may be utilized as the TAG program training video, if a TAG program is adopted. Dog groups (SPCAs, humane societies, dog rescue groups and commercial) will conduct classes on proper etiquette in parks and open spaces.

(cp 3/12/08)

Comment [MBE2]: recall that the new regulation will not have all the details of the plan.

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Comment [MBE3]: This was already included in the bullet above. I think you meant to delete it.

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GOLDEN GATE NATIONAL RECREATION AREA

Dog Management Education and Public Involvement Plan

PURPOSE

The fundamental purpose of the public participation plan is to educate the public on new dogwalking regulations, to provide clarity on the regulations and to increase compliance with regulations.

The plan will target a wide range of audiences—multiple user groups, individuals, professional dogwalking groups, environmental groups, civic groups, business groups, agency staff and leaders, appointed/elected officials, representatives on the Negotiated Rulemaking Committee and others.

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The park will identify different venues to educate the public to ensure that visitors have an understanding of the new regulations in each area of the park where dogs are allowed. Through these varied venues, information will be made readily accessible both to regular visitors and those who may only visit the park periodically.

PUBLIC INVOLVEMENT COMPONENTS

The Dog Management Education and Public Involvement Plan includes the following components:

I. VENUES FOR COMMUNITY OUTREACH:

- **Mailing Database**
  GGNRA maintains a database of persons, groups, and agencies interested in notification of updated general park information as well as a special mailing list developed for dog management. The park will initiate a conversion to an email list as soon as staff availability permits.

- **Open Houses**

The public will be invited to attend quarterly park Open House meetings. Dog Management information materials will be available and the public will have the opportunity to ask questions on dog management. The meetings are open to the public and noticed through the GGNRA public affairs office.

- **Written Materials:**

New materials will be developed that will include but not be limited to: brochures, a comprehensive guide to dogwalking at GGNRA with maps and pad maps specifically for dogwalking for each of the 3 counties of the park.

- **Signage:**

New signage will be developed that is clear and concise so the public can understand the regulations.

- **Education by NPS Staff**

All field staff will be educated on the new regulations and will discuss them with the public. It will be the primary role of the Interpretation Division to disseminate information through visitor centers and educational and public programs. All law enforcement personnel will be clearly briefed and will educate the public as well as enforce the regulation, as NPS law enforcement are trained to gain compliance through education. A separate law enforcement strategy will be developed.

- **Continued Updates to Adjacent Agencies and Community Leaders**

Written information will be shared with above community leaders so they can share it with constituents.

II. NEW EDUCATIONAL COMPONENTS:

- **Outreach staff—like Boulder (fill in)**

- **Current Dogwalking Events in the Park:**

NPS staff will attend current cleanup days at Fort Funston and Crissy Field at least once/year to discuss the regulation and gather feedback. The dogwalking communities in Marin and San Mateo Counties will be asked to develop cleanup days at least once per year and NPS will attend those events.

- **Comprehensive Guide To Dogwalking**

A guide will be developed that informs the pulbic of the regulations in each area of the park, including maps of each area where dogwalking is allowed. It will also include desired dogwalking behaviors.

- **Ads In Area Newspapers:**

Ads will be placed in community newspapers as funding allows in order to educate community residents who use the park on aregular basis.

- **Link to Dogwalking Websites**

Dogwalking groups will be asked to link their websites to the GGNRA website so their constituents and members will have access to the new regulation. The National Park Service Parameters and Scope of Negotiated Rulemaking Discussion (July 31, 2006), which was distributed to all Negotiated Rulemaking Committee members, stated that "Dogwalking groups must be active partners in management of dogwalking in the park including disseminating accurate information to constituents regarding dog management regulations.

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Partnerships
Partnerships with other land managing agencies and dogwalking groups are key to ensuring that visitors are informed of the new regulation. GGNRA will partner with Bay Area park agencies to develop a video/training/outreach on proper dogwalking etiquette in parks and open spaces. Dog groups (SPCAs, humane societies, dog rescue groups and commercial) will conduct classes on proper etiquette in parks and open spaces.

(cp 3/12/08)

Trailhead Leash Pilot Project

Monitoring Report

Prepared by:

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Resource Monitoring Coordinator

The City of Boulder
Open Space and Mountain Parks Department
Boulder, Colorado

July 19, 2007

Acknowledgements

The OSMP Monitoring Group extends a special thanks to the citizen Dog Monitoring Group for it's participation in the development of the project's monitoring protocol and review of the draft report

While this report represents the collective work of the Monitoring Group within the City of Boulder's Open Space and Mountain Parks (OSMP) Department, Mark Gershman initiated the monitoring project and was instrumental in development of the monitoring protocol. Lance Heimes, Ben Lenth, and Megan Bowes collected field data for the project. There were also numerous internal reviewers of the report**.**

Suggested Citation:

Giolitto, M. (2007). Trailhead Leash Pilot Project *Monitoring Report*. The City of Boulder, Department of Open Space and Mountain Parks. Boulder, Colorado.

Trailhead Leash Pilot Program
Effectiveness Monitoring Report

Introduction

The City of Boulder Open Space and Mountain Parks (OSMP) trail system offers approximately 135 miles of recreational trails. Most of these trails (93% of the total trail miles) allow visitors to be accompanied by their canine companions, and most OSMP trails (87 miles or 64% of the total trail miles) permit dogs to be off leash, provided dog guardians manage their dogs in accordance with the City's Voice and Sight ordinance[1]. This contrasts with many surrounding open space systems, including U.S. Forest Service land, that require dogs be leashed while on trails or prohibit dogs altogether. Given the restrictions faced in other jurisdictions, OSMP has long been a favorite area destination for individuals wishing to recreate with their dogs.

While most visitors believe dog guardians are responsible individuals who keep their dogs under control on OSMP trails (Vaske & Donnelly 2007), dog-related concerns still rank high when visitors are asked about conflict they experience on or concerns they have with OSMP. In a 2004 visitor exit survey (Vaske & Donnelly *in draft*), almost half (43%) of OSMP visitors who reported encountering a "conflict or unpleasant experience" during their visit described the conflict as dog-related. Similarly, a telephone survey of registered voters in Boulder (Public Information Corporation 2004) asked survey respondents to name "one thing about open space and mountain parks facilities and services that (they) feel is most in need of improvement". Survey participants responded most frequently to this question with dog-related complaints (19%). The survey results also suggest concerns over dog-related issues are growing. In 1999, only 7% of the survey participants responded to this question with a dog-related complaint (Public Information Corporation 1999).

In response to these survey results, OSMP's Visitor Master Plan (OSMP 2005) includes several strategies for decreasing conflict associated with dogs and improving overall visitor experience. One such strategy is the Trailhead Leash (THL) pilot program. This strategy is designed to increase guardians control over their dogs in an area where the probability of dog-related conflicts is high (i.e. the trailheads) without imposing restrictive dog regulations throughout the system. In this respect, the Trailhead Leash management strategy follows the guidance of the Visitor Master Plan (VMP) of using the "least restrictive means" to obtain the desired management goal.

[1] Trail mileage is as of June 2007. New trails are in the planning stage. Similarly, changes in dog regulations may occur over time.

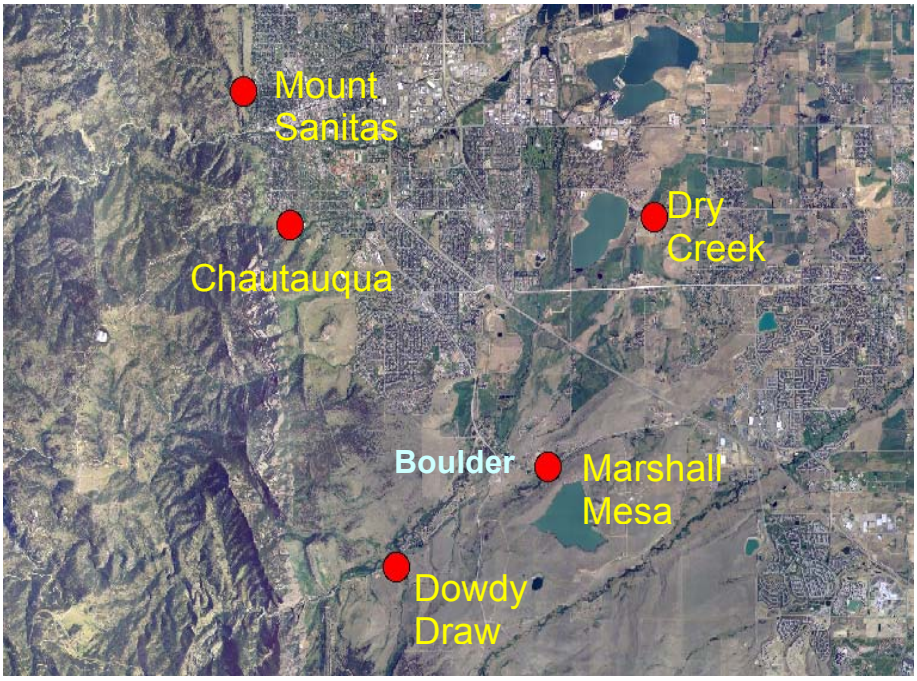

Figure 1: Locations of trailheads included in the THL program

The THL pilot program involved both a change in existing dog regulations at five trailheads in the OSMP system (Figure **1**) and a concerted outreach and education campaign. At THL trailheads, the new regulation requires visitors to leash their dogs immediately after the dog exits their vehicle and keep their dogs leashed until the visitor leaves the Trailhead Leash Zone. (See the Methods section for an explanation of the extent of the Trailhead Leash Zone.) In October of 2005, prior to implementation of the new regulation, OSMP conducted an outreach and education campaign. This effort included:

- Installing numerous signs in the parking corrals, at trailhead regulation boards, and along the trails at each site explaining the regulation and showing the boundaries of the Trailhead Leash Zone;
- Placing advertisements announcing the new regulation in local newspapers;
- Creating and stocking THL sites with site-specific pamphlets including a map of the Trailhead Leash Zone; and
- Providing regular opportunities for contact with OSMP staff (outreach specialists and rangers) at the THL sites when the regulation was implemented.

The primary goal of the THL pilot program is to improve the quality of the visitor experience. OSMP hopes that the THL pilot program will achieve this goal by: 1. increasing control of dogs by guardians; 2. decreasing conflict among dogs and guardians; 3. increasing the proportion of guardians in possession of a leash; 4. increasing the proportion of dog excrement that is removed; and 5. improving the safety of dogs and visitors in the parking areas. The THL pilot program's secondary goal is to improve environmental conditions, which OSMP hopes to achieve by decreasing off-trail trampling in the vicinity of the trailhead.

In accordance with the VMP and OSMP's commitment to an adaptive management framework, OSMP staff monitored the effectiveness of the THL pilot program in meeting its goals and objectives. This report documents the monitoring results.

Study Sites

OSMP implemented the Trailhead Leash pilot program at five trailheads: Chautauqua, Doudy Draw, Dry Creek, Marshall Mesa, and Sanitas (Figure **1**). Each of these trailheads is a popular destination for dog-walking visitors. At each trailhead, the leash regulation affects the parking corral/area adjacent to the trail and a small area immediately adjacent to the parking area. The distance from the trailhead included in the regulation varied at each of the five study sites. (Figures A-E in Appendix A present the Trailhead Leash Zones for each of the five trailheads included in this pilot program.) For the purposes of this document, "Trailhead Leash Zone" refers to the parking corral/area and portion of the trail covered by the trailhead leash regulation.

Each study site also included a "Displacement Zone". The Displacement Zone refers to the portion of the trail immediately adjacent to and up-trail from the Trailhead Leash Zone. At each site, the length of trail encompassed by Displacement Zone equaled the length of trail encompassed by the Trailhead Leash Zone. For example, the Trailhead Leash Zone at Dry Creek included the parking corral and the first 100 feet of trail extending from the parking corral. The Displacement Zone began at the point where the Trailhead Leash Zone ended and extended 100 feet up-trail. A citizen advisory group suggested monitoring a "displacement zone" to determine if the Trailhead Leash program resulted in the displacement of undesirable conditions from the trailhead to the location where the trailhead leash regulation ends.

Methods

OSMP staff conducted observations in the Trailhead Leash Zone and Displacement Zone at each of the five study sites during September of 2005 (prior to the trailhead leash regulation), and again in May and June 2006 (following implementation of the regulation). Staff monitored the study sites when visitor use was expected to be high to maximize efficiency. On weekdays, monitoring periods were in the morning (6:30-9:30 AM[2]) and evening (4:30-7:30 PM). On weekends, monitoring periods were in the morning (7:00-10:00 AM), at midday (11:00 AM-2:00 PM), and in the evening (4:00-7:00). OSMP used a grid design and random number sequence to assign staff members to study sites, days, and time periods.

At each study site, staff positioned themselves at a point from which they could view the entire Trailhead Leash Zone or Displacement Zone. To reduce the likelihood that visitors might alter their behavior due to the presence of a staff

[2] All times are approximate

member, the monitors did not wear clothing that would identify them as OSMP employees. Furthermore, at study sites where it was feasible, staff members conducted observations from a location that was out of sight to trail visitors. In addition, OSMP rangers and education staff were informed of the monitoring schedule and avoided locations where monitoring was taking place.

When the sampling period began, the staff member conducting the monitoring observed the first visitor party with a dog to enter the observation zone (either Trailhead Leash or Displacement). The staff member continued to observe the visitor party until that party left the observation zone. Once the party left the observation zone, the staff member observed the next visitor party with a dog to enter the observation zone. Consequently, staff only observed one visitor party at a time. For each observed visitor party, the staff member recorded the visitor party characteristics and whether any member of the party engaged in specific dog and guardian behaviors. Appendix B provides a copy of the data sheet used in the monitoring.

For the purposes of this study, the visitor party was the sampling unit. Consequently, the results are reported as percentages of visitor parties complying with the regulations, exhibiting at least one potentially conflictive behavior, involved in a safety hazard, or with at least one dog off the trail corridor. Differences between percentages observed before and after implementation of the Trailhead Leash program were analyzed using Fisher's exact test. For all tests, α=0.05.

Results

OSMP staff spent over 550 hours in the field monitoring visitor behavior as part of the THL program. Monitoring occurred on all seven days of the week. Staff collected approximately 40-45% of the data points (i.e. an observation of a visitor party with a dog) on weekends despite the fact that only approximately 30% of the monitoring periods occurred on the weekend (Figure 2). This result is not surprising since visitation levels are higher on weekends compared to weekdays. Monitoring periods were generally evenly distributed across the five study sites with most sites being monitored for 8 to 13 times before and after implementation of the THL program (Figures 3 and 4).

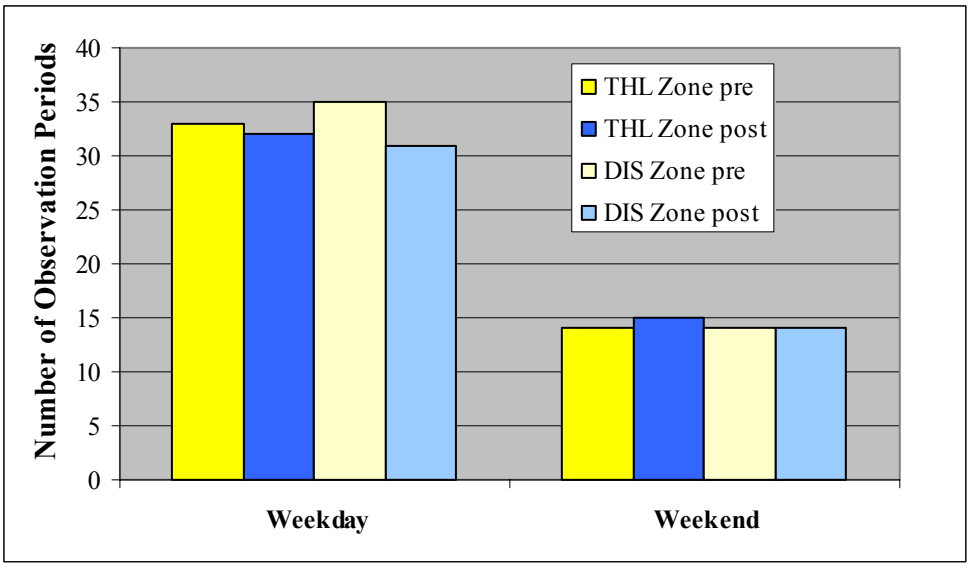

Figure 2. Distribution of THL monitoring periods between weekdays and weekends. THL=Trailhead leash zone; DIS=Displacement zone. Pre=Baseline sampling prior to implementation of the THL program; Post=Sampling following implementation of the THL program.

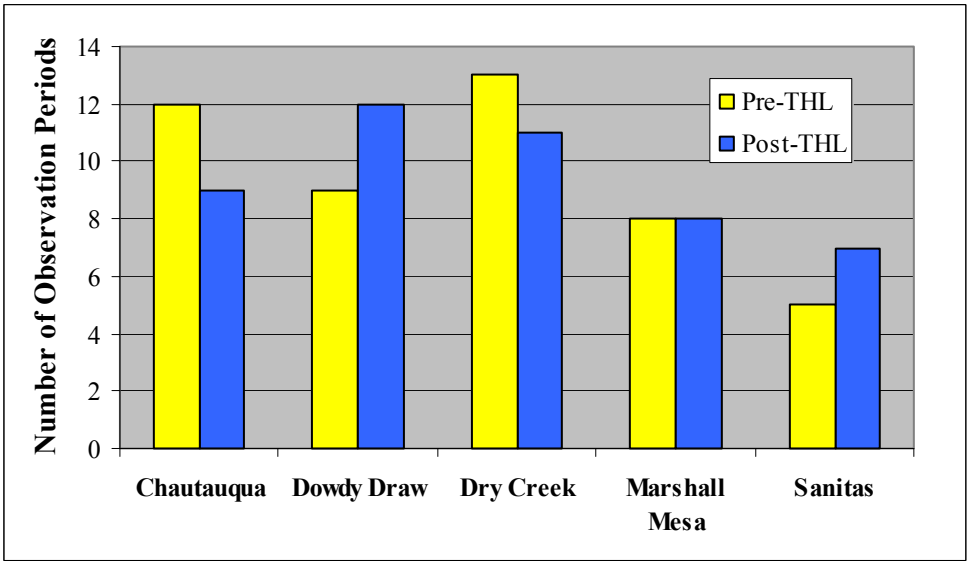

Figure 3. Distribution of monitoring periods among study sites in the ***Trailhead Leash Zone***. Pre-THL=Baseline sampling prior to implementation of the THL program; Post-THL=Sampling following implementation of the THL program.

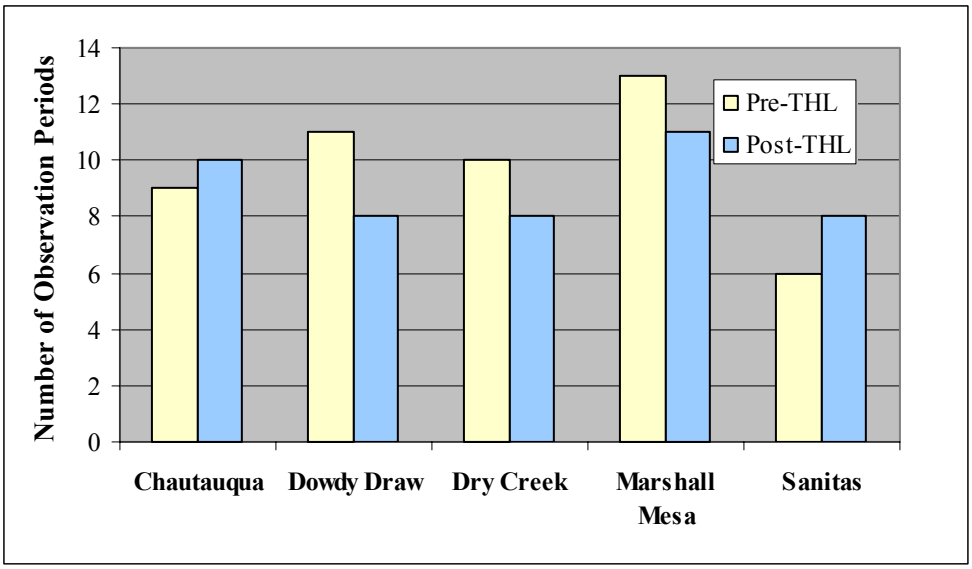

Figure 4. Distribution of monitoring periods among study sites in the ***Displacement Zone***. Pre-THL=Baseline sampling prior to implementation of the THL program; Post-THL=Sampling following implementation of the THL program.

This monitoring effort yielded observations of 2,748 visitor parties with dogs during the two monitoring periods (Table 1). Staff observed 1,364 visitor parties with dogs during the September 2005 baseline monitoring with 720 visitor parties with dogs observed in the Trailhead Leash Zone and 644 visitor parties with dogs observed in the Displacement Zone. During the May-June 2006 sampling period, following implementation of the THL program, staff observed a total of 1,384 visitor parties with dogs, 735 visitor parties with dogs in the Trailhead Leash Zone and 649 visitor parties with dogs in the Displacement Zone.

Table 1. Summary of number of visitor parties with dogs observed with the monitoring associated with the THL program.

Monitoring Period	Trailhead Leash Zone	Displacement Zone	Totals
September 2005 (pre-treatment)	720	644	**1,364**
May-June 2006 (post-treatment)	735	649	**1,384**
Totals	**1,455**	**1,293**	**2,748**

Each of the project objectives was met following implementation of the Trailhead Leash project (Figure 5). Within the Trailhead Leash Zone, the percentage of visitor parties with control of their dogs (as measured by compliance with dog-related regulations that could be observed) increased from 85.0% prior to program implementation to 92.9% after program implementation. The percentage of visitor parties that exhibited at least one conflictive behavior decreased from 8.1% prior to program implementation to 4.6% following program

implementation. Compliance with the excrement removal regulation increased from 72.5% to 85.1% following implementation of the Trailhead Leash program. The occurrence of safety hazards decreased with 5.7% of the visitor parties involved in at least one safety hazard following implementation of the Trailhead Leash program compared to 15.7% of the visitor parties prior to implementation of the Trailhead Leash program. Finally, the percentage of visitor parties with at least one dog leaving the trail declined from 28.3% prior to program implementation to 13.5% following program implementation. Each of the observed changes was statistically significant. In most cases, $p<0.001$; in all cases, $p<0.05$.

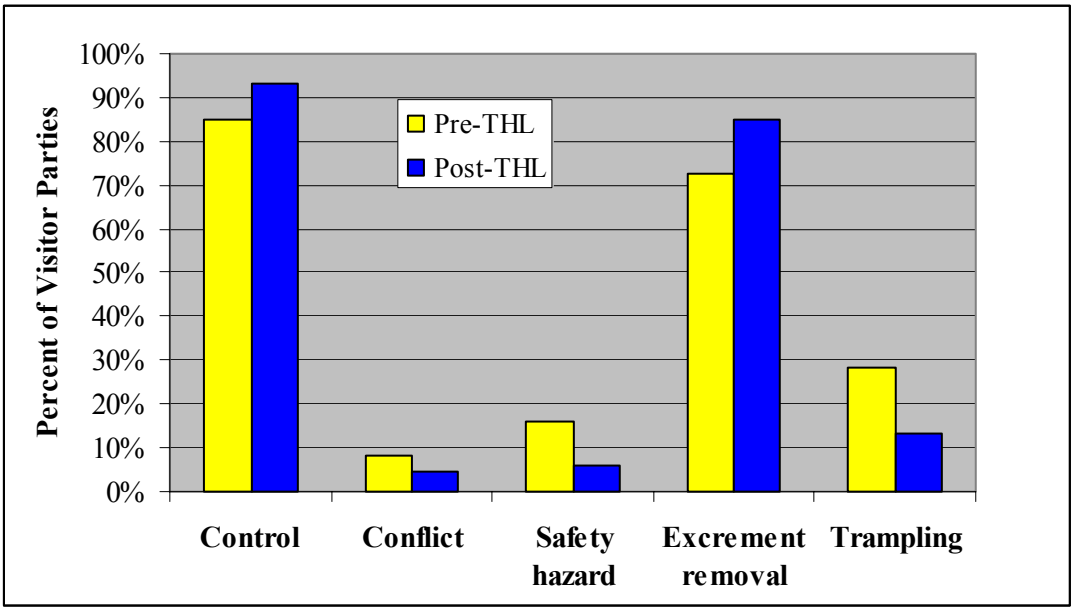

Figure 5. Percentage of visitor parties with dogs observed in the ***Trailhead Leash Zone*** exhibiting control of their dog(s), displaying at least one conflictive behavior, involved in a safety hazard, complying with the excrement removal regulation, or leaving the trail corridor before and after implementation of the Trailhead Leash (THL) program. Each difference is statistically significant at $p< 0.05$.

Although we did not measure the percentage of visitor parties in compliance with the leash possession regulation as part of this study, we did conduct visitor interviews to determine leash possession during monitoring associated with the City's Voice and Sight Tag program. Those interviews, conducted during March-May 2006, provide some insight into whether the Trailhead Leash program increased compliance with the leash possession regulation. Over 95% of the visitor parties at the Trailhead Leash sites possessed a leash for each dog in their party compared to just fewer than 90% of the visitor parties on non-Trailhead Leash sites (Figure 6). (Interviews were only conducted at trails/trailheads that allow dogs to be off–leash under Voice and Sight Control.)

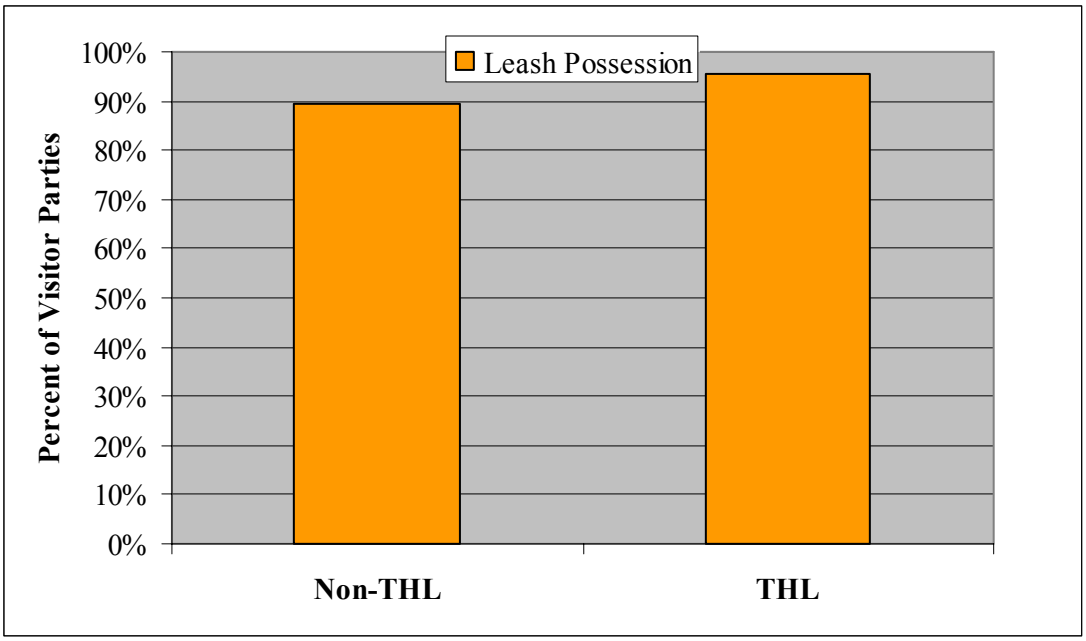

Figure 6. Percentage of visitor parties complying with the leash possession regulation at Trailhead Leash sites (THL) compared to other trails where Voice and Sight management is allowed, but the Trailhead Leash program does not exist (Non-THL). The difference is statistically significant at $p<0.02$.

While the data suggest that Trailhead Leash program achieved its objectives, a change in the monitoring indicators was also detected in the Displacement Zone following implementation of the Trailhead Leash program. This indicates a possible displacement effect; in other words the program may have "displaced" some undesirable behaviors, moving the behaviors the program hoped to treat from the trailhead to the point visitors were allowed to manage their dogs under voice and sight control (Figure 7). Within the Displacement Zone, guardian control of the dogs decreased from 89.4% of the visitor parties exhibiting control prior to implementation of the Trailhead Leash program to 80.7% after implementation of the program. Conflict among dogs and visitors also increased in the Displacement Zone. The percent of the visitor parties exhibiting at least one conflictive behavior more than doubled (6.5% to 14.8%) following implementation of the Trailhead Leash program. The percentage of visitor parties with at least one dog off trail also increased (28.0% to 43.5%) in the Displacement Zone following implementation of the Trailhead Leash program. Each of these observed changes is statistically significant ($p<0.001$).

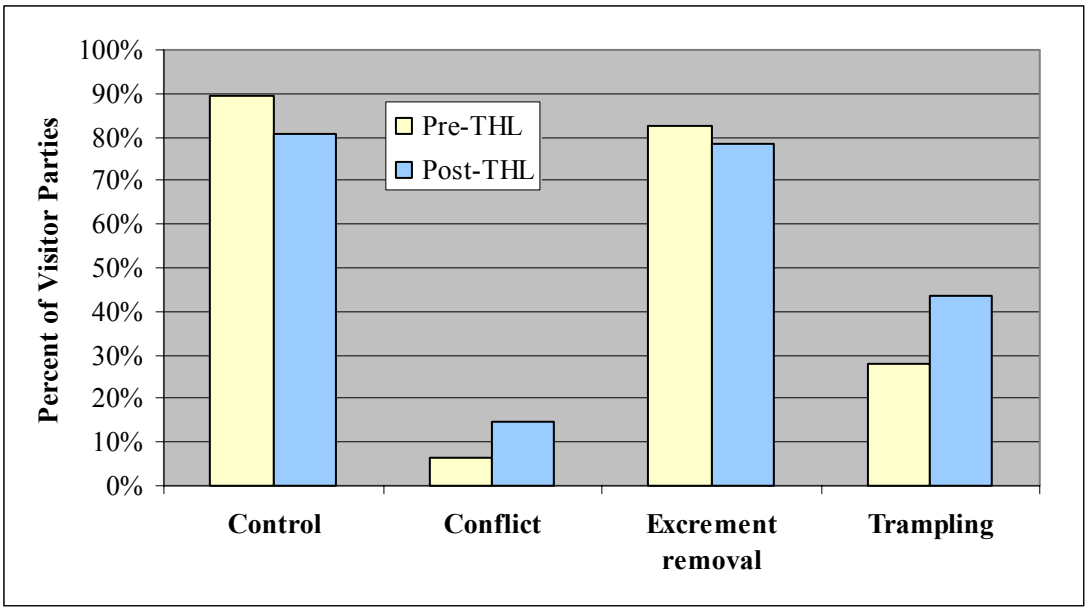

Figure 7. Percentage of visitor parties observed in the ***Displacement Zone*** exhibiting control of their dog(s), displaying at least one conflictive behavior, complying with the excrement removal regulation, or leaving the trail corridor before and after implementation of the Trailhead Leash (THL) program.

We did not observe a displacement effect with respect to compliance with the excrement removal regulation. Prior to implementation of the Trailhead Leash program, 82.6% of the visitor parties in the Displacement Zone complied with the excrement removal regulation. Following program implementation, 78.4% of the visitor parties complied with the regulation in the Displacement Zone. This difference was not statistically significant ($p>0.05$).

Discussion

OSMP implemented the THL program in an effort to improve visitor experience by increasing guardian control over their dog(s) at trailheads. OSMP developed this dog management strategy from a conceptual model of the trail system and dog/guardian behavior. In general, the model relies on several assumptions and facts:

1. Visitor density is greater at the trailheads relative to areas further from the trailheads;
2. The presence of vehicles at trailheads increases the potential for safety hazards at trailheads;
3. Visitors at the trailheads often have different objectives (e.g. hiking, wildlife watching, horseback riding, cycling, running, nature study, etc.) for their visit to OSMP; and
4. Dogs arriving at trailheads tend to be excited.

The conceptual model suggests that given these four factors, there is an increased risk of dog-related visitor conflict and safety hazards at trailheads relative to other portions of the OSMP trail system. This is particularly true if

guardians lack the ability to control of their off-leash dog(s). The THL program is designed to reduce the risk of dog-related visitor conflict and safety hazards at trailheads by requiring guardians to leash their dog(s) at these busy places, thus increasing guardian control over their dog(s).

The monitoring data indicate that the THL program achieved its objectives. As expected, requiring guardians to leash their dog(s) in the Trailhead Leash zone increased the guardians' control over their dog(s) compared to the level of control guardians possess when managing their dog(s) using voice and sight techniques. As a whole, guardians exhibited greater control over their dog(s) and removed their dog's excrement more regularly following implementation of the THL program. Additionally, there was less dog-related conflict and trampling of trailside vegetation and fewer safety hazards after implementation of the THL program compared to conditions prior to implementation of the program. The data from the Voice and Sight Tag program monitoring suggest visitors on trails with the THL program in place are more likely to have a leash for each dog they are managing under voice and sight control than visitors on trails without the THL program. Taken together, these results should lead to improved visitor experience on the OSMP system.

While the THL program appears to have been successful in meeting its goals, monitoring data from the Displacement Zone suggests that guardian control (taken as a whole) decreased once the leash requirement was lifted. The unintended result was that some of the undesirable conditions observed in the Trailhead Leash Zone were moved further up trail to the start of the Displacement Zone. Within the Displacement Zone, guardian control over their dog(s) decreased following implementation of the THL program. Similarly, dog-related conflict and trampling of trailside vegetation increased in the Displacement Zone after implementation of the THL program.

Given the potential displacement effect observed, the decision of whether to continue, modify, expand, and/or discontinue the THL program is difficult. In general, OSMP managers must determine whether the increase in guardian control at the trailheads is worth the displacement of undesirable conditions further away from the trailhead. In addition to these monitoring results there are several other aspects of the project (other benefits, feasibility, cost) that will figure into a decision about the future of the THL program. Appendix C summarizes comments from the OSMP Ranger staff and Outreach staff about this project.

There are numerous alternatives that OSMP managers might select to continue, modify, expand, and/or discontinue the THL program. OSMP managers might consider the following options with respect to the THL program:

1. <u>Continue The THL Program and Expand It To Other OSMP Trailheads</u> because dog guardians were more likely to comply with excrement removal regulation with the THL regulation in place and no displacement effect was observed.

Results of a recent survey of visitors to OSMP trailheads that lead to trails that allow visitors to manage their dogs under voice and sight control found that both dog guardians and non-dog guardians disapprove when guardians do not comply with the dog excrement removal regulation (Vaske & Donnelly 2007). In general, survey participants expressed a "zero tolerance" norm for guardians not picking up after their dogs. In other words, respondents believed dog guardians should *always* pick up after their dogs. Additionally, 79% of the survey respondents stated they would have a moderate to extreme problem with dog guardians failing to comply with the excrement removal regulation, and 91% of the respondents agreed or strongly agreed with the statement "It bothers me when dog owners (guardians) do ***not*** pick up after their dogs". These percentages were higher than any other potentially conflictive dog or guardian behavior included in the survey. Clearly, visitors want guardians to comply with the excrement removal regulation and lack of compliance leads to conflict. Thus, any management strategy that increases compliance with the excrement removal regulation will reduce visitor conflict and improve the visitor experience.

Increased compliance with the excrement removal regulation will likely also benefit the natural resources. For example, dog excrement left to decay may affect trailside vegetation composition. Figure 8 presents a conceptual model of how guardians' failure to remove dog excrement could affect trailside vegetation. Although no studies are available to validate the model as a whole, it is reasonable to assume dog excrement contains nitrogen, and several researchers (e.g. Stolgren et al. 1998, Stolgren et al. 1999) have shown positive correlations between exotic species (weeds) richness and/or cover and nitrogen content in soil.

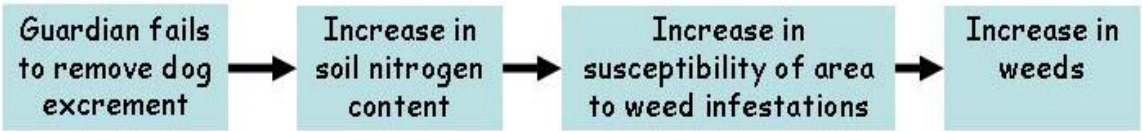

Figure 8.Conceptual model showing the impact of guardians' failure to remove dog excrement on trailside vegetation.

Similarly, several natural resource protection agencies, including the United States Environmental Protection Agency, recommend removing pet excrement to prevent degradation of water resources (USEPA 2005). Figure 9 provides a simplified model of the potential effects of pet excrement left near water resources. Again, research validating the model as a whole does not exist in the scientific literature. However, researchers have confirmed many of the pathways of the model (Smamadpour and Checkowitz 1998, Wetzel 1983). As the models

presented in Figures 8 and 9 suggest, any management strategy that increases compliance with the excrement removal regulation will likely also benefit the City's natural resources and thereby also improve visitor experience.

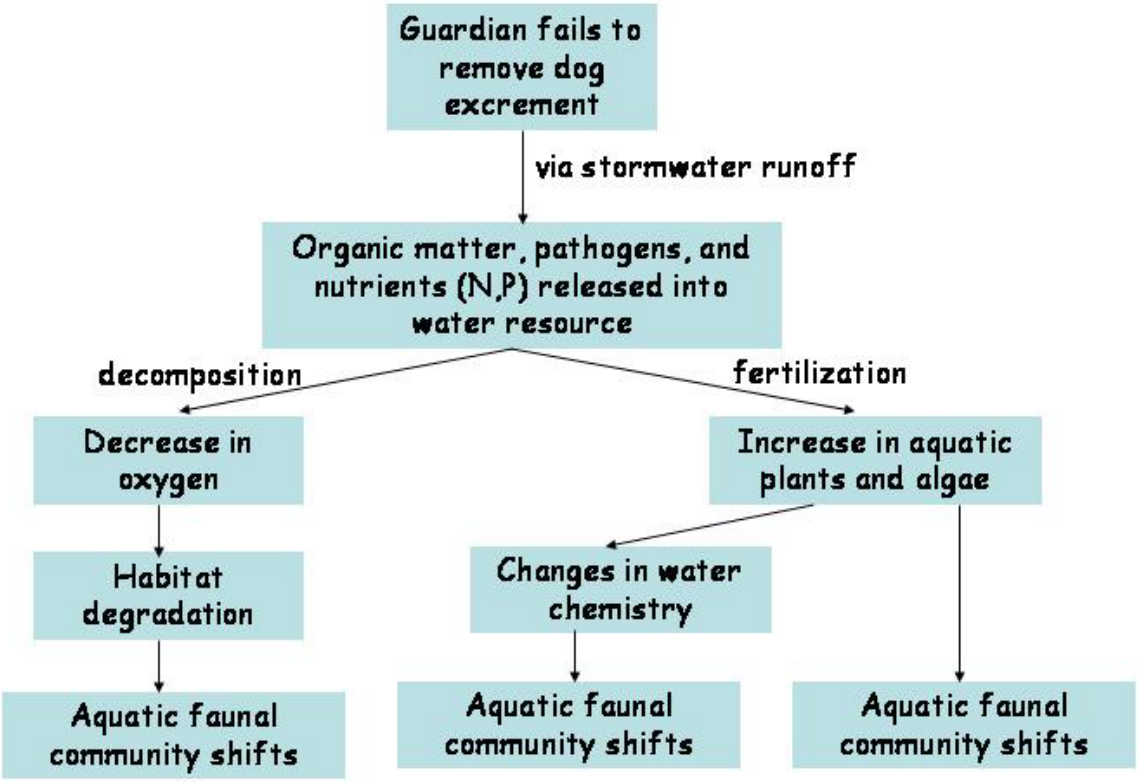

Figure 9. Simplified conceptual model showing the impact of guardians' failure to remove dog excrement on nearby aquatic resources.

2. <u>Continue The THL Program and Expand It To Other OSMP Trailheads</u> because the Voice and Sight Tag program will eliminate the displacement effect observed in this study.

The study showed that while the THL program was effective and met the project objectives, several of the undesirable behaviors the program targeted were simply "displaced" or moved further from the trailhead. The monitoring associated with the THL program concluded prior to implementation of the Voice and Sight (V&S) Tag program. The V&S Tag program shares some objectives with the THL program such as reduced visitor conflict and improved guardian control of their off leash dog(s). The V&S Tag program may achieve its goals and objectives and eliminate the displacement effect observed in this study. In combination, the two programs may increase safety (of dogs and visitors), increase compliance with the excrement removal regulation, reduce visitor conflict, and improve guardian control of their dog(s) more effectively than either program does alone.

3. <u>Discontinue The THL Program and Revise The Leave No Trace Message</u> because moving undesirable behaviors or conditions, particularly trampling, further from the trailhead is unacceptable. Trailheads serve as "sacrifice zones". Revamp Leave No Trace (LNT) education efforts to help visitors understand that LNT principles apply to dogs too.

4. <u>Require Visitors to Leash Their Dogs Only in Parking Corrals/Areas.</u>

The benefits of this management option are fourfold. First, the monitoring results show that by requiring visitors to leash their dogs within the parking corrals, the number of safety hazards declines. Certainly, improved safety of dogs will improve visitor experience. Second, the monitoring results also suggest that the THL program may have improved guardian compliance with the leash possession regulation. Requiring visitors to leash their dogs within the parking corrals means guardians must have a leash for each dog. Third, requiring visitors to leash their dogs only in the parking corral creates a consistent standard across the OSMP system. As currently implemented, the portion of the trail under the THL regulation varies at each site. This can be somewhat confusing for visitors, particularly if they see no logical reason for the specified distance. Fourth, limiting the leash restriction to the parking corrals only will reduce the number of signs placed further from the trailhead. Visitors expect signs in the parking corrals and at the start of the trail. However, signs further from trailheads might detract from the visitor experience (sign pollution).

As previously noted, there are numerous permutations OSMP managers might employ to continue, modify, expand, and/or discontinue the THL program. The options outlined above highlight ***some*** of the benefits and costs associated with continuing, modifying, expanding, or ending the THL program. Feasibility of continuing and/or expanding the program should also be considered in weighing various options for the program's future. Because the Ranger and Education and Outreach work groups would be responsible for much of the work associated continuing and/or expanding the program, their comments regarding the feasibility of continuing and/or expanding the program, as well as any comments on the benefits and costs of the program, are important. Appendix C presents this feedback from rangers and education and outreach staff.

Summary

OSMP implemented the Trailhead Leash pilot program in an effort to increase guardian control over dogs at selected trailheads. The program requires guardians to leash their dog(s) immediately after the dog exits their vehicle and keep their dog(s) leashed until the visitor leaves the Trailhead Leash Zone. The THL zone varies at each of the pilot program locations but generally extends at least 100 feet up trail from the parking corral/area. As part of its commitment to adaptive management, OSMP monitored the effectiveness of the THL pilot program in meeting its goals and objectives. The monitoring results indicate that the program met all of its objectives; however, the results also suggest many of the undesirable conditions and/or behaviors meant to be treated by this management strategy were simply moved further up trail to the point where guardians could manage their dogs under voice and sight control. OSMP managers should consider the benefits and costs (and others not mentioned) highlighted by the monitoring, as well as the feasibility of implementing any changes to the program and public input, in making their final decision on the program.

Management Response

Based on the monitoring results presented in this report and comments provided by the public and other OSMP work groups, OSMP managers decided to implement the trailhead leash program within the parking corrals of other designated trailheads across the OSMP system. At the time of this report, a committee was being established to determine whether the trailhead leash regulation would extend beyond the parking corral to cover a length of the trail at any of the designated trailheads.

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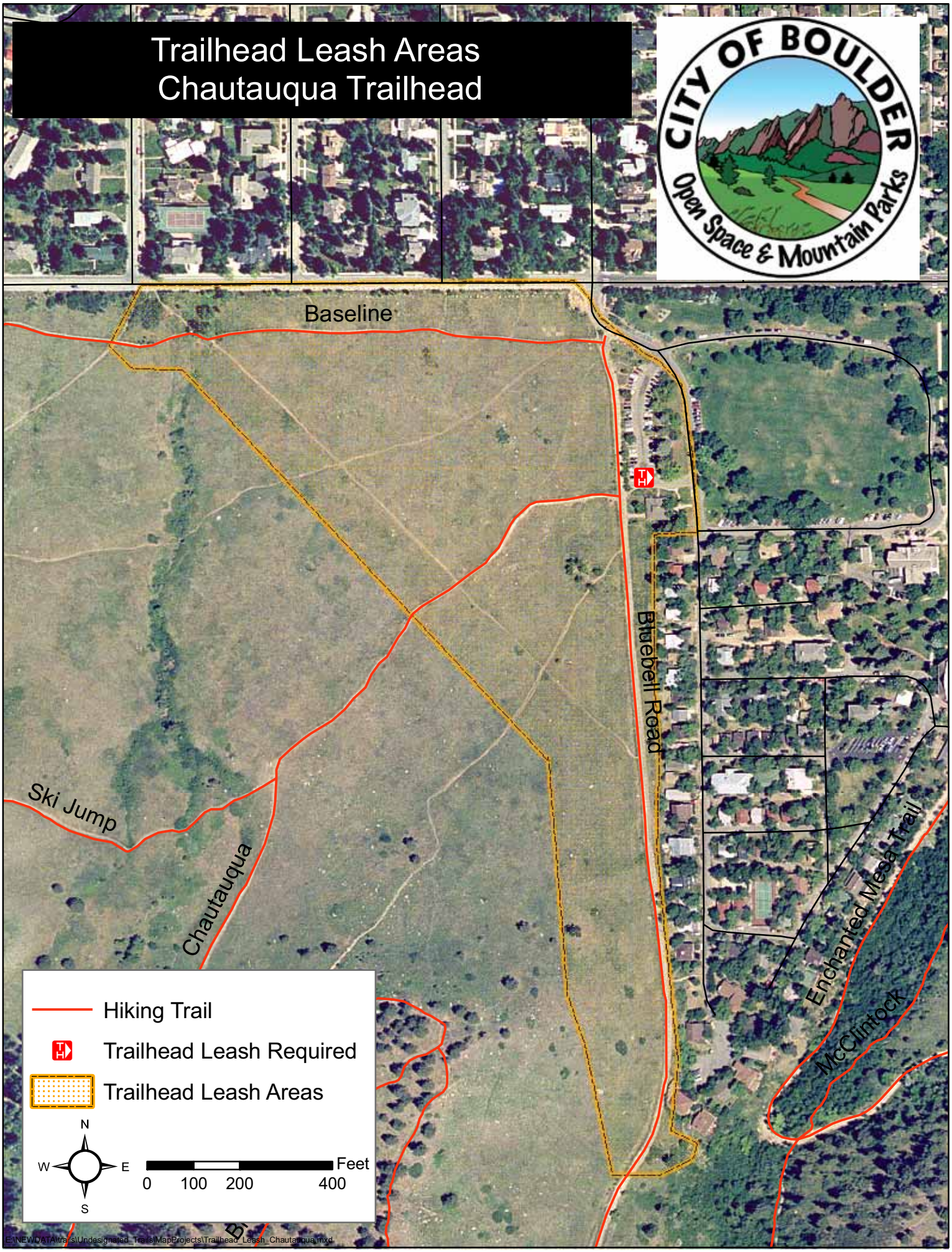
Appendix A

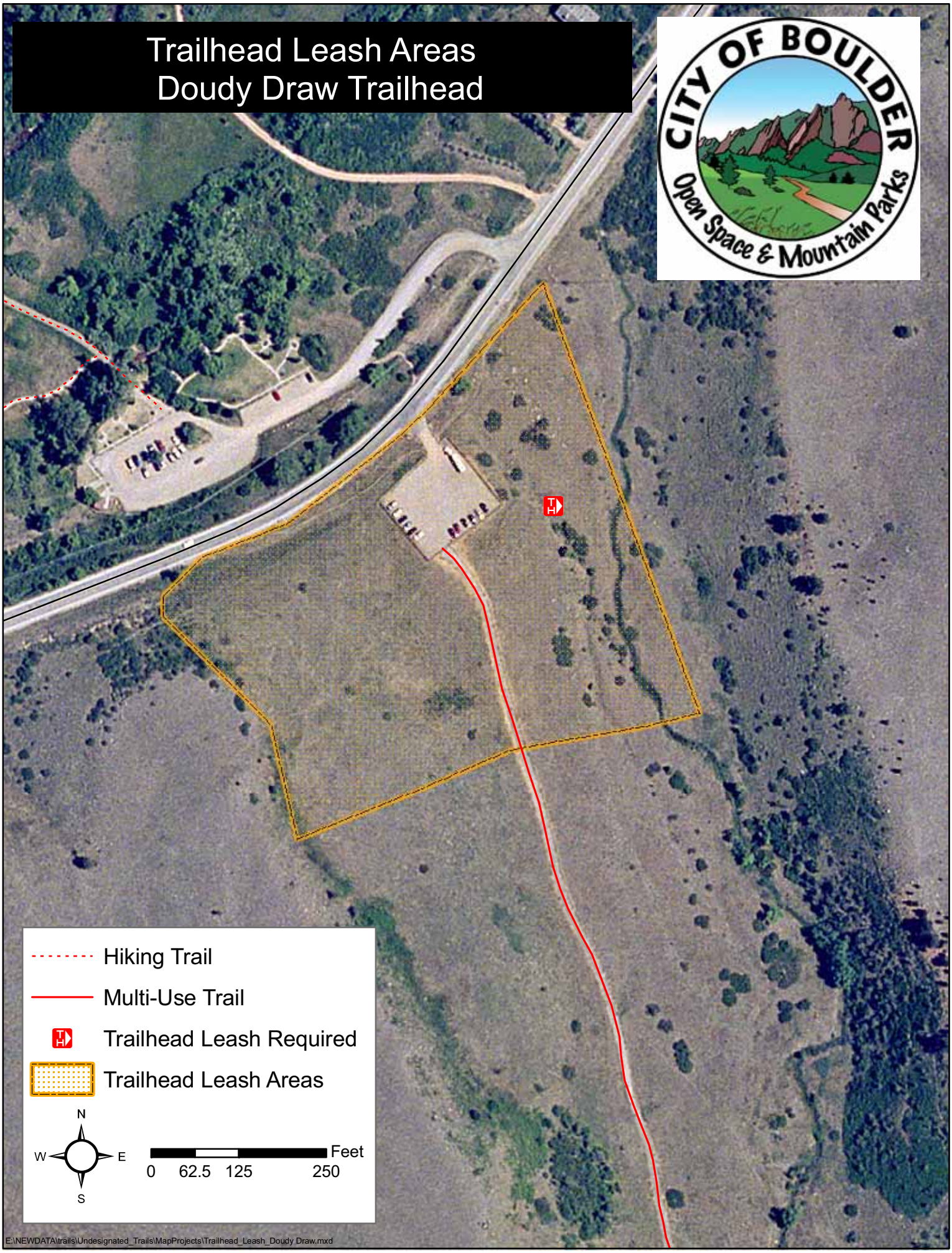
Trailhead Leash Pilot Program

Trailhead Leash Zones

Trailhead Leash Areas
Chautauqua Trailhead



Trailhead Leash Areas
Doudy Draw Trailhead



Trailhead Leash Areas
Dry Creek Trailhead

Trailhead Leash Areas
Marshall Mesa Trailhead

Trailhead Leash Areas
Sanitas Trailhead

Appendix B

Trailhead Leash Pilot Program

Data Sheet

Trailhead Leash Pilot Program Data Sheet

Page ___ of ____

Date (mm/dd/yy): | Location: | Direction: | Observer:

Time (24-hour): | Weather:

Obs. #	Visitor data		Leashed in proposed leashing area	Presence/absence of listed behaviors involving dogs			Presence/absence of safety hazards			Off trail use			Compliance with existing dog control regulations										
	People	Dogs	Leashed in proposed leashing area (0-n)	Opport for interaction (Y/N)	Other(s) present	Behavior observed	Leashed in trlhd (0-n)	# of hazards (0-n)	Type of hazard	Unleashed dog off trail corridor (0-n)	Leashed dog off trail corridor (0-n)	People off trail corridor (0-n)	Out of sight (0-n)	Respond to call		More than two dogs off leash (Y/N)	Excrement					Compliance (Y/N)	Notes
														Obeys (0-n)	Does not obey (0-n)		Poop (# of times, 0-n)	Picked up	Did not pick up	Took bag	Left bag		

Notes:

Behavior Codes

Location

T = Trail
P = Parking area

No physical contact by dog

1. Flushing or fleeing wildlife (requires 2 of the 4 modifiers)
    a. Dog is leashed
    b. Dog is unleashed
    c. Dog is within 10' of trail
    d. Dog is more than 10' from the edge of the trail
2. Chasing
    a. Dog on dog (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
    b. Wildlife
    c. Livestock
    d. Person other than member of party (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
3. Repeated barking (If possible notes should describe why the dog is barking)

Physical contact by dog

5. Physical contact NOT initiated by a visitor and not resulting in injury (requires at least 1 modifier) (Notes should describe the interaction.)
    a. Jumping on
    b. Licking
    c. Pawing
    d. Sniffing
    e. Other
6. Physical contact resulting in injury (requires at least 1 modifier)
    a. Person,
    b. Another dog,
    c. Wildlife
    d. Livestock

Incidents of the following behaviors by dog guardians or other visitors

7. Repeatedly calling the dog (more than two times)
8. Yelling/verbal confrontation
9. Kicking, hitting or "macing" of dogs by humans

Other

10. Other (Notes should describe the interaction/situation)

Each time a behavior is recorded the location of the behavior should also be recorded. For example, if two dogs are observed engaging in friendly (positive) chasing within the parking area, the event would be recorded "P2ai". If a dog jumped on a person along the trail, the event would be recorded as "T5a".

Appendix C

OSMP Staff Feedback on the THL Program

Rangers
Notes from June 13, 2007 meeting

Benefit

- Open Space and Mountain Parks should consider that reducing dog excrement at the trailhead with no displacement as a significant benefit. This alone justifies the project. (This point was reiterated throughout the conversation by other rangers.)
- The trailhead leash program has resulted in more people bringing leashes with them onto Open Space and Mountain Parks lands.
- The initial impression of first time visitors at one of our busiest trailheads shows orderliness instead of chaos. This sets an example for subsequent behavior. This is a huge difference and suggest that the regulation should be retained there (at Chautauqua), if nowhere else. (Agreement by other members of the ranger staff)
- Same response observed at the Sanitas Trailhead and the Dry Creek parking corral
- Given the displacement effect, it is unclear if there is sufficient "bang for the buck".
    - Response to comment above
      Although the number of negative behaviors may have increased in the displacement area, it is unlikely that this really represents an offset of the number of visitors affected by these conflictive behaviors. It is likely that bad behaviors in the displacement zone will affect fewer people if anyone at all.
- It is difficult to extract the effect of any one strategy when we have had many going on simultaneously (voice and sight tag, trailhead leash, seasonal closures, etc.)
- It would be of greater benefit if the strategy were also in place at the South Mesa Trailhead.
- May not make sense to continue at Doudy Draw because of low use levels
- It should be at all trailheads or none.
- Is there information from the Ranger Database that could be used to check the findings (number of dog bites, dog summonses, etc. before and after)

Feasibility

- There were considerable technical difficulties and lessons learned with the start-up and initial organization of the project. Where will the signs go? What are the extents of the on leash areas?
- There is a general positive attitude about the Trailhead Leash Program
    - Majority of comments are positive
    - People feel that it makes sense
    - It is a response of appropriate scale when compared to the issue of dog related conflicts

- Since they are supposed to have a leash in their possession, it is easy to be successful. Unlike other regulations (e.g. voice and sight tag), it does not require any extra effort or material.
- There has been a paradigm shift in some areas where now it is the norm to have your dog leashed in the trailhead area.
- If we are contemplating more or other dog regulations, be sure to coordinate them so we are not making unrealistic or incomprehensible demands on visitors.
- This is not complex or difficult to understand, that appeals to people

Other

- Given the fact that it appeals to many people, visitors may respond poorly to a decision to do away with the Trailhead Leash regulation. It may make all of our rules appear as capricious and short-lived
    - If OSMP discontinues the Trailhead Leash program, will visitors wonder if OSMP will end the V&S tag program as well?
    - People who were ticketed under the Trailhead Leash program would be being particularly alienated if OSMP discontinued THL when it was (viewed as) successful
- Continuing the THL program would reaffirm the feedback that we are receiving from the community.

Outreach Staff

Topher Downham and Steve Mertz have conducted numerous de-briefs and conversations with the (±) fifteen part-time seasonal outreach staff members during ’06 &’07 about the Trailhead Leash Program. The following is a summary of feedback that our staff has noted, as well as observations that Steve and Topher have made personally since the role out of this program.

The Outreach staff makes over 100,000 face to face contacts at trailheads, Farmer’s Markets and events annually. Additionally 37,000 contacts were made at the Chautauqua Cottage on 2006. The outreach staff is well positioned to gauge public receptivity to OSMP programs, rules, etc.

1. Public’s Receptivity to Trailhead Leash Program (TLP)

Compared to the permitting systems that have recently been introduced, this was an extremely easy program for Outreach Staff to introduce to the public:

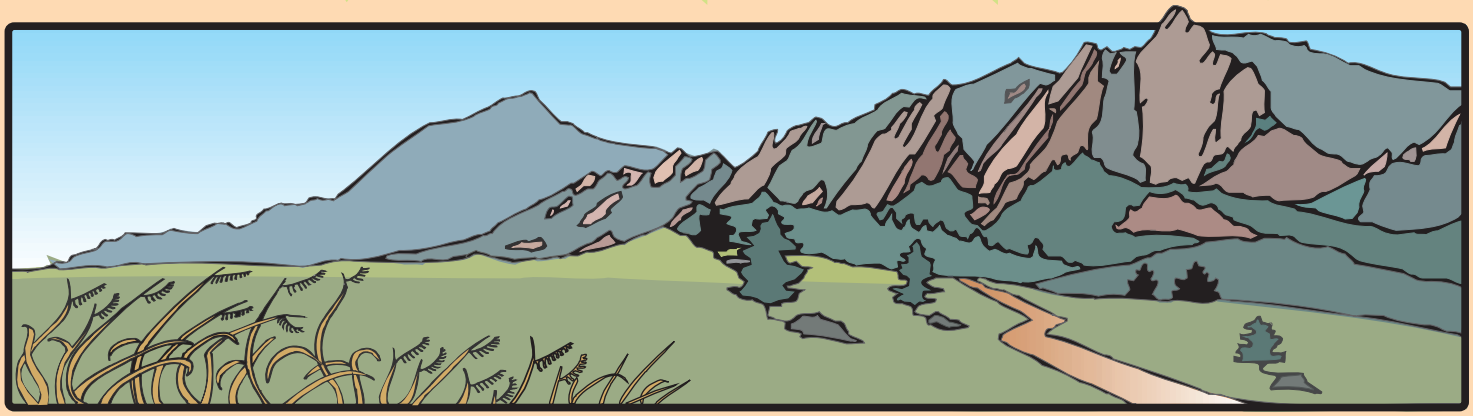
- TLP was an “easy pill for visitors to swallow.
- The TLP made sense to the public. Often staff was told “this makes sense” and “good idea”
- There were little comments about it being “a hassle”.
- Visitors were happy to get a free leash if they had forgotten one.
- This project was not viewed as overly bureaucratic

2. Effects of Program

Overall the benefits were easy for the staff to observe:

- Decrease in people hiking with out leashes.
- Decrease in “bad dog” behavior at trailheads
- Decrease in people yelling at dogs, barking—conflicts in general.
- Huge decrease in poop being left behind.
- Nice brochure- easy to understand.
- Made OSMP Department “look pro-active and smart”
- Looking pro-active and smart engenders trust

City of Boulder
OPEN SPACE & MOUNTAIN PARKS



VISITOR MASTER PLAN

ENJOY & PROTECT

APPROVED
APRIL 2005
www.osmp.org

Visitor Master Plan Acknowledgements

City of Boulder Open Space and Mountain Parks Department
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Linda Jourgensen, Chair
Bruce Bland
Kenneth Dunn
Allyn Feinberg
Sean Kendall

Open Space and Mountain Parks Staff and Community Members
Staff of the Open Space and Mountain Parks Department and many community members gave countless and long hours contributing to the preparation and completion of the Visitor Master Plan. To one and all, for these substantial and essential contributions, our sincerest appreciation and thanks.

The Vision: What Our Visitors Will See, Do, and Know Tomorrow

Years from now, a hiker steps into Boulder Open Space and Mountain Parks--and steps into a world apart from the hectic pace of the city. She pauses to marvel at the vast natural spaces that are home to native plant and wildlife species. Chances are good that she might be walking through a tall grass prairie or along a foothills ridge, features uniquely preserved here at the junction of Colorado's Great Plains and Rocky Mountains. The sounds of footsteps are occasionally joined by a horse's clip-clop gait or the soft whirr of a bicycle's wheels. It is clear that the stewards of this land have done their jobs well. As she follows a trail into a nearby neighborhood, the hiker makes a mental note--"I'll come back soon."

The Open Space and Mountain Parks Visitor Master Plan is more than words on paper. It frames a vision of what Boulder's Open Space and Mountain Parks can offer visitors tomorrow and in perpetuity.

Implementing the Visitor Master Plan will create a land system where:

- Visitors access Open Space and Mountain Parks from conveniently located trailheads or from neighborhoods

- The first impression is one of the incredible beauty of Boulder's natural open lands, scenic vistas, and breathtaking mountain backdrop

- The superb condition of the land and visitor facilities reflects the commitment of Open Space and Mountain Parks staff, volunteers, and the public to care for and sustain our public lands for generations

- Visitors know immediately that Boulder's Open Space and Mountain Parks is a special place offering:

    - A refuge from the city and a chance to connect with nature
    - Wide open spaces with diverse plants and wildlife
    - Opportunities for solitude, introspection, nature study and appreciation, as well as adventure, challenge, and exercise
    - A place for hands-on land stewardship activities for those who care deeply about preserving and restoring natural landscapes
    - A wide range of non-motorized recreational activities, including hiking, horseback riding, bicycling, climbing, fishing, and others
    - An interconnected trail system with a range of challenge levels and access to hundreds of beautiful and interesting destinations
    - An environment that is safe for people to experience on their own terms
    - Camaraderie among visitors who choose to be considerate of each other and to walk softly on the land
    - A natural setting where native plants and animals can thrive

- Visitors are invited to participate in an ethic of protecting and conserving the natural environment while enjoying outdoor recreational opportunities

- Visitors find places where they have the freedom to explore

- Visitors can walk their dogs either leashed or under voice-and-sight control

- Visitors discover some areas that are managed as a refuge for wildlife and natural ecosystems, and where resource protection is emphasized

EXECUTIVE SUMMARY

The Open Space and Mountain Parks Visitor Master Plan will guide the Open Space and Mountain Parks Department for the next decade. Its overall purpose is to provide a framework for decisions that will ensure a continued high quality visitor experience, while at the same time ensuring that the lands are protected and preserved for future generations. The Plan provides the policy direction, management strategies, and investment programs that will accomplish this vision.

Enhance, Improve, Enjoy, Protect, and Partner

The Visitor Master Plan has four overall goals. These goals are the product of citizen advisory committees appointed by the Open Space Board of Trustees in 1999 and 2003 to advise the Open Space and Mountain Parks Program on the preparation of this Visitor Master Plan.

Goal 1: Enhance the experience

Maintain or enhance the quality of the visitor experience when engaged in passive recreational activities such as hiking, climbing, and bicycling.

Goal 2: Improve access

Provide and maintain highly functional and sustainable visitor facilities that support visitor access to appropriate destinations and add to the quality of their experience.

Goal 3: Enjoy and protect

Ensure that passive recreational activities and facilities are compatible with long-term protection of natural, agricultural, and cultural resources.

Goal 4: Partner with the community

Partner with the community in passive recreation decision-making and stewardship efforts.

Organization of the Plan

This Open Space and Mountain Parks Visitor Master Plan has five parts:

1. An overview of the current situation (Chapter 2)
2. The plan for the future (Chapter 3)
3. How the plan will be implemented (Chapter 4)
4. Monitoring the success of the plan (Chapter 5)
5. The financial plan (Chapter 6)

1. Current Situation: The Visitor Experience and What We Know

An important community asset, the Open Space and Mountain Parks system supports diverse, nationally recognized outdoor recreational opportunities in a spectacular and varied natural setting. Visitors to Open Space and Mountain Parks lands enjoy:

- More than 130 miles of maintained trails with many convenient access points throughout the city and county

- A diverse range of recreational and interpretive opportunities offered by the Open Space and Mountain Parks Program

Throughout the Plan's public involvement process, the public, as a whole, indicated that they were very satisfied with their experience when visiting Open Space and Mountain Parks lands. They felt that preserving the beauty and naturalness of Open Space and Mountain Parks lands was extremely important to the quality of the visitor experience. Although our visitors are satisfied with current recreational opportunities, their experience, and resource conditions on Open Space and Mountain Parks lands, they are concerned about the future--whether or not land management will be able to maintain the Open Space and Mountain Parks' positive attributes in the face of projected growth in visitor activities.

Recent information suggests that Open Space and Mountain Parks lands increasingly are a regional destination for the Denver metropolitan area and communities outside of Boulder County.

A tradition of unlimited access combined with growth in visits accentuates concerns about the future. Public concerns include the quality of the visitor experience, adequacy of trails and facilities, an increase in visitor conflicts, and compatibility with resource protection and preservation.

2. The Plan: Key Policies for the Future

The Visitor Master Plan is intended to maintain or improve the quality of visitor experience and ensure that Open Space and Mountain Parks natural values--which make this place special--are protected and preserved. The Plan presents the following guidance:

- Extend a sense of welcome to visitors that fosters their enjoyment and appreciation of Open Space and Mountain Parks' special resources
- Invest in improving and expanding the trails system to enhance visitor access
- Focus on visitor safety, maintenance of existing facilities, and resource protection
- Emphasize education to motivate low-impact visitor use techniques
- Use the least restrictive means possible to reduce visitor conflict and minimize impacts on the environment
- Involve the public in managing Open Space and Mountain Parks lands by providing varied ways to give input to decisions and volunteer opportunities that foster learning and stewardship
- Follow an adaptive management approach that involves monitoring the results of management programs and allows adjustments when necessary

3. Implementing the Visitor Master Plan: The Approach for Meeting Future Needs

Seven initiatives to maintain and improve visitor services are proposed in the Visitor Master Plan. Management strategies to implement the initiatives are outlined. They include both programmatic and capital projects. The initiatives include:

1. Education and outreach
2. Safety and enforcement
3. Recreational opportunities
4. Trails and facilities
5. Resource protection
6. User conflict reduction
7. Public involvement

Mechanisms to implement the strategies include a system of management areas, a monitoring system, a financing plan, and ways to build Open Space and Mountain Parks capacities to implement the shared vision.

4. Monitoring the Success of the Plan: How Are We Doing?

Monitoring the progress of the Plan's implementation is a key element of the Visitor Master Plan. Assessments of the success of our initiatives, management strategies, and implementation projects will be critical for subsequent planning and budgeting. Monitoring will allow Open Space and Mountain Parks to discover what works best in achieving the Plan's goals and modifying management actions as needed.

5. Plan Phasing and Financing: The Investment Program

Visitor Investment Strategy
The Visitor Master Plan presents three capital funding investment programs based on different levels of funding: **Current Funding, Accelerated Funding, and Identified Need**. These programs implement the policy direction of the Visitor Master Plan at different funding levels and set priorities for investments in visitor services.

Capital Improvement Program
A 6-year capital improvement project schedule is outlined in the Visitor Master Plan, identifying major capital expenditures. The priorities for capital expenditures are visitor safety, maintenance of the existing infrastructure (trails, trailheads, and facilities), elimination of the deferred maintenance needs for existing trails and facilities, and construction of new trails and facilities.

To meet these prioritized needs, additional funding is needed over the next ten years. Potential funding sources include state and federal grants, partnerships with funding entities, private funds, donations, and reallocation of anticipated revenue.

City of Boulder Open Space Charter
The management of Open Space and Mountain Parks lands is guided by the City Charter, as approved by the city of Boulder voters in 1986. The Charter provides a context for the Visitor Master Plan and its implementation.

Open Space and Mountain Parks Provisions in the City of Boulder Charter

Open Space and Mountain Parks land shall be acquired, maintained, preserved, retained, and used only for the following purposes:

- *Preservation or restoration of natural areas characterized by or including terrain, geologic formations, flora, or fauna that is unusual, spectacular, historically important, scientifically valuable, or unique, or that represent outstanding or rare examples of native species;*
- *Preservation of water resources in their natural or traditional state, scenic areas or vistas, wildlife habitats, or fragile ecosystems;*
- *Preservation of land for passive recreation use, such as hiking, photography or nature study, and if specifically designated, bicycling, horseback riding, or fishing;*
- *Preservation of agricultural uses and land suitable for agricultural production;*
- *Utilization of land for shaping the development of the city, limiting urban sprawl and disciplining growth;*
- *Utilization of non-urban land for spatial definition of urban areas;*
- *Utilization of land to prevent encroachment on floodplains; and*
- *Preservation of land for its aesthetic or passive recreational value and its contribution to the quality of life of the community*

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Chapter

1

Introduction: A Long-Range Plan for a Priceless Resource

Boulder's 43,000 acres of Open Space and Mountain Parks are a community investment in natural lands and resources--for the visitors of today and tomorrow. This Visitor Master Plan is a long-range view for serving the community's needs and expectations concerning the management and protection of this priceless investment. The Plan contains goals, objectives, policy guidance, and strategies and investment programs that the city and community intend to accomplish by the year 2015.

A major part of managing the city's natural lands portfolio is providing diverse and meaningful opportunities for enjoyment and fun (recreation), as well as solitude, contemplation, and inspiration. The Visitor Master Plan presents a framework that defines how we can continue to provide high quality recreational experiences while protecting and preserving significant natural areas and valuable habitats for native plants and animals.

Local Recreation in a National Setting

Visitors to our Open Space and Mountain Parks lands find an incredible array of passive recreational opportunities amidst a beautiful landscape of mountains and prairies. Here, visitors value time spent outdoors and the chance to connect with the area's natural and agricultural heritage.

The Current Situation

As an important community asset, the Boulder Open Space and Mountain Parks Program supports a variety of nationally recognized outdoor recreational opportunities in a spectacular and diverse natural setting. Visitors enjoy approximately 130 miles of maintained trails served by more than 60 major access points (see Map 1.1 and Figure 1.1). An estimated 1.8 million visits took place during the summer (June, July, and August) of 2004. A year-long visitation study will be completed by Open Space and Mountain Parks in 2005 to update our visitation counts.

We Like Our Lands and Recreation

Based on surveys of Boulder residents, visitors enjoy the many recreational opportunities offered by the Open Space and Mountain Parks Program. In 2004, residents surveyed indicated that they were very satisfied with their experience, with 96% of respondents reporting that they considered the quality of their experience to be good or excellent. A similar percentage of visitors considered the trail facilities on Open Space and Mountain Parks lands to be excellent or good (90%). When asked about the management balance between recreation and preservation, 68% said the balance is "about right." Of those who felt the balance was wrong, about the same number said there was too much emphasis on recreation as those who said there was too much emphasis on environmental preservation. A summary of visitor use studies, including public surveys, is included in Appendix 1.1.

Boulder's Open Space and Mountain Parks lands have a tradition of "open access." They have also experienced recent rapid growth in visits. This combination accentuates concerns about the future of these lands, including:

- Future quality of the visitor experience
- Adequacy of the visitor trails and facilities
- Compatibility with resource protection

The Future: Crowds and Conflicts?

Although most visitors are satisfied with recreational opportunities and resource conditions on Open Space and Mountain Parks lands, they are also concerned about future conditions. Almost 40% of 1999 survey respondents said that they thought conditions will be worse in 25 years. Specific concerns include crowded conditions, conflicts among different types of use, and impacts to vegetation and wildlife due to increased use. An ongoing study of visitation to Open Space and Mountain Parks lands will shed even more light on visitor perceptions of the future.

Addressing growth-related infrastructure needs, unmet desires for new trails and connections, and programs to protect environmental resources will require major funding and potential new sources of funding. The vulnerability of sensitive habitats to impacts and the need for increased protection continue to be major community concerns. Recent information suggests that, increasingly, Open Space and Mountain Parks lands are a regional destination for the Denver metropolitan area and out-of-county communities.

Passive Recreation: What Is It?

Passive recreation is identified as a purpose of the Open Space and Mountain Parks Program in the Boulder City Charter. Although the City Charter never precisely defines passive recreation, it does mention several "passive" recreational activities, including: hiking, nature study, and photography. Three other recreational activities are listed in the City Charter as appropriate passive recreation under certain conditions--bicycling, fishing, and horseback riding. Passive recreation is different from developed recreation in that passive recreation activities require minimal construction or development of facilities for the activity to be conducted.

The first Visitor Plan Advisory Committee crafted the following definition of passive recreation, which is used in the Visitor Master Plan.

Passive recreation is defined as non-motorized activities that:

- Offer constructive, restorative, and pleasurable human benefits that foster an appreciation and understanding of Open Space [and Mountain Parks] and its purposes
- Do not significantly impact natural, cultural, scientific, or agricultural values
- Occur in an Open Space and Mountain Parks setting, which is an integral part of the experience
- Require only minimal facilities and services directly related to safety and minimizing passive recreational impacts
- Are compatible with other passive recreational activities

In addition to defining passive recreation, the Visitor Plan Advisory Committee also developed a passive recreation activity assessment process to help determine what activities on Open Space and Mountain Parks are appropriate (City of Boulder 2000b; see Plan Reference Documents on the Visitor Master Plan page at www.osmp.org). This process utilizes a set of criteria and a methodology to guide decisions on what recreational activities will be considered passive and allowed, and what conditions should be placed on activities to minimize their impacts. For

example, an activity-specific condition might be allowing a particular use only on-trail or only at specially designated sites.

Open Space and Mountain Parks staff used the Visitor Plan Advisory Committee criteria and methodology to evaluate the most popular activities enjoyed by our visitors. Table 1.1 summarizes the current status of recreational activities on Open Space and Mountain Parks lands, with regard to the definition of passive recreation.

Table 1.1: Current Status of Recreational Activities on Open Space and Mountain Parks

Activities *not* considered passive recreation	**Allowed only in Specifically-Designated Areas or Sites**	**Allowed only on Designated Trails**	**Allowed on Open Space and Mountain Parks (OSMP) Lands**
These activities do not fit the criteria for passive recreation and therefore are not allowed on OSMP lands.	To provide high-quality recreation opportunities in locations that can handle the impacts, these activities are allowed only at appropriate sites.	To provide high-quality recreation opportunities in locations that can handle the impacts, these activities are allowed only on appropriate trails.	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.
Motorized vehicles Hunting Organized sports Paintball games Swimming (prohibited in lakes and ponds)	Fishing Wading Tubing, kayaking, canoeing Sledding Hang/paraglilding Bolted climbing Dog walking Camping (at 4th-of-July campground only) Swimming (in creeks only)	Bicycling Horse-drawn wagons or sleds Dog sleds Strollers/joggers In-line skates Wheeled boards (e.g., skateboards, mountain boards)	Hiking Trail running/jogging Wheel-chair use Nature study Photography Picnicking Horseback riding Traditional climbing/ bouldering Cross-country skiing Snowshoeing Model glider flying Geocaching Orienteering

Visitor Services Overview

Visitor services provided by the Open Space and Mountain Parks Program include environmental education, public outreach, law enforcement, emergency response, and trails and facilities. Services are designed to enhance the visitor experience, provide visitor safety, and protect the natural environment. Although citizen surveys reflect a high satisfaction level with visitor services, improvements are suggested in some areas. Citizens most frequently requested “more public

information" and "more enforcement." Ratings of interpretive, emergency response, and law enforcement services in the 1999 citizen survey were high. Ratings of facilities directly serving visitors, such as trails, parking lots, signs, and trash cans, were also high.

Open Space and Mountain Parks--A Community Treasure for More Than 100 Years

For the residents of Boulder, the Open Space and Mountain Parks Program is one of the defining characteristics of their community. It is a community treasure, an integral part of the community fabric, and a gift given by past and present generations to future generations. These lands are destinations for fun and enjoyment. They are also the last remnants of Boulder County's natural and cultural heritage.

Testimony to the vision of Boulder citizens for the past 100 years, the Open Space and Mountain Parks system is the result of the citizens' desire to preserve the natural beauty and ecological integrity of Boulder's setting. This century-old collective vision defined by the Boulder community has never lost focus. Over the years, Boulder citizens have consistently approved taxes to acquire and protect the Open Space and Mountain Parks lands around Boulder from further development and loss.

Management to Enjoy, Protect, and Preserve Our Legacy

A rapidly growing and urbanizing corridor along Colorado's East Slope and Front Range has dramatically altered the natural landscape in the past 30 years. Farms have become sprawling subdivisions and shopping malls, ranches have become ranchettes, and towns have blossomed into cities. As a result, our Open Space and Mountain Parks lands are visited by more and more people. This increase in use has resulted in a clear recognition of the need for a management framework to meet the Boulder community's expectations:

- *Recreational*--providing opportunities for visitors to enjoy and appreciate the lands they helped preserve
- *Scenic*--protecting the beautiful natural setting
- *Natural*--protecting the native plants and animals that live here and preserving their homes and natural communities
- *Historical and cultural*--continuing agricultural operations that historically made the Boulder Valley a productive contributor to the agricultural economy of Boulder County

This Plan focuses on the first of these expectations--providing opportunities for visitors--but recognizes the need to blend passive recreation with these other expectations.

Given the many challenges, the Visitor Master Plan strengthens how recreational uses on Open Space and Mountain Parks lands will be managed. The Plan is a framework for providing high quality passive recreation activities and the services to support them, while meeting community expectations for protecting and preserving the natural environment.

Visitor Master Plan History and Direction

In 1998, the Open Space Board of Trustees authorized the Open Space and Mountain Parks Program to prepare a Visitor Master Plan. This direction was based on several earlier actions or planning guidance previously approved by the Open Space Board of Trustees or the Boulder City Council. See Appendix 1.2 for a summary of other plans that provide guidance for the Visitor Master Plan.

Long-Range Management Policies: Passive Recreation with Preservation

> "*Open Space will be managed in a way that provides for aesthetic enjoyment, minimizes cumulative impacts to the natural systems and conflicts between users, considers user safety, preserves responsible agricultural use, provides for a quality recreational experience, and protects natural areas*."
>
> The Open Space Department's *Long Range Management Policies* (City of Boulder, 1995)

Since the quality of the visitor experience is highly dependent upon the quality of the natural environment and the amount of recreational use these areas receive, the focus of the Visitor Master Plan is to provide quality passive recreational experiences in areas that are compatible with preservation of the natural environment. Even passive recreational uses are discouraged, and sometimes prohibited, in areas that have high environmental values or where sensitive natural resources may be damaged by certain activities.

The Open Space Board of Trustees and the Boulder City Council approved the preparation of a Visitor Master Plan for Open Space and Mountain Parks through its review and approval of the *Long Range Management Policies* and annual approvals of the Program's budget.

Relationship to Other Comprehensive, Master, and Resource Management Plans

The Visitor Master Plan fits under the umbrella of the Boulder Valley Comprehensive Plan. It implements the broader vision contained in the Boulder Valley Comprehensive Plan for Open Space and Mountain Parks--to provide recreational opportunities to sustain the quality of life in the Boulder Valley while protecting the natural resources and native ecosystems found in the Boulder Valley.

Two area management plans approved by the Open Space Board of Trustees in 1997 (*North Boulder Valley Area Management Plan*) and in 1998 (*South Boulder Creek Area Management Plan*) evaluate the visitor experience and recreational use in specific open space areas. A general management plan was completed for the Boulder Mountain Parks in 1999 and adopted by the Open Space Board of Trustees in 2000 (*Boulder Mountain Parks Resource Protection and Visitor Use Plan*). The *Open Space Long Range Management Policies* were adopted by the Open Space Board of Trustees and City Council in 1995. The Visitor Master Plan is designed to be implemented in conjunction with natural resource management plans such as the Colorado Tallgrass State Natural Area Management Plan, the Open Space and Mountain Parks Forest Ecosystem Management Plan, and other plans yet to be developed.

Public Process and Citizen Advisory Committees

The public process for the Visitor Master Plan was extensive and included more than 60 meetings with the public and community interest groups from 1999 to 2005. Two public opinion surveys in 1999 and 2004 provided in-depth information on public attitudes toward issues addressed by the Visitor Master Plan (They can be found at the Visitor Master Plan website at www.osmp.org). In addition, hundreds of citizens took the time to submit comments in writing or over the internet. A summary of the public involvement process can be found in Appendix 1.3; a summary of the public comments on the Visitor Master Plan can be found in the Plan Reference Documents (available on the Visitor Master Plan page at www.osmp.org). Three different citizen groups provided recommendations for the Plan.

In 1999, a Visitor Plan Advisory Committee was formed to advise the Open Space and Mountain Parks Department about visitor use and passive recreation. Comprised of representatives of both recreation and environmental groups, the committee presented its report to the Open Space Board of Trustees in 2000. The *Visitor Plan Advisory Committee Report* (City of Boulder, 2000b)

recommends completing and implementing a Visitor Master Plan and identifies several guiding principles for developing the Plan.

A second citizen advisory committee was appointed by the Open Space Board of Trustees in 2003 to provide further guidance and recommendations on improving visitor experience and managing recreational land use. The report from the second Visitor Plan Advisory Committee was accepted by the Open Space Board of Trustees in 2003 (City of Boulder, 2003d).

After the first draft of the Plan was released in April 2004, Open Space and Mountain Parks worked with a "roundtable" group of stakeholders to review the Plan. This Community Group Forum included a wide spectrum of recreational, environmental, and community groups. The Forum evaluated the Visitor Master Plan from the different perspectives and developed a report with consensus recommendations for plan changes that bridge between the different values and interests (City of Boulder, 2004d). The Forum's recommendations, along with the reports of the two Visitor Plan Advisory Committees, can be found on the Visitor Master Plan page at www.osmp.org. The Plan incorporates many of the recommendations offered by citizens, the Visitor Plan Advisory Committees, and the Community Group Forum.

Visitor Master Plan Goals

The principal goals for the Visitor Master Plan were developed by the Visitor Plan Advisory Committees. Management strategies and monitoring projects presented in this Plan are designed to accomplish these goals. The monitoring projects are designed to measure success in attaining these goals. Detailed information about these goals, and the objectives, principles, and policies that support them, can be found in Chapter 3.

Goal 1: Enhance the experience

> **Maintain or enhance the quality of the visitor experience when engaged in passive recreational activities such as hiking, climbing, and bicycling.**

Goal 2: Improve access

> **Provide and maintain highly functional and sustainable visitor facilities that support visitor access to appropriate destinations and add to the quality of their experience.**

Goal 3: Enjoy and protect

> **Ensure that passive recreational activities and facilities are compatible with long-term protection of natural, agricultural, and cultural resources.**

Goal 4: Partner with the community

> **Partner with the community in passive recreation decision-making and stewardship efforts.**

To achieve these goals, the Visitor Master Plan proposes to implement specific strategies that enhance, focus, and guide visitor activities. These implementation strategies are based upon the philosophy that: (1) people are a part of the "urban interface" natural lands managed by Open Space and Mountain Parks; (2) people need to experience nature in order to appreciate and value it; and (3) experiencing nature requires being outside in nature.

Visitor Master Plan Review Process

The Open Space and Mountain Parks Visitor Master Plan was adopted by the Open Space Board of Trustees on February 23, 2005 and recommended to the Boulder City Council. The Plan was reviewed by the Planning Board on March 17, 2005 with regard to consistency with the Boulder Valley Comprehensive Plan and the city's Capital Improvements Program. The Plan was reviewed and unanimously accepted by the Boulder City Council on April 12, 2005.

The citizens of Boulder have built the Open Space and Mountain Parks Program during the past 107 years. The Visitor Master Plan calls for continuing this vital and vibrant relationship between the Program and the citizens of Boulder--a partnership that is essential for sustaining Open Space and Mountain Parks lands over the long term.

The Visitor Master Plan will be reviewed periodically by the Open Space Board of Trustees, and updated and revised at least every five years using an adaptive management approach and the best available information.

Chapter

2

Context for the Visitor Master Plan

Why is the Visitor Master Plan needed? What is the rationale for the management strategies and actions contained in the Plan? How will area trends affect Open Space and Mountain Parks lands? What do visitors think about their Open Space and Mountain Parks? Chapter 2 summarizes: the Open Space and Mountain Parks Program funding, facilities, and services; visitor use patterns and trends; current and anticipated conditions for visitor experience, visitor infrastructure, and resources; and public input on the Visitor Master Plan to date. Later chapters will describe the strategies proposed to address these issues.

Facilities and Services

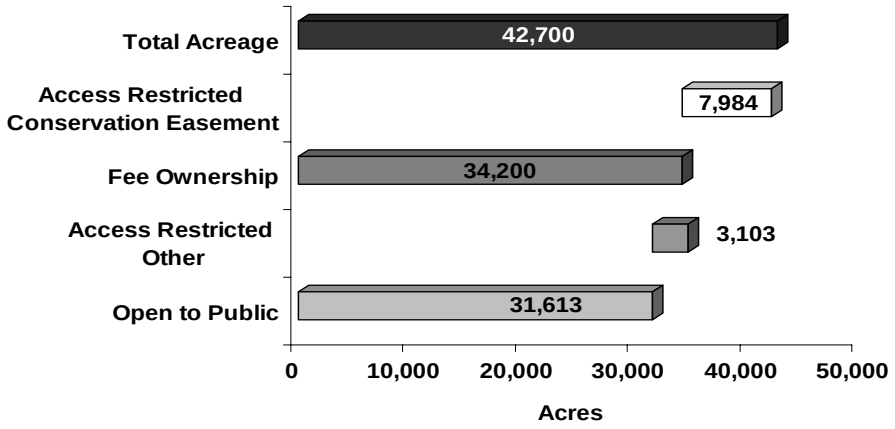
Land and Facilities for Passive Recreation

Lands

Open Space and Mountain Parks has acquired about 43,000 acres, nearly 32,000 acres (72%) of which is currently open to public use (Figure 2.1).

Approximately 8,000 acres (19%) were acquired as development rights or conservation easements. Those lands remain in private ownership. Properties with conservation easements or development rights are not open to the public, unless a trail or public use easement has been negotiated with the landowner. Approximately 3,000 acres (7%) of land owned are currently closed to protect visitors from potential hazards, or to protect sensitive resources.

Figure 2.1: Open Space and Mountain Parks Lands and Access



Facilities

Facilities at a Glance

- 32 designated trailheads with over 900 parking spots
- 75 designated access points
- 24 picnic areas

A variety of facilities are found on Open Space and Mountain Parks lands, all of which are important in helping Open Space and Mountain Parks meet the goals of this Visitor Master Plan. Purposes of facilities include keeping visitors safe, promoting enjoyment, providing access, reducing the aesthetic impact of litter and pet waste, and protecting other resources. Facilities are also used to minimize operational and maintenance costs. In addition to trails and trailhead parking lots, Open Space and Mountain Parks facilities include visitor centers, picnic areas, scenic overlooks, and fishing piers.

Trailheads and Access Points

Trailheads offer vehicle parking and convenient access to designated trails. Most trailheads also provide trash cans and information about how to use the area responsibly. Other trailhead amenities may include bike racks, restrooms, dog waste bag dispensers, picnic tables, benches, piers, bridges, and signs. **Access points** simply provide access to designated trails.

Trailhead Facilities Maintenance. Open Space and Mountain Parks staff routinely maintains trailheads and access points. Maintenance includes routine repairs due to normal wear and tear, vandalism, trash removal, mowing, cleaning of restrooms, filling potholes, painting, and sign repairs. Trailhead maintenance also includes snow removal at some popular trailheads.

Over 130 Miles of Maintained Trails

There are more than 130 miles of designated trails (i.e., trails which are signed, shown on public trail maps, and maintained) in the Open Space and Mountain Parks system. Typically, trails have a natural tread or soft surface of crushed rock or gravel. Approximately five miles of concrete or asphalt trails traverse Open Space and Mountain Parks. The majority of these trails were built and are maintained by others, such as the city's Greenways Program.

Currently, 41 miles (or about one-third) of the trail system are open to bicycles. Most bicycle trails are east of State Highway 93/Broadway. The entire trail system is open to pedestrians and equestrians.

Trails are maintained year-round, with most of the work done in the spring, summer, and fall. Junior Rangers (young men and women aged 14 to 17) do much of the routine annual maintenance. Open Space and Mountain Parks trail staff work with maintenance contractors and seasonal adult trail crews to address more difficult or larger-scale maintenance and construction projects.

Undesignated Trails: Where People and Animals Make Their Own Paths

In addition to the system of designated trails, there are approximately 300 additional miles of "undesignated" trails. Undesignated trails have been created or worn into the landscape by visitors repeatedly walking off of designated trails. Sometimes, undesignated trails begin as wildlife or cattle trails that attract the interest of hikers or other visitors. Many of the undesignated trails are in the mountain backdrop.

Undesignated trails can significantly damage a landscape. Repeated trampling, soil compaction or destabilization, and loss of litter, humus, and topsoil pose severe threats to plants and plant communities. Since vegetation is the primary stabilizing influence in a landscape, vegetation loss can result in serious erosion. The undesignated trails on Open Space and Mountain Parks lands

are among the greatest contributors to vegetation loss and soil erosion. In several areas, extensive networks of undesignated trails have formed, ranging from single paths to undesignated trails that resemble "spider webs" of interconnecting trails. See Figure 2.2 for an example of extensive undesignated trails in the Chautauqua area.

Unlike a state or national park, where most visitors enter through formal access points, much of the 340 mile perimeter of Open Space and Mountain Parks is open to pedestrian access. Undesignated trails arise more easily in this "open" land system. Although Open Space and Mountain Parks strongly discourages use of undesignated access points and undesignated trails, they are convenient to use and many people do not recognize the impact caused by such use.

Other Facilities: Nature Center to Picnic Shelters

The Open Space and Mountain Parks main offices at Cherryvale Road and our website (www.osmp.org) provide maps, directions and answers to a wide range of questions about Open Space and Mountain Parks lands and facilities. The Chautauqua Cottage is staffed daily during spring, summer, and fall, and on weekends during the winter. The Flagstaff Summit Nature Center is open weekends during the summer.

The Flagstaff Summit area has large picnic shelters and an open-air amphitheater, which can be reserved for weddings or other family gatherings and community events.

Visitor Services: For a Safe, Pleasant Experience

Open Space and Mountain Parks provides programs and services to deliver a high quality visitor experience. Safety, access to destinations, an aesthetically pleasing setting, and low levels of user conflict are stressed. In addition, some visitor services are aimed at maintaining the sustainability of the visitor facilities, while other services contribute to the conservation of natural, cultural or agricultural resources.

Visitor services include environmental education and community outreach, emergency response, law enforcement, and facility construction and maintenance.

Education and Outreach

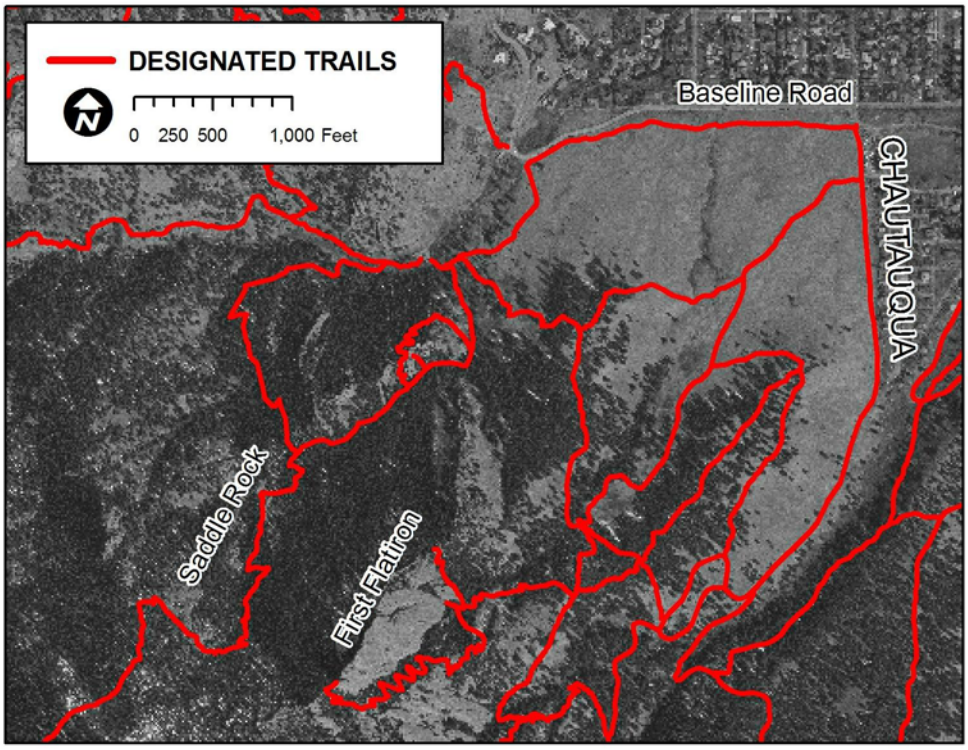
The Open Space and Mountain Parks Program has traditionally provided opportunities for visitors to deepen their appreciation of the landscape and cultivate responsibility for care of the land.

Staff and volunteers conduct environmental educational programs for civic groups, neighborhood organizations, schools, and others. Public "theme" hikes and nature walks are offered throughout the year. In 2004, 241 educational programs were presented, reaching about 6,800 people.

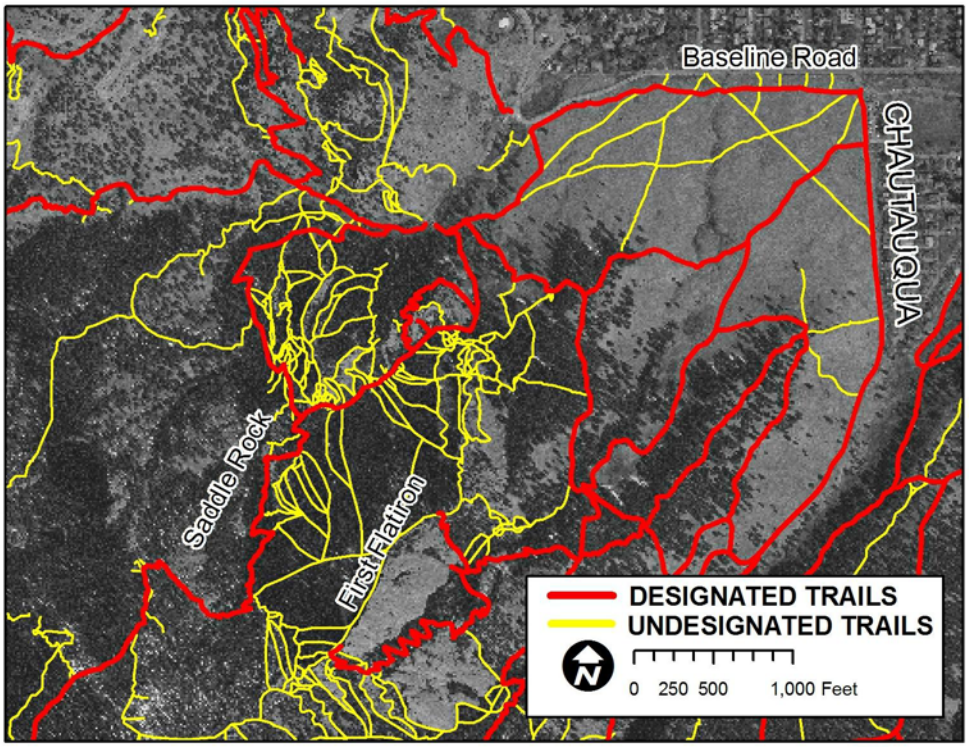
Open Space and Mountain Parks outreach complements educational programming by sharing similar messages in the community in a variety of settings such as the Boulder Farmer's Market or Boulder Creek Festival, at trailheads and on the trails. In 2004, such events accounted for over 120,000 contacts with citizens and visitors. Patrol by rangers also provides a daily outreach presence throughout the system. The majority of ranger contacts provides information and encourages responsible visitor behavior.

Figure 2.2: Example Comparison of Designated and Undesignated Trails
Aerial photography of an area in the vicinity of Chautauqua Meadow
A: Designated Trails Only
B: Designated and Undesignated Trails

A



B



The types of information provided by Open Space and Mountain Parks include:

- Trails and visitor opportunities
- Appropriate recreational activities
- Nature education about geology, wildlife, plants, and ecological communities
- Notification of bear and mountain lion activity
- Fire danger
- Trail construction activity
- Leave-No-Trace techniques

Leave-No-Trace

Open Space and Mountain Parks provides a safe haven for wild plants and animals and a welcome break from our work-a-day lives. By recreating wisely and using Leave-No-Trace practices, visitors can minimize impact on wildlife and fellow visitors while enjoying their experience even more. Leave-No-Trace consists of six simple principles for use in a front-country outdoor recreational setting:

- Manage your dog
- Stick to trail
- Pick up poop
- Share our trails
- Trash your trash
- Leave it as you find it

Other educational and outreach tools. Various materials and media tools are used to support education and outreach efforts, including brochures, trailhead information boards, televised videos and slide shows, interpretive signs, and displays.

The Open Space and Mountain Parks website (www.osmp.org) is the fifth most heavily visited website in city government. In 2003 there were 335,000 visits, averaging eight minutes per visit.

Enforcement of Regulations

Rangers enforce city ordinances and state wildlife regulations on Open Space and Mountain Parks lands and work with other law enforcement agencies as appropriate. City regulations are intended to provide a safe and enjoyable visitor experience that has minimal impact upon other resources. The majority of summonses are issued for violations of dog management regulations and illegal camping.

Typically, citations are issued as a last resort when there are flagrant or repeated violations. Enforcement is generally accomplished through explanation of rules and why they are important.

Keeping Visitors Safe

Medical Response

All Open Space and Mountain Parks rangers are required to be certified first responders; several are also certified as emergency medical technicians. While they work with other law enforcement and emergency service agencies, because of their experience and familiarity with the land system, rangers are often the first on the scene when responding to medical emergencies on Open Space and Mountain Parks lands. The most common types of emergencies are climbing accidents, injured hikers, and vehicle accidents. Rangers provide initial medical care, direct rescue personnel to the site, document the incident, and assist with patient evacuations. During 2004, rangers responded to 35 medical emergencies.

Wildlife

Rangers and ecologists assist the Colorado Division of Wildlife with bear and mountain lion complaints, especially when public safety is a concern. Open Space and Mountain Parks staff also post signs and enforce wildlife closures in areas of known lion and bear activity to reduce the likelihood of human/wildlife conflicts.

Fire

Wildland fires are a risk to visitor safety. The Program uses a full range of educational tools to educate the community about fire dangers as a way to reduce the likelihood of accidental fires. When fires start, Open Space and Mountain Parks responds with a focus on visitor safety. Many staff members are trained and certified to fight fires. The Program also maintains wildland fire equipment necessary to safely respond to fires. In addition, the city of Boulder has mutual aid agreements in place with many fire protection districts to provide additional response.

Environmental Resources

Plants, Animals, and Ecological Systems

Boulder's Open Space and Mountain Parks is home to an unusual diversity of living things. One quarter (over 800 species) of the vascular plants found in Colorado occur on Open Space and Mountain Parks (A. Armstrong, pers. comm.). Wildlife biologists estimate that approximately 500 vertebrate species use Open Space and Mountain Parks lands for some portion of their lives. This represents a little less than half the number of vertebrates in Colorado. The Colorado Breeding Bird Atlas project found that portions of Open Space and Mountain Parks contained the greatest number of species of breeding birds (101) and habitat types (15) of 1,745 places across the state. Included in this diversity are approximately 48 species considered rare or imperiled by the Colorado Natural Heritage Program and nine other species of concern to Open Space and Mountain Parks ecologists. Several thousand acres of Open Space and Mountain Parks are registered or designated as state natural areas through the Colorado Natural Areas Program.

Agricultural Operations

For some visitors, agricultural operations provide the vistas, scenery, and experiences that contribute to their satisfaction with the Open Space and Mountain Parks program. Agriculture uses include small grain production (mostly barley) and cow-calf operations (hay, pasture, range). Agriculture is an historic land use in the Boulder Valley and is identified specifically in the City Charter as a purpose of Open Space and Mountain Parks. In the increasingly developed landscape, the opportunity to see a farm or ranch in operation has become an "open space dependent" activity. The 16,000 acres of Open Space and Mountain Parks used by local farmers and ranchers are managed under the provisions of leases with the city of Boulder. Agricultural operations generate revenues in the form of lease payments. Lease revenues average approximately $150,000 annually.

Cultural Resources

Uninhabited cabins, hidden foundations, abandoned quarries, coal mines, old farmhouses, and barns dot the Open Space and Mountain Parks landscape suggesting different customs and different times. These features contribute to the visitor experience by providing a starting point for the imagination about the people who once lived and made a living here. In some places the story is clarified by interpretive signs that provide detail about the nature and extent of human activity. In addition to their interest for visitors, cultural sites and artifacts are important from cultural, religious, and scientific perspectives. Although not included as a purpose of Open Space in the City Charter, the Open Space Board of Trustees adopted cultural resource protection as part of the Long Range Management Policies in 1995 (City of Boulder 1995). All Open Space and Mountain Parks

projects with the potential to affect cultural resources, including improvements to trails, trailheads and other visitor facilities, are required to check existing inventories for potential impacts or provide a site specific survey by a qualified archaeologist describing the cultural resources in the area.

Open Space and Mountain Parks Staffing and Funding

Staffing

There are 69 standard staff positions (full-time equivalent) in the Program, organized into six working groups. A large proportion of the positions are directly responsible for providing visitor services and facilities as their primary focus. Every work group has a role in providing services to improve the quality of the visitor experience and reduce impacts to other resources. In 2004 over 50% of the total operating and maintenance (non-acquisitions) budget was dedicated to visitor services and visitor infrastructure.

Table 2.1: Open Space and Mountain Parks Work Group Involvement in Supporting Visitor Services and Facilities

Administrative Services The "front line" for visitor and community member questions and for reserving Open Space and Mountain Parks facilities. This group keeps track of the Open Space Board of Trustees meetings and maintains parts of the Program's website.	**Environmental and Visitor Services** Rangers and educators focus primarily on providing safe and positive experiences. This group works in partnership with ecologists to understand and conserve plants, animals, and natural systems. This group provides educational programs and shares information via the internet.
Land and Facilities Services Maintenance staff and project managers build and maintain trails, trailheads, and visitor facilities. Integrated pest managers are working to minimize the impact of trails and visitor use in spreading weeds. Agricultural managers work to conserve ranching and farming as a way of life in the Boulder Valley.	**Real Estate Services** This work group is responsible for purchasing Open Space and Mountain Parks lands, including negotiating public access easements and other real estate issues such as those associated with ownership and access.
Central Services The public information officer works with the community, the press, and other departments to keep lines of communication open and foster an awareness of public programs and management actions and ways the public can enjoy Open Space and Mountain Parks. Financial services staff oversee the budget and help develop the Capital Improvements Program. Volunteer services staff connect members of the community with Open Space and Mountain Parks projects and programs.	**Planning and Technical Services** Responsible for trails maps and analysis of information about the land. Planners prepare management plans to guide Open Space and Mountain Parks operations and services and oversee monitoring to help keep the program on track.

Current Open Space and Mountain Parks Funding

Protecting land as open space and preserving and maintaining these lands for the use and enjoyment of the community and future generations is expensive. Public funding for purchasing and managing lands has been the principal source of money to achieve these community goals during the past 100 years. The size of the land system and the increasing demands for visitor facilities and services will require additional investments to continue providing a high quality visitor experience and to protect the natural values of these lands.

Revenue Sources

Open Space Sales Tax Revenues. Open Space sales tax revenues are the primary source of funding for the Program. The Open Space revenues are derived almost entirely from sales tax revenues. These sales tax revenues are provided by three citizen-approved, dedicated sales tax increments totaling 8.8 cents per $10 purchase (Table 2.2). Open Space Fund revenues for 2005 are estimated at $19.5 million.

Table 2.2: Sales Tax Financing of the Open Space Fund

Amount (%)	First Year	Last Year
0.40	1967	NA
0.33	1989	2018
0.15	2004	2019
0.88	**Total**	

In addition to sales tax revenues, the Open Space Fund includes revenues from Flagstaff parking fees, facilities rental fees, house rental payments, and agricultural lease payments.

General Fund. About $1 million are projected in 2005 for Open Space and Mountain Parks from the city's General Fund. This amount includes funding to support real estate services for other city programs and Mountain Parks funding that was continued after the consolidation of Mountain Parks and Open Space.

Lottery/Conservation Trust Fund. Lottery revenues available for Open Space and Mountain Parks are projected to be $269,000 in 2005. This funding is scheduled to continue through 2007 and could be extended through a re-evaluation of the city's lottery funding distribution.

The Lottery Fund is financed by revenue from the Colorado Lottery. Annual lottery revenues for the city of Boulder have grown gradually over time and are projected to be $980,000 in 2005. Each year prior to 2001, $150,000 of lottery funds was allocated for the Tributary Greenways Program. The remainder was allocated to the Parks and Recreation Department. Beginning in 2001, lottery funds have been allocated under the provisions of a six-year agreement between Open Space and Mountain Parks and the Parks and Recreation Department. The allocation of lottery funds is described in Table 2.3. For the duration of this agreement, Open Space and Mountain Parks receives $100,000 each year as well as one-half of the balance after Greenways and Parks and Recreation have received their allocation. Parks and Recreation receives the other half of the Lottery Fund balance.

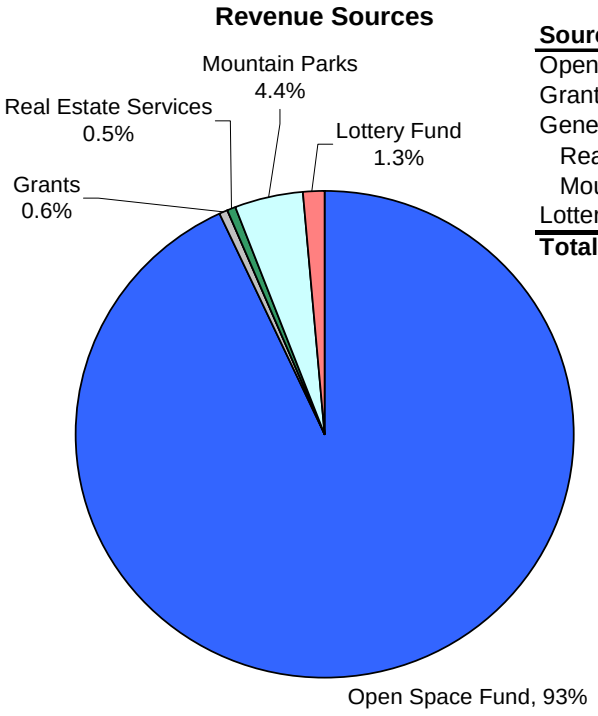
Grants. Grants and donations provide a relatively small source of revenue.

Flagstaff Parking Fees and Facility Rental. Open Space and Mountain Parks collects these fees. The General Fund transfer to Open Space and Mountain Parks is offset by a projection of the amount of parking and rental fees collected in 2000.

Table 2.3: Allocation of City of Boulder Lottery Funding (2002 to 2007)		
Program	**Uses**	**Amount**
Parks and Recreation	Debt Service property acquisition	$416,000 (2002) $304,000* (each year 2003-7)
Open Space and Mountain Parks	Trail and visitor facility rehabilitation	$100,000*
Tributary Greenways	Various projects	$150,000
Total (2002 to 2007)	$554,000	
*Lottery revenues in excess of $554,000 are split evenly between the Open Space and Mountain Parks Program and the Parks and Recreation Department.		

Figure 2.3 shows the sources of annual revenue for the Open Space and Mountain Parks Program.

Figure 2.3: Boulder Open Space and Mountain Parks Revenues for 2005 (2005 Approved Budget)



Source	Revenues		% of Total
Open Space Fund	$	19,475,101	93.2%
Grants	$	120,000	0.6%
General Fund			
Real Estate Services	$	111,177	0.5%
Mountain Parks	$	927,150	4.4%
Lottery Fund	$	268,828	1.3%
Total	**$**	**20,902,256.00**	**100%**

Expenditures

Approximately one-half (45% or $9.9 million) of Open Space and Mountain Parks revenue is used to make payments on debt incurred for the purchase of property. Almost one-fifth (17%--$3.7 million) of the annual revenues are used to purchase new property or as a “down payment” for properties.

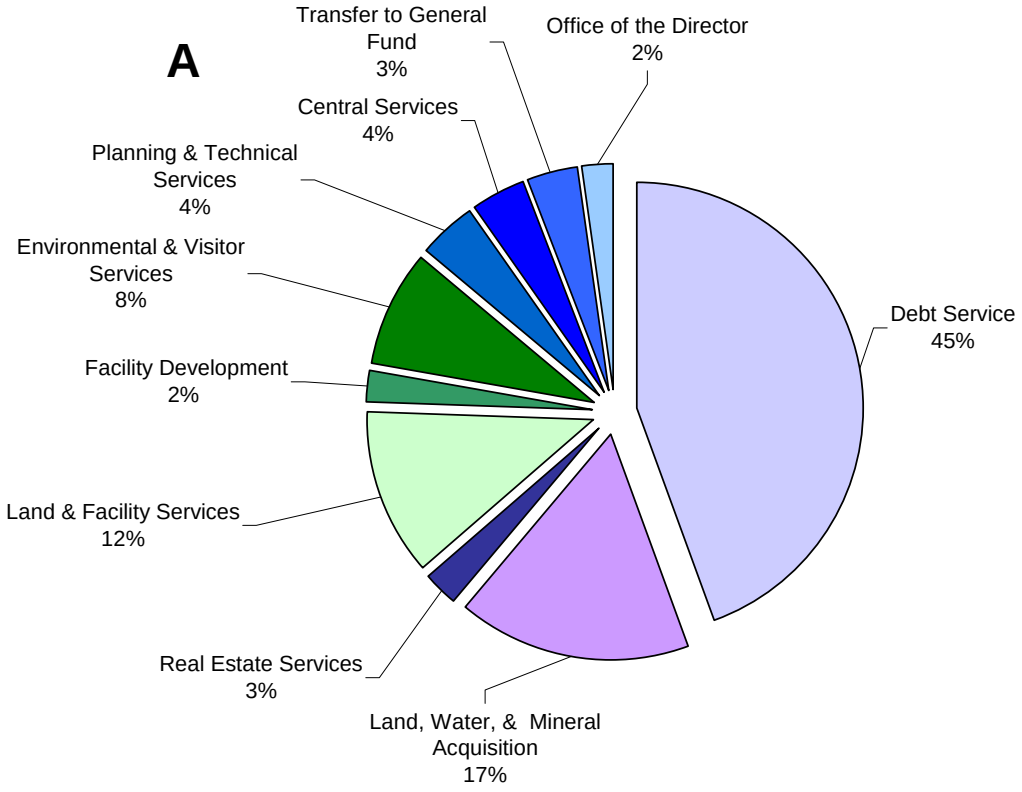
Approximately 2% of sales tax revenues are budgeted for capital improvements of visitor facilities. Salaries and other operating expenses account for the remaining expenditures (approximately $8.6 million, see Figure 2.4a). Operating expenses include $755,000 in transfers to the General Fund for services to Open Space and Mountain Parks by other city departments. This transfer represents approximately 3% of the Open Space and Mountain Parks budget.

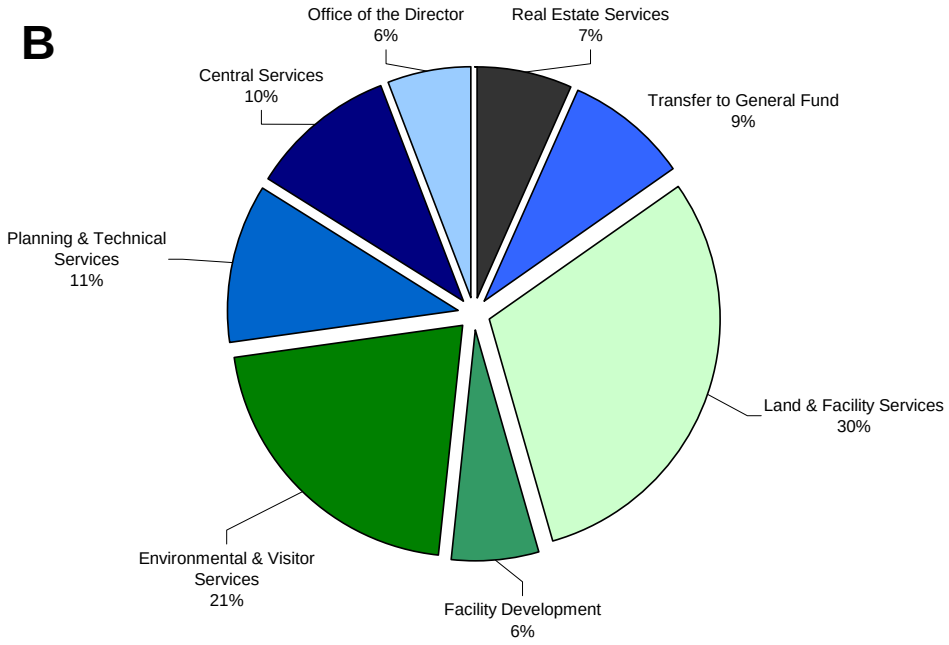
The following charts (Figures 2.4A and 2.4B) illustrate the Open Space and Mountain Parks approved 2005 expenditures.

Figure 2.4A shows the entire budget, including land acquisitions and debt service.

Figure 2.4B shows the operating expenditures which total approximately $8.6 million. Operating expenditures are used for management and protection of natural, cultural, and agricultural resources, as well as facility infrastructure, maintenance, and other environmental and visitor services. In 2005 over 50% of the total operating and maintenance (non-acquisitions) budget for Open Space and Mountain Parks is dedicated to visitor services and visitor infrastructure needs, including junior rangers, ranger services, education and outreach, volunteer services, and capital maintenance and new construction of visitor infrastructure.

Figure 2.4: Open Space and Mountain Parks Expenditures (2005 Approved Budget)
A: Total $22.2 million B: Operating: $8.6 million





Assessment of the Current and Future Management Situation

Current Visitor Use Patterns and Trends: Greater Use, Today and Tomorrow

The Visitor Master Plan has a ten-year planning horizon. It is necessary, therefore, to consider both the current situation as well as relevant trends. Important trends affecting the visitor experience indicate that recreational use of Open Space and Mountain Parks lands will continue to increase.

This section combines information from various sources, summarizing conditions that Open Space and Mountain Parks managers will face in the future. For detailed assessment of the current and anticipated situation for management, see *Condition, Compatibility and Trends: An Analysis of Visitor Experience and Infrastructure and their Compatibility with Resource Conservation* (can be found in Plan Reference Documents available on the Visitor Master Plan page at www.osmp.org).

High and growing level of visitation. The growth in the number of visits in the Open Space and Mountain Parks system has grown from an estimated 250,000 visits in 1980 to and estimated 3,000,000 in 1996. A year long visitation study to be complete in 2005, estimated 1.8 million visits in the first three summer months (June, July, August) of 2004. This increase is due in large part to the large population and employment growth in the Boulder Valley, Boulder County, and the Denver metropolitan region.

Despite the recent softening of the economy, continued growth is predicted for the Front Range and the Denver metropolitan area (DRCOG 2003). Population forecasts for the regional statistical areas adjacent to Boulder are provided in the table below (DRCOG 2003). The Colorado state demographer has estimated a 14% increase in Boulder County population between years 2000 and 2010 (State of Colorado 2004).

Table 2.4: Denver Regional Population Forecast by Regional Statistical Area

Area	2000 Population	Population Forecast 2020	Change	Forecast Annual Growth Rate
Arvada	72,003	82,417	10,414	0.72%
Boulder - Mountains	16,959	20,127	3,168	0.93%
Boulder - TriCities	74,929	108,731	33,802	2.26%
Boulder City - North	40,172	43,098	2,926	0.36%
Boulder City - Periphery	26,977	33,107	6,130	1.14%
Boulder City - South	51,880	57,857	5,977	0.58%
Golden	27,562	47,094	19,532	3.54%
JeffCo - Northwest	5,282	8,997	3,715	3.52%
Longmont	75,940	92,992	17,052	1.12%
Standley Lake	84,152	100,124	15,972	0.95%

Open Space and Mountain Parks is a regional outdoor recreation destination. The attraction of non-Boulder County visitors to the Open Space and Mountain Parks system is high. Boulder Open Space and Mountain Parks is one of the most scenic and opportunity-rich destinations in the Front Range. It is also a world-class climbing area, a regional destination for horseback riding and hang gliding/paragliding, and a destination for dog walkers who want to recreate with their dog off-leash. Open Space and Mountain Parks is the only public land agency on the Front Range that allows extensive off-leash opportunities for dogs.

Increased popularity of outdoor recreation. In addition to the numerous long-time residents that frequent Open Space and Mountain Parks, many new residents moved here because of Boulder's popular outdoor lifestyle. What's more, national trends indicate that higher percentages of the population are taking part in recreation more frequently now than in the past (Cordell 1999, 2002a, 2002b), and this trend is expected to continue. A steady increase in outdoor recreational activities is projected through the year 2040 for walking, bicycling, running/jogging, day hiking, and bird watching. Horseback riding is projected at a smaller increase, while rock climbing stays steady. These increases are due in part to the health benefits associated with an active lifestyle, marketing and promotion by the outdoor equipment industry, and increasing access to information through traditional publications and the internet.

New types of outdoor recreation. Another factor fueling growth in outdoor recreation is the emergence of new types of recreation, especially those that involve mechanically-assisted travel. In the 1980s, bolt-assisted rock climbing became very popular. In the 1990s, mountain biking and hang gliding/paragliding grew tremendously in popularity. During the last few years, bouldering has become more popular. Other types of emerging outdoor recreation activities include: in-line skating and mountain boarding, geocaching, model glider flying, paintball, and extreme trail running. While Open Space and Mountain Parks accommodates many of these activities, others have not been allowed because they create significant negative impacts on other visitors or resources. When new activities emerge, they may create new recreational demands on our lands and the need for a management response.

Differential impacts of growth in recreational activities. As growth in visitation occurs, concentrated impacts often happen because of the limited number of locations where certain activities can occur (as in the case of rock climbing or bouldering) or because increased visitation tends to occur more often in the "front-country", where the most accessible trails and trailheads are available. Some of the concentrated impacts include trail crowding, trailhead parking congestion, trampled vegetation and soil, and networks of undesignated trails. With increased visitation, it is also more and more difficult for visitors to find solitude, which motivates them to travel to more remote areas. In turn, this dispersal of people into the "backcountry" creates further congestion, loss of solitude, and degradation of wildlife habitat.

Constrained land supply versus growing demand. Constrained land supply is another key trend creating new demands on Open Space and Mountain Parks management. Regionally, the open space land base has been growing much more slowly than demand for passive recreation. Undeveloped lands are disappearing as residential and commercial land uses are developed in communities surrounding Boulder. The recent explosive residential growth of Superior and commercial development in Broomfield are just two examples of this trend. Land values continue to increase. Most communities, even those with open space programs, find themselves unable to make purchases to adequately satisfy the recreational needs of their residents. As a result, Boulder and other communities with well-developed open space programs become regional providers of outdoor recreation.

What's Working and What's Not: Potential Areas of Improvement Summary

This summary focuses on the five major planning targets for the Visitor Master Plan: (1) visitor experience; (2) trails, trailheads, and other facilities; (3) natural environment; (4) farming and ranching operations; and (5) cultural resources. The analysis of current conditions helped us appreciate what management strategies are working well and also pointed out problem areas. These problem areas indicated unacceptable conditions or movement toward unacceptable conditions within the Visitor Master Plan's ten-year planning horizon.

This summary of "what's working" and "what's not" is <u>not</u> prioritized.

Visitor Experience

What's Working

- Widespread access to the places people want to go
- Beautiful vistas
- Ability to visit and traverse a wide variety of natural settings
- Availability of areas that seem remote from the built environment
- Few problems with the visual impact or safety concerns associated with vandalism
- Little unwelcome noise
- Majority of users are courteous and respectful of others and the landscape
- Personal safety is not a widespread concern
- Access is provided for a wide variety of activities and challenge levels

Room for Improvement

- Access for mountain biking
- Access for hang gliding
- Access by equestrians (fenced properties)
- Internal trail connections
- External trail connections
- Longer continuous trails
- Transit linkages
- Greater accessibility for disabled populations
- Unwanted dog encounters with other visitors
- Insufficient pick-up of dog waste
- Visual scarring due to erosion/gullying
- Growing levels of conflict and crowding (bicyclists traveling too quickly, conflicts with dogs/guardians, dog-on-dog conflicts, equestrians with dogs, and hikers)
- Dangerous road crossings
- Lack of clarity about trail designation and use (e.g., climbing access)
- Regulations addressing commercial use on Open Space and Mountain Parks

Trails, Trailheads, and Other Facilities

What's Working

- Many popular trails and trailheads
- Clean restrooms and empty trash bins
- Many trails with high-quality surfaces sustaining high levels of multiple uses, with ongoing maintenance

Room for Improvement

- Many physically unsustainable trails

- Lack of trails to some popular destinations
- Backlog of designated trail improvements
- Proliferation of undesignated (and therefore unmanaged) trails
- Trail designs that do not encourage visitors to stay on trail or behave in a manner that supports the physical sustainability of the trails
- Unbuilt trails and trail connections
- For many Open Space and Mountain Parks lands, visitor access and use has occurred without the benefit of management plans and provision of trails or other infrastructure to support the use
- Maintenance and funding levels
- Trailhead parking overflow

Natural Environment

What's Working

- Natural systems, plants, and animals provide much of the basis for a visitor experience that is "Open Space and Mountain Parks dependent"
- The enjoyment of natural systems, plants, and animals builds support for the conservation and protection of these areas
- The condition of native ecosystems in some areas is relatively good

Room for Improvement

- Direct impacts to habitat patches that are limited in extent or distribution (riparian areas, shrublands, tallgrass prairie, cliff faces, bases of cliffs)
- Trampling of vegetation
- Harassment and killing of wildlife by domestic dogs
- Role of trails/visitors/dogs as dispersal mechanism for weeds
- Potential for species displacement with increasing density of trails
- Level of protection from impacts does not correspond to the sensitivity of natural resources

Farming and Ranching Operations

What's Working

- Agricultural operations provide some of the basis for a visitor experience that is "Open Space and Mountain Parks dependent"
- Enjoyment of agricultural systems builds support for conserving and protecting these areas

Room for Improvement

- Dogs harassing livestock
- Trampling of crops and hayfields
- Visitors leaving gates open and/or cutting fences and gates

Cultural Resources

What's Working

- Low levels of vandalism
- Low levels of collection

Room for Improvement

- Isolated and therefore vulnerable sites

Key Unmet Public Desires, Problems, and Opportunities: Relationship to Visitor Master Plan Strategies

The Visitor Master Plan is designed to address those problems and opportunities that will maintain or improve visitor experience, visitor infrastructure, and resource conditions to acceptable levels. It includes several strategies that integrate management actions to achieve desired conditions.

Table 2.5: Key Unmet Public Desires, Problems, and Opportunities: Relationship to Master Plan Strategies

Visitor Master Plan Strategy	Unmet Public Desires or Problems Needing Attention	Available Opportunities
	Note: There are other funding deficiencies besides those noted below.	***Note: Funding to meet many identified needs is available with existing sources; other needs will require additional funds to be obtained, if they are to be addressed during the ten-year planning period.***
Visitor Education and Outreach	• Insufficient visitor motivation or knowledge to use low-impact techniques • Insufficient compliance with dog management regulations (dog control and dog excrement pick-up)	• Most people will be motivated to use low-impact techniques with education • More education to improve dog management compliance
Visitor Safety and Regulation Enforcement	• Unsafe trail crossings with roads • Insufficient compliance with dog management regulations (dog control and dog excrement pick-up)	• External funding for trail crossings • More enforcement of dog regulations
Visitor Opportunity	• Growth-related expansion needs • Unmet desires for more trail connections, more challenging mountain bike terrain, new bolted climbing routes, hang gliding/paragliding launch and landing sites	• New sites for sustainable visitor activities • Sustainable internal and external trail connections • Infrastructure improvements to increase sustainability of off-trail activities (e.g., hang gliding / paragliding, fishing, model glider flying) • Collaboration with climbers in developing a sustainable climbing access system
Visitor Infrastructure	• Growth-related expansion needs • Need for increased level of ongoing trail maintenance • Backlog of deferred maintenance • Unsustainable trail and trailhead designs, locations, conditions • Profusion of damaging undesignated trails • Unmet desire and lack of funding for new trails construction	• New emphasis on ongoing trail maintenance and deferred maintenance (including projects addressing sustainability) • Trail rebuild and reroute projects • Collaboration with climbing and other community groups in developing a sustainable climbing access trail system • Partnerships with community groups and neighboring communities to construct new trails

Table 2.5: Key Unmet Public Desires, Problems, and Opportunities: Relationship to Master Plan Strategies		
Visitor Master Plan Strategy	**Unmet Public Desires or Problems Needing Attention**	**Available Opportunities**
Resource Protection and Preservation/	• Growth-related impacts • Extensive off-trail travel • Lack of designated areas for many off-trail activities • Impacts from off-leash dog activity in sensitive areas and productive agricultural areas needs improvement • Inadequate regulation of special uses • Lack of regulations for commercial use • Nighttime activities in sensitive areas growing • Insufficient use of resource closures, especially for muddy trails • No effective closure of newly acquired properties until management in place • Insufficient information and protection for cultural resources •	• Requirements for on-trail travel • Designation of areas for off-trail activities • Expansion of areas requiring dogs on-leash or no-dogs • Expanded special use permit process • Commercial use permit regulations • Opportunity to retard significant growth in nighttime activities and associated wildlife impacts • Process for managing new recreation uses • Formal closures for newly acquired properties until plans and infrastructure in place • Cultural resource inventories and protections
Visitor Conflict Reduction	• High level of conflict between dogs and other visitors • Conflicts between bicyclists and other visitors • Inadequate regulation of special uses • Lack of regulations for commercial use	• Focused and expanded dog guardian and bicyclist education activities • Focused enforcement on dog management and bicyclist enforcement activities • Expanded special use permit process • Commercial use permit regulations
Visitor Access and Use Fees	• Steep growth in number of non-resident visitors • Insufficient funding for maintenance and operation expenses caused by visitor use • Insufficient mechanisms for cost recovery or influencing the number of out-of-county visitors	• Possible new funding sources • Possible new mechanisms for cost recovery and non-resident user fees
Public Involvement in Plan Implementation	• Desire for public involvement in ongoing plan implementation	• Formal and informal processes for public involvement in ongoing plan implementation

Table 2.5: Key Unmet Public Desires, Problems, and Opportunities: Relationship to Master Plan Strategies		
Visitor Master Plan Strategy	**Unmet Public Desires or Problems Needing Attention**	**Available Opportunities**
Management Areas	• Growth-related impacts • One-size-fits-all regulations instead of area-specific • Need for higher level of protection for sensitive areas and productive agricultural lands • Excessive off-trail travel • Insufficient compliance with dog regulations • Loss of opportunities for solitude	• Area management system • Area-specific regulations • Requirements for on-trail travel • Designation of areas for off-trail activities • Expansion of areas requiring dogs on-leash or no-dogs • Off-trail permit system
Open Space and Mountain Parks Organizational Capacity-Building	• Organizational changes to implement the Visitor Master Plan • Insufficient Open Space and Mountain Parks funding for operations and maintenance • Insufficient staff to implement the Visitor Master Plan • Need for new staff/consultant expertise	• Possible new funding sources • Evaluation of staff and training needs to implement the Visitor Master Plan • Expanded use of consultants/contractors • Expanded partnerships with community groups and other public agencies

Summary of Public Input on the Plan

In the development of the Visitor Master Plan, dozens of public meetings, workshops, field trips, community surveys, and other venues for public input on the Plan were conducted. Two citizen advisory committees produced reports with recommendations for the Visitor Master Plan. Another group with diverse interests, the Community Group Forum, also provided recommendations. Public input on the Plan provided diverse ideas and concerns. Many shared values and points of agreement were voiced but also some points of disagreement. The following is a summary of the overall themes and some of the key points of expressed agreement and disagreement.

There is no single overwhelming desire held by all segments of the community. There is no one overall theme that cuts across all comments; there are multiple themes in public comments, some of which are complementary, others of which conflict.

Some values are shared by many citizens:

- **Open Space and Mountain Parks lands: a valued community asset.** High value is placed on the natural, scenic, and recreational qualities of Open Space and Mountain Parks lands, and there is a strong desire for those qualities to be sustained over time. There is widespread belief that the quality of the environment--the “naturalness” of an Open Space and Mountain Parks lands--is the foundation of the recreational experience and should be sustained over time.

- **Concern about the future.** While many express a high level of satisfaction with the current visitor experience, concern exists about the future because of the potential for additional visitation growth and its associated impacts, as well as funding constraints to adequately deal with them. Many people are worried that as visitation grows, natural resources will be more at risk, and then more visitor restrictions will be imposed to deal with crowding, overuse, and resource protection issues.

- **Support for "recreation" and "environmental preservation" on Open Space and Mountain Parks lands.** Many people desire both recreational opportunities and protection of the Open Space and Mountain Parks natural environment. Some variation on this theme is expressed by different individuals and groups who sometimes emphasize one more than the other.

- **"Balance" in decision-making about visitor use and resource protection.** While there are differing definitions of "balance," for many people it means both the quality of the visitor experience and the quality of natural resources must be maintained and enhanced over time. Designation of management areas is seen by many as a useful tool for achieving overall balance among competing uses of Open Space and Mountain Parks lands.

- **Support for education.** There is wide support for educational activities to foster the connection that people feel with the land, reduce conflicts among different recreational activities, instill user ethics, and encourage low-impact use.

- **Expanded recreational opportunities.** In general, recreational user groups want more from Open Space and Mountain Parks--more recreational areas and opportunities, more facilities supporting their activities, and more freedom to "do their thing." Rock climbers, for example, want more bolt-assisted routes, while mountain bikers want more trails on challenging terrain, and horseback riders want more trails and off-trail riding opportunities.

- **Retention of existing recreational opportunities.** Concern has been expressed that Open Space and Mountain Parks should not eliminate any existing recreational opportunities. A strong current of expression has come from dog guardians who want to maintain their present dog off-leash freedoms and from rock climbers who want to maintain the freedom to explore new climbing routes and create new bolted climbs.

- **Assumed low impact.** Virtually every user group identifies the need to protect the resources, but feels its activity has minimal impact on resources. However, virtually all groups express the desire to contribute to the long-term stewardship of the land.

- **Preserve the environment.** This general value is widely articulated. Some of the major preservation concerns include: protection of habitat, sensitive species, and biodiversity; reservation of some land for wildlife; management of visitor use so that it does not exceed the carrying capacity of natural systems or degrade remaining large habitat blocks; the need to channel visitors away from sensitive areas; and the need to aggressively attack weeds and restore damaged ecosystems. There is wide agreement that trails should be precluded in highly sensitive areas, as well as wide support for wildlife closures when necessary.

- **Expand trail opportunities and additional trail improvements.** Some specific desires mentioned include: longer (day-long) trails, more trail loops, new trails in various areas; trail connections within the Open Space and Mountain Parks system and regional trail connections; high quality of experience (e.g., interesting routes not near roads or development); safe trail crossings across roads; and separation of trail uses (e.g., different trails for different uses, time-sharing among users).

- **Preserve the backcountry experience.** There is a desire to maintain opportunities to experience solitude in relatively pristine and lightly visited backcountry areas, even as this solitude may be harder to find over time.

- **Additional restrictions on visitor use**. There are divergent views on the desirability of additional restrictions to protect resources. A considerable segment of the public supports additional restrictions on visitor use. Others do not support additional restrictions, in principle, or because they don't believe conditions warrant them.

- **Additional restrictions on dogs.** There are divergent views on the desirability of additional restrictions on dogs to protect resources and reduce conflict. A considerable segment of the public seeks greater opportunities to use Open Space and Mountain Parks without the conflicts they associate with dogs. Some also feel that the impacts of dogs to environmental resources are unacceptable. These members of the community support additional restrictions on dogs, such as no-dog areas as well as on-trail and dog on-leash requirements. Others do not support additional restrictions, because they prefer the existing conditions, or because they do not believe conditions warrant them.

- **Justification for restrictions.** Concerns are articulated that: restrictions on use must be justified by objective scientific studies and data, restrictions must be "fair," and Open Space and Mountain Parks should use the least-restrictive method to achieve management goals.

- **Diverse range of opinions.** Divergent opinions were expressed by many people on a variety of issues. For example, divergent views on whether or not to:

    - Build new trails and parking facilities
    - Disperse or concentrate visitor use
    - Selectively impose on-trail restrictions for resource protection
    - Close or keep existing undesignated trails
    - Require dogs on-leash in more areas
    - Allow new bolted climbing routes
    - Build wide multiple-use trails or keep trails narrow
    - Shift land acquisition funding to build more trails and increase maintenance

Chapter

3

Planning Goals, Guiding Principles, Services, and Policies

Visitor Master Plan Goals

To achieve the vision for the Visitor Master Plan, Open Space and Mountain Parks worked closely with two citizen advisory committees to define four key goals.

Goal 1: Enhance the experience

Maintain or enhance the quality of the visitor experience when engaged in passive recreational activities such as hiking, climbing, and bicycling.

- Make visitors feel welcome on Open Space and Mountain Parks lands.
- Support a variety of passive recreation opportunities for the enjoyment of visitors.
- Provide a high level of personal safety for visitors.
- Foster a sense of value, appreciation, and care for Open Space and Mountain Parks resources.
- Encourage understanding, respect, and compatible behavior among visitors. This is especially applicable to visitors who engage in different types of passive recreation.

Goal 2: Improve access

Provide and maintain highly functional and sustainable visitor facilities that support visitor access to appropriate destinations and add to the quality of their experience.

- Provide trails to major destinations within Open Space and Mountain Parks.
- Link trails to create an interconnected trail system.
- Build trails and facilities that are both physically and environmentally sustainable.
- Provide clean and attractive visitor facilities to support passive recreation.
- Maintain and improve visitor trails and facilities to a level that keeps deferred maintenance needs to a minimum.
- Reduce the long-term costs of maintaining facilities to an acceptable standard.

Goal 3: Enjoy and protect

Ensure that passive recreational activities and facilities are compatible with long-term protection of natural, agricultural, and cultural resources.

- Avoid or minimize negative impacts of visitor activities on natural, cultural, and agricultural resources.
- Preserve and restore higher quality natural areas by directing visitor use to appropriate areas and away from sensitive areas.
- Locate, design, and maintain trails and facilities in ways that make visitor activities and protection of resources mutually compatible.

- Restore habitat damaged by past visitor use.

Goal 4: Partner with the community

Partner with the community in passive recreation decision-making and stewardship efforts.

- Foster the public's understanding of the need for management of visitor activities and their crucial role in implementing a management system.
- Actively involve the public in decisions affecting passive recreation and resource stewardship activities on Open Space and Mountain Parks lands.
- Improve the quality of public discourse to implement and refine the Visitor Master Plan, deepening public trust in the process.
- Provide a range of volunteer opportunities that allow visitors to help take care of Open Space and Mountain Parks lands and better appreciate its resources.

Guiding Principles

Sense of Welcome. Foster a sense of welcome while accommodating visitor activities that both create enjoyment and appreciation of nature and the outdoors, and are compatible with resource protection and preservation.

Balancing Competing Uses. Seek to balance competing community needs and desires and to be fair in allocating recreational use opportunities. Currently, open space purposes, as defined in the Open Space Charter, are not prioritized among competing uses.

Best Information. Use the best available information (see inset) when making management decisions with the goal of making sound decisions based on consideration of all relevant factors, needs, and values. When available, scientific information on the existing and desired conditions of natural, agricultural, and cultural resources and the impacts of visitor use on them, shall be used as well. When key information gaps exist, Open Space and Mountain Parks shall take reasonable measures, through independent or collaborative efforts, to generate or obtain new or improved information that will reduce uncertainty and improve decision-making.

Elements of a Best Information Standard

- *Use the best information available without unreasonable cost, effort, or time.*
- *Use diverse and inclusive information sources as applied to a particular circumstance. These may include biological/ecological concepts and data, visitor desires and use patterns, information generated by Open Space and Mountain Parks staff, values of the community, socio-economic information, and other sources.*
- *Use the most relevant, high-quality, and up-to-date scientific information--research studies, monitoring results, analyses, impact assessments, public opinion surveys, "expert" knowledge, and other types of information.*
- *Use both quantitative and qualitative information.*
- *Consider the quality, reliability, and limitations of the information.*
- *Assess trade-offs in outcomes, interests, and values.*
- *Evaluate alternatives that represent a spectrum of decisions or approaches.*

Dealing with Uncertainty. As established by the Open Space Charter, preserving the natural environment is essential to maintaining the quality of the visitor experience. Open Space and Mountain Parks shall be careful to protect and preserve environmental resources when there is uncertainty about their conservation status, the impacts of visitor use, and/or the effects of management actions. Open Space and Mountain Parks will assess management alternatives and determine appropriate resource protection measures when there are reasonable grounds for concern regarding threats of potentially serious or irreversible resource damage. Open Space and Mountain Parks will use the best available information to assess and weigh the benefits and impacts of the various management alternatives (including no action) and then select the best overall management action in order to achieve appropriate resource protection.

Creative Solutions to Site-Specific Conflicts. When there are conflicts between resource protection and visitor use, management priorities will be established by considering the context provided by the underlying management area designation. Open Space and Mountain Parks shall attempt, working with the public, to find creative solutions that mediate between providing new or enhanced recreational opportunities and avoiding, minimizing, or mitigating the impacts of visitor use.

Least-Restrictive Management Approach. Use the least-restrictive means possible to achieve management goals. More restrictive solutions will be incrementally implemented if less restrictive solutions are ineffective.

"Good Neighbor" Policy. Employ a "good neighbor" policy to prevent or mitigate adverse visitor use impacts on adjacent private or public lands.

Flexible, Adaptive Management. Implement an adaptive management approach that: monitors visitor experience, visitor infrastructure, and resource conditions, assesses the effectiveness of management actions, and revises them based on new information gained from research and experience.

Visitor Master Plan Initiatives, Services, and Policies

Education and Outreach Initiative

Services

Education and outreach services provide understanding and appreciation for natural resources and processes and other Open Space and Mountain Parks values. Fostering this understanding and appreciation adds to the quality of visitor experience and creates connections that people can feel with natural and agricultural landscapes. Education and outreach services also provide knowledge about low-impact visitor techniques, which enable environmentally responsible visitor use.

Policies

Emphasis on Education. Emphasize education and interpretation as tools to create public understanding and support for maintenance and enhancement of the quality of visitor experience and the protection of natural, agricultural, and cultural resources.

Excellence in Education. Provide education and outreach services that build personal and community connections with the land, enable visitors to use low-impact educational and recreational techniques, and promote partnerships in the stewardship of our lands.

Safety and Enforcement Initiative

Services

Safety and regulation enforcement services are directed at providing acceptable levels of personal safety and risk associated with physical hazards, and the absence of illegal activities. Management activities are designed to allow visitors to feel safe, avoid physical safety hazards, and induce compliance with laws and regulations.

Policies

Safety Comes First. The protection of visitors and resources is the highest priority in operation and maintenance functions. Management actions to protect visitor safety will be implemented as quickly as necessary.

Recreational Opportunities Initiative

Services

Many different kinds of services are directed at maintaining and expanding the variety of passive recreation activities on Open Space and Mountain Parks lands: providing information and signs, trails and facilities, ranger patrol and enforcement, guided hikes, and more.

Policies

Support for High-Quality Passive Recreation and Education. Foster visitor enjoyment, connection with the land, and shared stewardship.

Diverse Recreational Opportunities. Continue to provide a wide range of passive recreation and outdoor education opportunities that are appropriate in a natural area setting and compatible with protection of natural, agricultural, and cultural resources.

Services for People with Disabilities. Provide services and facilities that expand opportunities for people with disabilities to enjoy passive recreational and educational activities.

Trails and Facilities Initiative

Services

Construction and maintenance of trails and facilities provides opportunities for visitor travel, access to major destinations, and support for specific passive recreational activities. Providing functionality in the trail system is important to visitor convenience and enjoyment. Durable and environmentally sustainable trails and facilities ensure visitor safety and long-term protection of the environment. Trails and facilities that are aesthetically pleasing add to the quality of visitor experience and encourage visitors to stay on trails and “tread lightly on the land”. Other services that add to the quality of the visitor experience include timely maintenance of sanitation facilities, provision of receptacles for dog excrement, graffiti removal, and trash pick-up. These services also encourage visitors to take good care of resources and facilities.

Policies

Support for Visitor Trails and Facilities. Provide trails and facilities that support a quality visitor experience and protection of resources.

Travel Opportunities. Provide opportunities for visitor travel to major recreational destinations on safe, enjoyable, and physically and environmentally sustainable trails that offer a variety of experiences and challenge levels.

On-Trail Travel. Encourage visitors to travel on trail by: (1) providing designated trails to major destinations and links between trails that give visitors opportunities for longer-distance trail experiences; and (2) providing education, signs, and maps.

Multi-Use Trails. Provide trails where visitors are permitted to travel using various options (e.g., on foot, on bike, on horseback, with dog, etc.), when travel options are compatible and environmentally sustainable.

Loop Trails. Provide options for visitors to travel on loop trails, where practical, feasible, and environmentally sustainable.

Physical Accessibility. Design trails and other visitor facilities to be accessible for people with disabilities when and where appropriate.

Trailheads. Provide safe and convenient trailheads, with periodic refurbishment or redesign as visitor needs change.

Alternate Modes. Provide facilities and services to visitors to encourage their use of alternate transportation modes (e.g., bike racks, co-location of trailheads and transit stops, etc.).

Infrastructure Priorities. Give priority to visitor infrastructure improvements that provide for visitor safety, maintain existing trails and facilities, improve physical and environmental sustainability, and protect resources. Build new trails and facilities, as needed and as financial resources allow.

Sustainable Maintenance. Implement a trail and facility maintenance program that is cost effective in meeting sustainability standards over the long term.

Facility Location and Design. Locate and design trails and facilities that are physically and environmentally sustainable, with the following requirements: Under normally scheduled maintenance and normal wear and tear, the trail or facility remains in an acceptable condition that provides intended access, safety, and visitor enjoyment and minimizes negative impacts on the environment such as accelerated drainage, erosion, spread of weeds, and others.

Integrate the goals of engendering stewardship, aesthetics, and resource protection into trail and facility design.

Funding for Infrastructure. Increase the overall level of funding for maintenance and construction of trails and other facilities over time, in order to “catch up” in deferred maintenance and enhance the visitor experience with improved infrastructure.

Resource Protection Initiative

Services

Resource protection services include a variety of activities designed to channel visitors to those places and times that can accommodate use without unacceptable resource impacts, and ensure compliance with resource protection regulations. The desired effects of resource protection services is increased environmental sustainability and reduced visitor use impacts on natural, agricultural, and cultural resources.

Policies

Resource Protection. While supporting high-quality visitor opportunities, take actions to prevent resource degradation and support restoration of native populations and ecological systems. The minimum objective of management actions is to "do no harm." Where recreational activities may, will, or could harm the environment, Open Space and Mountain Parks shall avoid, minimize, and mitigate impacts. Restricting visitor activities will be a last resort.

Sustainability. Support management actions that ensure long-term, sustainable passive recreational experiences and natural values. To be sustainable in the long-term, visitor use must not:

- Degrade the integrity and diversity of natural, agricultural, and cultural resources
- Detract from the quality of recreational experience
- Overwhelm the capacity of facilities to provide acceptable levels of service

Management strategies will be directed at ensuring that future passive recreational experiences and the condition of the natural environment are of the same quality or better than they are today.

Managed Access. Strengthen management of visitor access to maintain acceptable, and reduce unacceptable, conditions related to the visitor experience, visitor infrastructure, and resource protection. Implement a system of "managed access" that maintains the quality of both the visitor experience and resources.

Protection of Sensitive Areas. Direct visitor use to appropriate areas and away from sensitive areas. Some uses or levels of visitor use may need to be limited or not allowed, in order to protect natural, agricultural, and cultural resources.

Designation of Activity Areas. Designate appropriate areas for specific passive recreational activities and identify areas where specific activities are not appropriate and will be prohibited, in order to protect the quality of visitor experience and preserve and protect resources.

Resource Conservation Design. Integrate resource conservation goals into guidelines for facility design, construction, and maintenance of trails, trailheads, and other visitor facilities.

Special Use and Commercial Use. Implement administrative oversight of special use activities and commercial operations through discretionary permit processes.

Review of New Activities. Evaluate whether or not "new" recreational activities are "passive" and appropriate on Open Space and Mountain Parks lands.

Prerequisites for New Properties. Complete site management plans and provide appropriate infrastructure for newly acquired properties before opening them for public access.

Competitive Events. Prohibit competitive events on Open Space and Mountain Parks lands because of unacceptable visitor and resource impacts.

User Conflict Reduction Initiative

Services

Services directed at reducing visitor use conflicts are designed to reduce conflict with dogs, cyclists, or other visitors, and thereby increase visitor satisfaction and enjoyment. Services include education, physical or temporal separation of uses, enforcement or regulations, and others.

Policies

Conflict Reduction among Visitor Activities. Provide education and outreach services, publicize and enforce regulations, and construct infrastructure improvements that reduce conflict among visitors.

Targeted Areas for Conflict Reduction. Target efforts aimed at reducing visitor conflicts to areas with concentrated visitor use or congregation of specific activities that may lead to conflict.

Public Involvement Initiative

Services

Public involvement services involve providing a variety of meaningful ways for the public to give input to decisions affecting Open Space and Mountain Parks lands. The intent is to make people feel that their ideas are considered and make better decisions because of better information about public needs and desires.

Policies

Openness and Responsiveness. Implement open, inclusive, and responsive public involvement processes that provide information about key management decisions affecting visitor experience, visitor infrastructure, and resource conditions.

Partnerships. Collaborate and partner with community groups to provide services and infrastructure that support passive recreational activities and use of low-impact techniques.

Transparent Decisions. Provide information to the public that makes decisions both understandable and transparent.

Accountability. Be open to ideas and concerns offered by the public and respond to them when possible.

Chapter

4

Visitor Master Plan Implementation

This chapter outlines several Visitor Master Plan initiatives, which organize and group management strategies. The chapter also lays out an important tool for implementing various management strategies, namely a system of Open Space and Mountain Parks Management Areas.

The Visitor Master Plan integrates various management strategies to achieve desired conditions in Open Space and Mountain Parks. Strategies are packages of management actions which include existing and proposed programs and other projects.

Management strategies are designed to:

- *Maintain or enhance* acceptable conditions for visitor experience and supporting visitor infrastructure (e.g., trails, parking, shelters, etc.)
- *Minimize the impact* of visitor activities on natural, agricultural, and cultural resources
- *Improve or restore* visitor experience, infrastructure, and resource conditions to an acceptable level if they fall below thresholds of acceptability

These strategies are based on: an analysis of the current context for managing visitor use (summarized in Chapters 1 and 2); an assessment of the relationship of existing visitor experience, visitor infrastructure, and resource conditions relative to acceptability thresholds and improvement opportunities (summarized in Chapter 3); and an analysis of management needs and issues.

The Visitor Master Plan initiatives are:

1. Education and outreach initiative
2. Safety and enforcement initiative
3. Recreational opportunities initiative
4. Trails and facilities initiative
5. Resource protection initiative
6. User conflict reduction initiative
7. Public involvement initiative

A Word About Adaptive Management

Given the context of uncertainty, managing visitor use and natural resources is often experimental. Many times the most effective strategies must be discovered through objective monitoring and modification, an approach called adaptive management. An adaptive and cautious approach considers changing circumstances, creates opportunities to incorporate new information and evaluate unanticipated activities, and minimizes the likelihood of irreversible environmental impacts.

1. Education and Outreach Initiative

Connecting with the community and educating visitors requires strategies designed to:

- Foster an appreciation of our Open Space and Mountain Parks resources and their sensitivity to visitor impacts
- Reduce visitor conflict
- Help visitors reduce their impact on natural systems, agricultural operations, and cultural resources
- Encourage productive collaboration between Open Space and Mountain Parks and community groups--from exchanging ideas to combining hands-on and financial resources to improving low-impact visitor behaviors

Management Strategies

Educational Programs and Public Information. Motivate the public to help ensure that educational and recreational activities are sustainable in the long term, using educational information and interpretive themes. A variety of communication mechanisms can be used, including: the Open Space and Mountain Parks website; trailhead contacts; interpretive, regulatory, and informational signs; trailhead board posters; educational presentations and interpretive hikes; media articles; brochures; maps; guidebooks; and outreach contacts with community groups and at community events.

Key Messages

- Open Space and Mountain Parks offers a range of experiences and opportunities to connect with and enjoy the land.
- There are unique values associated with using Open Space and Mountain Parks lands.
- Within Open Space and Mountain Parks, there are many stories (geological, ecological, cultural, and agricultural) relevant to the experience of visitors.

Providing news and useful information about Open Space and Mountain Parks (through a variety of venues, including the media) would also be part of this educational program.

Visitor and Community Contact Program. Continue to deliver consistent and repeated messages on low-impact visitor techniques, which are implemented through the front-country Leave-No-Trace program and other outreach activities. Face-to-face education and outreach contacts occur in various places--trails, trailheads, the Chautauqua Cottage, the Flagstaff Nature Center, and community special events such as the Boulder Creek Festival, Farmers Market, and events targeted at University of Colorado students.

- Encourage visitors to limit their use to designated trails (involves placing signs at undesignated trails and providing education and outreach contacts).
- Continue focused education efforts to increase compliance with dog management regulations (includes placing informational/regulatory signs at trailheads and along trails, conducting dog management classes (often in collaboration with other agencies), trailhead and trail outreach contacts, and focused dog excrement pick-up education, i.e., “1+1 pick-up” program).
- Communicate the importance of closing gates on agricultural properties.

Community Outreach. Develop or continue outreach programs to community groups that influence visitor activity on Open Space and Mountain Parks lands.

- Collaborate with these groups to educate Open Space and Mountain Parks visitors.
- Provide volunteer opportunities for community members to deepen their commitment and formalize their relationship to Open Space and Mountain Parks lands.
- Encourage compliance with Open Space and Mountain Parks regulations.
- Involve the community in the planning and construction of sustainable trails and other visitor facilities.
- Work with community groups to create user group "codes of ethics" to reduce visitor conflict and activity impact.

Dog Voice-and-Sight Video and Tag Program. Implement a dog voice-and-sight video education and tag program that would be required for all dog guardians who wish to take advantage of voice-and-sight control privileges. The video will depict realistic and enforceable dog management behaviors to meet the voice-and-sight dog management regulations. Upon completing the video education requirement and agreeing to keep their dogs under control, dog guardians will be issued a highly visible tag that must be worn by all off-leash dogs; without this evidence dogs would be required to be on-leash. This voice-and-sight control tag requirement will be phased in.

Author/Publisher Outreach. Work with authors and publishers of maps and outdoor recreation guides to ensure Open Space and Mountain Parks opportunities are appropriately placed and described. Information and guidance from third parties can play a constructive role in promoting Leave-No-Trace principles and encourage responsible stewardship of Open Space and Mountain Parks lands.

2. Safety and Enforcement Initiative

Keeping visitors safe is a top priority. The Open Space and Mountain Parks Program seeks to improve the visitor experience and reduce resource impacts by providing services that protect personal safety.

These services involve communicating and enforcing regulations to enhance visitor safety, reduce conflicts, and protect resources. Most visitors understand the rules and their rationale. Some people choose to ignore or violate Open Space and Mountain Parks regulations, and education is unlikely to successfully change the behavior of this segment of visitors. Education and enforcement appear to be an effective combination to change visitor behaviors.

Management Strategies

Keep Visitors Safe

Emergency Response. Respond safely and quickly to fires, medical emergencies, hazardous situations, law enforcement incidents, and rescue operations. Provide timely and effective assistance to visitors.

Infrastructure Safety. Identify and respond to unsafe conditions and access associated with infrastructure. These interventions are designed to quickly respond to hazards and remove threats to visitors.

Response to Identified Natural Hazards. Respond to natural hazards with appropriate actions that prevent harm to people, resources, and facilities. Repair damage to resources and facilities.

Road Crossings. Improve the safety of "critical" road crossings. A variety of solutions are needed to provide safety to visitors where trails cross roads (at-grade pedestrian crossings/striping/warning signs, underpasses, overpasses, pedestrian signal lights, stoplights, etc.). These improvements are expensive and frequently require multi-agency funding.

Livestock and Visitors. Provide for safe interactions between livestock and visitors. This strategy primarily involves segregating bulls and cows with calves from trails where appropriate, but may also involve closing trails at times. Signs provide warnings to visitors. The need for caution is publicized through media and outreach contacts.

Parking Safety and Enforcement. Enforce roadside parking prohibitions in cooperation with the County Sheriff's Office and the Colorado Department of Transportation. Multi-agency collaboration is needed to identify problem areas, post signs, and enforce roadside parking prohibitions.

Enforce Regulations

Ranger Patrol. Provide a consistent level of ranger patrol coverage. This base patrol checks trailheads, trails, and properties and also monitors and manages visitor use and resource protection. Provide more ranger patrols in high-use areas and areas with special resource protection needs, where conflicts are more likely to occur.

Dog Management Regulation Enforcement. Focus enforcement on compliance with dog regulations for leash control, voice-and-sight control, and waste removal. This involves prioritizing patrol areas, placing educational and regulatory signs, and making trailhead and trail ranger contacts. If necessary, revise voice-and-sight control regulations to improve clarity and enforceability.

Dog Management Compliance Studies. Develop an information base to assess the status of dog management, fill key gaps in knowledge about the impacts of dogs, and evaluate the effectiveness of dog management projects and programs.

- Develop service standards for dog management regarding overall level of compliance.
- Working with the community, continue a dog voice-and-sight control demonstration project for selected trails.

Dog Voice-and-Sight Education and Certification. Implement a dog voice-and-sight certification system, which would be voluntary except for repeat offenders who want to regain voice-and-sight privileges. Open Space and Mountain Parks would collaboratively determine the standards and work with the Boulder Valley Humane Society, dog trainers, other qualified providers, and others to implement the program.

Graduated Fines for Dog Management Violations. Establish a graduated system of fines for violations for both dog voice-and-sight offenses and dog waste pick-up offenses. Penalties would escalate from less to more severe fines, loss of voice-and-sight privilege, and banning individual dogs, and may involve community service requirements if imposed by the court.

Ranger Educational/Informational Contacts. Provide ranger contacts with the public to educate and inform. These services complement and strengthen the effectiveness of enforcement activities.

3. Recreational Opportunities Initiative

Open Space and Mountain Parks seeks to provide a broad diversity of educational and recreational opportunities, a high quality of visitor experience, and enhancements to current opportunities when compatible with resource protection and preservation.

Management Strategies

Bicycling

Retrofitting Trails for Bikes. As trail improvement projects are being planned, give consideration to the appropriateness of designating and constructing them to include bicycling.

New Bike Trails. Work with community groups to examine the feasibility of possible mountain biking/multiple-use trails that would: (1) connect the east side of Mountain Parks to Walker Ranch or U.S. Forest Service land; and/or (2) provide more mountain biking opportunities west of State Highway 93.

Climbing

New Climbing Bolts. Continue to implement and evaluate a pilot program for limited new climbing bolts in designated areas. The current pilot project is located in the vicinity of Dinosaur Mountain. Project goals include considering a limited number of new hardware-assisted climbing routes that can support sustainable use and improving the sustainability of existing routes (which could mean changing them, removing them, and restoring damaged resources).

Climbing Access Trails. Collaborate with the climbing community to develop a system of climbing access trails that provide sustainable access to desired destinations. This action involves: evaluation of existing undesignated trails with defined criteria; decisions on which trails to designate, close, or improve; and restoration of natural resources damaged by historically unsustainable access.

Hiking

Off-Trail Permits. Implement a permit system for off-trail use in Habitat Conservation Areas (HCAs), in order to provide for officially-sponsored activities and use by the general public. These activities will be subject to Open Space and Mountain Parks regulations consistent with management goals for Habitat Conservation Areas, which may include limiting the number of permits issued due to individual or cumulative impacts.

No-Dog Trails

New No-Dog Opportunities. Establish additional no-dog opportunities on some trails, using a collaborative process and suitability criteria.

Information on No-Dog Trails. To avoid conflicts and provide dog-free opportunities, establish and publish, on the Open Space and Mountain Parks website and elsewhere, a list of "no-dog" trails.

Voice-and-Sight Control Demonstration Projects

Preservation of Voice-and-Sight Opportunities. Implement a dog voice-and-sight control demonstration project for selected trails, in collaboration with Friend interested in Dogs and Open Space (FIDOS) and others. Initial pilot studies include Big Bluestem/South Boulder Creek Trail and Sage Trail.

- The demonstration would determine whether voice-and-sight control would continue or be replaced by an on-leash requirement (either all-year or seasonal).
- During the demonstration, targeted education, enforcement, and monitoring of voice-and-sight control are included in the project.

Hang Gliding/Paragliding

Launch and Landing Areas. Provide designated launch and landing area(s) for hang gliding and paragliding.

- Designate areas for hang/paragliding activities in order to reduce resource impact and visitor conflict.
- Designate and construct a sustainable trail to the launch site at Wonderland Lake, in order to minimize resource impacts.
- Work with community groups to determine if other Open Space and Mountain Parks sites could be designated for sustainable hang gliding and paragliding activities.

Off-Trail Activities

Designated Areas and Conditions for Off-Trail Activities. Provide designated areas and appropriate infrastructure and conditions for off-trail passive recreation activities. Examples include hang gliding/paragliding, fishing, horseback riding, orienteering, model glider flying, and sledding.

Opportunities for People with Disabilities

Facilities and Services for People with Disabilities. Increase services available to community members regardless of physical ability. Implement infrastructure and service improvements and provide other appropriate services that offer access to a broad spectrum of abilities.

4. Trails and Facilities Initiative

Trails provide and guide visitor use on Open Space and Mountain Parks lands, and allow visitors to travel to desired destinations. Other facilities are designed to make certain kinds of educational and recreational activities possible and enjoyable. Open Space and Mountain Parks will redesign existing trails and trailheads, and build new trails and facilities to meet defined standards for physical and environmental sustainability. Open Space and Mountain Parks also will maintain trails and facilities to sustainability standards. Priority will be given to completing deferred maintenance and redesigning existing trails and facilities over constructing new infrastructure.

Management Strategies

Trail, Trailhead, and Facility Maintenance. Implement a trail and facility routine maintenance program that is cost effective and meets physical and environmental sustainability standards over the long term. Maintenance to sustainability standards lowers

the cost by preventing unnecessary or more costly improvements while extending the service life of trails and facilities and protecting the public investment.

Trail Classification System. Define and implement a hierarchical system of trails and associated trail construction and maintenance standards. Trail classes should encourage visitors to travel on-trail and minimize impacts, and they should include high-use trails, medium-use trails, low-use primitive trails, and activity-specific trails. Facility design, construction, and maintenance should be incorporated into the standards.

Trail Planning. Collaborate to study and evaluate possible new trails and trail connections, and their relationship to management area designations. Assess visitor access and resource protection needs, propose new sustainable trails and improvements, and schedule them in the Open Space and Mountain Parks Capital Improvements Program for Trail Study Areas. Planning for the Trail Study Areas will produce a comprehensive set of recommendations for a given area, including:

- Actions for existing trails--improvements and relocations
- Actions for undesignated trails--designation and relocation or improvement, designation without improvement, and elimination and restoration.
- Actions for new trails--construction of new trails and linkages

The intent is to complete Trail Study Areas throughout the Open Space and Mountain Parks system. The initial priorities for Trail Study Areas are:

- **Marshall Mesa/Southern Grasslands Trail Study Area.** In West Marshall Mesa Passive Recreation Area, East Marshall Mesa Natural Area, and Southern Grasslands Habitat Conservation Area. Includes consideration of new trailhead at City Limits property.
- **Eldorado Mountain/Doudy Draw Trail Study Area.** In Eldorado Mountain Habitat Conservation Area and the portion of Doudy Draw Natural Area west of State Highway 93. Includes access to Peanuts Wall and Mickey Mouse Wall climbs.
- **North Foothills Trail Study Area.** In North Foothills Habitat Conservation Area.
- **Union Pacific/White Rocks Trail Study Area**. In Creek Confluence Natural Area and Lower Boulder Creek Habitat Conservation Area.
- **East Boulder/Dry Creek Trail Study Area.** In East Boulder Natural Area and Dry Creek Passive Recreation Area. Includes consideration of trail connections with Dry Creek trails.
- **Tallgrass Prairie East Trail Study Area.** In Tallgrass Prairie East Habitat Conservation Area. Includes consideration of U.S. 36 underpass.
- **Mountain Parks North Trail Study Area.** In Flatirons/Mountain Backdrop Natural Area and part of Flagstaff/ Chautauqua Passive Recreation Area. Includes access to non-contiguous Sacred Cliffs climbs in the Western Mountain Parks Habitat Conservation Area.
- **Mountain Parks South Trail Study Area.** In Flatirons/Mountain Backdrop Natural Area.
- **Shanahan/South Mesa Trail Study Area.** In Shanahan Natural Area and South Mesa Passive Recreation Area. Includes consideration of a possible connection between South Boulder Creek Trail and Community Ditch Trail.

(See Map 4.1 for the Trail Study Areas Map.)

Trail Reconstruction. Address major trail reconstruction needs. Initiate trail rebuilding and rerouting to improve physical and environmental sustainability, safety, aesthetic appeal, and resource protection. Address major maintenance projects that are beyond the scope of routine maintenance. (See Map 4.2 for the Trail Reconstruction and Critical Road Crossings Map.)

New Trails. Construct sustainable trails to appropriate destinations and appropriate trail linkages in the overall trail system. Open Space and Mountain Parks seeks to provide trails to the most popular destinations while preserving visitor experiences and protecting

resources. Establish a process with public input for deciding dog access and management on newly-constructed trails. (See Map 4.3 for the Priority New Trails and Improvements Map.)

Undesignated Trails. Develop a program to assess undesignated trails, and take appropriate actions. These actions include: evaluating needs, and options, and perhaps, re-routing, closing, and reclaiming, or retaining and monitoring undesignated trails. (See Map 4.4 for the Trailhead and Trail Access Improvements Map.)

Trailhead Improvement. Construct or improve trailheads, possibly including:

- Parking lot function, design, access, and capacity
- Visitor infrastructure including trailhead boards, information and interpretive signs, restrooms, trash receptacles, and horse trailer or bicycle parking facilities
- Special facilities for persons who are mobility impaired

Trail Aesthetics. Redesign or relocate selected trails and trailheads to improve aesthetic appeal. The quality of visitor experience within natural and agricultural landscapes is affected by the appearance of trails and trailheads. In many cases, improvements can be made by redesigning existing trails and trailheads.

Transit Linkages. Popularize and improve transit linkages with existing Open Space and Mountain Parks trailheads and access points, whenever appropriate. Promote the use of alternate transportation modes by visitors to Open Space and Mountain Parks and minimize the impact of vehicle travel.

Volunteer Opportunities for Trail Construction and Maintenance. Open Space and Mountain Parks shall explore opportunities for local community groups and individual volunteers to participate in trail construction and maintenance projects, including managing on a test basis: (1) an annual community trail construction day or days; and (2) an "adopt-a-trail" program. Open Space and Mountain Parks shall also explore volunteer opportunities for habitat restoration.

5. Resource Protection Initiative

Visitor impacts that degrade or diminish the quality of natural, agricultural, and cultural resources should be minimized. The most significant potential impact from visitor activities is through visitor travel or access. This initiative is intended to: (1) direct visitors away from areas with highly sensitive resources; (2) direct visitors to areas where resource impacts can be minimized or avoided; and (3) set conditions on visitor access that will minimize or avoid resource impacts.

Management Strategies

Best Management Practices. Develop and implement trail and facility location, design, construction, and maintenance best management practices to avoid, reduce, and minimize impacts on the natural environment. These impacts include degradation of habitat qualities, trampling of vegetation, soil erosion and compaction, the spread of non-native plant species, and others. Locate and design trails to provide a travel route and travel experience that encourage users to stay on-trail and avoid off-trail travel.

On-Trail Requirements. Require visitors to stay on the trail in Habitat Conservation Areas and encourage on-trail travel in all management areas. Habitat Conservation Areas are the largest blocks of habitat with relatively intact and functional ecosystems. To a great extent, the

absence of high trail and road density contributes to this ecological integrity. In order to provide a high level of habitat protection and preserve these large habitat blocks, all visitor travel is required to be on-trail in Habitat Conservation Areas (unless approved through an off-trail permit). Requiring and encouraging on-trail visitor access is a key strategy for resource protection. On-trail visitor travel minimizes vegetation trampling, soil erosion, spread of weeds, and disturbance or displacement of wildlife.

Dogs-on-Leash Requirement. Require dogs to be on-trail and on-leash in Habitat Conservation Areas to provide a high level of habitat protection and preserve large habitat blocks. This will be the default management strategy. Dogs also may be prohibited within Habitat Conservation Areas.

Exceptions will be considered to on-leash requirements in Habitat Conservation Areas to meet special circumstances. These may include seasonal restrictions, on-corridor voice-and-sight dog management, no dogs, and others. The corridor width for on-corridor voice-and-sight control is 20 feet on either side of the designated trail.

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.

Commercial Use Management. Implement a commercial use permit program consistent with city-wide policy.

- Permit proposed commercial activities that are compatible with protection and preservation of Open Space and Mountain Parks lands and resources and that support Open Space and Mountain Parks values.
- Direct commercial uses to appropriate sites and locations, which can adequately handle the activity impacts.
- Minimize the impact of the approved activity on the safety and quality of other visitors' experiences.
- Minimize the impact of the approved activity on natural, agricultural, and cultural resources.
- Promote the Leave-No-Trace ethic to permitees and activity participants.

Fees will be imposed to recover the costs of permit processing, oversight, and management. Permit conditions are placed on the activity to minimize impact. Open Space and Mountain Parks will work with community members and stakeholders to provide input for the development of the details of the program (e.g., profit vs. non-profit fees, size of operation, types of impacts, on/off trail, busy vs. down use times, etc.).

Commercial uses are defined as any activity on Open Space and Mountain Parks lands or facilities for which fees are charged for services and which bring people to Open Space and Mountain Parks lands. Commercial uses may be provided by either for-profit or non-profit providers. Examples include guided activities (climbing, hiking, nature study, photography, fishing, horseback riding, bicycle riding, and environmental education) and commercial filming. Commercial use permits will provide a discretionary approval process for any commercial use or service. For more detailed information on commercial use permits, see the Plan Reference Documents (available on the Visitor Master Plan page at www.osmp.org).

Localized Protection Measures. Implement wildlife closures (e.g., in the vicinity of raptor nests or concentrated large mammal feeding areas) and resource protection closures (e.g., muddy conditions) as needed and establish adequate regulatory authority. Closures are activated seasonally or temporarily to protect wildlife and people from each other or prevent resource damage by visitors.

New Property Planning and Facilities. Complete planning and infrastructure improvements in a timely manner, prior to opening newly acquired properties to public access. However, as appropriate, preserve existing public access during the planning and improvement process. Open Space and Mountain Parks will complete a site management plan recommending appropriate locations, types of uses and visitor infrastructure, and how to provide adequate visitor infrastructure and services. The timeline for completing plans and infrastructure improvements will be developed by Open Space and Mountain Parks staff and the Open Space Board of Trustees as part of annual work plans for implementing the Visitor Master Plan. Management plans will be considered by the Open Space Board of Trustees. An enforceable regulation to close properties to the public until these requirements are met will be developed and adopted. Open Space and Mountain Parks will communicate area regulations to the public using maps, signs, its website, and other means as appropriate.

Assessment of New Recreational Activities. Implement a process to determine whether or not "new" recreational activities or uses are passive and appropriate on Open Space and Mountain Parks lands. As part of the Visitor Master Plan, an activity assessment was performed to determine what conditions should be placed on existing passive recreational activities, or what infrastructure improvements should be made to ensure acceptable visitor and resource impacts. This review resulted in several recommended Management Strategies incorporated into the Visitor Master Plan.

A formalized oversight process will be defined and implemented to: (1) evaluate "new" recreational activities or uses to determine whether or not they should be allowed on Open Space and Mountain Parks lands; and (2) determine necessary conditions or infrastructure to avoid or minimize impact. "New" activities or uses include completely new types of recreation (possibly using new technologies), new locations for existing types of recreational activities, or substantially increased levels of a previously evaluated and approved activity. In order to prevent degradation in visitor experience or resource conditions, it is important that a passive recreation determination be conducted before or soon after a new recreational activity appears. Initiation of this determination process may be proposed by Open Space and Mountain Parks staff, the Open Space Board of Trustees, or members of the public.

Cultural Resource Management. Complete an inventory and vulnerability assessment of Open Space and Mountain Parks' cultural resources and implement various ways of increasing protection of cultural resources such as curation, stabilization, physical improvements, and restoration.

6. User Conflict Reduction Initiative

The following actions are intended to minimize conflicts between visitors and promote good recreational experiences for all visitors.

Management Strategies

Trailhead Dog Leash Requirement. Require dogs to be on-leash at selected trailheads. Open Space and Mountain Parks will require that dogs be leashed at selected trailheads where

visitor congestion and conflict are significant problems. This dog management program is intended to: decrease conflict among dogs and with other trail users; reduce safety hazards in trailhead parking areas; decrease off-trail trampling in the vicinity of the trailhead; and increase compliance with existing requirements for dog control, dog handler possession of a leash, and dog waste pick-up. In the development and implementation of this program, Open Space and Mountain Parks could decide that some trailheads may not need this on-leash restriction.

- The size and configuration of the on-leash area will fit the specific physical layout and management needs of specific trailheads.
- Implement this program with a pilot project to test the benefits and feasibility of dogs on-leash at trailheads. If successful, this program may be made permanent and applied to other selected trailheads.

Bicycling Compatibility. Work with community groups to reduce potential conflicts between bicyclists and other visitors.

Special Use Permits. Lower the special use group size threshold to 25 or more participants and require greater oversight of educational group activities, in order to reduce visitor and resource impacts.

- Require all groups with 25 or more participants to obtain a special use permit, with appropriate conditions to avoid, minimize, or mitigate impacts.
- Formalize and streamline the permit process to minimize the time commitment of applicants and staff. Annual permits may be issued for repeat visits.
- For school groups with 25-49 participants, require only Open Space and Mountain Parks notification and communication of visitation guidelines; for 50 or more require a permit.
- Evaluate the effectiveness of changes in the special use permit process. If needed, consider different group size thresholds for special use permits that vary by type of management area.

Special Use Permits. Special use permits are required for passive recreational activities with 25 or more participants or any event that may require an exemption from any existing policies or regulations. Examples of special uses include group hikes/rides, group picnics, and weddings. Permits are a means to: (1) approve special uses with conditions that can bring impacts to within an acceptable level; (2) direct special uses to alternate sites that can adequately handle the impacts of the activity; and (3) disallow special uses that create unacceptable impact. Reservations for Open Space and Mountain Parks shelters are not considered special events. Reasonable fees may be collected to partially cover the cost of administering the special use permit program. For more information on the special use permit program, see Plan Reference Documents (available on the Visitor Master Plan page at www.osmp.org).

Competitive Events. The Open Space and Mountain Parks Department shall not authorize competitive events on Open Space and Mountain Parks lands. The Department will establish regulatory authority prohibiting competitive events.

7. Public Involvement Initiative

Open Space and Mountain Parks will seek partnerships with community groups to develop support for management policies and programs, infrastructure investment, and resource protection--all aimed at improving the quality of the visitor experience and resource conditions.

Management Strategies

Annual Public Forums. Provide public "open dialogue" forums at least once a year to coincide with the timing of Open Space and Mountain Parks assessment of monitoring results and formulation of the annual work plan, budget, and capital improvements program development. This type of community consultation process is intended to provide fresh ideas, feedback on what is working and what is not, and discussion of priorities. It will also help Open Space and Mountain Parks refine its management strategies and change the course of ongoing implementation efforts.

Present project updates to the Open Space Board of Trustees and other community forums as appropriate on a regular basis. Work with the Open Space Board of Trustees to provide additional effective opportunities for community input. Use community survey results to track community attitudes, values, desires, and trends, which help inform implementation decisions for the Visitor Master Plan.

Hold two public meetings within 18 months of Visitor Master Plan approval to:

- Present and discuss the first-year Visitor Master Plan implementation work plan
- Present results of first year's monitoring one year after plan approval
- Present and discuss next year's Visitor Master Plan implementation work plan

Community Group Liaison. Designate an Open Space and Mountain Parks community liaison position that would provide a single point of contact for community groups to provide input to Open Space and Mountain Parks. The position will help provide ongoing working relationships that foster trust and collaboration. Other staff will have a liaison role to specific community groups, in coordination with the recreation liaison position. The intent is to create long-term working relationships between Open Space and Mountain Parks and community groups.

Issue-Based Community Collaboration. Use issue-specific, short-term task groups as needed. Possible tasks or projects:

- Devising specific details for programs like special use permits, commercial use permits, and off-trail permits in Habitat Conservation Areas
- Developing criteria, evaluating, and determining the status of undesignated trails
- Developing partnerships for trail construction and maintenance
- Developing priorities and designs for major trailhead improvements
- Developing monitoring protocols and implementing a monitoring program
- Guiding problem-focused research studies
- Devising pilot programs like dog certification and dogs on-leash at trailheads
- Evaluating bicycling options west of State Highway 93
- Designating specific use areas for hang gliding/paragliding, fishing, model glider flying, orienteering, etc.

Community Meetings. Conduct periodic meetings with community groups and the public to "check in" on plan implementation and adjust as necessary.

Volunteerism. Foster volunteerism as an important component of public involvement.

Management Areas: A Geographic Framework for Implementing the Plan

Open Space and Mountain Parks will use an area management system as a framework for implementing Visitor Master Plan implementation strategies. Key policies, programs, and projects are targeted to area-specific needs throughout the system.

The Open Space and Mountain Parks area management system provides a framework for implementing management strategies and setting priorities for visitor infrastructure improvements and service delivery. Under the umbrella of area management, certain key policies, programs, and projects are targeted to area-specific needs in different parts of the Open Space and Mountain Parks land system. Area management defines the geographic context for deciding which visitor activities are most suitable in a given area and what conditions will minimize impacts on other visitors or resources.

Protection, preservation, and management of city lands and provision of passive recreation opportunities, as defined by the City Charter, are fundamental goals for the Open Space and Mountain Parks Program. Management area designations define a management emphasis for different areas within the Open Space and Mountain Parks land system, based on a primary open space purpose (e.g., provision of quality passive recreational opportunities, preservation of agriculture, and protection and restoration of natural systems). The management designation defines suitable visitor activities in each type of area and under what conditions those activities can occur. The management designation also defines the management strategies needed to enhance visitor experience and ensure compatibility of visitor activities with resource protection.

Specific management strategies are applied in a given management area. The set of strategies applied in a given management area is based on the land characteristics (e.g., physical and ecological qualities, existing and anticipated visitor use patterns, existing and potential visitor infrastructure, and others) and the management needs that exist in that area. A flexible approach for applying strategies to a given management area is necessary, as exceptions may be needed to meet special circumstances.

A Description of the Open Space and Mountain Parks Management Area Designations

The primary goal of area management is to encourage visitor use in areas that can best accommodate the use, which includes areas that can provide a high-quality visitor experience and ensure compatibility of visitor use with natural, agricultural, and cultural resources. Areas with highly vulnerable resources require a higher level of protection: directing people away from sensitive resources, placing conditions on the use that avoids or minimizes impact, or providing visitor infrastructure to ensure acceptable levels of impact.

The quality of the environment--the "naturalness" of an area--is the foundation of the recreational experience on Open Space and Mountain Parks lands. Consequently, both the quality of the environment, and the quality of visitor experience, should be preserved and maintained in all Open Space and Mountain Parks management areas.

Four management area designations are defined on Open Space and Mountain Parks lands: Passive Recreation Areas, Natural Areas, Agricultural Areas, and Habitat Conservation Areas (see Map 4.5). These management area designations provide the overall context for how visitor

activities should occur. See Map 4.6 for a delineation of dog management strategies applied within management areas. Management areas are delineated for each of the designation categories. The characteristics, goals, and criteria used to delineate the management areas are described below.

Passive Recreation Area Designation

Characteristics

- Generally in close proximity to city or county development.
- Higher level of visitor use and density of existing trails.
- More evidence of human use and impacts.
- May include some interspersed patches of high-quality habitat.

Goals

- Provide a high level of public access to destinations and connection through designated trails.
- Maintain or improve passive recreational and educational opportunities, while protecting and preserving natural lands and resources.
- Accommodate high levels of visitor use with appropriate management, trails and trailheads, and services.
- Reduce conflicts among visitor activities.
- Minimize the number of undesignated or "social trails;" eliminate undesignated trails when they are duplicative or damaging to resources.

Criteria for Inclusion of Management Areas in the Passive Recreation Area Designation

- Higher level of visitation.
- Trails and trailheads that accommodate high levels of visitor use.
- High density of trails.
- Offers destinations for a wide range of different passive recreational activities.
- Compatibility with adjacent land use (i.e., opportunities to coordinate with neighboring or nearby landowners/managers in providing recreational services).

Natural Area Designation

Characteristics

- Locations can be both close to and remote from development.
- Varying levels of visitor use, types of activities, and availability of facilities.
- Conditions of natural ecosystems are variable--many areas with ecological systems in good condition, some with evidence of human use and impacts.
- May be in proximity to agricultural production and operations.

Goals

- Accommodate low-impact visitor activities where adequate trails exist or can be built, and resource impacts can be minimized.
- Provide opportunities for passive recreational and educational activities that require topographic relief or a natural setting (e.g., hang/paragliding, climbing/bouldering, nature study, scenic viewing).
- Protect the quality of natural and agricultural resources (especially where high value resources exist).
- Eliminate undesignated trails when they are redundant or damaging to resources.

Criteria for Inclusion of Management Areas in the Natural Area Designation

- Interspersed recreational and natural values require that management determine the appropriate mix of open space purposes and manage multiple uses accordingly.
- Relatively high resource and recreation values.
- Compatibility with adjacent land use (i.e., opportunities for coordinating habitat protection and connections and passive recreational activities/trail linkages).

Agricultural Area Designation

Characteristics

- Rural areas in the Boulder Valley.
- May be in proximity to areas of either high or low visitor use.
- Areas of intensive agricultural production or operation.

Goals

- Maintain the efficiency of agricultural production and operation.
- Manage agricultural production and operation to ensure safety for operators and visitors in the vicinity.
- Provide, where appropriate, public access and passive recreational opportunities that have minimal impacts on agricultural production and operation or other resources.
- Manage visitor access in areas of intensive agricultural production or operation to ensure visitor safety.
- Eliminate undesignated trails when they are redundant or damaging to resources.

Criteria for Inclusion of Management Areas in the Agricultural Area Designation

- Crop production and irrigated hay fields and grazing areas.
- Areas where conflicts with visitors and their pet companions could or do adversely affect the efficiency of agricultural production and operations or endanger visitor safety.
- Compatibility with adjacent land use (i.e., opportunities for coordinating agricultural protection and recreational activities/trail linkages).

  Note: Areas of concentrated livestock activity (corrals, horse boarding, etc.), private residences, machinery storage areas, etc. will be addressed in a separate policy.

Habitat Conservation Area Designation

Characteristics

- Tend to be located in more remote areas.
- Typically represent the largest blocks of an ecosystem type with few, if any, trails or roads.
- Lower level of visitor use; no or few trails and trailheads.
- Naturally functioning ecosystems (but may contain areas with evidence of human use and impacts).

Goals

- Maintain, enhance, and/or restore naturally functioning ecological systems.
- Maintain, enhance, and restore habitat for species of concern identified in the Boulder County and the Boulder Valley Comprehensive Plans.
- Provide public access and passive recreational opportunities that foster appreciation and understanding of ecological systems and have minimal impacts on native plant communities and wildlife habitats or other resources.

- Eliminate all undesignated trails, unless they are made part of the designated trails system or provide specialized access to appropriate low-use destinations.
- Where sustainable infrastructure exists, continue to allow public access to appropriate destinations.

Criteria for Inclusion of Management Areas in the Habitat Conservation Area Designation

- Large habitat blocks with a low density of trails, roads, or development.
- High potential for restoration of natural ecosystems (including areas with restoration underway).
- Plant communities that are rare or unique on Open Space and Mountain Parks lands.
- Habitat for species of concern such as threatened, endangered, rare, and other species.
- Areas with high biodiversity such as wetlands and riparian areas (especially un-trailed riparian reaches).
- Comparatively lower visitation levels.
- Compatibility with adjacent land use (i.e., opportunities for coordinating habitat protection and connections and recreational activities/trail linkages).

Management Area Strategies

The management strategies associated with each management area designation are summarized in Table 4.1.

Note: The following table identifies strategies **normally** applied in specific management area designations. (*That does not preclude localized application in any of the management areas where needed).*

Table 4.1: Management Strategies for Open Space and Mountain Parks Management Areas

Management Issue	Passive Recreation Area Strategies	Natural Area Strategies	Agricultural Area Strategies	Habitat Conservation Area Strategies
On-Trail Visitor Use **Note:** Management *in all areas* may include seasonal or local requirements for visitors to stay on-trail or seasonal/local closures to address environmental sensitivity or trail sustainability. All designated trails will be signed and indicated on trail maps.	Encourage on-trail use. Require on-trail use in sensitive areas and/or at specific times, unless an off-trail permit is obtained.	Encourage on-trail use. Require on-trail use in sensitive areas and/or at specific times, unless an off-trail permit is obtained.	Encourage on-trail use. Require on-trail use in sensitive areas and/or at specific times, unless an off-trail permit is obtained. Consider/provide designated on-trail access to selected destinations.	Require on-trail use except: (1) in a limited number of designated off-trail activity areas; or (2) if an off-trail permit is obtained for OSMP-sponsored activities or other limited and approved public use. Consider/provide designated on-trail access to selected destinations.

Table 4.1: Management Strategies for Open Space and Mountain Parks Management Areas				
Management Issue	**Passive Recreation Area Strategies**	**Natural Area Strategies**	**Agricultural Area Strategies**	**Habitat Conservation Area Strategies**
Trail Functions, New Trails, and Interconnected Trail System **Note**: In all management areas, OSMP will provide different classes of trails. Trail classes are matched to the specific travel needs / opportunities and the environmental context in a given area. Trails will provide different levels of access, offer different types of travel experiences / challenges, and use different physical designs and materials. Trails will accommodate different types and levels of use, but all are intended to accommodate use without undue maintenance demands and to minimize impacts on the environment. OSMP will make management decisions based upon the best available information and evaluate the appropriateness and effectiveness of management actions.	Build and maintain a hierarchy of trails that encourage visitors to travel on-trail and minimize impacts. New trails to important destinations will be considered. Improve and construct sustainable trail linkages to create an interconnected trail system.	Build and maintain a hierarchy of trails that encourage visitors to travel on-trail and minimize impacts. New trails to important destinations will be considered. Improve and construct sustainable trail linkages to create an interconnected trail system.	Minimize new trails and trail density; locate new trails to minimize impacts on agricultural operations. Consider designating/building trails that: • Do not impinge upon agricultural operations • Provide appropriate access • Include appropriate linkages and connections	Minimize new trails and trail density; locate new trails to minimize impacts on habitat quality. Consider designating/building trails that: • Do not impinge upon ecological systems • Provide appropriate access • Include appropriate linkages and connections
Trail Design for Level of Use	Design and construct trails and other facilities to sustain a <u>higher</u> level of visitor use.	Design and construct trails and other facilities to sustain a <u>variable</u> level of visitor use.	Design and construct trails and other facilities to sustain a <u>variable</u> level of visitor use.	Design and construct trails and other facilities to sustain a <u>low</u> level of visitor use.

Table 4.1: Management Strategies for Open Space and Mountain Parks Management Areas				
Management Issue	**Passive Recreation Area Strategies**	**Natural Area Strategies**	**Agricultural Area Strategies**	**Habitat Conservation Area Strategies**
Undesignated Trails	Lower priority for management of undesignated trails. Minimize new undesignated trails. Management actions for existing undesignated trails include: • Evaluate best management actions • Designate • Re-route • Close and reclaim • Retain undesignated trails • Monitor newly established or developing undesignated trails	Variable priority for management of undesignated trails. Minimize new undesignated trails. Management actions for existing undesignated trails include: • Evaluate best management actions • Designate • Re-route • Close and reclaim • Retain undesignated trails • Monitor newly established or developing undesignated trails	Variable priority for management of undesignated trails. Minimize new undesignated trails. Management actions for existing undesignated trails include: • Evaluate best management actions • Designate • Re-route • Close and reclaim • Retain undesignated trails	High priority for management of undesignated trails. Minimize new undesignated trails. Management actions for existing undesignated trails include: • Evaluate best management actions • Designate • Re-route • Close and reclaim
Access to Areas Normally Closed to Visitors	Provide guided educational hikes in areas normally closed to visitors.	Provide guided educational hikes in areas normally closed to visitors.	Provide guided educational hikes in areas normally closed to visitors.	Provide guided educational hikes in areas normally closed to visitors or require permits for off-trail use.

Table 4.1: Management Strategies for Open Space and Mountain Parks Management Areas				
Management Issue	**Passive Recreation Area Strategies**	**Natural Area Strategies**	**Agricultural Area Strategies**	**Habitat Conservation Area Strategies**
Dog Management	Visitors are strongly encouraged to keep dogs on-trail. Dog management is predominantly voice–and-sight control. Dogs on-leash, dogs prohibited, or seasonal dog requirements may be implemented.	Visitors are strongly encouraged to keep dogs on-trail. Dog management is predominantly voice-and-sight control. Dogs on-leash, dogs prohibited, or seasonal dog requirements may be implemented.	Visitors are strongly encouraged to keep dogs on-trail. Dog management is predominantly voice-and-sight control. Dogs on-leash, dogs prohibited, dogs on-corridor voice-and-sight control, or seasonal dog requirements may be implemented.	Dogs are required to be on-trail, with some exceptions allowing on-corridor voice-and-sight control. Dog management is predominantly on-leash. Dogs on-leash, dogs prohibited, dogs on-corridor voice-and-sight control, or seasonal dog requirements may be implemented.
Nighttime Use	Trailhead parking prohibited 11 p.m. to 5 a.m. (except Panorama Point and Halfway House).	Trailhead parking prohibited 11 p.m. to 5 a.m.	Trailhead parking prohibited 11 p.m. to 5 a.m.	Trailhead parking prohibited 11 p.m. to 5 a.m. and a nighttime curfew encouraged one hour after dusk to one hour before dawn.
Emphasis for Education and Enforcement Activities	Target educational and enforcement services to reduce visitor conflict, foster appreciation and protection of the OSMP environment, and support resource protection.	Target educational and enforcement services to reduce visitor conflict, foster appreciation and protection of the OSMP environment, and support resource protection.	Target educational and enforcement services to support on-trail visitor use and foster appreciation and protection of agricultural resources.	Target educational and enforcement services to support on-trail visitor use and foster appreciation and protection of natural resources.
Visitor Services and Facilities Matched to Level of Use	Provide a level of visitor services and facilities to support <u>higher use levels</u> and a quality visitor experience (interpretive signs, scenic pull-outs, picnic tables, toilets, etc.).	Provide a moderate level of visitor services and facilities.	Provide a variable level of visitor services and facilities matched to the levels of use encountered.	Provide a low level of visitor services and facilities, except those supporting basic protection and maintenance services.

The management areas within the Passive Recreation Area, Natural Area, Agricultural Area, and Habitat Conservation Area designations are listed in Table 4.2, and their boundaries are shown on Map 4.5. These management areas share a set of management strategies appropriate for different situational contexts.

Table 4.2: Management Area Designations and Management Areas on Open Space and Mountain Parks	
Passive Recreation Area Designation: Management Areas: • Western Boulder County • Lefthand Canyon • Boulder Valley Ranch • Wonderland • Sanitas Valley/Red Rocks • Elephant Buttress • Flagstaff/Chautauqua • South Mesa • West Marshall Mesa • Dry Creek • Gunbarrel/Heatherwood Passive Recreation Area	**Natural Area Designation: Management Areas** • Northern Tier • East Beech • Sanitas • Anemone Hill • Flatirons/Mountain Backdrop • Shanahan • Doudy Draw • East Marshall Mesa • South Boulder Creek • East Boulder • Creek Confluence • Valmont Reservoir • Diagonal • Gunbarrel/Heatherwood Natural Area • Outlots
Agricultural Area Designation: Management Areas • East Boulder Valley • North Boulder Valley	**Habitat Conservation Area Designation: Management Areas** • North Foothills • Western Mountain Parks • Eldorado Mountain • Jewel Mountain • Southern Grasslands • Tallgrass Prairie East • Sombrero Marsh • Cottonwood Grove • Lower Boulder Creek

Appendix 4.1 includes information on: the process used in developing the Open Space and Mountain Parks area management system, the specific criteria attributes that apply to each of the management areas, the relationship of management areas to Environmental Conservation Areas designated in the Boulder County Comprehensive Plan, and references to the documents and analyses that provide information about the management areas.

Appendix 4.1 also includes detailed information about the management areas, including: natural resources, recreational use, management issues, and recommended management actions.

Policies

Geographic Targeting. Delineate management areas that provide a framework for implementing area-specific policies, programs, and projects, based on the visitor use, infrastructure, and resource characteristics of each area.

Passive Recreation. Provide a higher level of visitor services and more durable facilities in those areas where accommodating passive recreation is emphasized.

Resource Protection. Provide a higher level of resource protection in those areas that are most vulnerable to adverse impacts from visitor use.

Variable Access. Designate management areas that help Open Space and Mountain Parks manage the land for varying purposes. To achieve this, a continuum of public access options will be implemented (e.g., on-trail or off-trail, seasonal or permanent) as well as dog management options (e.g., voice-and-sight control, on-leash, on-trail, on-corridor, seasonal or permanent).

Integration with Capital Improvements Program and Service Delivery Decisions. Integrate the varied management emphases of the different management areas into decisions on trail and facility improvements and changes in delivery of visitor services.

Management Actions

Phased Implementation. Begin phased implementation of the management areas and associated strategies and actions.

Education and Enforcement. Develop and phase in education and enforcement activities related to area management.

- Education and outreach activities will communicate the rationale and requirements for changes in visitor use allowed in various management areas (including media coverage, new signs, trailhead board information, brochures, Open Space and Mountain Parks website, public presentations, etc.). A Visitor Master Plan public outreach program will be created that specifically includes information about the area management system.
- Enforcement activities will be designed to induce compliance with new area management requirements.

Integration with Capital Improvements Program and Service Delivery Decisions. Integrate the management emphases of the different management areas into decisions on trail and facility improvements and changes in delivery of visitor services.

Regulatory Changes. Make regulatory changes that will implement the area management requirements.

Chapter

5

Monitoring and Performance Measures

The Visitor Master Plan establishes standards for several key services that support and enhance the experiences of visitors and protect the natural values of the Open Space and Mountain Parks lands. Success in providing these community services is defined as making meaningful progress toward a sustainable and high quality visitor experience.

The monitoring program for the Visitor Master Plan is designed to measure success by answering three key questions:

Is the quality of the visitor experience being maintained or enhanced?

Are impediments or threats to sustainable management being addressed?

Are partnerships successfully involving the community in decision-making and stewardship?

Monitoring

- Provides information needed to assess progress toward achieving management goals.
- Should measure both the conditions "on the ground" and the status of impediments that prevent achieving management goals.
- Provides information that enables Open Space and Mountain Parks to adjust or change actions or behaviors, thereby adapting to changing conditions.

The monitoring program incorporates measures that are reliable and sensitive to change. Reliability is based upon an understanding of cause-and-effect relationships for a particular situation or phenomenon. The monitoring plan may include research to validate these models--especially those that are least certain.

The proposed adaptive management framework in the Visitor Master Plan is based upon three levels of monitoring:

Implementation--"Did we do what we said we were going to do?"
Effectiveness--"Did our strategies and actions have the intended effect?"
Research--"Did the system respond according to our predictive models?"

Implementation monitoring includes tools for tracking and documenting completion of individual projects to create an annual record of accomplishment. Implementation monitoring can identify programs that are feasible and working and those that need to be modified or discontinued. As new management needs arise, implementation monitoring will provide a clear understanding of the actions taken and allow an informed response for allocating resources and funding.

Effectiveness monitoring is used to address both direct and indirect effects of Open Space and Mountain Parks actions. For some services, the relationship between what

Open Space and Mountain Parks does and the effect or outcome is well understood. In other cases, less certainty exists about the cause-and-effect relationships between management actions and the desired effect or outcome.

Determining and analyzing cause-and-effect relationships can be complicated. **Research** may be required to separate a large number of interconnected factors that contribute to a problem or certain situation. Scientific research is usually expensive and requires a long-term commitment to provide meaningful results.

Collaboration with the community is an important part of the Visitor Master Plan monitoring program. The Open Space and Mountain Parks Department will seek partnerships with other land and resource management agencies, community groups, and interested members of the public to measure the success of Visitor Master Plan implementation. A staff research committee will identify key research and data needs and issue an annual "call for proposals." Issue-specific or ad hoc groups may be assembled on a short-term basis to examine research results and help resolve management issues. Periodic "state-of-the-system" updates and annual reports to the community will facilitate information exchange and help determine future priorities.

Monitoring, Performance Measures, and the Visitor Master Plan Initiatives

The Visitor Master Plan describes seven community initiatives that deliver **services** (Chapter 3) to Open Space and Mountain Parks visitors and the community through a package of **strategies** (Chapter 4). This chapter describes **performance measures** that enable Open Space and Mountain Parks to assess progress toward implementing those strategies and meeting the Visitor Master Plan goals and objectives.

The Visitor Master Plan initiatives are:

1. Education and outreach
2. Safety and enforcement
3. Recreational opportunities
4. Trails and facilities
5. Resource protection
6. User conflict reduction
7. Public involvement

Priority Monitoring Projects and Performance Measures

Each of the seven initiatives will be monitored. Implementation monitoring will be comprehensive. Open Space and Mountain Parks will track strategy implementation and project completion. The Program will prioritize effectiveness monitoring, selecting certain key services and strategies to insure that our actions are having the intended effect. Performance measures for implementation and effectiveness will be presented in periodic reports to the Open Space Board of Trustees, the City Council, and the community.

Research priorities will be identified when a lack of understanding keeps the Open Space and Mountain Parks Department from making forward progress toward Visitor Master Plan goals. The Department will work with the professional research community, as well as resource management, visitor use, and conservation organizations to develop and answer "problem-focused" and practical research questions.

Monitoring will be integrated into annual work planning, which is based on identified work priorities, staffing levels, and available funding.

Monitoring Project Descriptions

Monitoring project descriptions for the seven initiatives are listed below. Each monitoring project description includes a list of implementation measures that will be tracked and reported. **Effectiveness measures** are shown with the frequency and timing for monitoring each measure, the current estimate of the measure (if available) and the proposed standard.

Questions to measure effectiveness also will be included in surveys of residents and visitors. Open Space and Mountain Parks will periodically conduct surveys to assess public perception. Community residents will be surveyed about how the Open Space and Mountain Parks Program is meeting their expectations. Visitors to Open Space and Mountain Parks will be asked their opinions on a variety of issues related to their use and enjoyment of Open Space and Mountain Parks.

Education and Outreach Initiative

Implementation Monitoring

- Assess educational information and materials
- Track and report numbers, locations, and topics for public contacts, programs, and volunteer hours
- Compile and document environmental educational materials and programs

Effectiveness Monitoring

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Outreach Evaluation Percent of visitors surveyed who characterize outreach effort as “of high quality” or “welcoming”	Every other year On-going	n/a	90%
Education Evaluation Percent of educational program participants who are very satisfied with environmental education programs and public programs	Every other year On going	n/a	90%
Volunteer Satisfaction Percent of volunteers who are very satisfied with their volunteer opportunity	Every other year On-going	n/a	90%

Safety and Enforcement Initiative

Implementation Monitoring

Track and report:

- Emergencies, natural hazards, and potentially unsafe conditions
- Projects to resolve hazards associated with road crossings and roadside parking hazards
- Development and revision of ordinances needed for implementing the Visitor Master Plan
- Number of warnings and summonses for violations of visitor use-related regulations
- Document safety standards as well as inspection and response procedures for structures, agricultural operations, and natural hazards

Effectiveness Monitoring

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Frequency of Accidents Number of avoidable safety related incidents	Annual On-going	n/a	0
Response Lapse Time lapse between potential hazard brought to OSMP's attention and OSMP's response	Annual On-going	n/a	< 24 hrs.
Type Type of safety-related incidents	Annual On-going	Tracked to better direct facilities and services	
Location Location of safety related incidents	Annual On-going	Tracked to better direct facilities and services	
Patrol Properties patrolled to established standards	Monthly On-going	n/a	Meet patrol standards at least 90% of the time
Compliance with "on-trail" regulation	Annual For 1-3 years	n/a	90%
Compliance with dog control and excrement removal requirements	Annual For 1-3 years	n/a	90%

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Survey Questions			
How safe do you feel during your visits to OSMP?	Survey conducted every other year On-going	98%	95-100%
Reasons for feeling safe/unsafe		Tracked to better direct facilities and services	

Recreational Opportunities Initiative

Implementation Monitoring

Track and report:

- Completion of accessibility improvements for the disabled
- Identification and evaluation of routes for bicycling to be considered for future designation or construction
- Identification and evaluation of potential launch sites for hang/paragliding to be considered for future designation or construction
- Designation of areas for off-trail activities
- Proposals and Open Space and Mountain Parks decisions regarding climbing bolt placement and replacement
- Completion of plans and infrastructure improvements on newly acquired properties
- Compatibility reviews completed for “new” activities.
- Implementation of new policies for special uses and commercial uses
- Implementation and review of dog management policies, including the voice-and-sight control demonstration project and additional no-dog opportunities on some trails

Effectiveness Monitoring

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Survey Questions			
How would you rate your ability to access the destinations you would like to visit on OSMP? Using scales: A-F (resident survey) or Very Adequate, Somewhat Adequate, Somewhat Inadequate, Very Inadequate (visitor survey)	Every other year (resident) As part of visitor survey On-going	n/a	B or 90%** **Respond “somewhat adequate” or “very adequate”

Trails and Facilities Initiative

Implementation Monitoring

Track and report:

- Completion of capital improvement projects (trail construction, designation, reclamation)
- Development of standards for temporary trail closures
- Development of evaluation criteria and process for new trails
- Development of evaluation criteria and process for undesignated trails

Effectiveness Monitoring

Monitoring Measure	**Frequency and Timing of Monitoring**	**Current Status**	**Proposed Standard**
Maintenance Condition: Trails An aggregate measure which includes: grade, clearance, % change in width, compaction, erosion, undesignated trails, and braiding.	Annual On-going	Vary by trail segment	Trails kept in acceptable condition by regularly scheduled maintenance
Maintenance Condition: Trailheads An aggregate measure which includes: cleanliness and condition of trailhead infrastructure.	Annual On-going	Vary by trailhead	Trailheads kept in acceptable condition by regularly scheduled maintenance
Maintenance Condition: Facilities An aggregate measure which includes: Structural integrity, exits, security, integrity of utility systems, hazardous materials, associated machinery, signs, paint.	Annual On-going	Vary by facility	Facilities kept in acceptable condition by regularly scheduled maintenance
Miles of undesignated trails	Partial: Annual Complete: every 5 years On-going	305 miles	Less than 50 miles
Miles of new undesignated trails	Every 5 years	n/a	0 miles
Survey Questions			
Quality of facilities and services. (Resident Survey)	Every other year On-going	93% Responding: Good or Excellent	90-100%

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Trail Condition and Maintenance	Every other year	n/a	B
(Visitor Survey)	On-going	On a grading scale from A-F	

Resource Protection Initiative

Implementation Monitoring

Track and report:

- Review of educational materials and activity-groups' codes of ethics for appropriate content regarding invasive exotics
- Identification and establishment of areas within any of the management zones that may require local protection measures
- Identification of areas where environmental conditions and patterns of visitor use suggest that temporary closures would effectively protect Open Space and Mountain Parks resources
- Development and application of Best Management Practices for environmental protection
- Completion of cultural resource inventories

Effectiveness Monitoring

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Change in streamside and wetland cover trampled	TBD On-going	5-50%	5%
Percent change in baseline cover for selected trailside shrub stands	TBD Ongoing	15-50% decrease in baseline cover	No more than 1-5% loss
Percent change in cover/abundance of sensitive species in selected locations	TBD On-going	n/a	0% loss of individuals or No more than 1-5% decrease in baseline cover or abundance
Density of trailside occurrences of selected rare species	TBD On-going	Density reduced less than 5%	No more than 5% reduction in density from established baseline
Compliance with raptor closures	Annual On-going	n/a	100%
Compliance with bat closures	Annual On-going	n/a	100%

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Compliance with bear closures	Annual On-going	n/a	90-100%
Non-native species cover, number of species at trailheads, areas of concentrated visitor use, and along trails (grassland)	TBD On-going	10-25% cover 3-5 exotic indicator species present	0-10% non-native cover fewer than 3 indicator species present
Percent canopy cover of highest priority weeds at trailheads, areas of concentrated visitor use, and along trails (grassland)	TBD On-going	0-5%	0-5%
Percent cover, # infestations trail-related highest priority weed species (forest)	TBD On-going	15-50%	5-15%
Compliance with dog control requirements	TBD 1-3 years	65%	90%
Compliance with on-trail requirement	TBD 1-3 years	n/a	95%
Number of dog/livestock incidents	Annual On-going	Variable	< 1/month on average
Condition of selected cultural resources	TBD On-going	n/a	TBD

User Conflict Reduction Initiative

Implementation Monitoring

Track and report:

- Development and dissemination of codes of ethics for various user groups
- Implementation of video/tag program
- Development of voice-and-sight control certification program
- Develop questions for resident and visitor surveys to measure types, location, and frequency of conflicts among visitors
- Observe and report periodically on selective visitor behaviors to assess regulation compliance, visitor conflict reduction, and overall visitor use patterns

Effectiveness Monitoring

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Percent of dogs off-leash "participating" in dog management video/tag program	Annual On-going	n/a	90%
Compliance with trailhead leash and dog excrement pick-up requirements (observational studies)	Annual On-going	n/a	TBD

Public Involvement Initiative

Implementation Monitoring

Track and report:

- Assignment of staff as liaisons with community groups
- Public meetings held to review Visitor Master Plan updates and annual reports
- Public process for issue specific or *ad-hoc* projects
- How public input is integrated into the annual work program

Effectiveness Monitoring

Monitoring Measure	Frequency and Timing of Monitoring	Current Status	Proposed Standard
Survey Questions			
Questions [to be developed] to assess the effectiveness and adequacy of communication about implementation of the Visitor Master Plan with staff, the Open Space Board of Trustees, and City Council	Every 2 years On-going	n/a	TBD

Chapter

6

Funding and Scheduling

Investment Strategy

The Open Space and Mountain Parks investment strategy focuses first on maintaining and operating the designated trail system and providing basic visitor services and resource protection, and, second, on completing deferred maintenance and trails planning for undesignated trails and priority new trails. Remaining available funds will be used to build priority new trails. This strategy protects the extensive public investment in existing facilities, ensures the safety and integrity of the system, delivers an improved visitor experience, and reduces resource impacts. Three capital funding investment programs are presented that protect the long-term community investment and provide multiple community benefits.

Investment policies guiding the priorities for funding are:

- **Highest priority**--visitor system, operation, maintenance, resource protection, trail planning, and review of undesignated trail status
- **Next priority**--deferred maintenance, high priority new trails
- **Lower priority**--additional visitor enhancements, lower priority new trails

Three capital funding investment programs are described that bridge the direction provided in the Boulder Valley Comprehensive Plan with the city's capital budget: **Current Funding, Accelerated Funding, and Identified Need**. The three capital funding investment programs identify various funding levels to accomplish the goals of the Visitor Master Plan over the six-year planning timeframe:

- **Current Funding Investment Program** $3.5 million ($583,000/year)
- **Accelerated Funding Investment Program** $4.2 million ($700,000/year)
- **Identified Need Investment Program** $4.9 million ($817,000/year)

Approximately 20% of the 2005 budget ($3.9 million) is allocated to implementing the Visitor Master Plan. This includes capital (shown above) in the Current Funding Investment Program and non-capital expenditures (including standard employees, fixed-term employees, seasonal employees, and equipment and materials).

The Accelerated Funding Investment Program is a hypothetical scenario that reflects a funding level for capital projects that is mid-way between the Current Funding level and the projected Identified Need funding level. A funding level difference of $1.4 million is projected between the Current Funding and Identified Need levels. The mid-point between these funding scenarios of $700,000 was selected as part of the funding analysis presented in the Visitor Master Plan.

The Identified Need Investment Program represents a funding level that is necessary to complete all of the capital projects identified in the Visitor Master Plan over the six-year capital improvements program (CIP). Completion of the capital infrastructure program in the Identified Need Investment Program is expected between 2005 and 2010 based on projected budgets and revenues.

The Open Space and Mountain Parks Program is publicly funded, primarily through local sales tax revenues. Sales tax revenues are dependent upon the strength and vitality of the local economy.

Sales tax revenues drop when the local economy slumps. The capacity to implement a **reduction strategy** is necessary in this changing economic climate. For example, in order to address negative revenues from 2001 through 2003, the Open Space and Mountain Parks Department adopted a strategy of funding the basic maintenance and operational services, re-allocating staff and funds to core services, achieving sustainable reductions over time together with one-time reductions, continuing to gain efficiencies in all service areas, and keeping matching funds in priority projects funded by grants. Funding for the Department has improved starting in 2004 with collections from the 0.15 cent sales tax increase and in 2005 with the turnaround in sales tax collection trends from negative to positive. It is important for the Department to continue to aggressively pursue and adopt goals while retaining preparedness to respond to economic conditions.

Current Funding Investment Program

The Visitor Services Capital Improvements Program ($250,000 annually) and Lottery Funds ($269,000 in 2005) are funding sources currently used for capital expenditures. Under the Current Funding Investment Program priorities identified for visitor infrastructure capital improvement projects (CIP) in the Trails Assessment Report (City of Boulder 2004c) could be completed in approximately eight years.

Major capital projects and non-capital projects are identified in the project scheduling section. Spending at the Current Funding level will meet many of the project priorities between 2005 and 2010, but require a longer time period to complete all identified capital and non-capital projects.

Accelerated Funding Investment Program

As additional funds are available between 2005 and 2010, they will be considered for allocation to implementing the Visitor Master Plan.

The Accelerated Funding Investment Program is an increase in funding above the Current Funding Investment Program. This additional funding will increase the capacity of the Open Space and Mountain Parks Department to complete undesignated trail assessments, fix eroding trails more quickly, correct infrastructure deficiencies by doing more deferred maintenance, and improve additional visitor facilities such as trailheads.

Identified Need Investment Program

The Identified Need Investment Program funding level reflects a Capital Improvements Program that will complete all identified priority capital improvement projects in the Trail Assessment Report, including routine maintenance, deferred maintenance, evaluation and designation of undesignated trails, and construction of all high priority new trails by 2010. Funds required for all capital projects are estimated at $4.9 million.

Funding for the Identified Need Investment Program is approximately 40% greater than funding in the Current Funding Investment Program. The Identified Need Investment Program increases the funding level by $1.4 million more than the Current Funding Investment Program. Starting in 2006, an additional $250,000 per year, or $1.5 million over the Capital Improvements Program planning horizon, has been requested for reallocation from fund balance for this purpose.

Funding

Capital funding for implementation of the strategies to provide community services identified in the Visitor Master Plan is outlined in the capital funding investment programs. The Visitor Master Plan describes a realistic and fully-funded plan that details what is spent and what is accomplished. The Current Funding Investment Program is based on current (2005) funding levels, primarily from city sales tax revenues (see Chapter 2, Current Open Space and Mountain Parks Funding). The Open Space sales tax contributes 93.2% of the current funding. The city General Fund is the source of 4.9% of the current budget. Another 1.3% of the current budget is a share of the Colorado Lottery contribution to the city of Boulder. The Identified Need Investment Program is based on using a mixed-funding approach of dedicated funds augmented when necessary by external funds and grants.

Future Funding Plan

Open Space and Mountain Parks will use several funding options to develop a realistic funding plan for the future that includes the following annual budgeting targets:

- Continued budgeting of city sales tax revenues (Open Space Fund) and city General Fund
- Annual grants from public (state and federal) and private sector sources for selected projects
- Increases in annual city sales tax revenues available for allocation to visitor infrastructure projects and resource protection and restoration
- Approximately $269,000 of Lottery funds annually, re-allocated under agreement of the Open Space Board of Trustees and the Parks and Recreation Advisory Board

Capacity-Building

The investment and funding strategies are dependent on sufficient organizational capacity to implement and achieve the goals of the Visitor Master Plan. The Visitor Master Plan provides the basis for the Open Space and Mountain Parks Department to determine what additional funding and staffing are necessary to achieve the goals of the Visitor Master Plan. The following actions target the efficient use of funds and staffing.

Develop and Use Service Standards and Performance Measures. Develop and implement service standards that define actionable targets for desired visitor experience, visitor infrastructure, and resource conditions. These service standards will guide decisions regarding appropriate levels of service, infrastructure, and resource protection. Performance measures provide a means of measuring progress in meeting the targets over time (see Chapter 5).

Increase Interagency Cooperation. Cooperate with other agencies to pursue shared interests, especially when management challenges and opportunities cross agency boundaries. This cooperation will include ongoing communication, information sharing, coordinated management actions, and other activities.

Develop Partnerships for Funding and Management. Develop partnerships that support mutual responsibilities for land management, including shared commitment of staff time to address mutual issues, joint capital improvements, compatible regulations, joint grant applications, and other programs and projects.

Improve Effectiveness and Compatibility of Management Actions. Ensure the compatibility of management actions affecting visitor use with other types of management actions. Open Space and Mountain Parks will strive to make various policies, programs, and operations as consistent

and effective as possible (e.g., management of visitor activities, resource conservation activities, and agricultural operations).

To accomplish the actions outlined above, the Open Space and Mountain Parks Program will consider the following.

- **Evaluate current staffing and funding levels** to meet Visitor Master Plan priorities and make changes as appropriate.

- **Fund staff training and service contracts** to improve capabilities needed to implement the Visitor Master Plan. New staff expertise may be needed to effectively implement the Visitor Master Plan. Some expertise may be best acquired by hiring consultants or contractors.

- **Transfer ownership or management responsibility** for some satellite properties and facilities to other agencies, if it is beneficial to Open Space and Mountain Parks and the receiving agency.

- **Expand opportunities for local community groups** to participate in "Adopt-A-Trail," Trail Guides, and other hands-on stewardship projects.

- **Expand opportunities to partner with the community** for joint programs that implement the Visitor Master Plan such as educational programs, maintenance and restoration activities, trail projects, monitoring activities, and others.

- **Expand volunteer capabilities of Open Space and Mountain Parks** to organize and supervise more volunteer trail improvement projects.

- **Expand staff capabilities to apply for and obtain external funds for high-priority projects.** Increase the sharing of grant funding ideas, the number of grants applied for, and associated staff training for grant writing.

- **Expand staff capabilities to manage contracts**, including project planning and management.

- **Support a "Friends of Open Space and Mountain Parks" Foundation** to raise private donations**.**

- **Create financial stewardship opportunities** for neighborhoods, clubs, and businesses to contribute financially to specific trails or other facilities.

- **Maintain the Flagstaff Mountain parking fee system** and investigate making it more efficient in administration with increased compliance and associated revenues.

Project Phasing for Plan Implementation

Major capital and non-capital projects to implement the Visitor Master Plan are scheduled for the Open Space and Mountain Parks work plan. Projects listed below are among the major projects identified for 2005 through 2010 to achieve the goals in the Visitor Master Plan.

2005

Trail Study Areas

- Complete development of trail suitability and evaluation criteria (including undesignated trail evaluation criteria)
- Complete two Trail Study Area plans: Marshall Mesa-Southern Grasslands and Eldorado Mountain-Doudy Draw
    - Designate climbing accesses in Habitat Conservation Areas (Sacred Cliffs, Peanuts Wall, Mickey Mouse Wall)
    - Designate additional no-dog trails

Trail Planning

- Study Boulder Feeder Canal Trail
- Plan Greenbelt Plateau to Coalton Trail

Trail Construction

- **New Trails**
    - Fund building Cottontail Trail to connect to Monarch Trail (across State Highway 52)
    - Build Marshall Mesa to South 66th St. (community volunteer project)
    - Build Flagstaff Sensory Interpretive Trail
    - Build Marshall Mesa-City Limits Trail
- **Rebuild or Re-Route Trails**
    - Rebuild Elephant Buttress trail and restore area (volunteer project component)
    - Rebuild/reroute E.M. Greenman Trail
    - Rebuild/reroute Bear Canyon Trail--middle section

Trailhead Improvements

- Settlers Park Trailhead
- Crown Rock Trailhead
- Boulder Falls
- South Mesa Trailhead
- Build City Limits Trailhead
- Plan Sanitas Trailhead and Centennial Trailhead improvements

Road Crossings

- Construct Community Ditch underpass at State Highway 93
- Study South Boulder Creek Trail road crossing at State Highway 93

New Non-Capital Priority Projects

- Adopt new ordinances for on-trail travel and dogs on-leash in Habitat Conservation Areas, sign areas, and begin education and enforcement
- Adopt trailhead leash ordinance, sign areas, and begin education and enforcement
- Complete dog management compliance video and begin education, signs and training classes (with public participation)
- Develop commercial use permit program with public process
- Revise Special Use Permit ordinance

- Develop Habitat Conservation Area off-trail access permit program, including criteria (with public process)
- Focus public information and education focus--signs, maps, brochures, webpage
- Begin implementation and effectiveness monitoring--collect baseline data, when necessary
- Hold annual public forum to review work program

2006

Trail Study Areas
- Complete four Trail Study Areas (North Foothills, Tallgrass Prairie East, Mountain Parks North, and East Boulder-Dry Creek)
    - Designate climbing access using results from Trail Study Areas
    - Designate additional no-dog trails

Trail Planning
- Plan Boulder Feeder Canal Trail in conjunction with city and county
- Plan Saddle Rock Trail improvements
- Plan Chautauqua (Bluebell-Baird and Bluebell Mesa) trail rebuilds
- Plan Dry Creek-South Boulder Creek Trail

Trail Construction
- **New Trails**
    - Build Greenbelt Plateau-Coalton Trail
    - Build Wonderland Paraglider Access Trail
    - Implement 2005 Trail Study Areas improvements
- **Rebuild or Re-Route Trails**
    - Rebuild Marshall Mesa-Community Ditch Trail

Trailhead Improvements
- Improve Sanitas and Centennial Trailheads
- Improve Buckingham Park picnic area
- Improve Fourth of July campground

Road Crossings
- Improve South Boulder Creek Trail road crossing at State Highway 93
- Improve South Mesa to Doudy Draw road crossing at State Highway 170

New Non-Capital Priority Projects
- Require commercial use permits and off-trail permits
- Begin enforcement of new dog regulations
- Continue implementation and effectiveness monitoring
- Update maps and brochures
- Schedule two community volunteer projects
- Hold public forum to review work plan

2007

Trail Study Areas
- Complete three Trail Study Areas (Mountain Parks South, East Boulder-Teller, and Shanahan-South Mesa)

Trail Planning
- TBD

Trail Construction
- **New Trails**
  - Implement 2006 Trail Study Area improvements
  - Build Boulder Feeder Canal trail
  - Build Dry Creek-South Boulder Creek Trail
  - Designate climbing accesses
- **Rebuild or Re-Route Trails**
  - Rebuild/reroute Saddle Rock trail
  - Rebuild Chautauqua (Bluebell-Baird, Bluebell Mesa) trails

Trailhead Improvements
- Improve Gregory Canyon trailhead
- Improve Realization Point trailhead
- Plan Flagstaff Summit improvements

Road Crossings
- Improve road crossing on East Boulder Trail at Valmont Road

New Non-Capital Priority Projects
- TBD

2008

Trail Study Areas
- Complete two Trail Study Areas (others)

Trail Planning
- Plan Flagstaff Trail improvements
- Plan Dry Creek-Teller Trail (East Boulder Trail)

Trail Construction
- **New Trails**
  - Implement 2007 Trail Study Area improvements
  - Build North Rim Trail (Boulder County)
  - Build Dry Creek-Teller Trail (East Boulder Trail)--Phase 1
- **Rebuild or Re-Route Trails**
  - Chautauqua area trails

Trailhead Improvements
- Flagstaff Summit Trailhead

New Non-Capital Priority Projects
- TBD

2009

Trail Study Areas
- Complete two Trail Study Areas (Jewell Mountain and Union Pacific ROW)

Trail Planning

- Plan Bear Peak summit access from Fern Canyon and Bear Peak West Ridge
- Plan Green Mountain West Ridge Trail to Lost Gulch overlook
    - Plan upper Flagstaff Mountain trail connection

Trail Construction

- **New Trails**
    - Implement 2008 Trail Study Area improvements
    - Build Dry Creek to Teller (East Boulder Trail)
    - Continue Flagstaff Summit improvements
- **Rebuild or Re-Route Trails**
    - Flagstaff Trail

Trailhead Improvements

- Flagstaff Summit Trailhead

New Non-Capital Priority Projects

- TBD

2010

Trail Construction

- **New Trails**
    - Continue to implement Trail Study Area improvements
    - Green Mountain West Ridge Trail to Lost Gulch Overlook
- **Rebuild or Re-Route Trails**
    - Bear Peak summit access from Fern Canyon
    - Flagstaff Mountain trail connector

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List of Plan Reference Documents Available on the Open Space and Mountain Parks Website

The Plan Reference Documents are available on the Open Space and Mountain Parks website at www.osmp.org.

Condition, Compatibility, and Trends Analysis

Trail Assessment and Prioritization Report

Passive Recreation Activity Assessment Process

Synthesis of the Open Space and Mountain Parks Activity Assessment

Commercial Use Permits--A Draft Framework

Special Use Permits--A Draft Framework

2004 Open Space and Mountain Parks Citizen Survey

Boulder Mountain Parks Resource Protection and Visitor Use Plan, 1999

Summary of Public Comments on the Visitor Master Plan

Community Advisory Reports
- Visitor Plan Advisory Committee-1 Final Report, 2000
- Visitor Plan Advisory Committee-2 Final Report, 2003
- Report of the Community Group Forum, 2004

Appendices

Appendix 1.1: Summary of Visitor Use Studies

Visitation Studies and Trends **(entrance/exit studies)**

1993 Open Space Visitor Use Study

Estimates derived from an extensive visitor use study (Zeller et al. 1993) indicate that approximately 1,455,418 visits occurred on city of Boulder Open Space lands from June 1, 1992 to May 31, 1993. Visitation trend data, collected through 1999 using trail and vehicle counters, show a range of approximately 1.6 million to 1.9 million annual visits with an average of approximately 1.7 million annual visits on city of Boulder Open Space lands.

The majority of these visits occur during the spring (38%), followed by fall (28%), summer (24%), and winter (10%). The average party size is 1.4 persons with 70% of these visits being single visits. Ninety percent of all parties consisted of one or two persons. The average length of visits was 53 minutes.

The Open Space and Mountain Parks system is a regional system which gets substantial visitation from areas outside the city and county. While almost 75% of the visitation on Open Space in 1993 was by Boulder residents, a relatively high amount (10%) of the visits were from outside both the city of Boulder and Boulder County. Boulder County residents make up about 15% of the visits to Open Space. The origin of visits varies greatly by location within the Open Space system and time of year. Mountain Parks also received significant out-of-Boulder visitation.

1995/1996 Mountain Parks Visitation Estimate

It was estimated that annual visitation was 1.46 million visits (City of Boulder 1997a).

1995 North Boulder Valley Management Area Visitation Study

A visitor use study (Wheeler 1995) was conducted during the fall of 1995 to provide specific information on visitor use and distribution of visitation within the North Boulder Valley Management Area. The purpose of this study was to provide information on the relative amount of visitation and the types of activities that occur on various trails and regions of the management area. It also provided information on the time-of-day and day-of-the-week use occurs, information about off-trail activities, and trends in dog use (on-leash, off-leash, and distance from trail/owner.

A total of 15,436 visits were observed during 84 hours of sampling. Only 2.4% of all use observed within the management area occurred away from designated trails or on undesignated trails. Of those visits observed off designated trails or on undesignated trails, 21% were within 0 to 25 meters, 28% were within 25 to 100 meters, and the remaining 51% were further than 100 meters off designated trails or undesignated trails. Approximately 70% of the dogs observed were within 0 to 25 meters from the owner and approximately 86% were within 0 to 25 meters from the trail. Only 21% of the dog owners complied with the posted regulations in that portion of Zone A where dogs are required to be on a hand-held leash and the remaining 79% let their dogs off-leash.

2000 Mountain Parks User Survey

Mountain Parks conducted a user survey in 2000 (City of Boulder 2000a). Many of the questions from the 2000 Mountain Parks User Survey were also used in a similar 1995/1996 study. The

average party size was 2.1 people. On average, people visited 28 times per year. Eighty percent of all parties consisted of one or two persons.

Two-thirds of Mountain Parks visits were from Boulder residents, 6% from unincorporated Boulder County, 12% from other cities in Boulder County, 10% from metro Denver, 4% from other areas in Colorado, and 10% from out of state; visitors from other Boulder County cities jumped 8% from 1995 to 2000.

Large changes in activity participation from 1995 to 2001 were: hiking 53% to 71%, scenic viewing 7% to 13%, photography 2% to 9%, exercising pets 11% to 19%, and climbing 4% to 7%. Parties accompanied by one or more dogs rose from 13% to 25%. Eighty-eight percent (88%) of visitors thought the balance between preservation and recreation was just about right, with 8% saying there was too much emphasis on recreational opportunities, and 4% saying there was to much emphasis on the natural environment.

Related Open Space and Mountain Parks Studies

1999 Open Space Visitor Plan Phone Survey

Purposes of Open Space

Boulder residents thought the single primary purpose of Open Space was managing growth/buffer (39%) with environmental preservation and providing recreation both receiving 23%. These priorities have not changed substantially from two previous polls (1992 and 1994).

Balancing Passive Recreation and Environmental Preservation

Nearly two-thirds (62%) felt the current balance is “about right.” Of those who felt the balance was wrong, twice as many people (20%) felt there was too much emphasis on recreation (not enough on environmental preservation) than felt (11%) there was too much emphasis on preservation (not enough on recreation).

In a related question, 93% of the respondents indicated it is important to consider the negative impact of recreation on the natural environment when making management decisions (62% “very important”, 31% “somewhat important”). When recreation and preservation efforts conflict, the following management options are the four most preferred: education of users, temporary closures, limiting use to designated trails, and limiting activities that cause greatest impact.

Definition of “Passive Recreation”

In an open-ended question, the most common response contained one or more of the following four concepts: (1) the importance of having and maintaining high natural aesthetic qualities as part of the recreational experience and when Open Space is viewed from a distance, (2) the desire that recreational activities cause, at most, only minor harm to the natural environment and wildlife habitats, (3) the provision of low intensity recreational activities that are relaxing, calming, quiet, and leisurely, and (4) the absence of motorized and organized/structured sports-like activities.

Current Passive Recreational Uses

By far, the main passive recreational use respondents engage in is hiking (67%). Other significant uses include biking (22%), jogging (11%), and dog walking (10%). Several minor uses were indicated; however only fishing (3%) and picnicking (3%) are engaged in by more than 1% of the respondents. Only 8% of the respondents indicated they did not use Open Space or used it rarely. Clearly, a very large portion of the local population visits Open Space and two-thirds visit it for hiking.

One important question asked respondents to rate the appropriateness of five criteria for determining which recreational activities were appropriate for Open Space. Interviewees indicated that all five are highly appropriate for this purpose. The five listed in order (beginning with the most appropriate) are: the potential for negatively impacting the environment, the potential for positively increasing the user's appreciation of nature, the potential for negative impacts to aesthetic values, the benefit the activity has to the community, and the potential for increasing user conflicts.

Passive Recreational Quality

An overwhelming 93% of the respondents indicated the quality of their passive recreational experiences on Open Space is "excellent" (58%) or "good" (35%).

Problems experienced by passive recreational users appeared in two questions on the survey. The results of one question indicated that the most significant problem is conflicts with certain other types of uses, particularly with bicycles (27% saw this as problematic) and dogs (26% - due to feces and dogs out of control). In another question, trail crowding was seen as a problem by 16% of passive recreational users (15% chose "crowded", 1% "extremely crowded").

The four most popular management options for dealing with passive recreational conflicts and crowding according to the respondents are buying more land, educating users, enforcing laws, and limiting problem activities.

Passive Recreational Facilities and Services

Eighty-nine percent (89%) of respondents felt Open Space facilities are "excellent" (39%) or "good" (50%). Many suggestions were made for improvements, but all registered a smaller response (5% to 12%). The suggestions dealt with trail construction and maintenance, signs, trash, parking, restrooms, and enforcement of leash laws.

Nearly two-thirds of respondents felt visitor services are "excellent" (20%) or "good" (45%). Twenty-one percent (21%) had no response. Only two suggested improvements garnered more than a 2% response. They are "more public information" (20%) and "more law enforcement" (11%). More than half of the respondents made no suggestions at all.

1999 Leave-No-Trace Observational Study

A trailhead observational study was performed to identify which Leave-No -Trace principles were not being followed and to more effectively focus Leave-No-Trace education on problem behavior. Observations were only performed at trailheads and not for entire visits. Of those observed,13% of visitors did not follow at least one principle. Of those, 68% did not manage their dog, 12% did not pick up their dog's poop, 12% went off-trail, 4% littered, 3% took something, and 1% did not share the trail.

1999 Leave-No-Trace Trailhead/Mailer Survey

A pre/post study was conducted in 1999 of city of Boulder Open Space visitors to determine if their knowledge and behavior changed following a "front country" Leave-No-Trace educational effort. Respondents were asked Leave-No-Trace knowledge and behavior questions at trailheads. Visitors were then contacted at the same trailheads to educate them about Leave-No-Trace principles. A brochure was handed out to reinforce the contact. Signs were placed. Respondents were surveyed later to again measure their Leave-No-Trace knowledge and behaviors. Surveys were also analyzed to determine which type of communication appears to be a more compelling approach. Additionally, results were compared by user group, age, frequency of visits to open space, gender, and years living in the county.

Results indicate that Leave-No-Trace knowledge did increase, albeit minimally and only differed significantly by gender. Overall, Leave–No-Trace knowledge was considerably high before the

treatment. Also, familiarity with regulations was more predictive of whether an individual actually practiced Leave-No-Trace behaviors than was one's Leave-No-Trace knowledge or time spent thinking about specific Leave-No-Trace behaviors. This indicates that Leave-No-Trace educational efforts may not be as effective as other strategies, such as enforcement, in changing behavior when the user group is already highly knowledgeable of Leave-No-Trace principles.

1999 Behavioral Interaction and Conflict among Domestic Dogs, Black Tailed Prairie Dogs, and People in Boulder, Colorado

Sixty percent of dogs near the Dry Creek Trailhead were observed to either bark at, run towards, chase, or attempt to catch prairie dogs (Bekoff and Ickes 1999). Only 25% of the time did the guardian try to stop dogs from harassing prairie dogs. Most dogs (68%) traveled more than 5 meters off the trail. In a written survey, 16% reported their dog did occasionally disturb prairie dogs; of these, 50% said they tried to stop their dogs from disturbing prairie dogs. Fifty-eight percent said prairie dogs should not be protected even if dogs were a problem.

2001 Boulder Resident Mail Survey

Protecting habitat for wildlife and plants and preserving scenic views were indicated by residents of Boulder in a 1999 survey as the clear priorities for managing Open Space and Mountain Parks lands. When asked about the relative importance of some management items, Boulder residents rated protecting habitat for wildlife and plants and preserving scenic views 97% and 96% respectively as either very or fairly important. Growth management, preserving agriculture, and hiking ranked more than 80%. When asked to rank the number one management priority of the items, 41% chose protecting habitat, 23% chose preserving scenic views, and 19% chose growth management. The highest ranking recreation activity was hiking at 5%.

2001 Ranger Reports

In 2001, 207 summonses were issued by rangers. Of these 104 were for dog violations: 59 dog at-large (23 not under voice-and-sight control, 33 off-leash in a leash area, three not with keeper), 25 dogs in prohibited areas, 11 failure to protect wildlife, seven aggressive dog, one improper animal care, and one dog poop left. Illegal camping resulted in 67 summonses. Others summonses included: entering wildlife closure (11), trespassing on public property (four), damaging public property, consumption of alcohol, (three), illegal fire, possessing glass bottle, illegal boating, littering, possession of alcohol (two), and driving vehicle off roadway, discharge fireworks, possession of fire arm (one).

In 2002, 233 summonses were issued. Of these 129 were dog violations: 98 dog at-large (38 not under voice-and-sight control, 60 off-leash in a leash area), 22 dogs in prohibited areas, four dog poop left, three failure to protect wildlife, and two aggressive dog. Illegal camping resulted in 79 summonses. Others summonses included: mountain biking where prohibited (seven), entering wildlife closure (four), entering Boulder Falls closure, entering closed property (three), fishing where prohibited (two), possession of firework (landing a hot air balloon--fire hazard), discharged firearm, possessing glass bottle, consumption of alcohol, picking flowers prohibited, and emergency policy--no smoking (one).

2004 Open Space and Mountain Parks Visitor Master Plan Phone Survey

<u>Purposes and management priorities of Open Space</u>

Boulder residents thought the most important purpose of Open Space and Mountain Parks was: providing recreation (31%), environmental preservation (24%), managing growth/buffer (18%), and aesthetics (15%). Controlling growth dropped 21% since a 1999 survey and providing recreation gained 8%, while environmental protection stayed about the same.

When asked the question "What is the most important management priority?", 45% stated environmental protection, 19% mentioned some sort of recreation, 11% said community buffers, and 9% replied preserving scenic views.

Balancing Passive Recreation and Environmental Preservation

Two-thirds (68%) said the current management balance is "about right." Of those who felt the balance was wrong, about the same number said they felt there was too much emphasis on recreation (not enough on environmental preservation) (15%) than felt there was too much emphasis on preservation (not enough on recreation) (12%).

When recreation and preservation efforts conflict, or when there is conflict among users, the following management options were considered very or somewhat appropriate: have city ecologists determine Open Space and Mountain Parks habitat value (96%), limit use to designated trails in high wildlife value areas (94%), leash dogs in high wildlife value areas (91%), leash dogs for first 100 yards from trailhead (86%), no dogs in high wildlife value areas (81%), and required permits for visitors to go off trails in high wildlife areas (77%). Charging a fee to people out of the city was only considered very or somewhat appropriate by 32%, and charging a fee to people out of the county by 50%.

Current Passive Recreational Uses

The primary passive recreational use interviewees engage in is hiking (83%). Other significant uses include biking (30%), enjoying beauty (12%), dog walking (11%), and jogging (10%). Several minor uses were indicated; however, only picnicking (5%), climbing (5%), and winter sports (4%) are engaged in by more than 1% of the respondents. Only 1% of the interviewees indicated they did not use Open Space or used it rarely. Clearly, a very large portion of the local population visits Open Space and four-fifths visit it for hiking.

Passive Recreational Quality

Ninety-six percent of the interviewees indicated the quality of their passive recreational experiences on Open Space is "excellent" (60%) or "good" (36%).

Problems experienced by passive recreational users appeared in two questions on the survey. When asked what activities are in conflict, bike-related answers were 37% and dog-related comments at 23%. About 10% said they were not aware of conflicts. When asked what activities could make a person's experience much, or somewhat more pleasant, more that 60% of the respondents indicated hikers, dogs on-leash, and runners made their experience more pleasant; horse back riders were 45%, and mountain bikers and dogs off-leash were 34% and 32% respectively.

The four most popular management options for dealing with passive recreational conflicts and crowding according to the interviewees are buying more land, educating users, enforcing laws, and limiting problem activities.

Passive Recreational Facilities & Services

Ninety percent (90%) of interviewees felt Open Space facilities are "excellent" (40%) or "good" (50%). Many suggestions were made for improvements--better dog management (19%), trails/trails maintenance (17%). Better signs, acquire more open space, more parking, more rangers and more/better maintained toilets all were under 10%. Most (87%) found signs warning of hazards to be adequate, about half (55%) found enforcement of bike regulations, and a third found enforcement of dog voice-and-sight (37%) and enforcement of excrement pick up (33%) to be adequate.

2004 FIDOS/Open Space and Mountain Parks Effectiveness of Trailhead Education on Cleaning Up Dog Excrement Study

A partnership was formed in 2003 between Open Space and Mountain Parks and Friends Interested in Dogs and Open Space (FIDOS), a local advocacy group, to assess the effectiveness of education at reducing dog excrement. The study consisted of counting and mapping with a GPS unit the dog deposits before, during, immediately after and several months after the education treatment along one trail adjacent to a trailhead. FIDOS members promoted the "1 + 1, pick up an extra" program at the trailhead for 40 hours over a 3 week period. Brochures were distributed and signs posted to support the personal contact. Dog litter levels were significantly reduced during (63%), immediately after (68%) and six months (81%) after the educational treatment.

2004 Open Space and Mountain Parks/Colorado State University Effectiveness of Low Impact Education to Reduce Resource Impacts

A pre/post study was conducted of Open Space and Mountain Parks visitors to determine if their knowledge and behavior changed following a 1999 "front country" Leave-No-Trace educational effort. Respondents were asked Leave-No-Trace knowledge and behavior questions at trailheads. Visitors were then contacted at the same trailheads to educate them about Leave-No-Trace principles. A brochure was handed out to reinforce the contact. Signs were placed. Respondents were surveyed later to again measure their Leave-No-Trace knowledge and behaviors. Surveys were also analyzed to determine whether or not different communication approaches appear to be more compelling. Additionally, results were compared by user group, age, frequency of visits to open space, gender, and years living in the county. Results indicate that Leave-No-Trace knowledge did increase minimally, and only differed significantly by gender (women were more knowledgeable of Leave-No-Trace). Overall, Leave-No-Trace knowledge was considerably high before the treatment. Also, familiarity with regulations was more predictive of whether an individual actually practiced Leave-No-Trace behaviors than was one's Leave-No-Trace knowledge or time spent thinking about specific Leave-No-Trace behaviors. This indicates that Leave-No-Trace educational efforts may not be as effective as other strategies in changing behavior when visitors are already highly knowledgeable of Leave-No-Trace principles. More effective strategies likely include raising awareness of consequences of non-compliance, social desirability of compliance, and approaches that trigger individual reaction.

Regional Trends

1997 Boulder County Open Space Survey

Results about management priorities and acceptability of management options from this survey parallel the results from the 1999 City of Boulder Open Space Visitor Plan Survey. Protecting habitat for wildlife was the most important value with 75% saying it was very important to them, and 21% saying it was fairly important. Hiking was next highest, with 64% saying it was very important, and 29% saying it was fairly important.

Support for direct management options was strong. Requiring visitors to stay on-trail in sensitive areas was thought to be very or fairly important by 94%, seasonal trail closures to protect wildlife was at 92%, closing trails in sensitive areas to dogs was 84%, closing selected trails to some visitors to minimize conflicts with hikers 84%.

2002 Boulder County Open Space Survey

Results about management priorities and acceptability of management options from this survey parallel the results from the 2001 Boulder Citizen Mail Survey, the 1999 Visitor Plan Survey, and the 1997 Boulder County Open Space Survey. Following are the results of the survey, with the survey break-out for Boulder residents included in the percentage following the County results.

Once again, protecting habitat for wildlife was the most important value with 71% (77%). Preserving agriculture lands was next with 59% (58%) saying it was very important to them and 30% (33%) saying it was fairly important. The highest passive recreation activity was hiking, with 57% (66%) saying it was very important and 34% (29%) saying it was fairly important.

Requiring visitors to stay on-trail in sensitive areas was thought to be very or fairly important by 94%. Creating preservation areas in certain sensitive wildlife areas at 91%, and creating plans before opening properties at 67%, were supported in the survey.

National Trends

Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends

Nationally, hiking, horseback riding, and climbing days are all projected to increase by at least 50% from 1995 to 2050. In 1995 about 48 million people participated in hiking, 14 million rode horses, and 7.5 million rock climbed. Information for other activities were not available or were compiled in a way that did not apply to Open Space and Mountain Parks (Cordell 1999).

Appendix 1.2: Guidance from Other Plans

Guidance for developing a Visitor Master Plan on city of Boulder Open Space and Mountain Parks lands is provided at two levels. First, numerous planning documents exist within the Open Space and Mountain Parks Department. These documents are described below and include the City of Boulder Charter, *Long Range Management Policies* (City of Boulder 1995), resource management plans, and area management plans.

The second level of plan guidance is provided at a regional level. Regional plan guidance is provided by the *Boulder Valley Comprehensive Plan* (City of Boulder 2001b) and the *Boulder County Comprehensive Plan* (Boulder County 1999).

City of Boulder Charter

The management of Open Space and Mountain Parks lands is guided by the City Charter, as approved by the city of Boulder voters in 1986.

Sec. 176. Open Space Purposes - Open space land.

Open space land shall be acquired, maintained, preserved, retained, and used only for the following purposes:

- *Preservation or restoration of natural areas characterized by or including terrain, geologic formations, flora, or fauna that is unusual, spectacular, historically important, scientifically valuable, or unique, or that represent outstanding or rare examples of native species;*
- *Preservation of water resources in their natural or traditional state, scenic areas or vistas, wildlife habitats, or fragile ecosystems;*
- *Preservation of land for passive recreation use, such as hiking, photography or nature study, and if specifically designated, bicycling, horseback riding, or fishing;*
- *Preservation of agricultural uses and land suitable for agricultural production;*
- *Utilization of land for shaping the development of the city, limiting urban sprawl and disciplining growth;*
- *Utilization of non-urban land for spatial definition of urban areas;*
- *Utilization of land to prevent encroachment on floodplains; and*
- *Preservation of land for its aesthetic or passive recreational value and its contribution to the quality of life of the community.*

Mission

The Open Space and Mountain Parks Department preserves and protects the natural environment and land resources that characterize Boulder. We foster appreciation and use that sustain the natural values of the land for current and future generations.

Long Range Management Policies

The city of Boulder Open Space and Mountain Parks Department *Long Range Management Policies* were adopted in 1995. This document sets the framework and provides direction for Open Space and Mountain Parks planning processes and subsequent management decisions. The *Long Range Management Policies* state "Open Space and Mountain Parks will be managed in a way that provides for aesthetic enjoyment, minimizes cumulative impacts to the natural ecosystems and conflicts between users, considers user safety, preserves responsible agricultural use, provides for a quality recreational experience, and protects natural areas." While many aspects of the *Long Range Management Policies* affect visitor use, sections IX and X specifically address use of Open Space and Mountain Parks and Open Space and Mountain Parks facilities.

IX. Use of Open Space

This section describes the potential uses of Open Space and Mountain Parks and provides recommendations concerning management of visitor use, accessibility for disabled persons, special uses, and visitor safety.

X. Open Space and Mountain Parks Facilities

This section describes the potential types of Open Space and Mountain Parks facilities and provides recommendations on access, trail systems, and related facilities.

Resource Management Plans

Resource plans provide system-wide management guidance for various natural, cultural, or agricultural resources and are integrated into specific on-the-ground actions contained within area management plans.

City of Boulder Grassland Management Black-Tailed Prairie Dog Habitat Conservation Plan

The *City of Boulder Grassland Management Black-Tailed Prairie Dog Habitat Conservation Plan* (City of Boulder 1996) was approved in 1996. This plan provides guidance on the management of grasslands to protect, preserve, and enhance habitat suitable for black-tailed prairie dogs. While many aspects of the grassland plan affect visitor use, sections 8.8.1 through 8.8.3 specifically address plague, trails, and pets.

8.8.1 Response to Plague

This section describes the public health concerns associated with bubonic plague and recommends that prairie dog preserves generally not be located where there is potential for prairie dogs to come in contact with large numbers of people. This section also provides recommendations for monitoring signs of plague and actions which may be necessary to protect the public from exposure to plague.

8.8.2 Trails

This section describes the importance of trails to focus visitor use and provide opportunities for the public to access and observe prairie dog colonies. To keep the degree of disturbance to a minimum, trails should be located along the margins of prairie dog colonies and visitors should be encouraged to stay on trails near prairie dog colonies.

8.8.2 Pets

This section describes the impacts which can occur when pets and prairie dogs interact and recommends pets may be restricted to designated trails, required to be on a hand held leash, or restricted in grassland preserves.

Forest Ecosystem Management Plan

The *Forest Ecosystem Management Plan* (City of Boulder 1999c) was completed in 1999 and provides specific management direction to ensure the ecological sustainability of Boulder's forests. The *Forest Ecosystem Management Plan* will adhere to the principles of ecosystem management, while working to achieve the primary goals of conserving and promoting biological diversity and reducing the risk of wildfire to forest and human communities.

Area Management Plans

Area management planning provides on-the-ground management and direction. Two area management plans have been completed, North Boulder Valley Area (City of Boulder 1997b) and South Boulder Creek (City of Boulder 1998). These plans define and provide goals for passive recreation. The following definitions, goals, and objectives have been developed to guide management of passive recreation resources under area management plans.

Definitions

Recreation is often defined as activities that offer a contrast to work-related activities and that offer the possibility of constructive, restorative, and pleasurable benefits. Passive recreation is generally considered to be activities that occur in a natural setting which require minimal developments or facilities and for which the importance of the environment or setting for the activities is greater than in developed or active recreation situations.

Goals

- Manage and preserve natural and cultural resources
- Manage and preserve land for passive recreation use, its aesthetic or passive recreational value, and its contribution to the quality of life of the community
- Maintain sustainable agricultural operations by balancing economic and natural resource considerations

Objectives

- Provide a variety of appropriate quality passive recreation activities, outdoor education opportunities, and visitor services where compatible with protection of resources
- Preserve scenic vistas and undeveloped views
- Provide trails, access points, and passive recreational facilities to accommodate appropriate uses and to connect with adjacent trail systems
- Provide safe passive recreation experiences
- Minimize passive recreation impacts to natural, cultural, and agricultural resources

Boulder Mountain Parks Resource Protection and Visitor Use Plan

The *Mountain Parks Resource Protection and Visitor Use Plan* (City of Boulder 1999b) provides management direction for Mountain Parks lands. Guiding Principles were used to direct both short- and long-term management decisions, balance competing goals, and define strategies:

- Integrate the activities of nature and people

- Maintain Boulder Mountain Parks as a place of inspiration, natural wonders, spiritual renewal, and educational benefit for the community
- Where there are real or potential conflicts between nature and human use in the Boulder Mountain Parks, preference will be given to sustaining nature - both for its intrinsic values and its value as a component of human experience
- Managing the Mountain Parks is a shared responsibility. We seek to inform and engage the community in the challenges of setting policy and managing the park. (City of Boulder 1999b)

Management objectives included:

- Promote long-term sustainability of resources
- Utilize an adaptive natural resource management program
- Work with neighbors to maintain natural functions
- Utilize a system of management areas
- Manage recreation to protect natural resources and enhance visitor experience
- Improve interpretive, educational and research opportunities and engage the community in a cooperative stewardship program
- Improve the safety of Boulder Mountain Parks
- Improve core park management and maintenance
- Enhance park funding and staffing

The plan uses a "management zone" framework to provide management guidance and for implementing management actions.

Boulder Valley Comprehensive Plan

The *Boulder Valley Comprehensive Plan* contributes to the Open Space and Mountain Parks mission and states that the environment of the Boulder Valley is a critical asset that must be preserved and protected, and provides the framework within which growth and development may be permitted to take place.

The *Boulder Valley Comprehensive Plan* establishes the coordination between the city of Boulder and Boulder County on planning issues involving both agencies. The Boulder Valley is a Community Service Area within Boulder County where the city and county have agreed upon a set of land use and management policies to implement joint planning objectives. This level of interagency commitment to a shared vision is unique and has proven to be beneficial to both agencies.

The current *Boulder Valley Comprehensive Plan*, adopted by both the city and the county in 1977, and updated periodically, describes the city's Open Space Plan as providing "the basic structure of the Boulder Valley Comprehensive Plan" (City of Boulder 2001b). The *Boulder Valley Comprehensive Plan* includes the purposes and functions of Open Space and Mountain Parks as defined by the Open Space Board of Trustees. Other community, environmental and design policies set goals for protecting many features of the Boulder Valley, including the appearance of major entryways, agricultural areas, critical habitat areas, and aquifer and groundwater recharge areas. Facilities policies promote cooperation to provide a trails network when compatible with environmental preservation goals. Many of the policies and maps in the *Boulder County Comprehensive Plan*, dealing with the protection and management of significant agricultural lands, wildlife and plant habitats, natural landmarks and natural areas, archaeologically sensitive areas, and provision of trails, are now components of the *Boulder Valley Comprehensive Plan*. The 1996 update of the *Boulder Valley Comprehensive Plan* added a Natural Ecosystem Map and related policies.

The 1996 update of the *Boulder Valley Comprehensive Plan* identified general policy direction for resource and land protection and management. Restoring, maintaining, and sustaining the environmental quality of the Boulder Valley are principal emphases of the revised *Boulder Valley Comprehensive Plan*. Protecting and restoring native ecosystems, biological diversity, and natural processes are essential elements of these policies. Preservation of agricultural lands, wetlands, Open Space and Mountain Parks, and historic and cultural resources are other major components of the environmental sections of the *Boulder Valley Comprehensive Plan*. The Boulder Valley Comprehensive Plan Trails Map is a guide for existing and proposed trails and trail connections for the Boulder Valley.

The Boulder Valley Natural Ecosystems Map, designating significant, high quality native ecosystems or restorable native ecosystems in the Boulder Valley, is a component of the *Boulder Valley Comprehensive Plan* land use map. Boulder Valley natural ecosystems are defined as places that support native plants and animals or possess important ecological, biological, or geological values. Boulder Valley natural ecosystems may also contain features that are rare, unique, or sensitive to human disturbance and are essential to maintain the scientific and educational importance of places representing the rich natural history of the Boulder Valley. The Natural Ecosystems Map also identifies connections and buffers that are important for sustaining biological diversity and viable habitats for native species, protecting the ecological health of certain natural systems, and buffering potential impacts from adjacent land uses.

The purpose of the Boulder Valley Natural Ecosystems Map is to guide city and county planning decisions in the protection of wildlife and plant habitats. Natural ecosystem designations will not necessarily preclude development or human use of a particular area, but will serve to educate agencies and landowners about environmental concerns in particular areas. Information contained in the Natural Ecosystems Map may be used in planning decisions for service area changes, land use designation changes, annexations and zonings, development reviews, Valley-wide planning, subcommunity and departmental master planning, land acquisitions, and private land management.

Boulder County Comprehensive Plan

County comprehensive plans are mandated by state law and address county land use. City of Boulder Open Space and Mountain Parks lands, for the most part, are under the land use jurisdiction of Boulder County. Boulder County adopted one of the earliest and most comprehensive county land use plans in Colorado. The *Boulder County Comprehensive Plan* (Boulder County 1999) is revised every five years and is adopted by the Boulder County Planning Commission. The plan has four principal elements: land use, parks and open space, environmental resources (including Environmental Conservation Areas), and cultural resources. The plan is also a guide for development in the County's rural areas, outside municipal planning boundaries. Revisions are prepared with the cooperation of municipalities, but are not subject to their approval.

Several major goals and policies in the *Boulder County Comprehensive Plan* are relevant to Open Space and Mountain Parks planning. Public use of Open Space and Mountain Parks should be consistent with the purposes of the acquisition of the land and resource management plans. Preservation and conservation of agricultural lands is a primary goal for Boulder County as is maintenance of the rural character of the County. Trails policies include planning trails to avoid degradation of natural and cultural areas, coordination among government agencies on a county-wide trail system, and cooperation with private landowners. The County Trails Map delineates current and conceptual trails. Preservation of rare plant habitats and natural communities are Comprehensive Plan goals, and historic and cultural sites and resources will be identified and protected in the County. Preservation of identified natural areas, natural landmarks, riparian ecosystems, and critical wildlife habitats are key components of the *Boulder County Comprehensive Plan*.

Environmental Conservation Areas are large and relatively undeveloped areas of the County that possess a high degree of naturalness, contain high quality or unique landscape features, and/or have significant restoration potential. Size, quality, and geographic location make them an important tool for combating the affects [sic] of habitat fragmentation. Environmental Conservation Areas are delineated by the County as areas capable of meeting criteria of size, naturalness, ecological condition and quality, connectivity, and sufficient information.

Appendix 1.3: Public Involvement Process

Public Participation Opportunities List

An opportunity was provided at all the forums listed below for citizen comment. In general, public meetings were announced in newsletters, Channel 8 programs, the Visitor Plan website, the Visitor Plan hotline, and in paid advertisements placed in the Daily Camera. Public meeting notices and newsletters were placed in many cases at trailheads, community centers, and various locations around Boulder.

Winter 1998	Visitor Plan survey included in community workshop notice mailer and *Daily Camera* -- 121 returned.
Winter 1998	Researched other agency visitor plans.
February 11, 1999	KGNU's morning radio talk show to discuss plan and encourage participation.
February 11, 1999	Community workshop to discuss scope of project, existing information, and public involvement opportunities. Comment summary with responses created.
February 24, 1999	Open house and Open Space Board of Trustees (OSBT) meeting to discuss scope of project, comments and response from previous meeting, and public involvement opportunities.
June 1999	Set up Visitor Plan (VP) hotline, e-mail, fax line, and information placed on website with e-mail response option.
June 1999	Visitor Plan Citizen Advisory Committee (VPAC I) created to work with the Open Space staff to collect, analyze, and summarize information and public comments and present a report.
June 30, 1999	VPAC I discussed and modified phone survey.
July 14, 1999	OSBT discussed VPAC I suggestions; they were incorporated and then revised.
July 21, 1999	Ideas from VPAC I, OSBT, and public suggestions reviewed and incorporated into the final survey questions.
July-August 1999	1999 scientific public opinion phone survey conducted to assess the views and attitudes from all members of the public including those who do not attend public meetings.
August 1999	Channel 8 video about VP requesting citizen involvement.
September 1, 1999	VPAC I reviews survey results.
September 8, 1999	OSBT reviews survey results.
September 9, 1999	Community workshop to review survey results.
September-November, 1999	VPAC I met a number of times to discuss workshop comments, phone survey results, and develop a report.
September 22, 1999	OSBT reviews and provides direction on public workshop and VPAC I results.
October 27, 1999	OSBT reviews and provides direction on public input and VPAC I results.
November 18, 1999	Community workshop to review the initial work of the advisory committee and to look at what activities may be appropriate and under what circumstances.
March 22, 2000	VPAC I work complete after presenting Advisory Committee Report to OSBT. VPAC I dissolved.
January 1, 2001	Open Space and Mountain Parks merge into one department.
April-September 2001	Re-review comments from the Mountain Parks Visitor Use and Resource Protection Plan 1998 public forums and text from the plan.

October 2, 2001	Community workshop to review Advisory Committee Report and gather further input on the visitor issues for Open Space and Mountain Parks Department.
January - April 2002	Attended interest group meetings to explain how to be involved and Special Protection Area process. Groups included: Flatirons Climbing Council (met a number of times), boulderers, Sierra Club, Boulder off Road Alliance (BOA), Friends Interested in Dogs and Open Space (FIDOS), Boulder Area Trails Coalition (BATCO), PLAN Boulder, hang/para gliders, Boulder County Horse Association (BCHA), Boulder County Nature Association (BCNA), Audubon, and Colorado Mountain Club.
January 23, 2002	OSBT updated about interest group meetings, opportunity for public comment.
February 13, 2002	OSBT updated about meeting with disbanded Visitor Plan Advisory Committee VPAC I members, opportunity for public comment.
February 20, 2002	Met with disbanded Visitor Plan Advisory Committee members to update them on process and to discuss Special Protection Areas and how to define recreational experience.
April 19, 2002	OSBT annual retreat update on management strategies.
July 10, 2002	OSBT updated on the need for additional analysis before the plan is released.
July 31, 2002	OSBT updated on staff work including a communications plan.
August 28, 2002	OSBT updated on staff work in including recreational needs assessment, activity assessment, trail assessment, and cultural resources.
September 11, 2002	OSBT updated on planning strategies.
September 25, 2002	OSBT presented with passive recreation trend analysis.
October 9, 2002	OSBT presented with 1975 mountain backdrop carrying capacity document and acting City Manager feedback on trend analysis.
November 2002	New web “short-cut” page address obtained (visitorplan.com)
December 11, 2002	OSBT study session to prepare for City Council study session including the second Visitor Plan Advisory Committee (VPAC) II charter and make-up.
January 14, 2003	City Council/OSBT study session on visitor plan management concepts and VPAC II.
January 22, 2003	OSBT appoints second VPAC II including the group’s mission, timeframe, and membership. Nine committee meetings and two community forums were held with the opportunity for input at each meeting. VPAC II hosted two general discussion forums for additional public input.
June 2003	VPAC II presents its report to OSBT.
October 9, 2003	Open house and Open Space Board of Trustees meeting that facilitated interest group presentations of their proposed management area maps and management strategies. Staff worked with group representatives using OSMP Geographic Information Systems computer technology to draft maps.
Late 2003- early 2004	OSBT updates at all meetings with the opportunity for public comment.
January and February 2004	Meetings with interest group representatives to set-up community group meeting process to review the Draft Visitor Master Plan.
April 26, 2004	Community Group Forum meets for the first of eight meetings. Groups included: Boulder Area Trails Coalition, Boulder County Audubon, Boulder County Nature Association, Boulder County Horse Association, Boulder Off-Road Alliance, Boulder Trail Runners, Colorado Mountain Club, Flatirons Climbing Council, Friends Interested in Dogs and Open Space, Friends of Open Space Access, PLAN Boulder County, Rocky Mountain Hang Gliding & Paragliding Association, and Sierra Club.
April 28, 2004	OSBT is briefed on 2004 scientific public opinion phone survey that documented attitudes and preferences of Boulder residents.

May 11, 2004	City Council/OSBT study session on planning framework, public process, and issue identification.
May 26, 2004	Draft Visitor Master Master Plan presented to OSBT with public comment opportunity.
June 9, 2004	OSBT Visitor Master Plan Public Comment.
June 28, 2004	Community Group Forum presents its report to OSBT.
July 14, 2004	OSBT study session on precautionary principle, competitive events, dogs, commercial use, and user fees.
September 8, 2004	OSBT review and consideration of public comments for plan direction.
December 14, 2004	City Council/OSBT study session.
January 26, 2005	OSBT meeting and public comment on issues referred from City Council including management areas, dealing with uncertainty, and dog management.
February 23, 2005	OSBT reviewed and adopted final draft Visitor Master Plan following public testimony.
March 17, 2005	Planning Board reviewed and recommended final draft Visitor Master Plan following public testimony.
April 5, 2005 and April 12, 2005	City Council reviewed and accepted Visitor Master Plan following public testimony.
May 24, 2005	City Council reviewed and accepted Visitor Master Plan Implementation

Appendix 4.1: Detailed Information on Management Areas

Process Used in Developing the Open Space and Mountain Parks Management Areas

Delineating the Open Space and Mountain Parks land system into management areas is based on information overlays and professional judgment about the recreational and resource values of an area. When analyzing these suitability factors to delineate an area, consideration of the larger landscape context is required, i.e., the functional relationships or interactions among areas and how surrounding areas are managed. The practicalities of implementing varied management strategies among different areas need to be taken into account in the area designation process.

The concepts and map boundaries for the Open Space and Mountain Parks area management system were developed through staff collaboration and public participation. An interdisciplinary staff team conducted a visitor use-resource inventory and impact assessment process. The outcomes of this process were: a documentation of the co-location of resource values and visitor use, an assessment of where there are existing or anticipated impacts that the Visitor Master Plan should address, and a designation of management areas with shared management strategies. The specific steps included:

- Identification of areas with existing and anticipated visitor use and facilities.
- Identification of significant natural, agricultural, and cultural resources. Natural resources included: unique ecosystems, critical wildlife habitats, rare and sensitive plant communities, riparian and wetland areas, forest interior habitat areas and mature forest areas, and large habitat blocks.
- Identification of areas of potential compatibility and conflict.
- Analysis of specific threats and impacts.
- Identification of management areas and appropriate management strategies.

Expectations/Intentions

- Open Space and Mountain Parks Management Areas are intended to support both the provision of high quality visitor opportunities and reduction of resource impacts from these visitor activities.
- Designating management areas should make implementation of strategies more feasible and make on-the-ground management understandable for visitors.
- Management Areas provide coarse-level strategies to protect resources.
- The best information available will be used to define Management Areas.

✓ **Indicates a significant presence of the criteria attribute**

Passive Recreation Areas	**High level of visitation**	**Trails and trailheads for high use**	**High density of trails**	**Multiple-activity destination(s)**	**Opportunities for coordinating recreational activities/trail linkages**
Western Boulder County	✓	✓		✓	✓
Lefthand Canyon	✓	✓	✓	✓	
Boulder Valley Ranch	✓	✓	✓	✓	✓
Wonderland	✓	✓	✓	✓	✓
Sanitas Valley/Red Rocks	✓	✓	✓	✓	✓
Elephant Buttress	✓	✓	✓	Mostly climbers	
Flagstaff/Chautauqua	✓	✓	✓	✓	✓
South Mesa	✓	✓	✓	✓	✓
West Marshall Mesa	✓	✓	✓	✓	Ped underpass needed
Dry Creek	✓	✓	✓	Mostly dog walkers	✓
Gunbarrel/Heatherwood PRA	✓	✓	✓	✓	✓

✓ **Indicates a significant presence of the criteria attribute**

Natural Areas	**Interspersed recreational and natural values**	**Relatively high resource values**	**Relatively high recreational values**	**Opportunities for coordinating habitat protection and recreational activities/trail linkages**
Northern Tier	✓	✓ In some pockets		
East Beech	✓	✓	✓	✓
Sanitas	✓	✓	✓	✓
Anemone Hill	✓	✓	✓	✓
Flatirons/Mountain Backdrop	✓	✓	✓	✓
Shanahan	✓	✓	✓	✓
Doudy Draw	✓	✓	✓	✓
East Marshall Mesa	✓	✓	✓	✓
South Boulder Creek	✓	✓	✓	✓
East Boulder	✓	✓	Potential trail linkage	✓
Creek Confluence	✓	✓	Potential trail linkage	✓
Valmont Reservoir	✓	✓		
Diagonal	✓	✓		✓
Gunbarrel/Heatherwood NA	✓	✓	✓	✓
Outlots	Variable	✓ In some pockets		

✓ **Indicates a significant presence of the criteria attribute**

Agricultural Areas	**Crop production/irrigated hay fields/grazing areas**	**Agricultural efficiency/visitor safety conflicts**	**Opportunities for coordinating agricultural protection and recreational activities/trail linkages**
East Boulder Valley	✓	✓	✓
North Boulder Valley	✓	✓	✓

✓ **Indicates a significant presence of the criteria attribute**

Habitat Conservation Areas	**Large habitat blocks/low density of trails, roads, development**	**High ecosystem restoration potential**	**Rare or unique plant communities**	**Habitat for threatened, endangered, or rare species**	**Areas with high biodiversity**	**Comparatively lower visitation levels**	**Opportunities for coordinating habitat protection and recreational activities/trail linkages**
North Foothills	✓	✓	✓	✓	✓	✓	✓
Western Mountain Parks	✓	✓	✓	✓	✓	✓	✓
Eldorado Mountain	✓	✓	✓	✓	✓	✓	✓
Jewel Mountain	✓	✓	✓	✓	✓	✓	✓
Southern Grasslands	✓	✓	✓	✓	✓	✓	✓
Tallgrass Prairie East	✓	✓	✓	✓	✓	✓	✓
Sombrero Marsh		✓	✓	✓	✓		✓
Cottonwood Grove		✓	✓	✓	✓	✓	
Lower Boulder Creek	✓	✓	✓	✓	✓	✓	

Open Space and Mountain Parks Management Areas and Their Relationship to Boulder County Comprehensive Plan Environmental Conservation Areas

As defined in the *Boulder County Comprehensive Plan Environmental Resources Element* (Boulder County 1995), Environmental Conservation Areas are "large and relatively undeveloped areas of the County that possess a high degree of naturalness, contain high quality or unique landscape features, and/or have significant restoration potential. Their size, quality, and geographic location make them an important tool for combating the effects of fragmentation."

Primary factors used to evaluate potential Environmental Conservation Areas include:

- Naturalness--Relatively undeveloped landscapes offer greater opportunities for maintaining natural processes, protecting sensitive and wide-ranging animal species, and minimizing landscape fragmentation caused by development and roads.
- Quality and Uniqueness--This includes high quality plant communities such as native prairies or old-growth forests, and unique landscape features such as elk winter concentration areas and winter raptor concentration areas.
- Size--Bigger is better, more capable of supporting natural disturbance regimes, meeting the needs of wide-ranging animals, and protecting a mosaic of landscapes.
- Restoration Potential--Ability of a site to be restored to a native plant community and/or good wildlife habitat.

Mapping criteria for Environmental Conservation Areas:

- They should be centered on undeveloped landscapes and include high quality and unique landscape components as revealed in the biological and ecological assessment.
- Environmental Conservation Areas should be a minimum of 2,500 acres in size in order to be effective management units.
- They should cover all life zones and habitat types.
- Boundaries of Environmental Conservation Areas are influenced by the following:

    - The larger the Environmental Conservation Area, the greater probability of meeting the needs of wide-ranging species, allowing natural disturbance regimes, and minimizing adverse impacts from development. Environmental Conservation Areas should include all contiguous undeveloped land and nodes of high quality or unique landscape features.
    - Boundaries should avoid areas with significant existing development.
    - The shape should minimize fragmentation and edge effects.
    - The shape and geographic location of Environmental Conservation Areas should facilitate connectivity within the regional landscape.

Habitat connectors or wildlife movement corridors between Environmental Conservation Areas should be preserved--riparian and stream ecosystems, large-mammal migration corridors, and undeveloped land around Environmental Conservation Areas that provide a matrix of dispersal and movement options for wildlife. Land uses around Environmental Conservation Areas should be low intensity to buffer the impacts of development.

The Environmental Conservation Area designation has provided an important context for defining Open Space and Mountain Parks management areas.

Open Space and Mountain Parks Management Areas	Boulder County Environmental Conservation Areas
Passive Recreation Areas	**Environmental Conservation Area**
• Western Boulder County	Indian Peaks
• Lefthand Canyon	North St. Vrain/Foothills
• Boulder Valley Ranch	Boulder Valley Ranch/Beech Open Space
• Wonderland	
• Sanitas Valley/Red Rocks	
• Elephant Buttress	
• Flagstaff/Chautauqua	Boulder Mountain Park/South Boulder
• South Mesa	Boulder Mountain Park/South Boulder
• West Marshall Mesa	Boulder Mountain Park/South Boulder
• Dry Creek	
• Gunbarrel/Heatherwood PRA	White Rocks/Gunbarrel Hill
Natural Areas	**Environmental Conservation Area**
• Northern Tier	North St. Vrain/Foothills
• East Beech	Boulder Valley Ranch/Beech Open Space
• Sanitas	
• Anemone Hill	
• Flatirons/Mountain Backdrop	Boulder Mountain Park/South Boulder
• Shanahan	Boulder Mountain Park/South Boulder
• Doudy Draw	Boulder Mountain Park/South Boulder
• East Marshall Mesa	Boulder Mountain Park/South Boulder
• South Boulder Creek	Boulder Mountain Park/South Boulder
• East Boulder	
• Creek Confluence	Stream connection with Environmental
• Valmont Reservoir	Conservation Areas
• Diagonal	
• Gunbarrel/Heatherwood NA	White Rocks/Gunbarrel Hill
• Outlots	
Agricultural Areas	**Environmental Conservation Area**
• East Boulder Valley	
• North Boulder Valley	Boulder Valley Ranch/Beech Open Space
Habitat Conservation Areas	**Environmental Conservation Area**
• North Foothills	Boulder Valley Ranch/Beech Open Space
• Western Mountain Parks	Hawkin Gulch/Walker Ranch/Upper Eldorado Canyon and Boulder Mountain Park/South Boulder
• Eldorado Mountain	Hawkin Gulch/Walker Ranch/Upper Eldorado Canyon and Boulder Mountain Park/South Boulder
• Jewel Mountain	
• Southern Grasslands	Boulder Mountain Park/South Boulder
• Tallgrass Prairie East	Boulder Mountain Park/South Boulder
• Sombrero Marsh	
• Cottonwood Grove	
• Lower Boulder Creek	White Rocks/Gunbarrel Hill

Detailed Information on Management Areas

Note: *References (i.e., information sources such as plans, reports, and studies) are numbered and identified at the end of the appendix.*

Passive Recreation Areas

Western Boulder County Passive Recreation Area

References: 4, 11

Natural Resources

- The 4th-of-July campground property includes sub-alpine forest, wet meadow, and riparian habitats. The campsites are undefined and located in a riparian area, conditions that have caused significant degradation. Located in the Indian Peaks Environmental Conservation Area, designated in the Boulder County Comprehensive Plan.
- Boulder Falls is a unique waterfall feature at the bottom of North Boulder Creek before it joins with Boulder Creek. The area around it is forested and rocky.

Recreational Use

- Both the 4th-of-July campground and Boulder Falls are physically distant from other Open Space and Mountain Parks lands but have high levels of visitation, easy auto access, intense concentration of use, and developed facilities (i.e., trailheads, trash pick-up, and a pit toilet for the campground). Both are regional destinations--the campground a major trailhead and gateway to the Indian Peaks Wilderness Area, and Boulder Falls a scenic water feature. Both require coordination with adjacent land uses (Boulder County and U.S. Forest Service). Both have adjacent sensitive habitat (riparian and aquatic habitats).
- Dogs are required to be on-leash or under voice-and-sight control in this management area (no change).
- Operation and maintenance of these properties require long travel times for rangers and maintenance staff. This situation results in inefficient use of staff time and resources, and also less staff presence and lowered level of services for visitors.

Management Issues

- The need to redesign and refurbish the campground (or close it) to keep visitors on hardened surfaces and out of the riparian area.
- The constant threat of injury from visitors who want to climb up above the falls over very difficult terrain. A regulatory closure is in place and requires constant monitoring.
- Boulder County and the U.S. Forest Service were not interested in taking over the management of these properties in the past.

Recommended Management Actions

- Actively work to transfer the management and/or ownership of 4th-of-July campground and Boulder Falls, the two satellite Open Space and Mountain Parks properties that are far removed from the Boulder Valley, to another public agency that can provide excellent visitor services with greater efficiencies in operation and management. Alternatively, explore the benefits and feasibility of contracting out the day-to-day management of the properties.
- Make improvements to the 4th-of-July campsite to define the campsites and remove them from the riparian area.

Lefthand Canyon Passive Recreation Area

References: 4, 11, 14

Natural Resources

- From the mining claim donated to the city of Boulder, Open Space and Mountain Parks owns a strip of land along Lefthand Creek of about two miles long and a wider parcel across from the Palisades cliffs. It includes riparian, montane forest, and rock ecosystems. Lefthand Creek is an important wildlife movement corridor. Located in the North St. Vrain/Foothills Environmental Conservation Area.
- Golden eagles nest on top of the Palisades cliff formation, and a wildlife closure is in effect when nesting occurs.

Recreational Use

- Visitor facilities along Lefthand Creek include several road pull-outs, picnic tables, a pit toilet, and trails. This management area is not a year-round high-use area, but it receives a significant amount of concentrated visitor use during the good-weather months of the year.
- Dog management is on-leash or voice-and-sight control (no change).
- Currently this management area is closed for public use dusk to dawn (which is different from other Open Space and Mountain Parks areas).

Management Issues

- This management area receives less patrol or other services because of the site's remote location, which makes it difficult to provide adequate services.
- Many of the pull-offs beyond Buckingham Park are used to access property not in the Open Space and Mountain Parks system.

Recommended Management Actions

- Develop efficient ways to monitor visitor use and provide patrol in this isolated location.

Boulder Valley Ranch Passive Recreation Area

References: 4, 7, 8, 13, 14

Natural Resources

- Grassland, shrubland, and riparian habitats are present. Parts of the management area are shale barren prairie, bluffs, and drainages. The grassland community includes a diversity of native and non-native grassland types. Parts of the management area contain rare and sensitive plant communities listed by the Colorado Natural Heritage Program, including needle-and-thread grass mixed grass prairie, New Mexican feather grass mixed grass prairie, and Bell's twinpod (*Physaria bellii*) habitat. Located in the Boulder Valley Ranch/Beech Open Space Environmental Conservation Area.
- Nesting habitat for northern harriers and winter raptor habitat occur along the Eagle Trail and in other nearby drainages.
- Prairie dog colonies are present in the southern and northwest portions of the management area.
- Eagles and hawks perch and hunt near the prairie dog colonies.
- Mesa Reservoir, with an extensive riparian habitat and open water, attracts many different kinds of mammals, birds, and other animals. The public is asked to stay out of the area, but there is no formal public closure.
- The BLIP ponds are important native fish refugia.

Recreational Use

- This management area receives a high level of use by hikers, dog walkers, bicyclists, and horseback riders.
- The density of trails is very high in the northern portion of the management area.
- Dog management is on-leash or voice-and-sight control (no change).
- A significant amount of off-trail use has created a network of undesignated trails.
- Trail widening and braiding in areas are a significant problem in this management area.

Management Issues

- The high amount of off-trail use (especially in the southeast portion of the management area) exposes some of the native grassland communities and riparian areas to trampling, soil erosion, and weed dispersal.
- Dogs roam off-leash in prairie dog and riparian areas. The designated trails in this management area criss-cross through a prairie dog colony where very few dog handlers control their dogs.
- A significant conflict exists between off-leash dogs and livestock, and to some extent off-trail visitor use and crop production. The problem of dogs harassing cattle is especially acute during the calving season.

Recommended Management Actions

- Where needed, better define the trail corridor to avoid trail widening.
- Close and restore undesignated trails to protect shale barrens and Bell's twinpod habitat.
- Consider dog on-leash requirement for the Degge/Hidden Valley prairie dog colony.
- Implement seasonal on-leash requirements, where needed, to reduce dogs harassing cattle.

Wonderland Passive Recreation Area

References: 8, 10, 13, 14, 16, 34

Natural Resources

- The Dakota hogback is an important transitional (ecotonal) area between the mountains and the plains. The management area includes xeric tallgrass communities that are important for rare butterflies (such as arogos skipper, two-spotted skipper, and cross-line skipper). Parts of the management area contain rare and sensitive plant communities listed by the Colorado Natural Heritage Program, including needle-and-thread grass mixed grass prairie, New Mexican feather grass mixed grass prairie, and Bell's twinpod (*Physaria bellii*) habitat.
- A mix of grassland, shrublands, forests, and riparian habitats are present.
- Wonderland Lake is important habitat for fish, birds, mammals, and amphibians.
- Prairie dog colonies are present north of Wonderland Lake and west of the Foothills Community Park, and also northwest of the intersection of U.S. 36 and Broadway (which is part of a designated Prairie Dog Habitat Conservation Area).

Recreational Use

- Very high level of visitation by hikers, bikers, and dog walkers.
- Dogs are required to be on-leash in this management area, except for the section of the Foothills Trail north of Lee Hill Road (no change).
- Fishing occurs along the Wonderland Lake dam and peninsula.
- The paragliding site is used frequently. Currently it is the only site open to this activity.
- Close proximity to, and easy access from, a large and dense residential area and a community park (which includes a dog park).

Management Issues

- Popular for dog walking and biking, which causes some conflicts. This management area requires a constant high level of patrol to maintain compliance.
- Current lack of sustainable access for hang gliders and paragliders (trails and launch sites).
- Rapid expansion of jointed goatgrass is occurring along most of the current designated and undesignated trails and on each paragliding launch sites.
- Dogs roam off-leash in prairie dog colonies.
- Dogs swimming in Wonderland Lake (illegally off-leash).
- Ice skating (no regulation prohibiting being on ice).
- No regulatory closure on public access to the Wonderland Lake marshes.

Recommended Management Actions

- Continue the requirement for dogs on-leash.
- With the cooperation of the user groups, create and maintain sustainable paragliding-specific trails and launch site.
- Implement a no-dog requirement on the paragliding trails and launch site.
- Focus concentrated efforts on control and elimination of jointed goatgrass and other non-native species along trails and on launch sites.

Sanitas Valley/Red Rocks Passive Recreation Area

References: 10, 11, 13, 14, 16, 20

Natural Resources

- This management area is a transitional (ecotonal) area between the mountain and the plains. The Dakota hogback, hogback valley, and the ridge that the Sanitas Trail follows contain a diverse mix of grassland, shrubland, forest, riparian, and rock habitats. The management area includes xeric tallgrass communities (mostly on upper, rocky portions of slopes), which are important for rare butterflies (such as arogos skipper, two-spotted skipper, and cross-line skipper).
- The Red Rocks cliff formations are unique scenic geologic features.
- A falcon nest is located on Sanitas Ridge and is affected by a wildlife closure when nesting occurs.

Recreational Use

- A very high-use area, with a high density of trails in many parts.
- A very popular dog walking area. Dog management is on-leash or voice-and-sight control (no change).
- Close proximity to, and easy access from, residential development.

Management Issues

- Hikers on the Silver Lake Ditch are causing significant erosion along the ditch banks, undermining the integrity of the ditch and causing the need for ditch maintenance.
- Sunshine Canyon Road/Mapleton Ave. is a dangerous street for pedestrian crossing, and the diagonal on-street parking at the trailhead is a safety concern. Safety issues and parking congestion are significant and need to be addressed at the Mt. Sanitas trailhead. Possible expansion of the Centennial trailhead parking, elimination of the Mt. Sanitas on-street parking, and providing a safer pedestrian crossing are alternatives that are being considered to address these issues.
- The amount and intensity of use have created significant trampling effects to the vegetation, wider trails, and a number of undesignated trails. People and dogs going off-trail in riparian areas have caused vegetation loss and erosion and probably reduced presence of native wildlife.

- Non-compliance with voice-and-sight and dog poop pick-up regulations is still significant. Dog excrement is a major and well-documented issue in this management area.

Recommended Management Actions
- Evaluate, close, restore, and monitor existing undesignated trails that run from the bottom of the valley straight up the slope to the upper part of the trail.
- Continue to direct visitors and their dogs to stay out of the Silver Lake Ditch.
- Provide solutions for safe visitor road crossings and trailhead parking.
- Continue to provide a higher level of educational outreach and enforcement to improve dog management.

Elephant Buttress Passive Recreation Area

References: 11, 14, 20

Natural Resources
- A series of rocky towers and crags alongside Boulder Creek and Highway 119.

Recreational Use
- A very popular climbing area in Boulder Canyon, with multiple climbs in a very accessible, relatively small area. Can be very congested during high-use periods.
- Dog management is on-leash or voice-and-sight control (no change).

Management Issues
- Climbers access some of the climbs and cross Boulder Creek by walking on the Silver Lake Ditch. The Ditch Company has concerns about the level of this type of use.
- Parking alongside Highway119 in Boulder can be congested, and pedestrian crossing of the road can be dangerous.

Recommended Management Actions
- Continue to direct visitors to stay off of the Silver Lake Ditch pipeline.

Flagstaff/Chautauqua Passive Recreation Area

References: 4, 5, 10, 11, 14, 15, 16, 19, 20, 21, 22, 24, 25, 27, 30, 31, 34

Natural Resources
- The Flagstaff Mountain area and Chautauqua/lower Gregory Canyon area below the Flatirons contain many high-value natural resources, including relatively wet and productive forests, pockets of old growth forest, mountain riparian corridors that include some large stands of shrubs, and wet meadows that contain mixed-grass, tallgrass, and other plant communities that are relatively rare on the dry Front Range. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- In spite of the proximity to the city and developed facilities on the Flagstaff summit, this management area provides high quality habitat for forest birds, Abert's squirrels, and occasional weasels, bobcats, black bears, and mountain lions. Some of the riparian zones harbor rare and sensitive plant species (such as birdsfoot violet, chaffweed, smilax, grassfern, Wright's cliffbrake, and wavy-leaf stickleaf, and the hazelnut community), and they provide fruits and berries for bears in the fall. The management area also provides habitat for some of the rare butterflies (such as hops blue, regal fritillary, others) that utilize foothills/montane vegetation there.
- Places like Enchanted Mesa provide exceptional forest bird habitat that supports a wide diversity of neo-tropical migrant and other forest bird species.

- The management area contains many high quality riparian corridors, which harbor a diverse set of species and provide wildlife travel corridors (Bluebell, Gregory, and Skunk creeks in particular).

Recreational Use

- Chautauqua Meadow is a gateway to one of the most heavily used portions of Mountain Parks. Casual hiking, running, and dog walking are very popular, and Chautauqua is a jumping off point for serious hiking and climbing in the Flatirons region. The Chautauqua Ranger Cottage is a well-used public information center for Open Space and Mountain Parks and the Chautauqua Association. Chautauqua Park, a multiple-use recreational and cultural center managed by the Boulder Parks and Recreation Department, draws visitors to the greater Chautauqua area.
- Flagstaff Road visitor use includes a significant amount of auto sightseeing and scenic viewing. In addition, Flagstaff Road is one of the highest draw destinations for bouldering in the Open Space and Mountain Parks system.
- Parts of Chautauqua Meadow are designated sledding areas.
- Dog management is on-leash or voice-and-sight control, except dogs are prohibited on the Upper McClintock Trail (no change). Dogs are required to be on-leash on the adjacent National Institute of Standards and Technology (NIST) and National Center for Atmospheric Research (NCAR) properties (federal requirement, no change).
- Enchanted Mesa, Kohler Mesa, the Flagstaff summit area, and the Flagstaff Road corridor (with scenic view pull-outs and picnic tables) all receive very heavy visitation. Flagstaff Road and Summit offer many spectacular scenic viewpoints, which attract many visitors.
- The Flagstaff Summit area contains many trailheads, group picnic shelters, the Flagstaff Sunrise Amphitheater, the Flagstaff Nature Center, pit toilets, water spigots, and other facilities designed to accommodate large numbers of visitors. The area is heavily used by both residents and destination visitors. The Flagstaff Summit Road is closed six months of the year to preclude snow plowing and other services during the winter and to provide the area with a season of rest from large numbers of people and vehicles.
- This management area contains the Flagstaff Mountain Cultural Landscape District, which is designated by Boulder County because of the cultural and heritage value of its recreational structures and associated historic context. These structures were either constructed by the Civilian Conservation Corps or constructed with similar Civilian Conservation Corps architectural style.
- The Flagstaff/Chautauqua management area is in close proximity to, and is easily accessed from, intensive residential development.

Management Issues

- Chautauqua Meadow experiences crowding in the parking lot and sometimes on the trails. Parking can back-up into the neighborhoods during high-use times, especially when events are occurring at the adjacent Chautauqua Park.
- Many people do not realize how many rare and sensitive plants are in Chautauqua meadow. Many people travel off-trail in the meadow, and the challenge of preventing, eradicating, and restoring undesignated trails is ongoing.
- Dog walking is a very popular activity in Chautauqua Meadow, and it adds to congestion and occasional conflict with other visitors. Non-compliance with voice-and-sight and dog poop pick-up regulations is still significant. Dog excrement is a major and well-documented issue in this management area.
- Enchanted Mesa has numerous undesignated trails, some of which could be designated but others still need to be removed.
- Gregory Canyon and Skunk Canyon may have temporary closures when bears are feeding there, and sometimes the bears, people, and their dogs come in close proximity to each other.
- Group activities, such as large group picnics and weddings, sometimes result in crowds that can then spillover into off-trail areas.

- The Flagstaff Trail winds its way up the mountain and crosses Flagstaff Road in several places. These trail crossings carry a certain amount of risk with cars descending steep sections of the road.
- Mountain biking groups have advocated either opening some mountain backdrop trails to bikes or building a trail connection west of Highway 93 through the mountain backdrop to Walker Ranch or Boulder Canyon. Construction of any new bicycle trails west of Highway 93 will likely require City Council approval, because Council adopted regulatory changes in 1987 that closed trails that were previously open to bikes. The area affected by this closure included south of Sunshine Canyon, west of Broadway, and north of Eldorado Canyon.

Recommended Management Actions

- Improve the safety of Flagstaff Road crossings for the Flagstaff Trail.
- Require dogs on-leash in Gregory Canyon foothill riparian areas.
- Make decisions on which undesignated trails should be converted to designated trails, re-routed, or removed and restored.
- Consider a possible mountain bike (multi-use) trail corridor from the frontside to the backside of Mountain Parks.

South Mesa Passive Recreation Area

References: 4, 10, 13, 14, 16, 31

Natural Resources

- This management area includes a number of outstanding natural features: wetlands and riparian areas along South Boulder Creek and connecting drainages (including Shadow Canyon Creek), diverse shrublands, and open meadows. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- South Boulder Creek provides important transitional riparian vegetation between the montane and foothills zones and the plains. The shrublands provide high neotropical bird species richness. The meadows in this management area contain xeric tallgrass habitat for rare butterflies like the native hops blue butterfly. Dwarf leadplant (*Amorpha nana*), a rare plant listed by the Colorado Natural Heritage Program, is present.
- Because of the high densities of wildlife and seasonal bear feeding area in the riparian corridor, dogs are required to be on-leash on the Towhee Trail. Otherwise, dog management is on-leash or voice-and-sight control (no change).

Recreational Use

- This management area includes a number of popular loop trails that are very scenic. The trail density is relatively high, with the Mesa Trail, Towhee Trail, and Homestead Trail in close proximity. The South Mesa trailhead is a gateway to many popular trails in the southwest part of the Open Space and Mountain Parks system and is often congested. The trailhead is large, with parking, restroom, and picnic areas. Horseback riders frequently use this trailhead.
- Dog management is on-leash or voice-and-sight control, except dogs are required on-leash on the Towhee Trail (no change).
- This management area offers an opportunity for interpretation of early settler history. The Dunn Homestead is interpreted by a monument/sign.
- This management area is popular for interpretive and educational hikes and field classes.

Management Issues

- At times with high visitor numbers, this trailhead can be very congested, and parking regularly back ups onto Eldorado Springs Drive. Open Space and Mountain Parks rangers have no enforcement authority on Eldorado Springs Drive. Equestrians have requested additional horse trailer parking here.

- Non-compliance with voice-and-sight and dog poop pick-up regulations is still significant. Dog excrement is a major and well-documented issue in this management area.
- Along South Boulder Creek west of the trailhead parking area, the public is asked to stay out of the area, but there is no formal public closure. This area near the creek experiences a high level of off-trail use that has caused significant stream bank erosion.

Recommended Management Actions

- Develop a solution to lessen congestion and parking overflow at the South Mesa trailhead.
- Consider a solution to better accommodate horse trailers.
- For safety reasons, work with the County Sheriff to enforce the no-parking requirement on Eldorado Springs Drive.

West Marshall Mesa Passive Recreation Area

References: 4, 10, 13, 14, 16

Natural Resources

- This management area is the farthest extension of foothills forest into the prairie margin of any area in the Open Space and Mountain Parks system. Because of increased elevation and slightly higher moisture conditions, this management area includes patches of ponderosa pine forest, a rich diversity of shrubs, and relatively wet meadows and savannas. Riparian areas are present in the Cowdry drainage and along the ditches, and wetlands exist in low-lying areas. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- While this management area was severely disturbed by mining activity in the 19th and 20th centuries, native plant communities have recovered in some areas. The management area includes xeric tallgrass communities (mostly on upper, rocky portions of slopes), which are important for rare butterflies (such as arogos skipper, two-spotted skipper, and cross-line skipper). Birdsfoot violet (*Viola pedatifida*), a rare plant listed by the Colorado Natural Heritage Program, is present.
- Marshall Mesa geology includes sandstone outcrops, plant fossils, and a coal seam. Evidence from historic Marshall Mesa coal mining activities is present, and interpretative signs provide highlights to visitors.

Recreational Use

- This management area has become very popular, with a large number of hikers, dog walkers, bikers, runners, and horseback riders.
- An extensive network of undesignated trails has developed here. The growth in use in recent years has been steep, paralleling the growth in the neighboring communities of Louisville and Superior.
- Dog management is on-leash or voice-and-sight control (no change).

Management Issues

- Non-compliance with voice-and-sight and dog poop pick-up regulations is still significant. Dog excrement is a major and well-documented issue in this management area.
- Trail cutting on steep slopes has caused soil erosion, as has the trail widening on both the biking-allowed and biking-prohibited trails. In particular, the multi-purpose trail has seen creation of parallel trails and severe widening and erosion in parts.
- Conflict between the different types of visitor activities has been a problem here.
- Trailhead parking frequently results in high congestion and backup parking along Marshall Drive. Vehicle egress from the parking lot can be difficult and dangerous given the high speeds and limited sight distances on Marshall Drive.

Recommended Management Actions

- Construct the pedestrian underpass from Marshall Mesa to the Community Ditch Trail (under Highway 93).
- Address safety and parking congestion problems at the Marshall Mesa trailhead. Consider a new trailhead at the City Limits property.

Dry Creek Passive Recreation Area

References: 7, 9, 13

Natural Resources

- This management area includes a riparian area along Dry Creek, some large trees used as perches by raptors, a prairie dog colony, and non-native hay fields.
- The north bank of the creek has small patches of higher quality riparian and wet meadow vegetation, including native loosestrife and other species that are often associated with Ute ladies' tresses (*Spiranthes diluvialis*).

Recreational Use

- Visitation here has increased dramatically in recent years. The growth in use parallels the growth in the neighboring communities of Louisville and Superior.
- This property is heavily used, primarily by dog walkers. To deal with the this high level of use, the prairie dog colonies were fenced off, much of the riparian zone was fenced off (south of Dry Creek), a second trash can was installed farther from the trailhead, and "hint" fences were installed to encourage visitors to stay out of the back field, which is in proximity to raptor perch trees. These hint fences have been unsuccessful in discouraging visitor use.
- Dog management is on-leash or voice-and-sight control (no change).
- At some point, this property will be connected to the Bobolink Trail and the proposed extension of the East Boulder Trail from Boulder Reservoir to Teller Farm.

Management Issues

- The high use of this management area by dog walkers has discouraged the activities of other visitors who are not accompanied by dogs. Where the riparian area has not been fenced off, heavy dog use occurs in the creek, with the result of extensive stream bank erosion and degradation of fish habitat.
- The amount and intensity of use have created significant trampling effects to the vegetation, wider trails, and a number of undesignated trails. Knapweed and other noxious plants are making inroads into the grassland, in part due to soil disturbance caused by visitor use.
- Non-compliance with voice-and-sight and dog poop pick-up regulations is still significant. Dog excrement is a major and well-documented issue in this management area.
- Conflicts with adjacent landowners are frequent and include fence cutting, trespassing, parking encroachment on private rights-of-way, and dogs out of control on private property. In addition, parking often overflows from the trailhead parking lot to County access and onto Baseline Road.

Recommended Management Actions

- Evaluate the damage occurring to the Dry Creek riparian area and consider options to solve the problem.
- Construct the new trail connection from Dry Creek to the Bobolink Trail and the extension of the East Boulder Trail from Boulder Reservoir to Teller Farm.
- Continue to provide a higher level of educational outreach and enforcement to improve dog management here.
- Continue education and enforcement efforts to reduce conflicts with adjacent landowners.

Gunbarrel/Heatherwood Passive Recreation Area

References: 4, 7, 13, 14, 35

Note: The Open Space and Mountain Parks lands in the Gunbarrel area have been placed into two management area designations: the Gunbarrel/Heatherwood Passive Recreation Area (south of Lookout Road, described in this section) and the Gunbarrel/Heatherwood Natural Area (north of Lookout Road, described in a separate section). These two management areas share many characteristics, with much of the land in dryland farming. However, the bulk of the passive recreational activity occurs in the Passive Recreation Area.

Natural Resources

- In the past, the land on Gunbarrel Hill and around Heatherwood (a large contiguous block of land) was farmed for dryland crops (mostly dryland winter wheat), and much of it was severely overgrazed. These damaged lands are now undergoing native grassland restoration under the federal Conservation Reserve Program. The soils on these dry wind-exposed sites did not support plowing and cropping in a sustainable manner, with the result that they became highly eroded. The restoration of these lands has involved the planting of native grasses and forbs. The different properties are in different stages of recovery, but they are all being managed to restore a sustainable native grassland ecosystem. The habitat values of these lands are slowly being restored with the natural stabilization of prairie soils and reestablishment of native plant communities.
- Other smaller blocks of non-Conservation Reserve Program properties are still cultivated with non-native hay crops, some are non-native pastures used for grazing, and some are fallow. The habitat values of grassland properties in this management area support many native bird species, as well as small mammals, including some prairie dog colonies. The management area also supports some wet meadows and wetlands along ditches and creeks. Located in the White Rocks/Gunbarrel Hill Environmental Conservation Area.

Recreational Use

- The overall level of visitation in this management area is moderate to high, given its proximity to the Gunbarrel/Heatherwood residential subdivisions. The East Boulder-Gunbarrel Farm Trail is adjacent to or close to several residential areas and is used by many hikers, dog walkers, bikers, and horseback riders. Visitation is moderate but consistent on the East Boulder Trail and on several undesignated trails.
- Dog management in this management area is predominately on-leash or voice-and-sight control with a few exceptions (no change). Dogs on-leash is required on two portions of the Cottontail Trail (no change). Dogs are prohibited on a portion of the Gunbarrel Trail (no change).
- There is a network of undesignated trails that receives a relatively high level of use, mostly radiating off of the Gunbarrel and Heatherwood residential subdivisions. A dense cluster of undesignated trails is located on the Wood Brothers and Kaufmann properties (on the south side of Heatherwood), and dog walking is extremely popular here. Many of these trails lead down to the north side of Boulder Creek (where a reinforced fence has now been installed to protect the creek). The undesignated trail on the Kolb property riparian area east of 75th Street is a concern. A network of undesignated trails has developed from the Heatherwood subdivision north to Lookout Road, through Conservation Reserve Program land (e.g., undesignated trails located on the Jenik, Cosslett, Haley, and Knaus properties).

Management Issues

- Due to environmental damage from overuse, the plethora of undesignated trails needs to be sorted out--which ones to close and reclaim, and which ones to relocate or designate officially. The situation on Wood Brothers and Kaufmann especially needs attention (off-trail uses include hiking, dog walking, sledding, and paintballing).

- Off-trail activities such as hiking, dog walking, and model gliding (Jenik property) may make it more difficult to prevent invasion of weeds and restore some of the Conservation Reserve Program lands.
- In certain areas, the grassland bird communities may need some protection from dogs during times of nesting (seasonal closures).

Recommended Management Actions
- Assess how to deal with undesignated trails around the Gunbarrel and Heatherwood subdivisions, eliminating and reclaiming, relocating, or converting to designated trails.
- Monitor, assess, and determine whether or not any restrictions on visitor access should be implemented to support the restoration of native grasslands on the Conservation Reserve Program lands.
- Require seasonal closures or dog exclusions to protect seasonal nesting of grassland birds.

Natural Areas

Northern Tier Natural Area

References: 4, 7, 8, 13

Natural Resources
- The Northern Tier management area includes a large number of properties, which are dispersed, vary in size, and vary in ecological condition. Most are agricultural properties, some of which are irrigated, some of which are still actively farmed or grazed, and some are fallow. Some are weedy and heavily grazed by prairie dogs and cattle, others are in good condition. The irrigated agricultural fields provide seasonal habitat for ground nesting birds. Located in the North St. Vrain/Foothills Environmental Conservation Area.
- Prairie dogs are present on a few properties.
- Some properties contain wetlands and riparian areas along ditches or creeks.

Recreational Use
- Most of the properties have an “unofficial” visitor access closure, until management plans and infrastructure are put in place. There is little visitor use currently.
- No visitor facilities are provided.

Management Issues
- Continuation of agriculture and/or restoration of degraded lands are a priority on many of these properties. Until these properties are planned for visitor use and provided with appropriate visitor facilities, it is important that the level of use remain low.

Recommended Management Actions
- Formally close properties to visitor use until visitor use management plans and visitor use facilities are completed.

East Beech Natural Area

References: 4, 7, 8, 13, 14

Natural Resources
- In this management area grassland, shrubland, and riparian habitats dominate. The grassland community includes a diversity of native and non-native grassland types. The Beech property (east of U.S. 36) receives infrequent prescribed grazing. The BLIP property is leased for more

frequent grazing. The grasslands provide seasonal habitat for ground nesting birds. Located in the Boulder Valley Ranch/Beech Open Space Environmental Conservation Area.

- Parts of this management area are shale barren prairie and contain rare and sensitive plant communities listed by the Colorado Natural Heritage Program, including needle-and-thread grass mixed grass prairie, New Mexican feather grass mixed grass prairie, and Bell's twinpod (*Physaria bellii*). The habitat here is somewhat fragmented because of old agricultural roads, designated trails, and undesignated trails.
- Parts of this management area are in need of restoration, and significant infestations of non-native invasive plants such as knapweed and Mediterranean sage are present. This concentration of Mediterranean sage is a part of the only population in the state of Colorado, and its eradication has been identified as a statewide priority.
- Most of the management area is included in a designated Prairie Dog Habitat Conservation Area, and there are many small, medium, and large active colonies.

Recreational Use

- This management area currently experiences a relatively low- to moderate-level of visitor use with hiking, biking, and horseback riding. Growth in use is increasing with growing popularity of the Boulder Valley Ranch area.
- Undesignated trails now spur off of the designated Lefthand Trail. The Beech Pavilion, which is managed by Boulder County, is located on the north end of the East Beech property.
- Dogs are prohibited in this management area, except dogs are allowed on-leash on the Lefthand Trail (no change).

Management Issues

- The growing density of undesignated trails could cause degradation in habitat quality and fragmentation of habitat patches. The threats posed by the spread of weeds are a significant problem in this management area.

Recommended Management Actions

- Make decisions on which undesignated trails should be converted to designated trails, re-routed, or removed and restored.
- Locate any new trails, if any, on the periphery of the existing habitat block.

Sanitas Natural Area

References: 10, 13, 14, 16, 31

Natural Resources

- Similar to the Anemone Natural Area, this management area includes ponderosa pine forest and savanna, shrublands, mountain meadows, and riparian areas. Some parts of the management area contain rare plant communities, including king spike fescue/ponderosa pine and xeric tallgrass prairie with associated rare butterfly habitat. Much of the management area is relatively dry with only moderately fertile soils; consequently, its vegetation is not quite as diverse as some other areas.
- This backcountry area provides a refuge for forest birds and small and large mammals.

Recreational Use

- While the adjacent Sanitas Valley area has a very high level of visitor use, the amount of current visitor use in this management area is comparatively lower and less intensive. There are no designated trails, but there is a network of undesignated trails, many of them leading from Sunshine Canyon and nearby residential subdivisions.
- Some of the undesignated trails are on steep slopes and may not be sustainable.
- Dog management is on-leash or voice-and-sight control (no change).

Management Issues

- The system of undesignated trails has led to a visitor use pattern that may not be sustainable.

Recommended Management Actions

- Make decisions on which undesignated trails should be converted to designated trails, re-routed, or removed and restored.

Anemone Hill Natural Area

References: 10, 11, 14, 16, 19, 20, 31

Natural Resources

- This management area includes ponderosa pine forest and savanna, shrublands, mountain meadows, and riparian areas. It is drier and has less fertile soils than areas like Enchanted Mesa; consequently its vegetation is not quite as diverse.
- This back-country area provides a refuge for forest birds and small and large mammals.

Recreational Use

- While the adjacent Red Rocks area has a very high level of visitor use, the amount of current visitor use in this management area is comparatively lower and less intensive. Anemone Trail (less than half a mile) is the only designated trail in this management area, but there is a network of undesignated trails. One of the undesignated visitor use corridors is the heavily eroded maintenance road for the Sunshine Canyon water supply pipeline owned by the city of Boulder Water Utility.
- Some of the undesignated trails are on steep slopes and are not sustainable.
- Dog management is on-leash or voice-and-sight control (no change).

Management Issues

- The system of undesignated trails has led to a visitor use pattern that may not be sustainable.
- Illegal bike use is a historic problem, and dead ends into private property resulting in trespass violations.

Recommended Management Actions

- Develop a new sustainable trail system and eliminate undesignated trails.

Flatirons/Mountain Backdrop Natural Area

References: 4, 10, 14, 16, 19, 20, 21, 22, 26, 31

Natural Resources

- This management area includes Boulder's scenic mountain backdrop and is a very popular visitor destination. It includes most of the land from the Mesa Trail to the high ridgeline of the mountain backdrop. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- This management area is primarily mixed coniferous forest and shrublands but also includes montane meadows and significant rock and cliff terrain. It includes the upper parts of several steep mountain canyons and associated riparian areas such as Gregory Canyon, Skunk Canyon, Bear Canyon, Fern Canyon, and Shadow Canyon.
- The foothills/montane forest and riparian corridors harbor diverse vegetation and many rare and sensitive plant communities such as grass fern, maidenhair spleenwort, hazelnut community, dwarf leadplant, smilax, calypso orchid, picture-leaf wintergreen, and birdsfoot violet. This management area contains several pockets of thick unbroken forest and also very old trees on steep inaccessible slopes.

- The cliff-face ecosystems are habitat for many unique and rare plants, including carrion flower (*Smilax lasioneuron*), ferns such as grass fern (*Asplenium septentrionale*), and many species of mosses and lichens. These ecosystems also provide bat roosting, maternity, and water hole sites, and many raptors nest on cliffs, such as golden eagles, peregrine falcons, and prairie falcons.
- This management area includes many avian habitats of special interest. Species of concern like northern goshawk and flammulated owls, denizens of intact mature forest, inhabit the area. It also includes bear browsing areas with important food sources.
- The federally listed Preble's meadow jumping mouse (threatened) inhabits Upper Bear Canyon.
- Contains important habitat for the state-threatened Townsend's big-eared bat and many other bats.
- Provides important habitat for many rare butterflies that inhabit foothills/montane meadows.

Recreational Use

- This management area, while more remote than many areas of Open Space and Mountain Parks, still encounters a significant amount of visitation. It is a destination for visitors who want to hike the steeper terrain, take advantage of terrific views of the plains, and rock climb. It includes geological destinations such as the Diatreme, the Flatirons, Saddle Rock, Royal Arch, and Mallory Cave. For most visitors climbing up to the high mountain park peaks, they will be accessing them from the east side in this management area.
- Rock climbing is a popular attraction for visitors in this management area, involving traditional and sport climbing and bouldering.
- Significant off-trail visitor travel occurs in this management area.
- The raptor cliff-nesting areas are closed seasonally (when occupied) to visitors for approximately six months of the year, which seasonally restricts off-trail hiking and climbing in several areas.
- Dog management is predominantly on-leash or voice-and-sight control, with some exceptions. Bear Canyon and Fern Canyon are now on-leash. Lower Skunk Canyon is now on-corridor voice-and-sight control. The Eldorado Canyon Trail is on-leash, in order to be consistent with dog management on those parts of the trail that connect with Eldorado Canyon State Park and Boulder County Walker Ranch (no change). Dogs are required year-round to be under on-corridor voice-and-sight control. Previously, dogs were seasonally required to be under on-corridor voice-and-sight control, in order to maintain compatibility with seasonal raptor closures.

Management Issues

- Trying to balance resource protection with high levels or concentrated use is difficult. Currently seasonal wildlife closures for raptors and bats are one effective tool used to deal with this dilemma.
- The lack of a sustainable climbing access trail system has resulted in the proliferation of undesignated trails and much damage to vegetation and soils on steep slopes, riparian areas, and cliff faces. Collaboration with the climbing groups to manage the climbing areas and establish sustainable climbing access trails in selected areas is needed to address these problems.
- Off-trail travel on steep slopes and rocky terrain may damage fragile vegetation. This is especially true where vegetation exists on rock faces and is exposed to rock climbing and bouldering.
- Many of the trails follow canyon streams that are very important for wildlife and contain vegetation that is especially susceptible to trampling. Right now there are no protective measures to ensure that rare and sensitive riparian plants are protected.

Recommended Management Actions

- Working collaboratively with the climbing community, develop a system of sustainable climbing access trails.

- Require dogs on-leash on Bear Canyon Creek Trail (the entire trail, including all three zones), as well as the Skunk Canyon Trail, and Fern Canyon Trail—in order to provide a higher level of resource protection in their foothill riparian areas.
- Institute an on-corridor voice-and-sight control requirement for Shadow Canyon and the connecting trail between Bear Peak and South Boulder Peak, in order to provide an off-leash option to Bear Peak and South Boulder Peak.

Shanahan Natural Area

References: 2, 3, 4, 6, 10, 13, 14, 16, 17, 31, 34

Natural Resources

Shanahan Ridge Area

- The Shanahan Ridge portion of this management area includes a diversity of habitats with a transitional foothills-plains grassland/savanna area and a relatively flat foothills forest area up to the Mesa Trail. Pockets of xeric and mesic tallgrass prairie are present in the meadows (and associated rare butterfly habitat). It possesses many of the same habitat qualities that are present in the Chautauqua area. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- This area includes the relatively pristine Fern Canyon meadow, which probably resembles Chautauqua Meadow before development built up around it.
- This area contains birdsfoot violet, dwarf leadplant, and other rare and sensitive plants.
- Parts of this area are excellent forest bird habitat, and many small and large mammals use the area. It includes an active prairie dog colony on the eastern portion—south of Shanahan Ridge and west of the Shanahan conservation easement.

Big Bluestem/South Boulder Creek Area

- A relatively large expanse of natural lands, consisting of a diverse transitional area between the foothills and the plains. At the western, highest elevation portion of the management area is a combination of patches of ponderosa pine and ponderosa/Douglas-fir forest and savanna/mountain meadows. Further to the east and downslope is a combination of shrublands, mixed grasslands, and extensive tallgrass patches. There are numerous riparian drainages and extensive South Boulder Creek floodplain areas where deer congregate. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area .
- Extensive and diverse upland shrublands and patches of tallgrass provide nesting, feeding, and hiding cover for birds and mammals. Black bears forage in the shrublands and along the stream drainages.
- A 100-acre section of the Colorado Tallgrass Prairie State Natural Area includes large concentrations of big bluestem, little bluestem, yellow Indiangrass, switchgrass, and prairie cordgrass.
- This area harbors several known rare plants (listed by the Colorado Natural Heritage Program) such as birdsfoot violet (*Viola pedatifida*) and dwarf leadplant (*Amorpha nana*, the largest known population in our section of the Front Range).
- Relatively rare butterflies associated with montane/foothill habitats and tallgrass habitats utilize this area.

Recreational Use

Shanahan Ridge Area

- This portion of the management area offers some easy plains and forest hikes adjacent to the Devil's Thumb and Shanahan Ridge neighborhoods. It is a very popular hiking and dog walking area and can be used as a jumping off point for visitors to hike and climb the peaks or to boulder (climb).

- Dog management is on-leash or voice-and-sight control (no change) in most of the Shanahan Ridge area, with the exception that dogs are required to be on-trail in the eastern portion of the area (no change).

Big Bluestem/South Boulder Creek Area

- This portion of the management area offers a diversity of habitats and relatively flat trails for visitors to enjoy with the scenic mountain backdrop.
- The amount of visitor activity by people, dogs, and horses is comparatively high and growing in this habitat-rich area. A significant number of visitors live in Shanahan Ridge, but this area is also a destination for other visitors.
- The mountain bicycling community has articulated the desire to allow bike use on the popular Big Bluestem-South Boulder Creek loop trails. At the same time, considerable opposition to this proposal by environmental advocates should be anticipated.
- Off-trail use has been expanding. A network of undesignated trails now exists, primarily from Shanahan Ridge south to the Big Bluestem Trail.
- On the Big Bluestem-South Boulder Creek loop trail, dogs are now required to be on-corridor voice-and-sight control. In the heart of the tallgrass areas, dogs are prohibited in off-trail areas (no change). In addition, the Big Bluestem Trail seasonally requires dogs to be on-leash, because of the bear feeding activity in the fall (no change).

Management Issues

Shanahan Ridge Area

- The lack of a formal trailhead creates some conflict over parking in the neighborhoods.
- Many undesignated trails exist from neighborhood access points.

Big Bluestem/South Boulder Creek Area

- A significant number of undesignated trails come off of Shanahan Ridge to the south, and off-trail use in the tallgrass areas is increasing. Widening of some of the designated trails is also occurring, which can cause soil erosion and spread of weeds.
- In the past, heavy grazing at certain times of the year degraded the health of the plant community and the aesthetics for visitors. However, recent changes in grazing practices have improved the situation.
- Seasonal dog leash requirements have had a low level of compliance on the Big Bluestem Trail.

Recommended Management Actions

Shanahan Ridge Area

- Reconsider the need for and feasibility of a new trailhead on Shanahan Ridge.

Big Bluestem/South Boulder Creek Area

- Evaluate, close or retain, restore, and monitor undesignated trails, especially those from Shanahan Ridge.
- The Big Bluestem/South Boulder Creek loop trail is proposed for a voice-and-sight compliance study area, which will evaluate whether or not changes to dog management regulations are needed.
- To improve grassland health and aesthetics, remove cattle grazing when the current leases are terminated, except for prescribed grazing to achieve resource objectives.
- Closely monitor this area to ensure that any undue impacts do not occur as a result of visitor use.
- Develop and implement a restoration plan for this area to ensure that the health of the ecosystem is restored.

Doudy Draw Natural Area

References: 4, 7, 10, 13, 14, 15, 16, 24, 26, 28, 29, 31, 34

Natural Resources

- This management area is a relatively large expanse of natural lands, with mixed grasslands in the north and east, and ponderosa pine forest and savanna in the southwest. The habitat is largely unbroken--penetrated by only two designated trails (Community Ditch and Doudy Draw), and the power line maintenance road. Highway 93 and the Greenbelt Plateau Trail are located on the eastern margin. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- It includes some very extensive and diverse north-facing shrub communities in the uplands, forest meadows and outwash mesa tops with xeric tallgrass, and riparian areas for portions of Doudy Draw and some other drainages. The management area also includes several pockets of forest interior habitat and mature forest. (Mature forest conditions include a mix of characteristics such as large trees, old trees, multiple tree canopy layers, forest canopy openings, and diversity in tree size, density, species type, and age). Species of concern such as northern goshawk and flammulated owls, denizens of intact mature forest, may inhabit the area.
- The Doudy Draw Natural Area harbors several known rare plants such as the federally-threatened Ute ladies'-tresses orchid (*Spiranthes diluvialis*), and birdsfoot violet (*Viola pedatifida*) and dwarf leadplant (*Amorpha nana*), which are both listed by the Colorado Natural Heritage Program. In addition, the area contains a rare plant community listed by Colorado Natural Heritage Program (Ponderosa pine/Big bluestem, mountain mahogany). This occurrence area is the most southerly extent of mountain mahogany on Open Space and Mountain Parks lands.
- The management area includes a diverse transitional area between the foothills and the plains. As such the area has high habitat values for birds and mammals. Relatively rare butterflies associated with montane/foothill habitats and tallgrass habitats utilize this area.
- Doudy Draw is an important bear habitat and an avian habitat of special interest (especially the upland shrub habitat). The management area also includes a large active prairie dog colony, which is part of a designated Prairie Dog Habitat Conservation Area
- There are several drainages that provide riparian habitat, that harbor many different species including threatened Preble's meadow jumping mouse.
- Lindsay Pond, and possibly other wetland areas, harbors northern leopard frogs, which are a state-threatened species. Lindsay Pond also harbors a large concentration of painted turtles.

Recreational Use

- This management area offers a diversity of habitats and relatively flat trails for visitors to enjoy with the mountain backdrop in the background.
- The Community Ditch Trail and the Doudy Draw Trail are very popular. Less used are County Road 67 up to the Fowler Trail and a very small trail segment that connects to the Rattlesnake Gulch Trail.
- Visitor use--people, dogs, horses, and bikes--is moderate and has increased steadily, fueled by its "discovery" by many visitors, many of whom live in the growing cities outside Boulder County. Off-trail use especially has been expanding. An extensive network of undesignated trails, primarily along and north of the Community Ditch Trail and south of the Doudy Draw Trail (east-west portion), dissects this area.
- Dog management on the Community Ditch Trail and the Doudy Draw Trail is on-leash or voice-and-sight control, except for a portion of the Doudy Draw Trail that is seasonally on-leash because of bear protections (no change). On County Road 67 up to the Fowler Trail and the trail segment that connects to the Rattlesnake Gulch Trail, dogs are now required to be on trail and on-leash. Dogs are prohibited in the southwest portion of this management area (no change).
- Cultural resources in this management area may need protection or stabilization.

Management Issues

- Undesignated trails are beginning to form in the southern part of Lindsay and Lindsay-Jefferson County, with uncontrolled use on the Stengel II property spilling over into this area. Multiplying undesignated trails are dissecting interior forest habitat, shrubland, and riparian communities. Soil erosion on hillsides and in drainages is occurring where equestrians and pedestrians use them. Weeds are spreading along the undesignated trails, and one social trail threatens an occurrence of Ute ladies' tresses. The quality of habitats is being degraded with uncontrolled access and off-trail use. Of particular concern is the impact of off-trail use on the Doudy Draw wetlands and riparian areas and the north-facing shrublands. The lack of a sustainable trail system where extensive undesignated trails have occurred supports continuation of this situation.
- Significant congestion at the Doudy Draw and Flatirons Vista trailheads, including parking overflow onto Eldorado Springs Drive and State Highway 93 right-of-way respectively, needs to be addressed. Horse trailer parking is common and increases congestion.

Recommended Management Actions

- Develop new designated trails south of the Doudy Draw Trail; eliminate the undesignated trails.
- Develop a new north-south trail connection east of the Denver Water Canal; eliminate the undesignated trails.
- Require dogs to be on-leash (and on-trail), including the existing trails on County Road 67 up to the Fowler Trail and the trail segment that connects to the Rattlesnake Gulch Trail.
- Develop a solution to lessen congestion and parking overflow at the Flatirons Vista trailhead and the Doudy Draw trailhead.
- Closely monitor this area to ensure that any undue impacts do not occur as a result of visitor use.
- Develop and implement a restoration plan for this area to ensure that the health of the ecosystem is restored.

East Marshall Mesa Natural Area

References: 4, 13, 14

Natural Resources

- This management area includes both drier upland grasses (mostly Western wheat-mixed grass prairie) and shrubs and also relatively wet meadows. Diverse riparian areas are present in the Cowdry drainage and along the ditches, and wetlands exist in low-lying areas.
- While this management area was severely disturbed by mining activity in the 19th and 20th centuries, many native plant communities have recovered to varying degrees.
- Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.

Recreational Use

- This management area does not contain any designated trails, but it is becoming more popular as visitors explore off-trail areas to the east of the trailed areas. A substantial network of undesignated trails has developed here. Clearly there is a desire by visitors to travel to and from Superior and connect with existing trails on Marshall Mesa.
- A new trail connection east to Superior is planned, extending from the existing trailhead east to S. 66th St. and then east to Superior.
- Dog management is on-leash or voice-and-sight control (no change).

Management Issues

- Undesignated trails along steep slopes have caused erosion. One of the undesignated trails intrudes into the Cowdry drainage, which could negatively impact the wetland.

- Trailhead parking congestion that spills onto Marshall Drive could become worse with increases in visitation due to general growth in use and the new trail connection.

Recommended Management Actions

- Construct a trail connection from Marshall Mesa to S. 66th St. to Superior; eliminate the undesignated trails.
- Provide a solution to the trailhead parking congestion and safety concerns before the new trail is constructed.

South Boulder Creek Natural Area

References: 2, 3, 4, 6, 9, 13, 14, 17, 35

Natural Resources

- This management area extends along South Boulder Creek from the Centennial Trail south to State Highway 93. It is entirely included in the South Boulder Creek State Natural Area, a State designation that recognizes the high natural values of this relatively large habitat area composed of large remnant stands of tallgrass prairie, wet meadows, wetlands, and plains riparian and transitional riparian forests. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- Most of the management area consists of native vegetation, with a preponderance of big bluestem, yellow Indiangrass, western wheatgrass, and prairie cordgrass. Dwarf leadplant and American groundnut (*Apios americana*), both of which are listed as rare and sensitive by the Colorado Natural Heritage Program, are present in this management area. American groundnut in this management area is one occurrence of the six known locations in Colorado (four of six in Colorado are on Open Space and Mountain Parks).
- Two federally-listed threatened species are present--Ute ladies'-tresses and Preble's meadow jumping mouse. The riparian corridors along South Boulder Creek and several ditches provide important wildlife habitat.
- The mixed and tall grasses provide high-quality ground-nesting bird habitat for a suite of grassland bird species not common elsewhere in the Front Range. Voluntary seasonal closures currently are used to protect bobolinks nesting in selected areas.

Recreational Use

- The South Boulder Creek Trail is one of the most heavily used trails in the Open Space and Mountain Parks system. It provides views, shade and amenities in the riparian areas, and access to water. A separate hard surface trail is open to bicycles and horses from Baseline Road to the vicinity of the East Boulder Recreation Center. Some visitors go off-trail to hike close to or fish in South Boulder Creek.
- Dogs are prohibited in the portion of the management area south of South Boulder Road, including the South Boulder Creek Trail, except that dogs are now allowed to travel on-leash from the trailhead parking to where the trail turns north. North of South Boulder Road, dog management is on-leash or voice-and-sight control, except that dogs are required to be on-leash on the multi-use paved trail.
- A significant amount of equestrian and hiking activity is accessed from the Wildflower Ranch (east of South Boulder Creek) and is increasing over time.

Management Issues

- While undesignated trails are not common, undesignated trails along South Boulder Creek exist and trail widening occurs. The South Boulder Creek Area Management Plan sets the objective to minimize the existence of trails on both sides of the same creek sections, in order to preserve habitat values. To date, significant damage to riparian areas has not occurred, but this situation needs to be monitored over time.

- In certain areas, the grassland bird communities may need some protection from dogs during times of nesting (seasonal closures).
- Significant congestion and parking overflow occurs at the Bobolink trailhead. Parking along Marshall Road (just east of Highway 93) is increasing as visitors access the South Boulder Creek management area from the west.

Recommended Management Actions

- Continue the prohibition of dogs south of South Boulder Road (including the South Boulder Creek Trail), in order to provide a place where non-dog walkers can be away from dogs and provide added resource protection.
- To eliminate conflict between dogs and bikes, require dogs to be on-leash on the multi-use paved trail north of South Boulder Road.
- Require seasonal closures or dog exclusions to protect seasonal nesting of grassland birds (a voluntary closure is already in place for this purpose in many areas).
- Develop a solution to lessen congestion and parking overflow at the Bobolink trailhead.
- Separate cattle and trail users, particularly during calving periods.

East Boulder Natural Area

References: 7, 9, 13, 14, 35

Natural Resources

- This management area includes several non-contiguous properties east and northeast of Baseline Reservoir. They include native lowland mesic tallgrass (big bluestem, yellow Indiangrass) and non-native hay pasture grasses (smooth brome, meadow fescue) and alfalfa. The management area also includes some wet meadows and riparian wetlands and forest. Many of these properties are grazed and hayed. Several of the properties have active prairie dog colonies.
- The Steinbach property contains mixed grass prairie habitat with remnant patches of needle-and-thread grass and a designated Prairie Dog Habitat Conservation Area.
- The grasslands provide ground-nesting bird habitat, and stands of cottonwoods provide perching and feeding habitat for raptors. Wintering bald eagles and other raptors perched in the cottonwoods on the Suitts property in the past, but it is unknown whether they still will as the number of visitors and dogs on the adjacent Dry Creek property (with prairie dogs) continue to increase. A small colony of prairie dogs is located on the Suitts property. The pond on the Suitts property provides relatively undisturbed habitat for water birds and other species.

Recreational Use

- The properties in this management area have low levels of visitor use, except for two. The O'Connor-Hagman and Steinbach properties see a high level of use (but low level of patrol). These two properties are directly adjacent to city of Louisville and county residents who use them for hiking and dog walking on undesignated trails (there are no designated trails).
- Dog management is on-leash or voice-and-sight control (no change except for proposal to use seasonal closures or dog exclusions to protect seasonal nesting of grassland birds).

Management Issues

- In certain areas, the grassland bird communities may need some protection from dogs during times of nesting (seasonal closures).
- The off-trail use on the O'Connor-Hagman and Steinbach properties may be causing damage to the grasslands and introducing weeds.

Recommended Management Actions

- Require seasonal closures or dog exclusions to protect seasonal nesting of grassland birds.
- Develop a trail system to formalize visitor use on the O'Connor-Hagman and Steinbach properties.
- Determine whether or not the fishing that currently occurs on the Suitts Pond should be designated or prohibited.

Creek Confluence Natural Area

References: 4, 9, 11, 13, 14, 35

Natural Resources

- This management area consists of two non-contiguous areas that contain or are in proximity to water bodies. While these areas have experienced significant human use and disturbance in the past, they are in various stages of recovery and are diverse in habitat quality.
- The Boulder Creek-South Boulder Creek confluence area includes floodplain and riparian wetland habitats and still creek backwaters and ponds that are valuable to many birds, mammals, and amphibians. The Short-Milne property, near the confluence of Boulder Creek and Fourmile Creek, contains an occurrence of Ute ladies' tresses, a federally threatened species. The management area also includes several prairie dog colonies (much of Andrus Mesa is a Prairie Dog Habitat Conservation Area). The extensive riparian forest and wetland areas in the Creek Confluence Natural Area are identified as important stream connections between Environmental Conservation Areas in the Boulder County Comprehensive Plan.
- Sawhill Ponds, created by sand and gravel mining/reclamation of the Boulder Creek floodplain and fed by water from Boulder Creek and groundwater, provides a unique plains marsh environment that supports a wide variety of insects, birds, mammals, fish, and amphibians. Some extensive cottonwood riparian areas are present in the upland areas, which provide habitat for owls and many other birds.

Recreational Use

- The level of visitor use on these properties varies greatly. The Creek Confluence management area receives a high level of visitation on the Boulder Creek and South Boulder Creek bikepaths, while off-trail use (including fishing) is low but increasing. A new trail connection through this area from the Boulder Creek path to Gunbarrel area trails is planned. Dogs are required to be on-leash on parts of the South Boulder Creek Trail and at KOA Lake (no change).
- Sawhill Ponds receives a high level of use by hikers, picnickers, dog walkers, birders, fisherpersons, and others. Many undesignated trails exist there. Dogs are required to be on-leash at Sawhill Ponds except for Ponds 1 and 2 (no change).

Management Issues

- New trails in the Confluence Area must minimize visitor use impacts on sensitive resources.
- Pit D provides valuable habitat that should be protected by not allowing dogs.
- The concentration and diversity of visitor activities at Sawhill Ponds, and the need for improved trails there, suggest the need for a site management plan.
- Open Space and Mountain Parks would like to own Sawhill Ponds, which it currently leases from the Colorado Division of Wildlife.

Recommended Management Actions

- Close Pit D to dogs.
- Construct the Valmont to Gunbarrel trail connection, with the alignment designed to minimize impacts on resources.
- Formalize the trails to the first two ponds (most easterly ones) at Sawhill Ponds.

(Both the Valmont to Gunbarrel trail connection and trail improvements at Sawhill Ponds will be considered for action as part of the Boulder Creek Confluence Plan, which is currently underway.)

Valmont Reservoir Natural Area

References: 7, 9, 13, 14

Natural Resources

- This management area includes two non-contiguous areas that are close to Valmont Reservoir: Valmont Butte open space and Ute Industrial Park properties.
- Valmont Butte open space includes the north side of the Butte and is relatively undisturbed. It includes some remnant native grassland and shrublands. It provides habitat for birds and mammals in a relatively isolated, protected setting.
- The larger Valmont Butte geologic site has a long history of human activities and alteration. It was part of the original Valmont Butte town site. It was historically mined for crushed rock and gravel as late as the 1980s. It was the location for a historic mining ore processing site, with tungsten, gold, and silver brought there from elsewhere. It is the location of the historic Valmont cemetery. It has been used as a Native American ceremonial site. The Valmont site is proposed for city of Boulder redevelopment, including a biosolids composting/recycling site and a regional fire training facility.
- The Ute Industrial Park property is surrounded by Valmont Lakes on two sides and provides both prairie and riparian habitat that support an extensive prairie dog colony, raptors, badgers, and many other animals. An osprey nest is currently located there. Most of this property was converted to agricultural crops and hay fields decades ago, and the condition of its vegetation and soils currently is very poor. The property is designated as a Prairie Dog Habitat Conservation Area. The Open Space and Mountain Parks operations/maintenance office occupies a former industrial building there.

Recreational Use

- Valmont Butte has very low visitation and has no visitor facilities.
- The Ute Industrial Park property receives a low level of visitation but could be a popular wildlife watching destination (for birds and prairie dogs).
- Dog management is on-leash or voice-and-sight control in this management area (no change).

Management Issues

- Redevelopment of Valmont Butte must protect the open space habitat values, deal with containment/clean-up of mine tailings, and respect the historic structures and cemetery.
- Significant growth in birding or other visitor activities may require management of visitor use at the Ute Industrial Park property.

Recommended Management Actions

- Ensure that the redevelopment of Valmont Butte protects the open space habitat values and cultural values of the property.
- If significant growth in wildlife observation or other visitor activities occurs, consider providing wildlife viewing and interpretive facilities.

Diagonal Natural Area

References: 7, 8, 9, 13, 35

Natural Resources

- This management area includes four non-contiguous areas close to and providing open land buffers along the Boulder-Longmont Diagonal Highway. Fourmile Canyon Creek is a

prominent natural feature, with some extensive cottonwood stands and other riparian habitat. Some drainageway wetlands and wet meadows are present. The vegetation is a mosaic of various types, dominated by non-native hayfields that offer ground-nesting bird habitat.
- Extensive prairie dog colonies exist on many portions of the management area (the part of the management area north of Independence Road and east of the Boulder-Longmont Diagonal Highway is a Prairie Dog Habitat Conservation Area).

Recreational Use
- The Fourmile Canyon Creek Trail and the Cottonwood Trail receive a high amount of visitation. However, the rest of the management area receives relatively low levels of visitor activity, and few undesignated trails exist.
- Dog management is on-leash or voice-and-sight control in this management area (no change).
- A key trail connection between the Fourmile and Cottonwood trails, involving a crossing of the Burlington Northern railroad tracks, is proposed.

Management Issues
- Visitors routinely cross from the Fourmile and Cottonwood trails, going over the railroad tracks or through sensitive riparian areas. A new safe, sustainable trail crossing is needed.
- Dogs roam off-leash in both prairie dog and riparian areas. The designated trails in this area criss-cross through a prairie dog colony where very few users control their dogs.
- In certain areas, the grassland bird communities may need protection from dogs during times of nesting (seasonal closures).

Recommended Management Actions
- Require seasonal closures or dog exclusions to protect seasonal nesting of grassland birds.
- Construct a safe trail crossing from the Fourmile Canyon Creek Trail to the Cottonwood Trail.

Gunbarrel/Heatherwood Natural Area

References: 4, 7, 13, 14, 35

Note: The Open Space and Mountain Parks lands in the Gunbarrel area have been placed into two management area designations: the Gunbarrel/Heatherwood Passive Recreation Area (south of Lookout Road, described in a separate section) and the Gunbarrel/Heatherwood Natural Area (north of Lookout Road, described in this section). These two management areas share many characteristics, with much of the land in dryland farming. However, the bulk of the passive recreational activity occurs in the Passive Recreation Area.

Natural Resources
- In the past, the land on Gunbarrel Hill and around Heatherwood (a large contiguous block of land) was farmed for dryland crops (mostly dryland winter wheat), and much of it was severely overgrazed. These damaged lands are now undergoing native grassland restoration under the federal Conservation Reserve Program. The soils on these dry wind-exposed sites did not support plowing and cropping in a sustainable manner, with the result that they became highly eroded. The restoration of these lands has involved the planting of native grasses and forbs. The different properties are in different stages of recovery, but they are all being managed to restore a sustainable native grassland ecosystem. The habitat values of these lands are slowly being restored with the natural stabilization of prairie soils and reestablishment of native plant communities.
- Other smaller blocks of non-Conservation Reserve Program properties are still cultivated with non-native hay crops, some are non-native pastures used for grazing, and some are fallow. The habitat values of grassland properties in this management area support many native bird species, as well as small mammals, including some prairie dog colonies. The prairie dog colony in this management area has been the location of nesting burrowing owls, the first

observed or recorded nesting success in the Boulder Valley in years. The management area also supports some wet meadows and wetlands along ditches and creeks. Located in the White Rocks/Gunbarrel Hill Environmental Conservation Area.

Recreational Use

- Much of the land in this management area does not receive a high level of visitation. However, the Cottontail Trail, which is next to residential areas, receives significant visitation (hiking, dog walking, and biking).
- Dog management in this management area is predominately on-leash or voice-and-sight control (no change). Dogs on-leash is required on two portions of the Cottontail Trail (no change).

Management Issues

- Off-trail activities such as hiking and dog walking, to the extent that it occurs in the future, may make it more difficult to prevent invasion of weeds and restore some of the Conservation Reserve Program lands.
- In certain areas, the grassland bird communities may need some protection from dogs during times of nesting (seasonal closures).

Recommended Management Actions

- Monitor, assess, and determine whether or not any restrictions on visitor access should be implemented to support the restoration of native grasslands on the Conservation Reserve Program lands.
- Require seasonal closures or dog exclusions to protect seasonal nesting of grassland birds.

Outlots

References: 13

Natural Resources

- There are dozens of small outlots that have been dedicated as open space. They vary in their character and size. Some are internal open space in housing or industrial developments, some are undeveloped, some are natural portions of large residential lots next to larger Open Space and Mountain Parks land holdings, some are along Greenway trails. Some outlots have high quality habitat values (such as the east side of the Dakota Hogback or certain wetlands/riparian areas), while others do not, but they all provide relief from dense urban development. Size is highly variable--from less than 1/10th of an acre to 20+ acres.

Recreational Use

- The recreational use of these properties varies depending on whether they are privately owned with an open space easement or publicly owned, their location relative to development, and their size.
- Dog management is generally on-leash, since most of these properties are in the city (no change).

Management Issues

- These relatively small parcels are difficult to manage for recreational use and for conservation of natural resources.

Recommended Management Actions

- No specific recommendations.

Agricultural Areas

East Boulder Valley Agricultural Area

References: 9, 13, 35

Natural Resources

- The two designated Agricultural Areas include the largest blocks of high quality, productive agricultural land in the Open Space and Mountain Parks system. These areas were once native grasslands but have been converted to agricultural production because of their excellent soils and water availability to support crops (such as corn, wheat, oats, barley, or alfalfa, smooth brome and orchard grass hay) and/or non-native grasslands for grazing.
- American groundnut (*Apios americana*), which is listed as rare and sensitive by the Colorado Natural Heritage Program, is present in the East Boulder Valley Agricultural Area. American groundnut in this management area is one occurrence of the six known locations in Colorado (four of six in Colorado are on Open Space and Mountain Parks).
- This management area includes a number of physically disjunct agricultural properties in the eastern part of the Boulder Valley. Dry Creek runs through several of these properties, and several ditches provide water for irrigation (most are irrigated). Some wet meadows and riparian areas are present.
- In some fields limited herbicides or pesticides are used to maintain crop production. Heavy machinery is used in agricultural production in some fields.

Recreational Use

- Hiking, dog walking, horseback riding, and bike riding are popular activities on the East Boulder-Teller Farm Trail.
- Dog management is on-leash or voice-and-sight control in this management area, except for on-leash at Teller Lake #2 and no dogs at Teller Lake #5 (no change).
- Fishing is a popular activity at Teller Lake # 2 and Teller Lake # 5.
- A major new trail connection is planned for the East Boulder Trail from the Dry Creek property (at Baseline) to Teller Farm, located on Open Space and Mountain Parks properties and paralleling Dry Creek in some places.

Management Issues

- Crops and hay are damaged when people, dogs, and horses travel off-trail.
- Dogs roam off-leash in both prairie dog and riparian areas. The designated trails in this area criss-cross through a prairie dog colony where very few users control their dogs.
- In order to protect resources, the trail alignment for the East Boulder Trail extension should be located to minimize disruption to the riparian zone for Dry Creek and agricultural operations.

Recommended Management Actions

- Monitor compliance with dog regulations in this management area and take management actions to minimize conflicts with agricultural operations.
- Future construction of the East Boulder Trail from Dry Creek to Teller Farm should be located to minimize impacts on the Dry Creek riparian zone and agricultural lands.

North Boulder Valley Agricultural Area

References: 4, 7, 8, 13, 14

Natural Resources

- Boulder Valley Ranch is a working ranch with horse boarding, cattle grazing, and hay production. It includes some remnants of mixed-grass prairie (western wheatgrass-blue grama), but most of this agricultural area is non-native hay grass fields, many of which are

irrigated. A small portion of the area is shale barren prairie with needle-and-thread grass and New Mexican feathergrass, both listed by the Colorado Natural Heritage Program. The management area supports a large and significant occurrence of Bell's twinpod, also listed by the Colorado Natural Heritage Program. The management area also includes some riparian areas, wetlands, and pond/marsh habitat. Located in the Boulder Valley Ranch/Beech Open Space Environmental Conservation Area.

- The management area includes some extensive prairie dog colonies (much of the management area is included in a designated Prairie Dog Habitat Conservation Area). It also includes perches and feeding areas for raptors (including bald eagles), and nest sites for northern harriers.
- The native grasslands and some of the irrigated hay fields are habitat for ground nesting birds.

Recreational Use

- The Boulder Valley Ranch trails are heavily used, especially since they provide a connection between foothills trails and trails around Boulder Reservoir. The Sage Trail and the Eagle Trail in this management area are very popular with hikers, bicyclists, dog walkers, and horseback riders. Others parts of the management area on the northern and eastern fringes do not have trails but do get some off-trail use.
- Dogs are currently prohibited in a significant portion of this management area (Axelson property, no change). The Sage Trail is now on-corridor voice-and-sight control.
- A new trail from Boulder Reservoir to Lyons along the Boulder Feeder Canal is proposed as a collaborative project with Boulder County. Concerns about possible negative water quality impacts from a new trail have been expressed by the Boulder Water Utility, and a resolution of conflicting views will be needed before this trail becomes possible.

Management Issues

- A significant conflict exists between off-leash dogs and livestock, and to some extent off-trail visitor use and crop production. The problem of dogs harassing cattle is especially acute during the calving season.
- Dogs chasing prairie dogs off-trail is also a significant problem.
- Trail widening, braiding, and associated soil erosion and spread of weeds are significant problems in this management area.
- Bell's twinpod habitat needs to be protected from trampling by off-trail visitors.

Recommended Management Actions

- Implement seasonal on-leash requirements, where needed, to reduce dogs harassing cattle.
- The Sage Trail is proposed for a voice-and-sight compliance study area, which will evaluate whether or not changes to dog management regulations are needed.
- Make improvements to the existing fence along the Eagle Trail where dog off-trail travel is prohibited.
- Maintain dog access to most of the former irrigation/stock pond.
- Make trail improvements to deal with problems of trail widening, braiding, and erosion, including definition of the tread for major trails.
- Close the undesignated trails in the area just south of the Sage Trailhead, with its concentration of Bell's twinpod.
- Construct the Boulder Feeder Canal trail portion on Open Space and Mountain Parks lands when issues have been resolved.

Habitat Conservation Areas

North Foothills Habitat Conservation Area

References: 1, 4, 7, 8, 10, 13, 14, 15, 16, 31, 34

Natural Resources

- A large, relatively unfragmented habitat block, including a mosaic of mixed grass prairie, woodlands, shrublands, and riparian habitats. Includes a variety of steep draws and flatter mesas. The management area includes many Colorado Natural Heritage Program-identified sensitive plant communities, including: Foothills ponderosa pine savanna, Foothills ponderosa pine scrub woodland, Great Plains mixed grass prairie, mixed foothills shrubland, shortgrass prairie, and xeric tallgrass prairie. Includes important shale barren outcrops of the Niobrara and Pierre shale formations. Includes extensive prairie dog habitat (part of the management area is included in a designated Prairie Dog Habitat Conservation Area), rare butterfly habitat, and rare plants such as Bell's twinpod and birdsfoot violet. Some of the rare butterflies that depend on this area include: cross-line skipper, arogos skipper, and two-spotted skipper. The management area is important habitat for ground-nesting birds, because it offers a large block of high quality grassland habitats.
- This management area is a major raptor use area along the foothills. Historically and to this day, eagles nest on the Palisades, a striking vertical cliff-face, which is included in the seasonal wildlife closures.
- Includes the only known rattlesnake hibernaculum on Open Space and Mountain Parks lands, and many other kinds of snakes are concentrated here. The hibernaculum site is probably near the crest of the foothills in the Schneider draw; snakes likely disperse to lower elevations during the summer. Protection of this habitat for reptiles is critical to allow reproduction.
- Includes rare red-lipped plateau lizards.
- This management area has very good restoration potential as an ecotonal foothills grassland/mixed grassland ecosystem. Located in the Boulder Valley Ranch/Beech Open Space Environmental Conservation Area.

Recreational Use

- Currently there are two designated trails (Hogback Trail and a section of the Foothills Trail) and a low density of undesignated trails. A historic railroad grade running along the foothills has become the major undesignated recreational access and trail into the north part of the management area. Recreational use is currently relatively low but has been increasing. Visitor use is projected to grow substantially as all the new north Boulder neighborhoods are developed. There is a desire by recreationists to extend the Foothills Trail north from its terminus to the Heil Ranch.
- Dogs are required to be on-leash in this management area (no change). They are not allowed on the Hogback Trail (no change). They are required to be on-leash or voice-and-sight control on the Foothills Trail located on the south boundary of this management area.
- Contains prehistoric and settlement-era cultural resources. These resources need protection from visitor use activities.

Management Issues

- Undesignated trails, if they continue to develop, will significantly degrade and fragment the habitat. Some of the natural features and resources would be highly sensitive to damage from off-trail use.
- The steep draws, rocky hillsides, and shale barrens have highly erodable soils that are not suitable to sustainable trail construction and use.
- No infrastructure is currently provided to accommodate the paragliding activity. This activity may not be sustainable without new infrastructure to support it.

Recommended Management Actions

- Eliminate undesignated trails in the West Beech and Palisades areas.
- Maintain the no-dogs requirement on the Hogback Ridge Trail.
- Assess whether or not to provide a paragliding launch and landing site in this management area.

Western Mountain Parks Habitat Conservation Area

References: 4, 10, 11, 14, 16, 19, 20, 21, 22, 24, 25, 26, 31, 32, 34, 35

Natural Resources

- This management area contains many different types of ecosystems that form a mosaic of different habitat types: rocky cliffs, forests, woodlands, grassland savannas, montane meadows, wetlands, and riparian areas. Located in the Hawkin Gulch/Walker Ranch/Upper Eldorado Canyon Environmental Conservation Area and Boulder Mountain Park/South Boulder Environmental Conservation Area. Most of this management area is registered in the Colorado Natural Areas Program. Once the Visitor Master Plan is completed, the Natural Areas Program designation will be finalized.
- Contains several large habitat blocks, which are dissected by few if any trails and roads. These habitat blocks contain most of the naturally occurring ecosystem components and processes and harbor many species that thrive where few people are present (e.g., forest interior species).
- Contains many diverse forest settings and rich habitats--wet and dry areas, higher and lower elevation, diversity of tree species and ground-level vegetation.
- Contains the upper reaches of many important riparian areas and ephemeral streams and many biological diversity hot spots for rare and sensitive plant communities, where many different kinds of species occur in concentrated areas or corridors, including many listed by the Colorado Natural Heritage Program. Some of the many rare and sensitive plants include: chaffweed, paper birch, white adder's mouth, Sprengle's sedge, Torrey sedge, rattlesnake fern, Rocky Mountain sedge, smilax, Frost weed, yellow hawthorn, wood lily, broad-leaved twayblade, wavy-leaf stickleaf, western polypody, calypso orchid, picture-leaf wintergreen, and hazelnut, river birch and alder communities.
- This management area contains many areas with avian habitats of special interest, which harbor birds such as wild turkey, hermit thrush, ruby-crowned kinglet, hairy woodpecker, flammulated owl, long-eared owl, pygmy owl, saw-whet owl, northern goshawk, sharp-shinned hawk, and golden eagle.
- Provides a refuge for large forest predators like black bears and mountain lions.
- The Green Mountain area is a site for several rare butterflies, including: hop-feeding azure, Schryver's elfin, and Snow's skipper.
- Contains important habitat for the state-threatened Townsend's big-eared bat and many other bats.
- Contains several important areas of special natural heritage values:

Lost Gulch and Long Canyon/Panther Bowl

- Contains many rugged areas that have never been logged and some of the oldest trees on Open Space and Mountain Parks (300-400 years old).
- Several moist drainages (which are spring fed), with important riparian areas that harbor many rare, sensitive, and threatened plant communities (such as wild sarsaparilla, black snakeroot, carrionflower, wood lily, paper birch, beaked hazelnut, red baneberry, Rocky Mountain sedge, Torrey sedge, and broad-leafed twayblade orchids). These areas are hotspots for forest breeding birds.

Greenman Springs

- Particularly important botanical hot spot that contains the only known occurrence of the White adder's mouth orchid in Colorado, as well as other rare and sensitive plant species such as rattlesnake fern and western polypody fern.

Bear Canyon and High Elevation Areas

- Bear Canyon is an important wildlife travel corridor from the foothills to the plains.
- There are many unique and diverse forest settings in areas behind Bear Peak and South Boulder Peak, including mixed conifer stands that contain lodgepole pine, limber pine and Colorado blue spruce, and alder and birch communities.
- The federally listed Preble's meadow jumping mouse (threatened) inhabits Upper Bear Canyon.

Recreational Use

- This management area is a destination for those who want to climb the highest mountain peaks in Boulder's mountain backdrop, including Green Mountain, Bear Peak, and South Boulder Peak.
- Provides both moderate and rugged back-country experiences. A destination for those seeking physical challenge, remoteness, and solitude. Many trails wind through thick forest or travel to the high peaks.
- The overall level of trail use is low, and there is a low density of undesignated trails.
- Climbing and bouldering occur in this more remote management area, but they are not as popular here as in the Flatirons/Mountain Backdrop Natural Area. Sacred Cliffs and the backside of South Boulder Peak are two of the most popular climbing destinations in this management area. Access to them requires going off the designated trails.
- Mountain biking groups have advocated either opening some mountain backdrop trails to bikes or building a trail connection west of State Highway 93 through the mountain backdrop to Walker Ranch or Boulder Canyon. Currently there is a Council-adopted prohibition on new mountain biking trails west of State Highway 93/Broadway.
- Dog management in this management area has historically been all voice-and-sight control; the Visitor Master Plan changes dog management to be predominantly on-leash, with some exceptions**:** no dogs on Long Canyon Trail and on a portion of the E.M. Greenman Trail, and on-corridor voice-and-sight control on Ranger Trail to Green Mountain peak. Dogs are currently required to be on-leash on the Boulder Creek Bike Path and the Eldorado Canyon Trail (no change).

Management Issues

- Considerable spillover of hiking use occurs from the Flagstaff Road corridor into untrailed areas, particularly off-trail use by climbers seeking out climbing rocks or bouldering areas.
- Opportunity to preserve the unique back-country experience **(**especially important here given increases in visitor use).

Lost Gulch

- Relatively intact with few threats from recreational use, and the opportunity is available to secure this area from future threats. A new multi-use trail is proposed on Chapman Drive that would provide a bike link from Boulder Canyon to Flagstaff Road. If this trail were built, visitors should be required to stay on-trail, in order to prevent new undesignated trails that would threaten the rare and sensitive plant communities and forest interior habitat in the vicinity of Lost Gulch.

Long Canyon/Panther Bowl

- The Panther Bowl area is now relatively intact with few threats from recreational use, and the opportunity is available to secure this area from future threats.
- Long Canyon Trail is within or in close proximity to the riparian zone in many places; trampling of rare and sensitive plant communities is a significant threat there, particularly from people and dogs going off-trail to the stream.

Upper Bear Canyon Area

- Visitor use is increasing over time. The designated trail is within and crosses the riparian zone several times (although fewer times since the trail re-routes in 2004); it is in close proximity to rare and sensitive plant communities, which may be damaged by soil erosion or trampling. The density of undesignated trails is not high, but they dissect a large habitat block.
- Increasing and concentrated impacts of visitor use**;** in the area west of Bear Peak and South Boulder Peak, new bouldering areas are creating new undesignated trails; off-trail running events are also adding to undesignated trails. Neighbors on Bison Drive are observing unsanctioned visitor access and use and dogs chasing wildlife.

Recommended Management Actions

- Do not construct any new trails in the Tram Hill/Lost Gulch area.
- Where it is beneficial to provide enhanced protection, for particular trail segments, continue to relocate the Long Canyon Trail up-slope away from the riparian area.
- In Bear Canyon, implement re-routes that reduce the number of stream crossings, riparian impacts, and soil erosion (completed in 2004).
- Require dogs to be on-leash (and on-trail) for: Green Mountain West Ridge Trail, Green-Bear Trail, Bear Canyon Trail, and Bear Peak West Ridge Trail. Institute on-corridor voice-and-sight control on Ranger Trail and the connecting trail between Bear Peak and South Boulder Peak trails. Prohibit dogs on the Long Canyon Trail and a portion of the E.M. Greenman Trail.
- Work with the Access Fund, the Flatirons Climbing Council, and other community groups to develop a sustainable climbing access trail to the Sacred Cliffs.
- Consider a possible mountain bike (multi-use) trail corridor from the frontside to the backside of Mountain Parks (i.e., from Eldorado Springs to Walker Ranch).

Eldorado Mountain Habitat Conservation Area

References: 4, 10, 13, 14, 16, 23, 26, 28, 29, 31, 32

Natural Resources

- A remote large habitat block with a very diverse mosaic of cliff, forest, woodland, shrubland, montane forest meadows with xeric tallgrass, and riparian/wetland habitats. Because of the large elevation changes and diversity in habitats, this management area harbors many different kinds of habitats and species. This management area harbors several known rare plants (listed by the Colorado Natural Heritage Program) such as birdsfoot violet (*Viola pedatifida*) and dwarf leadplant (*Amorpha nana*). In addition, the area contains a rare plant community listed by Colorado Natural Heritage Program (Ponderosa pine/Big bluestem, mountain mahogany). This occurrence is the most southerly extent of mountain mahogany on Open Space and Mountain Parks lands. Located in the Hawkin Gulch/Walker Ranch/Upper Eldorado Canyon Environmental Conservation Area and Boulder Mountain Park/South Boulder Environmental Conservation Area.
- The management area contains avian habitats of special interest, including cliff nesting raptor habitat, north-facing upland shrublands, and several pockets of forest interior habitat and mature forest. Species of concern like Northern goshawk and flammulated owls, denizens of intact mature forest, inhabit the area.
- There are several drainages that provide riparian habitat that harbor many different species including threatened Preble's meadow jumping mouse. This management area is also a high-

use bear and mountain lion area. The area's montane and foothills meadows offer habitat to many rare and threatened butterfly species identified by the Colorado Natural Heritage Program (some of the same species identified under the Western Mountain Parks Habitat Conservation Area).

- The back-country areas of the Schneider donation, Ebner, Eldorado Mountain, and Lindsay-Jefferson County properties are very remote and have very high habitat quality and ecosystem values.

Recreational Use

- This management area, because of high habitat quality, low visitor use, and remote location, offers both a refuge for animals and a potential back-country experience for visitors. There are no designated trails into the area. Dogs historically have been prohibited in most of this management area.
- There are undesignated trails used by climbers traveling to the Mickey Mouse Wall, several of which cross private property or the railroad right-of-way. These undesignated trails include: the road to the former Conda quarry from Eldorado Springs Drive; the existing railroad right-of-way on the mountain; and spurs off the Rattlesnake and Fowler trails in Eldorado State Park. This climbing area is accessible only part of the year and is not yet heavily used. Mickey Mouse Wall has a raptor closure from February 1 to July 31.

Management Issues

- This management area, except for the mine face scar (which has been reclaimed), is relatively unspoiled and lightly used. The opportunity exists to preserve the high habitat quality by emphasizing resource conservation and limiting visitor use. If a trail or trails were developed in the area, they could be limited, located to minimize impacts, and require on-trail visitor use.
- The undesignated trails leading to the Mickey Mouse Wall climbing area are causing significant habitat fragmentation, erosion, and vegetation loss. Currently no legal access exists to the Mickey Mouse Wall.

Recommended Management Actions

- Do not develop any new trails west of the Denver Water Canal.
- Work with the Access Fund, the Flatirons Climbing Council, other community groups, and the private property owner to develop / designated a sustainable climbing access trail to the Mickey Mouse Wall (may require acquisition or trail easement) and the Peanuts Wall.
- Evaluate, close, restore, and monitor existing undesignated trails.

Jewel Mountain Habitat Conservation Area

References: 6, 7, 13, 15

Natural Resources

- This management area is a relatively intact large habitat block with a very high quality tallgrass prairie (with species like big bluestem, little bluestem, yellow Indiangrass, switchgrass, needle-and-thread grass, western wheatgrass, and others) and Coal Creek running through it. The tallgrass occurs because the Rocky Flats piedmont floodplain deposit, which is one of the oldest geologic surfaces in Colorado, holds enough water close to the surface to support xeric tallgrass. The tallgrass has persisted because the rocky nature of the soils prevented plowing and conversion to other non-native grasses. This management area is part of the Rocky Flats Bluestem community type, which is likely part of the largest xeric tallgrass remnant in North America. The Colorado Natural Heritage Program believes the Rocky Flats Mesa xeric tallgrass to be the largest remnant in Colorado. The xeric tallgrass communities provide habitat for many rare butterflies.
- Some significant stretches of Coal Creek run through the management area, and it is an exceptional high-quality, un-trailed riparian corridor, used for wildlife migration from the foothills

to the plains. There are also some high-quality upland shrub communities. Both of these habitat types provide nesting, feeding, and hiding cover for birds and mammals. The federally-threatened Preble's meadow jumping mouse is present here. A prairie dog colony is present on the Van Vleet-Jefferson County property.

- Jewel Mountain Lake, a natural water body, is buffered by a fairly intact grassland community. It has a diverse aquatic life and provides habitat for shorebirds. It has the largest documented population of painted turtles on Open Space and Mountain Parks.
- This management area, along with the adjacent Jefferson County Open Space property, provides forest and grassland winter habitat for elk.

Recreational Use

- This management area currently is "unofficially closed" to public use, and there are no designated trails. Although visitors use the access road along the Denver Water Board Canal, the amount of visitor use is very low in this management area.
- A major highway on the eastern boundary (State Highway 93) and the Plainview residential subdivision in Jefferson County bound the management area. Gravel mining still occurs to the north of this property. The Ranson-Edwards Jefferson County Open Space property lies adjacent to the south and west of Jewel Mountain and includes a portion of the Coal Creek corridor.
- There may be a Jefferson County Open Space proposal to build a trail on the Jefferson County Ranson-Edwards property on the west side of their property. There is a proposal for the Front Range Trail to run generally along State Highway 93 (which could be on the west or east side), but it could run through Jewel Mountain/Van Vleet-Jefferson County properties.

Management Issues

- Since this management area contains such a high quality grassland and riparian corridor, and very little visitor use occurs there now, the opportunity is there to protect and preserve this unique ecosystem by minimizing future visitor use impacts.
- The Jewel Mountain/Van Vleet-Jefferson County properties are the location of some important cultural resources. Open Space and Mountain Parks has a joint management agreement with the United Tribes of Colorado, which requires protection of the cultural resources and would require joint agreement on the construction of a trail on these properties.
- Grazing management in this management area is in the process of being evaluated, with the intent to reduce grazing intensity.

Recommended Management Actions

- Do not develop any new trails and formally close the management area to public access.
- Hold open the possibility of future sustainable trail development at the periphery of the habitat block, potentially coordinating with Jefferson County.
- Ensure that the Front Range Trail does not dissect this high quality habitat.
- Modify grazing practices in this management area to implement vegetation management prescriptions.

Southern Grasslands Habitat Conservation Area

References: 2, 3, 4, 6, 7, 13, 14, 17

Natural Resources

- This management area is the largest relatively intact block of grassland habitat in the Open Space and Mountain Parks system (a mosaic of plains riparian, mixed grass, and tallgrass habitats). It is a mixed complex of many different kinds of prairie grassland communities. The dominant shortgrass species include buffalograss and blue grama. Some of the important tallgrasses include big bluestem, little bluestem, switchgrass, needle-and-thread grass, prairie dropseed, side-oats grama, western wheatgrass, junegrass, and purple three-awn. It also

includes some rare forb and shrub communities. Dwarf leadplant (*Amorpha nana*), which is listed as rare and sensitive by the Colorado Natural Heritage Program, is present in this management area. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.

- Much of this management area is open to cattle grazing. It includes important undisturbed prairie dog habitat, which is the largest Prairie Dog Habitat Conservation Area designated on Open Space and Mountain Parks. The grassland is large enough and intact enough to be a site for threatened and endangered species reintroduction (e.g., sharp-tailed grouse and pronghorn). The management area has high quality prairie and mountain vistas. It has good restoration potential as a remnant mixed grass prairie. This area includes active reclamation of historic sand and gravel mining operations.
- This management area contains several miles of Coal Creek, the longest stretch of a riparian area without trails in the Open Space and Mountain Parks system. Coal Creek is a major restoration project for Open Space and Mountain Parks, with the goals of reestablishment of functioning channel morphology and hydrology and restoration of wetland and riparian vegetation. Coal Creek has high habitat value, especially for avian species. A pair of bald eagles attempted to nest along Coal Creek in 2003, 2004, and 2005, and there has been a seasonal wildlife closure to protect the nest. It is habitat for the state-threatened Preble's meadow jumping mouse. The Terra Foundation has provided grant funding to assist the restoration of Coal Creek. The funding is based on a commitment to protect and preserve the creek after restoration work is completed.

Recreational Use

- This management area currently has no designated trails in it and is a low use area. The Greenbelt Plateau Trail forms part of its western boundary and the Coalton Trail part of the eastern boundary. Open Space and Mountain Parks has considered building a trail connector at the southern periphery of the management area (hugging State Highway 128), which would connect the Greenbelt Plateau trailhead to the Coalton Trail on the east. Unfortunately, the original proposed alignment involved partial use of the State Highway 128 right-of-way, but use of the right-of-way was denied by the Colorado Department of Transportation. The proposed trail from the East Marshall Mesa Natural Area to Superior would be located in the northeast portion of this management area--the alignment would follow the south side of Highway 170 (but not close to the Cowdry drainage) to S. 66th St., then south along S. 66th St., stopping short of Coal Creek, and connect to Coal Creek Drive in Superior.
- A recently installed stoplight at the intersection of State Highways 128 and 93 now provides a safe road crossing and connection to the Doudy Draw Trail. Open Space and Mountain Parks had proposed a trail connection using an existing underpass to connect the Greenbelt Plateau trailhead east of State Highway 93 to the Flatirons Vista trailhead west of State Highway 93, but the new pedestrian-activated stoplight with a new short connection to the Doudy Draw Trail will take its place. There are a number of existing/potential undesignated trails in this management area, but currently they do not get high visitor use.
- A launch site for beginning-level hang gliders is located off State Highway 128 on the Waneka property. The area of landing is relatively small.
- Currently, dog management in this management area is predominantly no-dogs, although dogs are allowed on leash or under voice-and-sight control on the Greenbelt Plateau Trail and on leash on the Coalton Trail.
- The Coal Creek corridor (fenced) and the Varra property are both closed to public access because of restoration activities and/or unsafe conditions. In the past, Coal Creek has been a destination for some birders and hikers to a relatively intact, un-trailed riparian area.
- A new trail was built by Boulder County in 2004 that crosses Coal Creek on the Arsenault property and provides a new trail link for Superior residents to the trails in the area.

Management Issues

- Since this management area contains such a high quality grassland and riparian corridor, and very little visitor use occurs there now, the opportunity is there to protect and preserve this unique ecosystem by minimizing future visitor use impacts.
- This large block of grassland ecosystem and the Coal Creek riparian corridor have high habitat values and also high restoration potential. This management area still has relatively low use and is un-trailed. The opportunity exists to keep this large habitat block and riparian corridor intact and free from visitor use that would penetrate the core of this management area. Keeping future visitor use at the periphery of the habitat block would support a high level of habitat effectiveness that derives from the many diverse habitat patches where prairie dogs, raptors, grassland and riparian nesters, grazers, and many other types of wildlife can be sustained.
- The undesignated trails from hikers, equestrians, and hang gliders/paragliders are mostly at the periphery of this large area. Constructing the planned trails at the periphery of the habitat block will channel visitors to low-impact areas and minimize impacts on prairie dogs, soil erosion, vegetation trampling, and weed spread.
- The off-trail landings of the hang gliders, while not deep into the habitat block, have the potential to impede cattle operations and undermine the management of this Habitat Conservation Area.

Recommended Management Actions

- Construct a new trail connection between the Coalton Trail and the Greenbelt Plateau trailhead (at the periphery of the habitat block).
- Continue formal closure of the Coal Creek corridor and the Varra property.
- In order to maximize the extent of the Habitat Conservation Area, prohibit hang gliding and paragliding at the Highway 128 site.

Tallgrass Prairie East Habitat Conservation Area

References: 2, 3, 4, 6, 7, 9, 13, 14, 17, 35

Natural Resources

- A large mixed grassland habitat block, which is split by the Denver-Boulder Turnpike. Most of the management area north of U.S. 36 is in the South Boulder Creek State Natural Area, as is much of the land south of U.S. 36 and west of Cherryvale. The management area also includes several disjunct parcels of the Colorado Tallgrass Prairie State Natural Area. These designations recognize the high natural values of this relatively large habitat area composed of large remnant stands of tall grasses, wet meadows, and riparian wetlands and forests. Located in the Boulder Mountain Park/South Boulder Environmental Conservation Area.
- Most of the management area consists of native vegetation, with a preponderance of big bluestem, yellow Indiangrass, western wheatgrass, and prairie cordgrass. This management area harbors American groundnut (*Apios americana*), which is listed as rare and sensitive by the Colorado Natural Heritage Program. American groundnut in this management area represents two of the known locations in Colorado (four of six in Colorado are on Open Space and Mountain Parks). There are some non-native hay fields, but these areas and others are managed to support their natural values, including habitat for ground-nesting birds (e.g., bobolinks), and the federally-threatened Ute ladies'-tresses and Preble's meadow jumping mouse.
- Several prairie dog colonies are scattered in this management area, and the Gallucci property and part of the Yunker property are in the designated Prairie Dog Habitat Conservation Area.
- The riparian corridors along South Boulder Creek and several ditches provide important wildlife habitat and travel corridors.

Recreational Use

- Currently, the level of visitation in this management area is relatively low. The only designated trail in this area is the connection from the South Boulder Creek trailhead to the trail along South Boulder Road. Off-trail recreational activity occurs mainly in the eastern and southern portions of the management area, with access often originating from residential subdivisions. Off-trail hiking and horseback riding has historically occurred near South Boulder Creek and on Davidson Mesa.
- Dog management in this management area is predominantly no dogs (no change).
- The Church property (east of Cherryvale) is a place where model gliding activity occurs, a very localized seasonal activity that occurs in the irrigated hay meadow when the grass has been hayed and the soil is not too wet. The property is also used for dog training by a number of dog trainers and owners.
- The Louisville Davidson Mesa Trail dead ends into a fence on the east end of the Gallucci property. Some visitors have created undesignated trails on Gallucci by crossing over the fence, and one of these trails leads all the way down to Cherryvale Road.
- A new trail along the U.S. 36 corridor is proposed in the Boulder Valley Comprehensive Plan. Recreationists have proposed a trail connection from Davidson Mesa (both sides of U.S. 36) to Marshall Mesa.

Management Issues

- A proliferation of undesignated trails is occurring in certain parts of this management area, which is exacerbated by the undesirable situation of trails on both sides of South Boulder Creek.
- These multiple trails intensify disturbance from human activity to plants, birds, and other wildlife. Off-trail equestrian use from Wildflower Ranch creates the potential for weed proliferation and other impacts to a wet meadow grassland. The Church, Hogan Brothers, and Damyanovich properties have several undesignated trails, which are becoming an increasing impact to the xeric tallgrass prairie there. The Louisville dead-end trail and access by neighbors has created a system of undesignated trails that are degrading the grassland on Gallucci and elsewhere.
- Existing pedestrian gates currently provide access where it may not be consistent with the Habitat Conservation Area designation.
- In certain areas, the grassland bird communities may need some protection from dogs during times of nesting (seasonal closures).

Recommended Management Actions

- Determine whether all existing pedestrian gates should remain open or not, in order to be consistent with the Habitat Conservation Area designation.
- Change the dog management designation to allow on-leash dogs (currently no-dogs) from the parking lot to Cherryvale/South Boulder Road, which will allow dog walkers to travel from the trailhead to the South Boulder Creek Trail (going north).
- Do not allow the existing off-trail activities for dog training and horseback riding on the Church property.
- Work with the residents of Wildflower Ranch to provide low-impact access to the South Boulder Creek Trail under a special permit.
- Consider a special use permit with appropriate conditions for model glider flying on the Church property (as a long-term historic use that has very few users and is very low impact).
- Coordinate with the city of Louisville Open Space Program to resolve access issues and prevent undesignated access into the Gallucci property and the Prairie Dog Habitat Conservation Area.
- Close the pedestrian gates where off-trail access is no longer allowed.
- Provide signs and other notices that let persons fishing along South Boulder Creek know that they must obtain off-trail permits for fishing along the creek in this management area.

Sombrero Marsh Habitat Conservation Area

References: 9, 12, 13

Natural Resources

- Sombrero Marsh is a unique natural feature in the Boulder Valley, probably the only naturally occurring perennial open water body present in the Boulder Valley at the time of settlement. Sombrero is an alkali marsh, rare in this part of the United States. As a shallow marsh that periodically dries out, Sombrero provides mudflats and deeper water areas, which provide unique habitat for emergent vegetation, wading birds, and other wildlife.
- Open Space and Mountain Parks has invested a great deal of funding and effort to repair the physical extent and functioning of this wetland ecosystem that was present before about 20% of the marsh was filled in with construction and other materials (from 1957-1980).
- Sombrero provides a unique research and educational opportunity to better understand the process of restoring a degraded wetland.

Recreational Use

- Birding has always been popular, as many different kinds of water and wading birds use the marsh.
- The partnership with the Boulder Valley School District and Thorne Ecological Institute provides a unique indoor (i.e., education center) and outdoor educational experience for elementary and secondary students. Research by university students and researchers also occurs at Sombrero Marsh.
- Hiking and dog walking are popular at Sombrero Marsh by neighborhood residents. In the western "environmental preservation area" portion of the property, visitors must stay on the trail or boardwalk, no dogs, bikes or horses are allowed, and visitation is allowed only from dawn to dusk. Seasonal wildlife closures to protect nesting birds occur when warranted.
- In the eastern portion of the property (outside the "environmental preservation area"), dogs are no longer allowed unless a trail is built (where dogs might be allowed with an on-leash on-trail requirement).

Management Issues

- A formal trail connection from the neighborhoods along the south and east is needed to encourage people to stay on-trail in the upland areas, especially the irrigated tallgrass portion of the management area.

Recommended Management Actions

- Develop regulatory changes to support the existing requirement for no off-trail activities in the designated "environmental preservation area" and dogs prohibited.
- Construct a trail connection from the existing trail near the education center to the neighborhoods to the south and east.

Cottonwood Grove Habitat Conservation Area

References: 9, 13, 14

Natural Resources

- The Cottonwood Grove is a remnant concentration of riparian forest along Boulder Creek.

Recreational Use

- The Cottonwood Grove is closed to visitor use because of the rarity and research value of the habitat. An agreement with the University of Colorado has provided long-term research there.
- While closed to public access, the site is used for illegal camping, and there are many undesignated trails.

Management Issues

- Chronic illegal camping and the undesignated trails have the effect of compacting the soils, creating weeds, and eliminating the sparse understory in the grove.

Recommended Management Actions

- Maintain the current visitor access closure in the Cottonwood Grove and continue enforcement against illegal camping there.

Lower Boulder Creek Habitat Conservation Area

References: 1, 4, 7, 13, 14, 15, 18, 32, 33

Natural Resources

- This management area contains many diverse ecosystems and habitats and forms a large habitat block. The backwaters on Boulder Creek are extremely high-quality riparian and wetland/aquatic habitat, important for birds, mammals, and amphibians. The creek channel and its vegetation contain very diverse structure, which enhances the area's habitat diversity and provides a refuge for species that are wary of humans. Located in the White Rocks/Gunbarrel Hill Environmental Conservation Area.
- The lowland areas offer wet meadows, and the upland areas offer mixed grass prairies.
- Prairie dogs inhabit a small part of the management area.
- This management area harbors a large number of amphibian and reptile species, including the only occurrence on Open Space and Mountain Parks land of the six-lined racerunner lizard. Several small ponds are managed as fish refugia.
- The management area provides wintering habitat for bald eagles and nesting habitat for northern harriers. A pair of bald eagles successfully nested near Boulder Creek in this management area in 2003, 2004, and 2005, and a wildlife closure protected the nest.
- Open Space and Mountain Parks has a conservation easement on the White Rocks properties (Windhover Ranch and Ertl), which are sandwiched in the middle of the Open Space and Mountain Parks properties in this management area. White Rocks is designated as a Colorado State Natural Area because of the highly unique rock formations (sandstone cliffs, caves, and terraces, including "turtleback rocks") above Boulder Creek, microhabitats, and rare and threatened ferns and insects that inhabit the area. The Heron Rookery, on the Culver conservation easement located on the east side of 95th St. and adjacent to the Habitat Conservation Area, is on the Colorado Natural Areas Registry.

Recreational Use

- The only designated trail through this management area is the While Rocks Trail, which receives a moderate amount of use from hikers, dog walkers, bicyclists, and horseback riders. No public access is allowed off the trail. A small amount of off-trail visitor use occurs in this management area. To the north are the East Boulder and Gunbarrel Farm Trails and to the south is the Teller Farm Trail--all of which are heavily used.
- Dogs are not allowed in this management area (no change).
- Some of the properties in the Lower Boulder Creek Habitat Conservation Area contain very important cultural resources. These resources need protection and/or stabilization.

Management Issues

- Any increase in undesignated trails is a concern.
- People trespassing in the conservation easements in this management area is a problem.
- An increase in compliance with the no-dog requirement for this management area needs to occur.

Recommended Management Actions

- Maintain the existing no-dog requirement on the White Rocks Trail.
- Maintain efforts to prevent new undesignated trails and to enforce the no-dog regulation in this management area.

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City of Boulder Open
Space and Mountain Parks

Compliance with Leave No Trace Frontcountry Principles

A preliminary examination of visitor behavior

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Compliance with Leave No Trace Frontcountry Principles

An Preliminary Examination of Visitor Behavior

Purpose of this Study

To provide baseline information about rates of compliance with six desired behaviors for visitors to City of Boulder Open Space. These behaviors are referred to as the *Leave No Trace* (LNT) frontcountry principles (table 1). This study preceded an educational initiative aimed at raising awareness of these principles.

Table 1: Leave No Trace Frontcountry Principles

- Manage your dog
- Pick up after your dog
- Stick to the trail
- Leave it as you find it
- Trash your trash
- Share the trail

• Figure 1: Location of study area in western USA

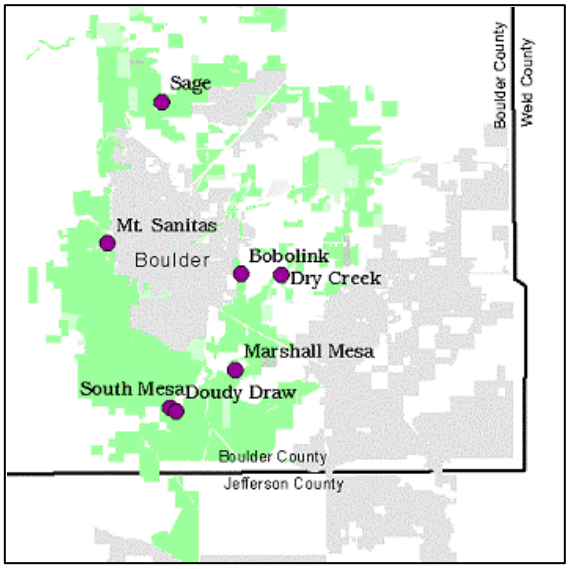
Methodology

Visitor behaviors were assessed during September 1999 at seven trailheads on the Open Space land system in Boulder County, Colorado. (figure. 1). The trailheads were selected on the basis of their relatively high use levels, geographical distribution and varied terrain. All trailheads used in the study allowed dogs under the city's "voice and sight" regulation. The approximate location of the trailheads is shown in figure 2.

Inconspicuous observers were stationed at vantage points near trailhead parking lots from where they could observe approximately 100 meters down the trail. The observers were engaged in typical visitor activities, and not identifiable as Open Space staff members.

There were three observations at each trailhead. One observation was conducted during each of the following times:

- mid-day on weekends (1000-1400hrs Saturday and Sunday)
- mid day on weekdays (1000-1400hrs Monday through Friday)



• Figure 2: Location of study areas (filled circles) within City of Boulder Open Space lands (green). Urban areas in gray

- "after work" 1600-2100 hrs, Monday through Friday)

Observers recorded the number of people and dogs entering the Open Space. In addition, the following data were collected about the six Leave No Trace principles.

Manage your dog

Measurements of compliance with dog management was cast in terms of the City's dog regulations. Dog were consider under control if they were leashed. Dogs exhibiting any of the following behaviors were considered out of control:

- **Charges/chases/shows aggression toward wildlife**

- **Charges/chases/shows aggression toward livestock**

- **Charges/chases/shows aggression toward people**
  Observers made judgements about what constituted "chasing, charging or showing aggression". Typical "peaceful" dog interactions with visitors and other dogs were not considered chasing, charging or showing aggression. When there was a question about the nature of the interaction, it was considered a peaceful interaction.

- **Charges/chases/shows aggression toward other dogs**
  Observers made judgements about what constituted "chasing, charging or showing aggression". Typical "peaceful" dog interactions with visitors and other dogs were not considered chasing, charging or showing aggression. When there was a question about the nature of the interaction, it was considered a peaceful interaction.

- **Dog out of sight of guardian**
  If dogs were very far away, or in dense vegetation, they were considered out of sight. Dogs trotting directly behind the guardian were not considered out of sight.

- **Visitor with more than two dogs**

- **Dog not responsive to commands of guardian**

Pick up after your dog

Observers recorded the number of defecating dogs. For each time a dog defecated, the observer recorded whether or not the excrement was picked up and deposited in a trash can.

Stick to the trail

Observers recorded the number of visitors leaving the trail. Observers made judgements about what constituted off-trail travel. For example leaving the trail to pick up after a dog and then returning to the trail, was **not** considered leaving the trail.

Leave it as you find it

This measure was a count of the number of times visitors were observed taking some natural or cultural feature from Open Space.

Trash your trash

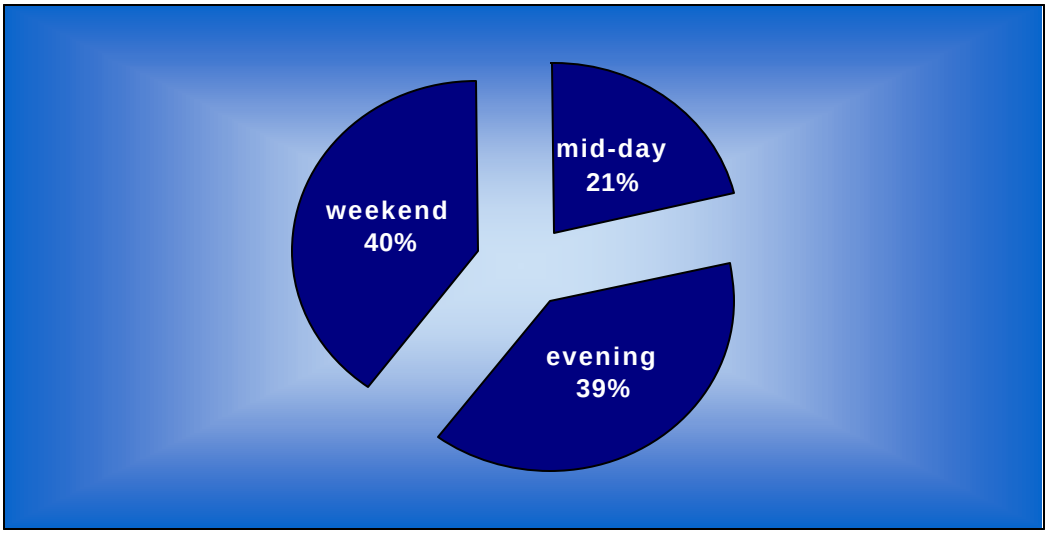
Observers recorded the number of times visitors left trash or other debris with no apparent intent to return for it.

Share the trail

This principle was measured by recording the number of times a visitor failed to yield to others (e.g. biker speeding downhill, ringing bell but not slowing down. Equestrian not moving off the trail to allow opposing traffic to pass.)

Results

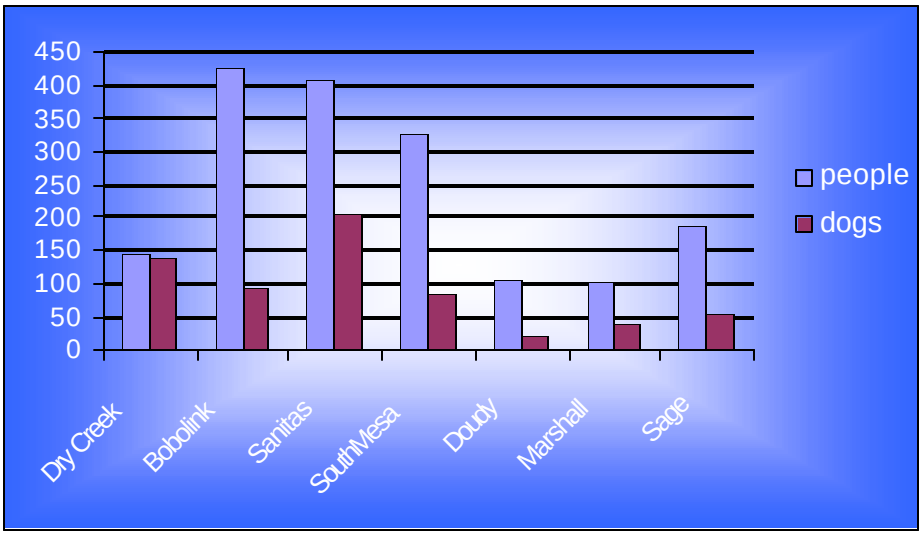
A total of 1,898 people, 720 dogs and 15 horses were observed during the 63 hours of observation. Most visitors were observed in the evenings and during the weekend (figure 3).



• Figure 3: Percentage of visitors observed by time of day.

Use was unevenly distributed among the trailheads, with the busiest trailheads receiving nearly three times the visitation of others. Ratios of dogs to humans ranged from 1:5 to 1:2 over most of the study areas. Dry Creek however had a nearly 1:1 dog to person ratio.

The results from the behavioral observation are given in tables 2 and 3. Table 2 summarizes the total rates of compliance for the six Leave No Trace principles.



• Figure 4: Total recorded visitor and dog use at study areas

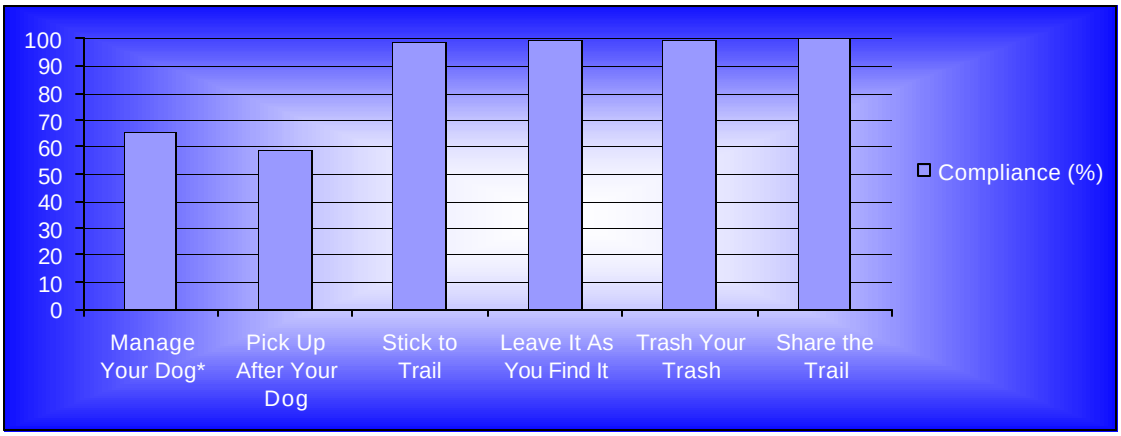
Table 3 provides a breakdown of the behaviors that resulted in non-compliance for dog management.

Table 2: Compliance with LNT principles

Principle	**Compliance (%)**
Manage Your Dog*	66
Pick Up After Your Dog	59
Stick to Trail	98.5
Leave It As You Find It	99.6
Trash Your Trash	99.5
Share the Trail	99.8

Table 3: Breakdown of behaviors contributing to non-compliance for dog management

Behavior	**Number (total = 180)**
Charges/chases/shows aggression toward wildlife	6
Charges/chases/shows aggression toward livestock	2
Charges/chases/shows aggression toward people	16
Charges/chases/shows aggression toward other dogs	20
Out of sight	100
More than two dogs	19
Not responsive to commands	40



• Figure 5: Compliance with LNT principles

Discussion

According to the data collected in this study, Open Space visitors are far more likely to be out of compliance with the dog management principles than any other Leave No Trace principles. The data suggest that over 40% of dog waste is not picked up by visitors, and that about 35% of the dogs on Open Space are not in compliance with the applicable dog management regulations mostly because dogs are out of sight of their guardians or unresponsive to their guardians commands.

Limitations of the Study

- This study did not associate dogs and visitors, therefore it is not possible to draw conclusions about the rates of non-compliance with dog management principles on a per visitor basis.
- Observers were only able to see visitors and dogs for a limited portion of their time on Open Space. It is likely that the rates of compliance given here are conservative estimates and that if followed for a longer distance, the measured rates would be lower.
- Because dog guardians were not asked to or required to call their dog, the study probably overestimates the rates of responsiveness of dogs to voice commands.

Implications for Open Space Management

- Management efforts such as education and enforcement should be focused upon improving compliance with dog management principles.
- Schedules for education and enforcement personnel should reflect peak visitor use times to ensure maximum rates of contact and opportunities for improving compliance.

Perceived Conflict with Off Leash Dogs at Boulder Open Space and Mountain Parks

Sponsored by the City of Boulder Open Space and Mountain Parks and conducted by

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Executive Summary

- This study described the extent to which visitors to the City of Boulder Open Space and Mountain Parks (OSMP) evaluated 11 human-dog interaction variables as problems.
- Data for this project were obtained from on-site surveys (n = 951) conducted at 16 OSMP locations during the summer of 2006. Sampling occurred at trailheads that provide access to trails allowing dogs to be managed under voice and site control.
- Questions related to perceived conflict examined 5 *direct* (e.g., dogs jumping on visitors) and 6 *indirect* (e.g., dogs causing wildlife to flee) human-dog interactions.
- We operationalized perceived conflict as: (a) no conflict, (b) interpersonal conflict, (c) social values conflict, and (d) both interpersonal and social values conflict.
- Summary of Key Conflict Findings
  1. All behaviors were thought to be a "slight" to "extreme" problem by some portion of the survey respondents. The most problematic behaviors were owners not picking up after their dog, dogs causing wildlife to flee, dogs jumping on a visitor, dogs pawing a visitor and dogs flushing birds.
  2. Although some statistical differences existed between (a) dog guardians versus non-dog guardians, (b) individuals who walk their dogs at OSMP versus those who do not, and (c) frequency of dog walking at OSMP, the magnitude of these differences was small.
  3. Nearly three-quarters (73%) of the respondents (14% – social values conflict; 59% – interpersonal and social values conflict) experienced some form of conflict with off leash dogs or their guardians at the OSMP locations studied.
- Recommendations
  1. The current implementation of the Voice and Sight Tag (VST) program is a necessary first step at reducing human-dog interaction conflict at areas managed by OSMP, but it may not be sufficient to eliminate conflict.
  2. To obtain a VST tag, visitors must view a video and agree to control their off leash dogs in a manner described in the video. Not included in the registration process, however, is a behavioral component where individuals demonstrate that their dogs are under voice and sight control. One recommendation would require individuals to not only watch the video, but also pass a written test and a physical demonstration of the their ability to control their dogs.
  3. Resolving the social values conflict will require continued education efforts of both dog guardians and non-dog guardians by the City of Boulder OSMP. A brochure and / or a video for non-guardians explaining the goals and objectives of the VST program, as well as appropriate behaviors of off leash dogs may help in this regard. If education efforts are not effective, a reduction in the number of trails allowing off leash dogs may be necessary.
  4. Formal education programs and formal sanctions (e.g., fines, loss of voice and sight privileges) may not be sufficient for resolving the interpersonal conflict. Part of the responsibility needs to be shouldered by OSMP visitors. Over three-quarters (78%) of the respondents believed that "it is OK for a visitor to say something to a dog owner who does not have his or her dog under control." Agency encouragement of such informal sanctions, when combined with the formal sanctions, may promote a higher quality experience for all visitors.
  5. The VST program should be periodically monitored to determine whether conflict is being reduced.

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Introduction

Researchers have analyzed recreation conflict for over four decades (e.g., Graefe & Thapa, 2004; Lucas, 1964). Although most researchers have examined interpersonal (i.e., goal interference) conflict (e.g., Jacob & Schreyer, 1980; Schneider, 2000), others have introduced and explored social values (i.e., social acceptability) conflict (Carothers, Vaske, & Donnelly, 2001; Vaske, Donnelly, Wittmann, & Laidlaw, 1995; Vaske, Needham, & Cline, 2007).

Interpersonal conflict occurs when the presence or behavior of an individual or group interferes with the goals of another individual or group (Jacob & Schreyer, 1980). A skier, for example, may experience interpersonal conflict if he or she is cut off by or collides with a snowboarder (Vaske, Dyar, & Timmons, 2004). Most recreation research has focused on interpersonal conflict between different activity groups such as non-motorized and motorized watercraft (Lucas, 1964; Shelby, 1980), skiers and snowboarders (Thapa & Graefe, 2003; Vaske, Carothers, Donnelly, & Baird, 2000; Vaske et al., 2004), hikers and mountain bikers (Carothers et al., 2001; Ramthun, 1995), hunters and non-hunters (Vaske et al., 1995), and cross-country skiers and snowmobilers (Jackson & Wong, 1982; Knopp & Tyger, 1973; Vaske et al., 2007).

Social values conflict occurs between groups who may not share similar norms / values about an activity (Ruddell & Gramann, 1994; Vaske et al., 1995). Unlike interpersonal conflict, social values conflict is defined in the literature as conflict that can occur even when there is no direct contact between the groups (Carothers et al., 2001). For example, although encounters with llama packing trips may be rare, individuals may philosophically disagree about the appropriateness of using these animals in the backcountry (Blahna, Smith, & Anderson, 1995).

A study at Mt. Evans, Colorado examined the distinction between interpersonal and social values conflict (Vaske et al., 1995). Interpersonal conflict between hunters and wildlife viewers was minimized due to the region's topography and management regulations separating the two activity groups. Conflict experienced between the groups was primarily attributed to differences in value orientations regarding the appropriateness of hunting and wildlife viewing. Nearly all of the non-hunters did not observe hunting-associated behaviors (e.g., see hunters, see animals be shot), yet still perceived social values conflict with hunters. Carothers et al. (2001) examined interpersonal and social values conflict among mountain bikers and hikers. Hikers were more likely to report both interpersonal and social values conflict than bikers.

In these investigations, perceived conflict was operationalized by combining responses from two sets of questions. First, individuals indicated how frequently events happened to them during their visit. In the Mt. Evans study (Vaske et al., 1995), events included three non-hunting (see people feed wildlife, disturb / harass wildlife, and see dogs chase wildlife) and three hunting (see hunters, hear guns being fired, and see animals being shot) situations. Responses were analyzed as "observed" (i.e., at least once) or "did not observe" the event (i.e., never saw). Second, respondents evaluated the extent to which they perceived each event to be a problem. Items were coded on a scale from "not a problem" to "extreme problem." For analysis purposes, responses were recoded into two categories ("no problem" or "problem").

Combining the frequency of occurrence (observed, not observed) variables with the corresponding perceived problem (no problem, problem) variables for each respondent produced conflict typologies with three possible attributes. Individuals who observed or did not observe a given event, yet did not perceive it to be a problem were considered to have experienced no conflict (i.e., no interpersonal or social values conflict). Those who never saw a given event, but believed that a problem existed for the event were considered to be expressing a conflict in social

values. Conversely, those who witnessed a particular event and believed that it had caused a problem were judged to be indicating interpersonal conflict.

These procedures used to operationalize "no conflict" and "social values conflict" are conceptually clear (Carothers et al., 2001; Graefe & Thapa, 2004; Vaske et al., 1995). If recreationists do not consider a situation / event to be a problem, regardless of whether or not it is observed, no conflict is apparent. If an individual does not observe an existing situation, but believes that it is problematic, the conflict stems from his or her social values. Conceptual problems, however, may arise when differentiating interpersonal from social values conflict. People who observe a situation / event *and* judge it to be a problem may be expressing interpersonal, social values, or both types of conflict. Recognizing this conceptual shortcoming, Vaske et al. (2007) further classified respondents in the interpersonal conflict cell (Figure 1) based on their agreement with the statement "just knowing that snowmobilers (or skiers) are in the area bothers me." Individuals who were initially identified as having interpersonal conflict, yet agreed that just knowing snowmobilers (or skiers) were in the area bothered them, were reclassified as having *both* interpersonal and social values conflict. Respondents who disagreed with this statement were considered to be reporting only interpersonal conflict.

The current study used the refinements developed by Vaske et al. (2007) for defining visitors as experiencing (a) no conflict, (b) interpersonal, (c) social values or (d) both interpersonal and social values conflict. Individuals in the "interpersonal and social values conflict" cell indicated that they observed a given situation, perceived that situation to be a problem, and *agreed* with the statement "Just knowing that off leash dogs are allowed in Open Space and Mountain Parks (OSMP) areas is a problem for me, even if I never see them." Individuals in the "interpersonal conflict" cell indicated that they observed a given situation, perceived that situation to be a problem, and *disagreed* with the statement "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them."

Figure 1. Conflict evaluations

		Perceived Problem	
		No	Yes
Observed	No	No Conflict	Social Values Conflict
	Yes	No Conflict	Interpersonal and Social Values Conflict [1]
			Interpersonal Conflict [2]

[1] Individuals in this cell indicated that they observed a given situation, perceived that situation to be a problem, and *agreed* with the statement "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them."

[2] Individuals in this cell indicated that they observed a given situation, perceived that situation to be a problem, and *disagreed* with the statement "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them."

The distinction between interpersonal and social values conflict is important because of the associated management implications. Three general strategies have been recognized for dealing with conflict: (a) zoning, (b) education, and (c) adopting alternative management strategies (Graefe & Thapa, 2004; Vaske et al., 1995). When conflict stems from interpersonal interactions, zoning incompatible visitors to different locations can be effective. When the source of conflict is a difference in values, intensified education efforts are often necessary, but may not be effective in changing basic beliefs. If social values conflict at OSMP is substantial, management may need to consider either (a) eliminating off leash dogs in all areas or (b) reducing the number of trails where off leash dogs are allowed.

Study Context and Objectives

The City of Boulder OSMP Visitor Master Plan identifies conflict reduction as a key objective. One specific type of potential conflict involves the presence of dogs in areas managed by OSMP and the impact of dog behaviors on the visiting public. Dog guardians, for example, that allow their dogs to be off leash may not be in control of their animals and may be less likely to clean up after their pets. Visitors who are intolerant of the presence and / or behavior of pets in natural areas are likely to evaluate these situations as unacceptable.

In response to this situation, OSMP has initiated a Voice and Sight Dog Tag Program (VST). Under the VST program, visitors wishing to have their dogs off leash and under voice and sight control are required to have a tag visibly displayed on their dogs. To obtain a tag, a visitor must view a video describing the requirements of voice and sight control and complete a registration form. Visitors not registered in the program or who do not have a tag on their dog must keep their dog on leash while visiting OSMP and other City of Boulder properties where voice and sight control applies. One objective of the VST program is to decrease conflict involving dogs on OSMP properties.

During the summer of 2006, OSMP conducted an observational study to evaluate visitors' compliance with observable aspects of existing dog regulations, including the voice and sight ordinance. The OSMP observational study also evaluated the level of conflict involving dogs on their properties. The study described in this document complements the OSMP observational investigation by evaluating visitor perceptions of conflict with dogs off leash in the City's Open Space and Mountain Parks. The study involved an on-site survey and addressed the following issues:

1. Visitors' reported frequency of observing 11 specific dog / guardian behaviors (e.g., dogs approaching visitors uninvited, guardians not picking up after their pets).
2. The extent to which visitors perceive the presence and / or behavior of dogs to be a problem at locations managed by OSMP.
3. The type (interpersonal vs. social values) and magnitude of conflict that currently exists among OSMP visitors.

Methods

Sampling Design

Data for this project were obtained from on-site surveys (n = 951) conducted at 16 locations managed by the City of Boulder Open Space and Mountain Parks during the summer of 2006 (Table 1). Representatives from OSMP distributed the self-administered surveys. Surveys were randomly distributed during July (43%), August (49%) and early September (8%). Both

weekdays (47%) and weekends (53%) were included in the sample. Surveys were administered in the morning (44%), midday (32%) and evening (24%). Sampling occurred at trailheads that provide access to trails allowing dogs to be managed under voice and site control.

Variables Measured

The one-page survey included general questions related to: (a) frequency of visitation, (b) dog ownership, (c) activities participated in on the day the individual was interviewed, (d) demographics (sex, age, education, place of residence), and (e) beliefs about off leash dogs at OSMP.

Table 1. Survey locations

Survey locations	Number	Percent
East Boulder – Gunbarrel	53	6
East Boulder – Teller Farm	21	2
Dry Creek	79	8
Bobolink	72	8
South Boulder Creek at EBCC	31	3
Marshall Mesa	66	7
Greenbelt Plateau	12	1
Doudy Draw	18	2
South Mesa	107	11
Shanahan Ridge	52	5
Chautauqua	216	23
Sanitas	64	7
Foothills	15	2
Sage	44	5
Eagle	53	6
Gregory Canyon	48	5
Total	951	100

Questions related to perceived conflict examined 11 specific behaviors that could potentially create conflict for OSMP visitors. This list of behaviors was developed collectively from input provided by OSMP and interested citizen group representatives. For presentation purposes these items were arranged into *direct* and *indirect* human-dog interactions. The direct behaviors involved situations where dogs interacted with visitors other than their guardians. In the indirect behaviors, the dog interacted with the guardian, wildlife or other dogs, or the guardian failed to pick up after their dogs.

The direct behaviors included:

- Dogs jumping on a visitor
- Dogs pawing a visitor
- Dogs licking a visitor
- Dogs sniffing a visitor
- Dogs approaching uninvited

The indirect behaviors included:

- Owners not picking up after their dogs
- Dogs causing wildlife to flee
- Dogs flushing birds
- Owners repeatedly calling their dogs
- Dogs off trail
- Dogs “play” chasing another dog

To address issues related to perceived conflict, respondents indicated the extent to which they considered each of the 11 behaviors to be a problem at OSMP. The response categories for these questions were “not at all a problem” (0), “slight problem” (1), “moderate problem” (2), and “extreme problem” (3). For some analyses and consistent with past research (Carothers et al., 2001; Vaske et al., 1995, 2007), these variables were recoded into two categories (“no problem” or “problem”). Combining the frequency of occurrence on a typical visit (observed, not observed) variables with the corresponding perceived problem (no problem, problem) variables for each respondent produced conflict typologies with the four possible attributes: (a) no conflict, (b) interpersonal conflict, (c) social values conflict, and (d) both interpersonal and social values conflict.

Results

Descriptive Findings

Fifty-six percent of the sample was female and 44% male. Half of the respondents were between the ages of 31 to 50, with another quarter over 50. The average age was 42 years old. A third of the sample held a bachelors degree and 53% had attended some graduate school or held masters or doctoral / professional degrees. Nearly half of the sample (48%) lived within the city limits of Boulder.

A quarter of the sample had visited OSMP locations two years or less; over a third (38%) had been visiting more than 10 years. The average number of years visiting OSMP locations was 11. Forty-one individuals (4%) had been visiting for more than 30 years. About a quarter (26%) of the individuals in the sample had made between 1 and 10 visits to OSMP locations within the past 12 months. On the other extreme, 38% had made more than 90 visits during the previous year. The average number of visits per year was 92 and ranged from 1 to 365 visits. A third of the respondents had made between 1 and 3 visits during the past month. Another third had visited 4 to 10 times, and a third had made more than 10 visits in the last month. The average number of visits was 10 per month and the range was from 1 visit to more than 31 visits.

Over half (54%) of the respondents were dog guardians. Of these individuals, 71% owned one dog and another quarter owned two dogs. Over half (56%) walk their dogs two or more times per week at OSMP areas. The average number of dogs per dog walker was 1.35.

Fifty-six percent were not visiting OSMP with a dog on the day they completed the survey; about a third were visiting with one dog and about a tenth (11%) with 2 or 3 dogs. On the day the respondent was interviewed, over a quarter (28%) considered their activity to be walking a dog. More than half (57%) were walking or hiking without a dog and a fifth (21%) were runners (Note: since respondents could check more than one activity, percentages do not sum to 100.)

Perceived Problem Behavior

All behaviors were thought to be a slight to extreme problem by some portion of the sample (Table 2). The most problematic behaviors were owners not picking up after their dog, dogs causing wildlife to flee, dogs jumping on a visitor, dogs pawing a visitor and dogs flushing birds.

Across all 11 potential problem behaviors, “owners not picking up after their dogs” was considered to be an “extreme problem” by 57% of all respondents (Table 2). Almost all (91%) individuals rated this behavior as at least slightly problematic. Only 10% indicated that they had observed this behavior on the day they completed the survey.

Among the other “indirect” behaviors, “dogs causing wildlife to flee” (35%) and “dogs flushing birds” (24%) were also evaluated as extreme problems, with about three quarters indicating that

these behaviors were slightly to extremely problematic. These behaviors, however, were only observed by 3% and 2%, respectively, on the day they were interviewed.

Nearly half of the respondents rated "dogs off trail" (47%) and "dogs 'play' chasing another dog" (44%) as problematic to at least some extent. A third observed dogs off trail and nearly a fifth reported seeing dogs play chasing another dog.

Among the five "direct" human-dog interaction variables, "dogs jumping on a visitor" was considered an extreme problem by 35% of the respondents; 82% rated this behavior as at least a "slight problem." "Dogs pawing a visitor" was considered a problem (slight to extreme) by three quarters of the visitors. Both of these behaviors, however, were observed by only 3% or less of the respondents on the day the survey was completed.

Dogs approaching another visitor uninvited and dogs sniffing a visitor were seen as a problem (slight to extreme) by two thirds and half of the visitors, respectively. These two behaviors were observed by about a fifth of the respondents on the day they were surveyed.

Table 2. Perceived problems associated with human-dog interactions

	Extent of Problem *if* Behavior Occurs [1]				
For dogs off leash:	Not at all a problem %	Slight problem %	Moderate problem %	Extreme problem %	Percent Observing Behavior Today
Indirect interaction					
Owners not picking up after their dogs	9	12	22	57	10
Dogs causing wildlife to flee	23	20	22	35	3
Dogs flushing birds	28	26	22	24	2
Owners repeatedly calling their dogs	30	39	22	9	12
Dogs off trail	53	29	13	5	32
Dogs "play" chasing another dog	56	26	13	5	18
Direct interaction					
Dogs jumping on a visitor	18	22	25	35	3
Dogs pawing a visitor	24	26	26	24	2
Dogs licking a visitor	35	30	19	16	6
Dogs approaching uninvited	32	32	20	16	19
Dogs sniffing a visitor	48	29	14	9	18

1. Cell entries are row percents

Tables 3 through 5 examine the relationships between each of the potential problem behaviors and three dog guardian variables. In addition to tests of statistical significance (χ^2), we used Cramer's *V* to compare the strength of the relationships. A value of .1 on this effect size statistic can be considered a "minimal" relationship (Vaske, Gliner, & Morgan, 2002). A Cramer's *V* of .3 is considered "typical" and effect sizes of .5 or greater are "substantial" relationships.

Compared to non-dog guardians, dog guardians were slightly less likely to evaluate "owners not picking up after their dogs," dogs causing wildlife to flee," "dogs flushing birds," and "owners repeatedly calling their dogs" as problems (Table 3). Although larger percentage differences were observed between guardians and non-guardians in terms of "dogs off trail" and "dogs play chasing another dog," and there were statistical differences between the two groups, all of the relationships can be characterized as "minimal." In other words, there are differences between dog guardians and non-dog guardians for the six indirect interaction perceived problem variables, but the differences are small.

Table 3. Perceived problems associated with each behavior by dog guardians

	Dog Guardian				
	No (n = 431) (%)	Yes (n = 509) (%)	χ^2	p-value	Cramer's V
Indirect interaction					
Owners not picking up after dogs			18.53	< .001	.141
Not at all a problem	7	10			
Slight problem	10	14			
Moderate problem	19	26			
Extreme problem	64	50			
Dogs causing wildlife to flee			14.72	< .002	.126
Not at all a problem	21	24			
Slight problem	18	22			
Moderate problem	19	24			
Extreme problem	42	30			
Dogs flushing birds			37.64	< .001	.201
Not at all a problem	25	31			
Slight problem	21	29			
Moderate problem	20	24			
Extreme problem	34	16			
Owners repeatedly calling dogs			33.61	< .001	.190
Not at all a problem	25	33			
Slight problem	34	43			
Moderate problem	27	18			
Extreme problem	14	6			
Dogs off trail			66.98	< .001	.267
Not at all a problem	39	64			
Slight problem	34	24			
Moderate problem	19	8			
Extreme problem	8	3			
Dogs "play" chasing another dog			41.11	< .001	.209
Not at all a problem	46	64			
Slight problem	30	24			
Moderate problem	19	8			
Extreme problem	5	4			
Direct interaction					
Dogs jumping on a visitor			15.23	< .002	.128
Not at all a problem	15	20			
Slight problem	19	25			
Moderate problem	25	25			
Extreme problem	41	30			
Dogs pawing a visitor			19.70	< .001	.146
Not at all a problem	20	26			
Slight problem	24	28			
Moderate problem	25	27			
Extreme problem	31	19			
Dogs licking a visitor			31.26	< .001	.183
Not at all a problem	28	41			
Slight problem	29	31			
Moderate problem	22	17			
Extreme problem	21	11			
Dogs approaching uninvited			34.91	< .001	.193
Not at all a problem	27	36			
Slight problem	28	35			
Moderate problem	22	18			
Extreme problem	23	11			
Dogs sniffing a visitor			67.66	< .001	.268
Not at all a problem	37	57			
Slight problem	28	30			
Moderate problem	21	9			
Extreme problem	14	4			

Table 4. Perceived problems associated with each behavior by dog walkers at OSMP

	Do you walk your dog at OSMP areas?					
	No (n = 78) (%)	Yes (n = 431) (%)	Do Not Own a Dog (n = 431) (%)	χ^2	p-value	Cramer's V
Indirect interaction						
Owners not picking up after dogs				19.22	.004	.102
Not at all a problem	12	10	7			
Slight problem	14	14	10			
Moderate problem	22	26	19			
Extreme problem	52	50	64			
Dogs causing wildlife to flee				15.63	.016	.092
Not at all a problem	27	24	21			
Slight problem	19	23	18			
Moderate problem	26	23	19			
Extreme problem	28	30	42			
Dogs flushing birds				40.87	< .001	.147
Not at all a problem	31	31	25			
Slight problem	27	29	21			
Moderate problem	19	25	20			
Extreme problem	23	15	34			
Owners repeatedly calling dogs				39.10	< .001	.144
Not at all a problem	24	35	25			
Slight problem	42	43	34			
Moderate problem	25	16	27			
Extreme problem	9	6	14			
Dogs off trail				78.69	< .001	.203
Not at all a problem	54	66	39			
Slight problem	26	24	34			
Moderate problem	10	8	19			
Extreme problem	10	2	8			
Dogs "play" chasing another dog				55.16	< .001	.170
Not at all a problem	51	67	46			
Slight problem	23	24	30			
Moderate problem	17	6	19			
Extreme problem	9	3	5			
Direct interaction						
Dogs jumping on a visitor				16.99	.009	.096
Not at all a problem	22	20	15			
Slight problem	27	24	19			
Moderate problem	20	26	25			
Extreme problem	31	30	41			
Dogs pawing a visitor				21.26	.002	.107
Not at all a problem	27	26	20			
Slight problem	33	28	24			
Moderate problem	22	28	25			
Extreme problem	18	18	31			
Dogs licking a visitor				33.42	< .001	.133
Not at all a problem	41	41	28			
Slight problem	34	31	29			
Moderate problem	12	18	22			
Extreme problem	13	10	21			
Dogs approaching uninvited				39.46	< .001	.144
Not at all a problem	28	38	27			
Slight problem	36	35	28			
Moderate problem	19	17	22			
Extreme problem	17	10	23			
Dogs sniffing a visitor				70.88	< .001	.192
Not at all a problem	57	57	37			
Slight problem	29	30	28			
Moderate problem	6	10	21			
Extreme problem	8	3	14			

Table 5. Perceived problems associated with each behavior by frequency of walking dogs at OSMP

	Frequency of Walking Dogs at OSMP					
	Never (*n* = 78) (%)	1 to 4 Visits per Month (*n* = 146) (%)	2+ Visits per Week (*n* = 285) (%)	χ^2	*p*-value	Cramer's *V*
Indirect interaction						
Owners not picking up after dogs				1.94	.925	.044
Not at all a problem	12	11	10			
Slight problem	14	16	13			
Moderate problem	22	24	27			
Extreme problem	52	49	50			
Dogs causing wildlife to flee				7.08	.314	.083
Not at all a problem	27	29	21			
Slight problem	19	21	24			
Moderate problem	26	18	26			
Extreme problem	28	32	29			
Dogs flushing birds				3.94	.684	.064
Not at all a problem	31	32	30			
Slight problem	27	30	29			
Moderate problem	19	22	26			
Extreme problem	23	16	15			
Owners repeatedly calling dogs				7.05	.316	.084
Not at all a problem	24	31	37			
Slight problem	43	47	41			
Moderate problem	24	16	16			
Extreme problem	9	6	6			
Dogs off trail				25.55	< .001	.168
Not at all a problem	54	55	72			
Slight problem	26	32	20			
Moderate problem	10	10	6			
Extreme problem	10	3	2			
Dogs "play" chasing another dog				15.87	.014	.135
Not at all a problem	51	63	69			
Slight problem	23	25	23			
Moderate problem	17	8	6			
Extreme problem	9	4	2			
Direct Interaction						
Dogs jumping on a visitor				3.35	.764	.057
Not at all a problem	22	23	19			
Slight problem	27	25	23			
Moderate problem	20	25	27			
Extreme problem	31	27	31			
Dogs pawing a visitor						
Not at all a problem	27	26	25	2.10	.910	.045
Slight problem	33	29	27			
Moderate problem	22	27	29			
Extreme problem	18	18	19			
Dogs licking a visitor				4.59	.597	.066
Not at all a problem	41	40	41			
Slight problem	34	33	30			
Moderate problem	12	20	17			
Extreme problem	13	7	12			
Dogs approaching uninvited				7.50	.277	.087
Not at all a problem	28	40	37			
Slight problem	36	32	37			
Moderate problem	19	15	18			
Extreme problem	17	12	8			
Dogs sniffing a visitor				9.38	.153	.096
Not at all a problem	57	56	57			
Slight problem	29	31	30			
Moderate problem	6	7	11			
Extreme problem	8	6	2			

For the direct interaction perceived problem variables in Table 3, more of the non-dog guardians felt each of the behaviors was a moderate to extreme problem than the dog guardians, and there were statistical differences between the two groups. However, similar to the indirect interaction variables, the strength of these differences was generally minimal.

In general, the evaluations given by dog guardians who do not walk their dogs at OSMP were similar to those who do walk their dogs at OSMP (Table 4). Once again, the effect size was "minimal" (i.e., Cramer's $V \leq .203$).

Among the dog guardians (Table 5), the frequency of walking their dogs at OSMP did not statistically influence their evaluations of problem behaviors. The one exception to this pattern was "dogs off trail" where 8% of the respondents who visited 2+ times per week rated the behavior as a moderated or extreme problem, compared to 13% of those who walk their dogs 1 to 4 times per month, and 20% of those who never visit with their dogs. Although these distributions were statistically different, the effect size was .168 (i.e., a minimal relationship).

Beliefs about Off Leash Dogs

Consistent with perceived problem measures, 91% of the respondents agreed with the statement "It bothers me when dog owners do not pick up after their dogs" (Table 6). Over three-quarters agreed that "Dog owners who *cannot* control their dogs off leash *should not* be allowed to visit OSMP areas with their dogs off leash" and that "It is OK for a visitor to say something to a dog owner who does *not* have his or her dog under control." Seventy-five percent, however, felt that "Most dog owners are responsible individuals who keep their dogs under control at OSMP areas." Over three quarters disagreed that "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them" and over half enjoyed watching dogs off leash at OSMP areas."

Table 6. Beliefs about off leash dogs [1]

	Disagree	Neutral	Agree
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them	78	13	9
The behavior of off leash dogs is a problem at OSMP areas	60	20	20
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas	42	25	33
I enjoy watching dogs off leash at OSMP areas	17	25	58
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me	17	20	63
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas	9	16	75
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash	10	13	77
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control	6	16	78
It bothers me when dog owners do ***not*** pick up after their dogs	2	7	91

1. Cell entries are row percents

Perceived Conflict

Consistent with past research (Vaske et al., 2007), perceived conflict was initially operationalized by combining the frequency of observing (observed vs. not observed) each of the 11 human-dog interaction variables on a typical visit with the corresponding perceived problem (no problem, problem) variables. This first step produced 11 conflict variables with three possible attributes (i.e., no conflict, interpersonal conflict, social values conflict). Step two further differentiated individuals in the interpersonal conflict category according to their responses to "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them." Individuals who *disagreed* with this statement were considered to have experienced only interpersonal conflict. Respondents who *agreed* with the belief statement were judged to have experienced both interpersonal and social values conflict. This additional classification produced four options for each of the 11 human-dog interaction variables (i.e., no conflict, interpersonal conflict, social values conflict, and both interpersonal and social values conflict).

Among the indirect interaction variables, 50% of the respondents reported interpersonal conflict for "owners not picking up after their dogs" (Table 7). In other words, these individuals observed this behavior and judged the behavior to be a problem. Thirty-five percent did not observe this behavior but considered it to be a problem (i.e., social values conflict). Only 8% reported no conflict with owners not picking up after their dogs, and 7% were in the combined "interpersonal and social values" conflict category. For "dogs causing wildlife to flee" and "dogs flushing birds," the modal response category was social values conflict (54% and 55%, respectively). The most frequent response for "owners repeatedly calling their dogs" was interpersonal conflict (46%). "Dogs off trails" and "dogs 'play' chasing with another dog" were generally considered "no conflict" (47% and 55%, respectively).

Among the direct interaction variables (Table 7), social values conflict was the modal response for "dogs jumping on a visitor" (48%), "dogs pawing a visitor" (56%), and "dogs licking a visitor" (39%). In other words, these respondents were not observing these behaviors, but considered them problems if they were to occur. No conflict was the modal category for "dogs sniffing a visitor" (48%) and about one-third (31%) were in the interpersonal conflict category for this variable.

Table 7. Perceived conflicts associated with human-dog interactions

	Respondents	
	Number	Percent
Indirect interactions		
Owners not picking up after their dogs		
No conflict	63	8
Interpersonal conflict	422	50
Social values conflict	290	35
Interpersonal & social values	63	7
Dogs causing wildlife to flee		
No conflict	181	22
Interpersonal conflict	170	20
Social values conflict	448	54
Interpersonal & social values	37	4
Dogs flushing birds		
No conflict	218	26
Interpersonal conflict	126	15
Social values conflict	455	55
Interpersonal & social values	28	4
Owners repeatedly calling their dogs		
No conflict	235	28
Interpersonal conflict	392	46
Social values conflict	157	19
Interpersonal & social values	59	7
Dogs off trail		
No conflict	442	47
Interpersonal conflict	290	30
Social values conflict	59	6
Interpersonal & social values	66	7
Dogs “play” chasing another dog		
No conflict	462	55
Interpersonal conflict	211	25
Social values conflict	116	14
Interpersonal & social values	49	6
Direct interactions		
Dogs jumping on a visitor		
No conflict	135	16
Interpersonal conflict	254	31
Social values conflict	402	48
Interpersonal & social values	45	5
Dogs pawing a visitor		
No conflict	183	22
Interpersonal conflict	152	18
Social values conflict	462	56
Interpersonal & social values	35	4
Dogs licking a visitor		
No conflict	282	34
Interpersonal conflict	180	22
Social values conflict	322	39
Interpersonal & social values	41	5
Dogs approaching uninvited		
No conflict	258	31
Interpersonal conflict	389	46
Social values conflict	127	15
Interpersonal & social values	64	8
Dogs sniffing a visitor		
No conflict	395	48
Interpersonal conflict	258	31
Social values conflict	126	15
Interpersonal & social values	48	6

Visitor Clusters: Perceived Conflict

Cluster analyses were performed on the 11 human-dog conflict variables (Table 8). A series of cluster analyses ranging from 2 to 4 group solutions were conducted. A 3-group solution provided the best fit for the data. To validate this solution, we randomly sorted the data and conducted a cluster analysis after each of 3 random sorts. These additional analyses supported the solution identifying three distinct groups of individuals.

Cluster 1 (27% of respondents) generally reflected a "no conflict" segment (9 of the 11 variables). These individuals had not observed the behaviors and did not consider the behaviors to be a problem.

Individuals in the second cluster (14%) consistently expressed a "social values conflict." These individuals had not observed the behaviors, but thought that the behaviors would be a problem if they were to occur.

Cluster 3 (59% of respondents) reflected a combination of interpersonal and social values conflict. Two of the indirect behaviors (dogs causing wildlife to flee, dogs flushing birds) and two of the direct behaviors (dogs jumping on visitors, dogs pawing visitors) represented a conflict in social values. The remaining seven variables in this cluster of individuals were interpersonal conflicts. In other words, these respondents had observed the behavior and considered the behavior to be a problem.

Table 8. Visitor clusters: Perceived conflict

	Cluster 1 No Conflict	Cluster 2 Social Values Conflict	Cluster 3 Both Interpersonal and Social Values Conflict
Indirect interaction			
Owners not picking up after their dogs	Interpersonal	Social Values	Interpersonal
Dogs causing wildlife to flee	No Conflict	Social Values	Social Values
Dogs flushing birds	No Conflict	Social Values	Social Values
Owners repeatedly calling their dogs	No Conflict	Social Values	Interpersonal
Dogs off trail	No Conflict	Social Values	Interpersonal
Dogs "play" chasing another dog	No Conflict	Social Values	Interpersonal
Direct interaction			
Dogs jumping on a visitor	Interpersonal	Social Values	Social Values
Dogs pawing a visitor	No Conflict	Social Values	Social Values
Dogs licking a visitor	No Conflict	Social Values	Interpersonal
Dogs approaching uninvited	No Conflict	Social Values	Interpersonal
Dogs sniffing a visitor	No Conflict	Social Values	Interpersonal
Percent of sample	27%	14%	59%

Understanding this 3-group solution is facilitated by Table 9. For example, a majority of individuals in cluster 1 checked no conflict for 10 of the 11 variables. The modal response for cluster 2 involved some form of social values conflict (either as the sole source or in combination with interpersonal). Respondents in cluster 3 (interpersonal and social values conflict) typically expressed more conflict across all 11 items than those in the other two clusters.

Table 9. Perceived conflict by conflict clusters

	Type of Conflict [1]					
	No Conflict	Social Values Conflict	Interpersonal Social Values Conflict	χ^2	*p*-value	Cramer's *V*
Indirect interaction						
Owners not picking up after their dogs				412.42	< .001	.566
No conflict	25	0	2			
Interpersonal conflict	52	6	60			
Social values conflict	23	41	38			
Interpersonal & social values	0	53	0			
Dogs causing wildlife to flee				584.80	< .001	.636
No conflict	71	3	4			
Interpersonal conflict	17	0	26			
Social values conflict	12	66	69			
Interpersonal & social values	0	31	1			
Dogs flushing birds				557.77	< .001	.608
No conflict	80	7	7			
Interpersonal conflict	10	0	21			
Social values conflict	10	70	71			
Interpersonal & social values	0	23	1			
Owners repeatedly calling their dogs				483.16	< .001	.596
No conflict	61	3	19			
Interpersonal conflict	34	6	61			
Social values conflict	5	41	20			
Interpersonal & social values	0	50	1			
Dogs off trail				413.49	< .001	.568
No conflict	79	9	48			
Interpersonal conflict	20	15	45			
Social values conflict	1	20	7			
Interpersonal & social values	0	56	1			
Dogs "play" chasing another dog				418.25	< .001	.561
No conflict	85	13	51			
Interpersonal conflict	12	4	36			
Social values conflict	3	39	13			
Interpersonal & social values	0	44	0			
Direct interaction						
Dogs jumping on a visitor				616.96	< .001	.652
No conflict	57	1	2			
Interpersonal conflict	29	0	38			
Social values conflict	14	59	60			
Interpersonal & social values	0	40	0			
Dogs pawing a visitor				607.77	< .001	.674
No conflict	72	2	5			
Interpersonal conflict	15	0	24			
Social values conflict	13	67	71			
Interpersonal & social values	0	31	0			
Dogs licking a visitor				535.83	< .001	.597
No conflict	81	4	21			
Interpersonal conflict	13	0	30			
Social values conflict	6	60	49			
Interpersonal & social values	0	36	0			
Dogs approaching uninvited				498.23	< .001	.610
No conflict	61	2	24			
Interpersonal conflict	33	5	62			
Social values conflict	6	37	14			
Interpersonal & social values	0	56	0			
Dogs sniffing a visitor				465.66	< .001	.582
No conflict	84	7	41			
Interpersonal conflict	14	6	44			
Social values conflict	2	44	15			
Interpersonal & social values	0	43	0			

1. Cell entries are column percents

Respondents' sex was related to the type of conflict that visitors experienced (Table 10). More males were in the "no conflict" (30%) and "social values" conflict (15%) clusters than females (24% and 12%, respectively). More females were in the interpersonal and social values conflict cluster (64%) than males (55%). The strength of the relationship, however, was only minimal (Cramer's $V = .089$).

Similarly, there was a weak statistical relationship between age and conflict cluster membership. Individuals in the social values conflict cluster were slightly older ($M = 45.69$) than those in the other two clusters ($M = 41.07$ and 41.59). In general, individuals with more formal education were more likely to report some form of conflict than those with less formal education. There was no statistical relationship between either place of residence variable and cluster membership.

Table 10. Demographics by conflict clusters

	Type of Conflict [1]					
	No Conflict	Social Values Conflict	Interpersonal & Social Values Conflict	χ^2	*p*-value	Cramer's *V*
Sex				6.50	.039	.089
Male	30	15	55			
Female	24	12	64			
Age				23.15	.026	.118
< 20	32	10	58			
21 to 30	26	13	61			
31 to 40	33	6	61			
41 to 50	22	15	63			
51 to 60	24	18	58			
61 to 70	26	24	50			
> 70	27	27	46			
Mean age	41.07	45.69	41.59			
Education				18.60	.046	.108
High school or less	43	8	49			
Some college	35	8	57			
College graduate	28	15	57			
Some graduate school	28	11	61			
Masters degree	21	13	66			
Doctoral / professional degree	21	20	59			
Place of Residence				.038	.981	.007
Within Boulder city limits	26	14	60			
Outside city limits	27	13	60			
				.419	.981	.016
Within Boulder city limits	26	14	60			
Within Boulder County	28	14	58			
Outside Boulder County	26	13	61			

1. Cell entries are row percentages

When analyzed as a crosstabulation, each of the frequency of visitation variables (number of years visiting OSMP, number of visits during the past 12 months, number of visits during past month) was related to type of conflict (Table 11). When the visitation indicators were treated as continuous variables in an Analysis of Variance, however, only number of visits during the past 12 months and number of visits during the past month were statistically significant. In these later analyses, individuals expressing social values conflict visited less frequently than those in the other two clusters.

Table 11. Frequency of visitation by conflict clusters

	Type of Conflict [1]					
	No Conflict	Social Values Conflict	Interpersonal & Social Values Conflict	χ^2 or *F*-value	*p* value	Cramer's *V* or eta
Number of years visiting OSMP				26.03	.011	.128
1st year	31	25	44			
1 to 2 years	24	15	61			
3 to 5 years	32	10	58			
6 to 10 years	29	8	63			
11 to 20 years	26	13	61			
21 to 30 years	20	12	68			
More than 30 years	21	28	51			
Mean	10.14	12.14	11.15	1.48	.229	.059
Number of visits during past 12 months				19.56	.012	.106
1 to 10 visits	28	20	52			
11 to 30 visits	25	15	60			
31 to 90 visits	22	12	66			
91 to 180 visits	29	9	62			
181 to 365 visits	31	9	60			
Mean	104.01 [a]	63.34 [b]	97.27 [a]	6.04	.002	.117
Number of times visited OSMP during past month				26.20	.010	.124
1 visit	27	23	50			
2 to 3 visits	19	18	63			
4 to 5 visits	28	12	60			
6 to 10 visits	28	9	63			
11 to 20 visits	26	12	62			
21 to 31 visits	35	8	57			
More than 31 visits	44	6	50			
Mean	11.95 [a]	7.79 [b]	10.27 [c]	6.75	.001	.124

1. Cell entries are row percentages

All four of the dog guardian variables were statistically related to type of conflict (Table 12). Current dog guardians expressed less conflict than non-guardians. Non-dog guardians were more likely to express social values conflict. A majority of both groups, however, were in the interpersonal and social values cluster. The effect size for this relationship approached "typical."

As the number of dogs owned and the number of dogs with the individual on the day they were interviewed increased, membership in the no conflict cluster also increased. The Cramer's *V* for these relationships, however were only .118 and .186, respectively.

Visitors who never walk their dog at OSMP locations were more likely to report social values conflict than those who walk their dogs at OSMP. About a third of all three groups (never, 1 to 4 visits per month, 2+ visits per week) were in the no conflict cluster. Roughly two-thirds of respondents in these latter two groups were in the interpersonal and social values conflict cluster (Cramer's *V* = .174).

Table 12. Dog guardian indicators by conflict clusters

	Type of Conflict [1]					
	No Conflict	Social Values Conflict	Interpersonal & Social Values Conflict	χ^2	*p*-value	Cramer's *V*
Are you currently a dog guardian?				62.59	< .001	.263
No	22	23	55			
Yes	31	6	63			
Number of dogs currently owned				11.19	.025	.118
1	30	5	65			
2	29	5	66			
3+	50	18	32			
Number of dogs with you on today's visit				64.90	< .001	.186
No dogs	23	21	56			
1 dog	31	3	66			
2+ dogs	38	5	57			
Frequency of walking dogs at OSMP				23.33	< .001	.174
Never	31	18	51			
1 to 4 visits per month	30	6	64			
2+ visits per week	31	2	67			

1. Cell entries are row percentages

Four of the six activity participation variables were statistically related to conflict cluster membership. Findings for walking a dog on the day the person completed the survey (Table 13) paralleled the results for walking a dog in general at OSMP locations (Table 12). People who were walking / hiking, bird watching, or wildlife viewing were more likely to be in the social values conflict cluster than those who were not participating in these activities. There was no relationship between participation in running or bicycling and cluster membership. All of the Cramer *V*'s were minimal.

Table 13. Activities by conflict clusters

	Type of Conflict [1]					
	No Conflict	Social Values Conflict	Interpersonal & Social Values Conflict	χ^2	*p*-value	Cramer's *V*
Walking Dog				51.91	< .001	.214
No	25	18	57			
Yes	33	2	65			
Walking / Hiking				18.20	< .001	.142
No	31	8	61			
Yes	24	18	58			
Running				4.50	.105	.069
No	27	15	58			
Yes	28	9	63			
Bicycling				.035	.983	.006
No	27	13	60			
Yes	26	14	60			
Bird Watching				6.67	.036	.088
No	28	13	59			
Yes	16	22	62			
Wildlife Viewing				14.08	.001	.125
No	28	13	59			
Yes	11	25	64			

1. Cell entries are row percentages

Eight of the nine beliefs about off leash dogs were statistically related to conflict cluster membership (Table 14). The one exception was "It is OK for a visitor to say something to a dog owner who does *not* have his or her dog under control."

Given that the statement "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them" was used in the construction of the conflict clusters, it was not surprising that this variable was "substantially" related to cluster type (Cramer's V = .540)

Over a third of the individuals who agreed with "The behavior of off leash dogs is a problem at OSMP areas" were in the social values conflict cluster, compared to 20% of those who were neutral and 3% who disagreed with this statement. Over half of the people who disagreed with the statement "I enjoy watching dogs off leash at OSMP areas" were in the social values conflict cluster, compared to 11% who were neutral and only 3% who agreed with the statement.

Consistent with the overall percentages for the conflict clusters (59% – mixed interpersonal and social values, 14% – only social values, 27% – no conflict), the modal responses on the belief statements (Table 14) were generally in the interpersonal and social values cluster. Taken together, these findings provide a measure of validation for the cluster groups.

Table 14. Beliefs about off leash dogs by conflict clusters

	Type of Conflict [1]					
	No Conflict	Social Values Conflict	Interpersonal & Social Values Conflict	χ^2	*p*-value	Cramer's *V*
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them				322.25	< .001	.540
Disagree	30	5	65			
Neutral	25	9	66			
Agree	1	95	4			
The behavior of off leash dogs is a problem at OSMP areas				148.40	< .001	.301
Disagree	34	3	63			
Neutral	21	20	59			
Agree	10	37	53			
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas				52.69	< .001	.172
Disagree	19	21	60			
Neutral	27	13	60			
Agree	36	4	60			
I enjoy watching dogs off leash at OSMP areas				207.06	< .001	.383
Disagree	6	52	42			
Neutral	25	11	64			
Agree	34	3	63			
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me				134.74	< .001	.318
Disagree	9	47	44			
Neutral	29	10	61			
Agree	31	6	63			
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas				49.37	< .001	.190
Disagree	15	39	46			
Neutral	20	20	60			
Agree	29	9	62			
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash				25.22	< .001	.123
Disagree	38	8	54			
Neutral	40	6	54			
Agree	23	16	61			
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control				2.76	.599	.040
Disagree	31	11	58			
Neutral	30	10	60			
Agree	26	14	60			
It bothers me when dog owners do ***not*** pick up after their dogs				9.90	.042	.070
Disagree	37	0	63			
Neutral	39	9	52			
Agree	26	14	60			

1. Cell entries are row percentages

Discussion

Summary of Findings

This study sought to describe the extent to which OSMP visitors evaluated six indirect and five direct human-dog interaction variables as problems. All behaviors were thought to be a "slight" to "extreme" problem. The most problematic behaviors were owners not picking up after their dog, dogs causing wildlife to flee, dogs jumping on a visitor, dogs pawing a visitor and dogs flushing birds. Although some statistical differences existed between (a) dog guardians versus non-dog guardians, (b) individuals who walk their dogs at OSMP versus those who do not, and (c) frequency of dog walking at OSMP, the magnitude of these differences was small.

Following previous research (Vaske et al., 2007), we operationalized perceived conflict for each of 11 human-dog interaction variables as: (a) no conflict, (b) interpersonal conflict, (c) social values conflict, and (d) both interpersonal and social values conflict. Cluster analyses on the 11 interaction variables suggested that a 3-group solution best described the data. Cluster 1 (27% of respondents) generally reflected a "no conflict" segment (9 of the 11 variables). These individuals had not seen any of the human-dog behaviors and judged the behaviors as "not at all a problem."

Individuals in the second cluster (14%) consistently expressed a "social values conflict." These individuals had not observed the behaviors, but thought that the behaviors would be a problem if they were to occur. Cluster 3 (59% of respondents) reflected a combination of interpersonal and social values conflict. Two of the indirect behaviors (dogs causing wildlife to flee, dogs flushing birds) and two of the direct behaviors (dogs jumping on visitors, dogs pawing visitors) represented a conflict in social values. The remaining seven variables in this cluster of individuals were interpersonal conflicts. In other words, these respondents had observed the behavior and considered the behavior to be a problem.

Although some demographic and participation variables were statistically related to membership in the three clusters, the strength of all these relationships was minimal. Eight of the nine belief statements regarding off leash dogs were statistically related to conflict cluster membership and the effect sizes were generally larger.

Implications for OSMP

The City of Boulder Open Space and Mountain Parks implemented a Voice and Sight Tag (VST) Program in 2006. This program requires guardians to watch a video about voice and sight control, register with OSMP, and display a voice and sight tag on off leash dogs at selected areas managed by OSMP. Given that nearly three-quarters (73%) of respondents experienced some form of conflict (14% – social values conflict; 59% – interpersonal and social values conflict) with off leash dogs or their owners at the OSMP locations studied in this report, the VST program represents a necessary first step in reducing conflicts created by human-dog interactions.

Because the VST program is new, some of the conflict reported here may be lessened as more visitors understand the objectives of the program and adhere to the legal mandate. In our opinion, however, the current VST rules and regulations may not be sufficient to eliminate human-dog conflict. For example, to participate in the program, visitors must view a video and agree to control their off leash dogs in a manner described in the video. Voice and sight control, however, is a subjective issue. What constitutes control by one visitor may not reflect control by another. Not included in the registration process is a behavioral component where individuals

demonstrate that their dogs are under voice and sight control. Similar to obtaining a driver's license where the person must pass both a written exam and a driving exam, one recommendation would require individuals to not only watch the video, but also pass a written test and a physical demonstration of their ability to control their dogs. Before moving to this extreme, however, the VST program should be periodically monitored to determine whether conflict is being reduced.

Some of the conflict noted in this report reflected purely social values conflict (14%). Social values conflict occurs when visitors do not observe a given set of behaviors, but believe that such behaviors are problematic. Resolving this type of conflict will require continuing the education effort for dog guardians (e.g., the video associated with the VST program). Additional education efforts designed to inform the non-dog guardians about the VST program and its goals and objectives should also be implemented.

If these education efforts are not effective in eliminating conflict, a change in management direction may be necessary. In 2006, for example, the management percentages for 130 miles of trail were: (a) 70% voice and sight, (b) 20% leash, (c) 6% voice in sight in trail corridor, (d) 3% leash seasonally, and (e) 1% no dogs. These percentages may need to be adjusted to reduce conflict.

The majority of conflict (59%) represented a mixture of social values and interpersonal conflict. Interpersonal conflict occurs when the behavior is observed and judged as unacceptable. Formal education programs and formal sanctions (e.g., fines, loss of voice and sight privileges) may not be sufficient for resolving these interpersonal conflict issues. Part of the responsibility needs to be shouldered by OSMP visitors. As reported here, 78% of the respondents believed that "it is OK for a visitor to say something to a dog owner who does not have his or her dog under control." Agency encouragement of such informal sanctions, when combined with the formal sanctions, may promote a higher quality experience for all visitors.

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From:	Chris Powell
To:	Michael B Edwards
Subject:	Re: Education and Public Involvement Plan-Dog Mgmt
Date:	03/12/2008 12:49 PM
Attachments:	Education and Public Involvement Plan.3.12.08 with EQD edits.doc Education and Public Involvement Plan.3.12.08.doc

---

Michael,

Most are already made, but I'm not sure why you deleted the paragraph on linking to dogwalking websites as this is key to getting out the right information (as opposed to the groups who have been putting out the wrong information).

Chris

Christine Powell
Public Affairs Specialist
Golden Gate National Recreation Area
National Park Service
(o)(415) 561-4732
(f) (415) 561-4353
(c) (415) 559-8596
▼ Michael B Edwards

Michael B Edwards

03/12/2008
08:57 AM
MDT

To: Chris Powell/GOGA/NPS@NPS
cc:
Subject: Re: Education and Public Involvement Plan-Dog Mgmt

Hi Chris,

Here are a couple of minor edits - I think you can deal with them in 5 minutes or less. Once you've had a chance to look it over, would you mind sending it out to everyone as the draft final product for the meeting next week, including Suzie?

Thanks!

Education and Public Involvement Plan.3.12.08 with EQD edits.doc

Michael B. Edwards
National Park Service
WASO-EQD
PO Box 25287
Denver, CO 80225
PHONE: 303-987-6953
FAX: 303-987-6782

▼ Chris Powell/GOGA/NPS

Chris Powell/GOGA/NPS

03/11/2008 08:58 PM EDT

To Michael B Edwards/DENVER/NPS@NPS
cc shirwin smith
Subject Education and Public Involvement Plan-Dog Mgmt

Here it is Michael....let me know if you have any questions.

Chris

Education and Public Involvement Plan.3.12.08.doc

Christine Powell
Public Affairs Specialist
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GOLDEN GATE NATIONAL RECREATION AREA

Dog Management Education and Public Involvement Plan

PURPOSE

The fundamental purpose of the public participation plan is to educate the public on new dogwalking regulations, to provide clarity on the regulations and to increase compliance with regulations.

The plan will target a wide range of audiences—multiple user groups, individuals, professional dogwalking groups, environmental groups, civic groups, business groups, agency staff and leaders, appointed/elected officials, representatives on the Negotiated Rulemaking Committee and others.

The history of dogwalking in GGNRA has led to confusion on the part of visitors and staff as to the regulations regarding dogwalking and the areas where they can walk their dogs. At this current time, there are areas of the park where dogs are not allowed, where they are allowed on-leash and where they are allowed off-leash (due to Barley v U.S.). The Dog Management Education and Public Involvement Plan must clarify the new regulation and educate visitors as to where dogwalking is allowed in GGNRA as well as appropriate dogwalking behavior that is expected when they visit a national park.

The park will identify different venues to educate the public to ensure that visitors have an understanding of the new regulations in each area of the park where dogs are allowed. Through these varied venues, information will be made readily accessible both to regular visitors and those who may only visit the park periodically.

PUBLIC INVOLVEMENT COMPONENTS

The Dog Management Education and Public Involvement Plan includes the following components:

I. VENUES FOR COMMUNITY OUTREACH:

- **Mailing Database**
  GGNRA maintains a database of persons, groups, and agencies interested in notification of updated general park information as well as a special mailing list developed for dog management. The park will initiate a conversion to an email list as soon as staff availability permits.

- **Open Houses**

The public will be invited to attend quarterly park Open House meetings. Dog Management information materials will be available and the public will have the opportunity to ask questions on dog management. The meetings are open to the public and noticed through the GGNRA public affairs office.

- **Written Materials:**

New materials will be developed that will include but not be limited to: brochures, a comprehensive guide to dogwalking at GGNRA with maps and pad maps specifically for dogwalking for each of the 3 counties of the park.

- **Signage:**

New signage will be developed that is clear and concise so the public can understand the regulations.

- **Education by NPS Staff**

All field staff will be educated on the new regulations and will discuss them with the public. It will be the primary role of the Interpretation Division to disseminate information through visitor centers and educational and public programs. All law enforcement personnel will be clearly briefed and will educate the public as well as enforce the regulation, as NPS law enforcement are trained to gain compliance through education. A separate law enforcement strategy will be developed.

- **Continued Updates to Adjacent Agencies and Community Leaders**

Written information will be shared with above community leaders so they can share it with constituents.

II. NEW EDUCATIONAL COMPONENTS:

- **Outreach staff—like Boulder (fill in)**

- **Current Dogwalking Events in the Park:**

NPS staff will attend current cleanup days at Fort Funston and Crissy Field at least once/year to discuss the regulation and gather feedback. The dogwalking communities in Marin and San Mateo Counties will be asked to develop cleanup days at least once per year and NPS will attend those events.

- **Comprehensive Guide To Dogwalking**

A guide will be developed that informs the pulbic of the regulations in each area of the park, including maps of each area where dogwalking is allowed. It will also include desired dogwalking behaviors.

- **Ads In Area Newspapers:**

Ads will be placed in community newspapers as funding allows in order to educate community residents who use the park on aregular basis.

- **Link to Dogwalking Websites**

Dogwalking groups will be asked to link their websites to the GGNRA website so their constituents and members will have access to the new regulation. The National Park Service Parameters and Scope of Negotiated Rulemaking Discussion (July 31, 2006), which was distributed to all Negotiated Rulemaking Committee members, stated that "Dogwalking groups must be active partners in management of dogwalking in the park including disseminating accurate information to constituents regarding dog management regulations.

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Partnerships
Partnerships with other land managing agencies and dogwalking groups are key to ensuring that visitors are informed of the new regulation. GGNRA will partner with Bay Area park agencies to develop a video/training/outreach on proper dogwalking etiquette in parks and open spaces. Dog groups (SPCAs, humane societies, dog rescue groups and commercial) will conduct classes on proper etiquette in parks and open spaces.

(cp 3/12/08)

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Comment [MBE1]: Seems like the outreach staff idea is already addressed in the other areas.

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(cp 3/12/08)

Comment [MBE2]: recall that the new regulation will not have all the details of the plan.

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Comment [MBE3]: This was already included in the bullet above. I think you meant to delete it.

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Off Leash Dog / Human Interactions at Boulder Open Space and Mountain Parks: Supplemental Analyses

Sponsored by the City of Boulder Open Space and Mountain Parks and conducted by

Jerry Vaske
Professor

Maureen Donnelly
Associate Professor

The Warner College of Natural Resources
Human Dimensions of Natural Resources
Colorado State University
Fort Collins, Colorado

HDNRU Report No. 77

March, 2007

Acknowledgements

The authors would like to thank Marianne Giolitto and Matt Jones for project management, and Deonne VanderWoude, Ben Lenth, and Megan Bowes for assistance in collecting the data for this project. We are grateful for the data entry assistance provided by Diann Brooks and Lisa Nieman at the City of Boulder Open Space and Mountain Parks.

Suggested American Psychological Association Citation:

Vaske, J. J., & Donnelly, M. P. (2007). Off leash dog / human interactions at Boulder Open Space and Mountain Parks: Supplemental analyses. (HDNRU Report No. 77). Report for Boulder Open Space and Mountain Parks. Fort Collins: Colorado State University, Human Dimensions in Natural Resources Unit.

Executive Summary

This report contains analyses that supplement the information in:

Vaske, J. J., & Donnelly, M. P. (2007). Visitor tolerances and standards for off leash dogs at Boulder Open Space and Mountain Parks. (HDNRU Report No. 75). Report for Boulder Open Space and Mountain Parks. Fort Collins: Colorado State University, Human Dimensions in Natural Resources Unit.

Vaske, J. J., & Donnelly, M. P. (2007). Perceived conflict with off leash dogs at Boulder Open Space and Mountain Parks. (HDNRU Report No. 76). Report for Boulder Open Space and Mountain Parks. Fort Collins: Colorado State University, Human Dimensions in Natural Resources Unit.

Tables presented in this document compare:

- Guardians vs. Non-guardians
- Guardians (Non-walkers – Walkers) vs. Non-guardians
- Frequent vs. Infrequent dog walkers at OSMP

Respondents' open-ended comments on the survey are listed at the end of the document.

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Dog Guardians vs. Non-Dog Guardians

Table 1. Dog Guardian

Are you currently a dog guardian?	Number	Percent
No	431	46
Yes	509	54
Total	940	100

Table 2. Number of dogs currently under your protection

Number of dogs Under your protection	Respondents Number	Percent
1	364	71
2	121	24
3	21	4
4	3	1
Total	509	100

Table 3. Frequency of visiting OSMP locations with your dog

	Respondents Number	Percent
Never	78	15
Once a month	55	11
Twice a month	32	6
3 times per month	18	3
4 times per month (once a week)	41	8
2 times per week	59	12
3 to 4 times per week	89	18
5 to 6 times per week	68	13
Daily	69	14
Total	509	100

Table 4. Number of dogs with you on today's visit

	Respondents	
	Number	Percent
No dogs	495	56
1 dog	283	32
2 dogs	93	10
3 dogs	11	1
4 dogs	4	< 1
5 dogs	3	< 1

Table 5. Leashed versus unleashed dogs on today's visit

	Respondents	
Were the dogs that you had with you today:	Number	Percent
Leashed ***all*** of the time?	72	17
Leashed ***part*** of the time?	237	55
Leashed ***none*** of the time?	76	18
Did not have a dog with me	258	48

Table 6. Prior visits to OSMP

	Dog Guardian				
	No (Mean)	Yes (Mean)	*t*-value	*p*-value	eta
Number of years visiting OSMP	11.10	10.75	0.50	.616	.017
Number of visits during past 12 months	72.65	109.69	5.41	< .001	.171
Number of times visited OSMP during past month	8.47	11.90	5.22	< .001	.166

Table 7. Average number of times behaviors were *personally observed* on a typical visit

	Dog Guardian				
	No (Mean)	Yes (Mean)	*t*-value	*p*-value	eta
Dogs off trail	2.87	3.02	0.99	.325	.034
Owners repeatedly calling or yelling at their dogs	1.88	1.60	2.24	.025	.078
Dogs “play” chasing another dog	1.75	2.46	5.18	< .001	.175
Dogs flushing birds	0.60	0.44	1.97	.049	.070
Dogs causing wildlife to flee	0.69	0.50	2.18	.029	.078
Dogs approaching uninvited	2.14	2.02	0.94	.349	.033
Dogs jumping on a visitor	0.89	0.70	1.96	.050	.069
Dogs licking a visitor	0.99	0.75	2.47	.014	.087
Dogs pawing a visitor	0.68	0.45	2.72	.007	.096
Dogs sniffing a visitor	1.93	2.29	2.57	.010	.089
Owners not picking up after their dogs	1.79	1.39	3.10	.002	.108

Table 8. Acceptability ratings for behaviors

	Dog Guardian				
	No (%)	Yes (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail			70.44	< .001	.284
Unacceptable	36	15			
Neither	25	19			
Acceptable	39	66			
Owners repeatedly calling or yelling at their dogs			28.94	< .001	.185
Unacceptable	50	32			
Neither	23	32			
Acceptable	27	36			
Dogs "play" chasing another dog			52.22	< .001	.249
Unacceptable	30	14			
Neither	30	23			
Acceptable	40	63			
Dogs flushing birds			30.58	< .001	.193
Unacceptable	68	49			
Neither	17	29			
Acceptable	15	22			
Dogs causing wildlife to flee			16.72	< .001	.142
Unacceptable	72	60			
Neither	14	24			
Acceptable	14	16			
Dogs approaching uninvited			28.49	< .001	.185
Unacceptable	55	37			
Neither	21	29			
Acceptable	24	34			
Dogs jumping on a visitor			5.90	.052	.084
Unacceptable	76	70			
Neither	12	18			
Acceptable	11	12			
Dogs licking a visitor			26.91	< .001	.181
Unacceptable	59	41			
Neither	22	33			
Acceptable	19	26			
Dogs pawing a visitor			5.66	.059	.083
Unacceptable	70	62			
Neither	19	23			
Acceptable	11	15			
Dogs sniffing a visitor			56.56	< .001	.260
Unacceptable	45	22			
Neither	27	30			
Acceptable	28	48			
Owners not picking up after their dogs			2.47	.291	.054
Unacceptable	87	84			
Neither	7	9			
Acceptable	6	7			

Table 9. Maximum norm tolerances for behaviors and percent of time norm was exceeded

	Maximum Norm Tolerances for Behaviors		Percent of Time Norm was Exceeded		
	Dog Guardian [1]		Dog Guardian		
	No (Mean)	Yes (Mean)	No (%)	Yes (%)	Entire Sample (%)
Dogs off trail	2.59	3.75	38	18	28
Owners repeatedly calling or yelling at their dogs	1.64	2.37	36	22	28
Dogs “play” chasing another dog	2.10	3.44	21	16	18
Dogs flushing birds	0.66	1.28	19	9	13
Dogs causing wildlife to flee	0.63	1.06	19	14	17
Dogs approaching uninvited	1.51	2.27	45	27	35
Dogs jumping on a visitor	0.52	0.59	32	22	27
Dogs licking a visitor	0.97	1.52	27	12	19
Dogs pawing a visitor	0.57	0.82	23	12	17
Dogs sniffing a visitor	1.72	2.98	36	20	27
Owners not picking up after their dogs	0.40	0.67	56	46	50

1. All mean differences statistically significant at $p \leq .016$

Table 10. Perceived problems associated with each behavior

	Dog Guardian				
	No (%)	Yes (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail			66.98	< .001	.267
Not at all a problem	39	64			
Slight problem	34	24			
Moderate problem	19	8			
Extreme problem	8	3			
Owners repeatedly calling or yelling at their dogs			33.61	< .001	.190
Not at all a problem	25	33			
Slight problem	34	43			
Moderate problem	27	18			
Extreme problem	14	6			
Dogs "play" chasing another dog			41.11	< .001	.209
Not at all a problem	46	64			
Slight problem	30	24			
Moderate problem	19	8			
Extreme problem	5	4			
Dogs flushing birds			37.64	< .001	.201
Not at all a problem	25	31			
Slight problem	21	29			
Moderate problem	20	24			
Extreme problem	34	16			
Dogs causing wildlife to flee			14.72	< .002	.126
Not at all a problem	21	24			
Slight problem	18	22			
Moderate problem	19	24			
Extreme problem	42	30			
Dogs approaching uninvited			34.91	< .001	.193
Not at all a problem	27	36			
Slight problem	28	35			
Moderate problem	22	18			
Extreme problem	23	11			
Dogs jumping on a visitor			15.23	< .002	.128
Not at all a problem	15	20			
Slight problem	19	25			
Moderate problem	25	25			
Extreme problem	41	30			
Dogs licking a visitor			31.26	< .001	.183
Not at all a problem	28	41			
Slight problem	29	31			
Moderate problem	22	17			
Extreme problem	21	11			
Dogs pawing a visitor			19.70	< .001	.146
Not at all a problem	20	26			
Slight problem	24	28			
Moderate problem	25	27			
Extreme problem	31	19			
Dogs sniffing a visitor			67.66	< .001	.268
Not at all a problem	37	57			
Slight problem	28	30			
Moderate problem	21	9			
Extreme problem	14	4			
Owners not picking up after their dogs			18.53	< .001	.141
Not at all a problem	7	10			
Slight problem	10	14			
Moderate problem	19	26			
Extreme problem	64	50			

Table 11. Beliefs about off leash dogs

	Dog Guardian				
	No (%)	Yes (%)	χ^2	*p*-value	Cramer's *V*
I enjoy watching dogs off leash at OSMP areas			165.83	< .001	.423
Disagree	31	5			
Neutral	32	19			
Agree	37	76			
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me			48.46	< .001	.233
Disagree	27	9			
Neutral	19	20			
Agree	54	71			
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them			103.20	< .001	.336
Disagree	63	91			
Neutral	21	6			
Agree	16	3			
The behavior of off leash dogs is a problem at OSMP areas			98.56	< .001	.331
Disagree	44	74			
Neutral	24	16			
Agree	32	10			
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas			54.65	< .001	.256
Disagree	54	32			
Neutral	25	25			
Agree	21	43			
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash			31.15	< .001	.185
Disagree	8	12			
Neutral	7	18			
Agree	85	70			
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control			0.33	.849	.019
Disagree	6	6			
Neutral	16	15			
Agree	78	79			
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas			49.92	< .001	.236
Disagree	14	4			
Neutral	22	12			
Agree	64	84			
It bothers me when dog owners do ***not*** pick up after their dogs			6.79	.033	.086
Disagree	2	2			
Neutral	5	9			
Agree	93	89			

Table 12. Demographics

	Dog Guardian				
	No (%)	Yes (%)	χ^2	*p*-value	Cramer's *V*
Sex			1.07	.300	.035
Male	46	42			
Female	54	58			
Age			17.33	.008	.142
< 20	4	4			
21 to 30	23	14			
31 to 40	21	26			
41 to 50	23	30			
51 to 60	20	20			
61 to 70	8	5			
> 70	1	1			
Mean age	41.56	42.77			
Education			4.04	.545	.068
High school or less	4	5			
Some college	8	8			
College graduate	36	35			
Some graduate school	9	12			
Masters degree	29	27			
Doctoral or professional degree	14	13			

Dog Guardians (Non-walkers vs. Walkers) vs. Non-Dog Guardians

Table 13. Walk Dogs at OSMP Areas

Do you walk your dog at OSMP areas?	Number	Percent
No	431	46
Yes	78	8
Do not own a dog	431	46
Total	940	100

Table 14. Prior visits to OSMP

	Do you walk your dog at OSMP areas?					
	No (Mean)	Yes (Mean)	Do Not Own a Dog (Mean)	*F*-value	*p*-value	eta
Number of years visiting OSMP	6.79[a]	11.44[b]	11.10[b]	6.29	.002	.117
Number of visits during past 12 months	23.91[a]	125.01[b]	72.65[c]	46.59	< .001	.301
Number of times visited OSMP during past month	4.49[a]	13.22[b]	8.47[c]	39.23	< .001	.279

Table 15. Average number of times behaviors were *personally observed* on a typical visit

	Do you walk your dog at OSMP areas?					
	No (Mean)	Yes (Mean)	Do Not own a Dog (Mean)	*F*-value	*p*-value	eta
Dogs off trail	2.01 [a]	3.20 [b]	2.87 [b]	9.46	< .001	.147
Owners repeatedly calling or yelling at their dogs	1.10 [a]	1.69 [b]	1.88 [b]	5.86	.003	.117
Dogs “play” chasing another dog	1.21 [a]	2.68 [b]	1.75 [a]	30.22	< .001	.259
Dogs flushing birds	0.18 [a]	0.48 [b]	0.60 [b]	4.08	.017	.099
Dogs causing wildlife to flee	0.29 [a]	0.54 [ab]	0.69 [b]	3.77	.023	.095
Dogs approaching uninvited	1.41 [a]	2.13 [b]	2.14 [b]	4.87	.008	.107
Dogs jumping on a visitor	0.30 [a]	0.77 [b]	0.89 [b]	5.63	.004	.115
Dogs licking a visitor	0.49 [a]	0.80 [ab]	0.99 [b]	4.54	.011	.104
Dogs pawing a visitor	0.42 [a]	0.45 [a]	0.68 [b]	3.89	.021	.096
Dogs sniffing a visitor	1.38 [a]	2.45 [b]	1.93 [c]	12.04	< .001	.168
Owners not picking up after their dogs	1.17 [a]	1.43 [a]	1.79 [b]	5.53	.004	.114

Table 16. Acceptability ratings for behaviors

	Do you walk your dog at OSMP areas?					
	No (%)	Yes (%)	Do Not Own a Dog (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail				74.99	< .001	.206
Unacceptable	22	14	36			
Neither	23	18	25			
Acceptable	55	68	39			
Owners repeatedly calling their dogs				34.31	< .001	.142
Unacceptable	40	30	50			
Neither	36	31	23			
Acceptable	24	39	27			
Dogs "play" chasing another dog				75.97	< .001	.208
Unacceptable	34	11	30			
Neither	25	22	30			
Acceptable	41	67	40			
Dogs flushing birds				36.97	< .001	.151
Unacceptable	63	46	68			
Neither	21	31	17			
Acceptable	16	23	15			
Dogs causing wildlife to flee				20.33	< .001	.110
Unacceptable	69	59	72			
Neither	22	24	14			
Acceptable	9	17	14			
Dogs approaching uninvited				31.45	< .001	.137
Unacceptable	46	35	55			
Neither	26	30	21			
Acceptable	28	35	24			
Dogs jumping on a visitor				5.95	.203	.060
Unacceptable	70	70	77			
Neither	17	18	12			
Acceptable	13	12	11			
Dogs licking a visitor				27.30	< .001	.129
Unacceptable	37	41	59			
Neither	36	33	22			
Acceptable	27	26	19			
Dogs pawing a visitor				5.99	.200	.060
Unacceptable	65	62	70			
Neither	20	23	19			
Acceptable	15	15	11			
Dogs sniffing a visitor				62.93	< .001	.193
Unacceptable	32	20	45			
Neither	33	30	27			
Acceptable	35	50	28			
Owners not picking up after their dogs				2.66	.615	.040
Unacceptable	82	84	87			
Neither	11	9	7			
Acceptable	7	7	6			

Table 17. Maximum norm tolerances for behaviors

	Maximum Norm Tolerances for Behaviors [1]					
	Do you walk your dog at OSMP areas?					
	No (Mean)	Yes (Mean)	Do Not Own a Dog (Mean)	*F*-value	*p*-value	eta
Dogs off trail	2.84 [a]	3.89 [b]	2.59 [a]	30.76	< .001	.272
Owners repeatedly calling or yelling at their dogs	1.95 [ab]	2.44 [a]	1.64 [b]	15.81	< .001	.201
Dogs “play” chasing another dog	2.48 [a]	3.59 [b]	2.10 [a]	40.58	< .001	.316
Dogs flushing birds	1.36 [a]	1.27 [a]	0.66 [b]	12.97	< .001	.186
Dogs causing wildlife to flee	1.13 [a]	1.05 [a]	0.63 [b]	6.81	.001	.135
Dogs approaching uninvited	1.83 [ab]	2.33 [a]	1.51 [b]	14.06	< .001	.193
Dogs jumping on a visitor	0.74 [ab]	0.80 [a]	0.52 [b]	3.81	.023	.101
Dogs licking a visitor	1.40 [ab]	1.54 [a]	0.97 [b]	8.77	< .001	.154
Dogs pawing a visitor	0.74 [ab]	0.83 [a]	0.57 [b]	2.96	.052	.090
Dogs sniffing a visitor	2.33 [ab]	3.08 [a]	1.72 [b]	35.20	< .001	.298
Owners not picking up after their dogs	0.47 [ab]	0.70 [a]	0.40 [b]	4.77	.009	.113

Table 18. Percent of time norm was exceeded

	Percent of Time Norm was Exceeded						
		Do you walk your dog at OSMP areas					
	Entire Sample	No (%)	Yes (%)	Do Not Own a Dog (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail	28	20	18	38	38.12	< .001	.224
Owners repeatedly calling or yelling at their dogs	28	19	22	36	18.34	< .001	.157
Dogs "play" chasing another dog	18	17	15	21	3.40	.183	.069
Dogs flushing birds	13	8	9	19	16.50	< .001	.152
Dogs causing wildlife to flee	17	15	14	19	3.18	.204	.066
Dogs approaching uninvited	35	30	27	45	24.99	< .001	.186
Dogs jumping on a visitor	27	19	23	32	10.31	.006	.119
Dogs licking a visitor	19	12	12	27	27.17	< .001	.195
Dogs pawing a visitor	17	15	12	23	13.57	.001	.138
Dogs sniffing a visitor	27	26	19	36	24.52	< .001	.186
Owners not picking up after their dogs	50	42	47	56	7.29	.026	.100

Table 19. Perceived problems associated with each behavior

	Do you walk your dog at OSMP areas?					
	No (%)	Yes (%)	Do Not Own a Dog (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail				78.69	< .001	.203
Not at all a problem	54	66	39			
Slight problem	26	24	34			
Moderate problem	10	8	19			
Extreme problem	10	2	8			
Owners repeatedly calling or yelling at their dogs				39.10	< .001	.144
Not at all a problem	24	35	25			
Slight problem	42	43	34			
Moderate problem	25	16	27			
Extreme problem	9	6	14			
Dogs "play" chasing another dog				55.16	< .001	.170
Not at all a problem	51	67	46			
Slight problem	23	24	30			
Moderate problem	17	6	19			
Extreme problem	9	3	5			
Dogs flushing birds				40.87	< .001	.147
Not at all a problem	31	31	25			
Slight problem	27	29	21			
Moderate problem	19	25	20			
Extreme problem	23	15	34			
Dogs causing wildlife to flee				15.63	.016	.092
Not at all a problem	27	24	21			
Slight problem	19	23	18			
Moderate problem	26	23	19			
Extreme problem	28	30	42			
Dogs approaching uninvited				39.46	< .001	.144
Not at all a problem	28	38	27			
Slight problem	36	35	28			
Moderate problem	19	17	22			
Extreme problem	17	10	23			
Dogs jumping on a visitor				16.99	.009	.096
Not at all a problem	22	20	15			
Slight problem	27	24	19			
Moderate problem	20	26	25			
Extreme problem	31	30	41			
Dogs licking a visitor				33.42	< .001	.133
Not at all a problem	41	41	28			
Slight problem	34	31	29			
Moderate problem	12	18	22			
Extreme problem	13	10	21			
Dogs pawing a visitor				21.26	.002	.107
Not at all a problem	27	26	20			
Slight problem	33	28	24			
Moderate problem	22	28	25			
Extreme problem	18	18	31			
Dogs sniffing a visitor				70.88	< .001	.192
Not at all a problem	57	57	37			
Slight problem	29	30	28			
Moderate problem	6	10	21			
Extreme problem	8	3	14			
Owners not picking up after their dogs				19.22	.004	.102
Not at all a problem	12	10	7			
Slight problem	14	14	10			
Moderate problem	22	26	19			
Extreme problem	52	50	64			

Table 20. Beliefs about off leash dogs

	Do you walk your dog at OSMP areas?					
	No (%)	Yes (%)	Do Not Own a Dog (%)	χ^2	*p*-value	Cramer's *V*
I enjoy watching dogs off leash at OSMP areas				202.92	< .001	.326
Disagree	17	3	31			
Neutral	37	16	32			
Agree	46	81	37			
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me				56.12	< .001	.174
Disagree	18	8	27			
Neutral	14	21	19			
Agree	68	71	54			
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them				125.69	< .001	.255
Disagree	73	94	63			
Neutral	17	4	21			
Agree	10	2	16			
The behavior of off leash dogs is a problem at OSMP areas				109.26	< .001	.246
Disagree	58	77	44			
Neutral	26	14	24			
Agree	16	9	32			
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas				59.78	< .001	.183
Disagree	32	32	54			
Neutral	30	24	25			
Agree	38	44	21			
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash				34.27	< .001	.138
Disagree	7	13	8			
Neutral	15	19	7			
Agree	78	68	85			
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control				2.67	.614	.037
Disagree	3	7	6			
Neutral	13	15	16			
Agree	84	78	78			
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas				65.67	< .001	.191
Disagree	4	4	14			
Neutral	28	9	22			
Agree	68	87	64			
It bothers me when dog owners do ***not*** pick up after their dogs				10.34	.035	.070
Disagree	0	3	2			
Neutral	10	9	5			
Agree	90	88	93			

Table 21. Demographics

	Do you walk your dog at OSMP areas?					
	No (%)	Yes (%)	Do Not Own a Dog (%)	χ^2	*p*-value	Cramer's *V*
Sex				2.11	.348	.049
Male	48	41	46			
Female	52	59	54			
Age				34.56	.001	.150
< 20	12	2	4			
21 to 30	18	13	23			
31 to 40	24	26	21			
41 to 50	18	32	23			
51 to 60	18	20	19			
61 to 70	5	5	8			
> 70	3	1	2			
Mean age	38.92	43.41	41.56			
Education				29.51	.001	.144
High school or less	13	4	4			
Some college	21	6	8			
College graduate	31	35	35			
Some graduate school	8	13	9			
Masters degree	19	28	29			
Doctoral / professional degree	8	14	15			

Frequency of walking dogs at OSMP

Table 22. Frequency of walking dogs at OSMP

	Number	Percent
Never	78	15
1 to 4 visits per month	146	29
2+ visits per week	285	56
Total	431	100

Table 23. Prior visits to OSMP

	Frequency of Walking Dogs at OSMP [1]					
	Never (Mean)	1 to 4 Visits per Month (Mean)	2+ Visits per Week (Mean)	*F*-value	*p*-value	eta
Number of years visiting OSMP	6.79 [a]	9.45 [a]	12.43 [b]	11.11	< .001	.043
Number of visits during past 12 months	23.91 [a]	40.64 [a]	168.23 [b]	123.58	< .001	.329
Number of times visited OSMP during past month	4.49 [a]	5.69 [a]	17.06 [b]	99.22	< .001	.285

1. Means with different superscripts differ statistically at $p < .05$

Table 24. Average number of times behaviors were *personally observed* on a typical visit

	Frequency of Walking Dogs at OSMP [1]					
	Never (Mean)	1 to 4 Visits per Month (Mean)	2+ Visits per Week (Mean)	*F*-value	*p*-value	eta
Dogs off trail	2.01 [a]	2.97 [b]	3.32 [b]	10.28	< .001	.206
Owners repeatedly calling or yelling at their dogs	1.10 [a]	1.51 [ab]	1.78 [b]	4.97	.007	.146
Dogs "play" chasing another dog	1.21 [a]	2.17 [b]	2.96 [c]	23.64	< .001	.307
Dogs flushing birds	0.18 [a]	0.32 [a]	0.57 [b]	5.87	.003	.160
Dogs causing wildlife to flee	0.29	0.48	0.57	2.08	.127	.095
Dogs approaching uninvited	1.41 [a]	2.15 [b]	2.12 [b]	4.80	.009	.144
Dogs jumping on a visitor	0.32 [a]	0.74 [b]	0.79 [b]	4.51	.012	.139
Dogs licking a visitor	0.49	0.80	0.79	1.67	.190	.086
Dogs pawing a visitor	0.42	0.43	0.47	0.09	.919	.019
Dogs sniffing a visitor	1.38 [a]	2.44 [b]	2.45 [b]	8.57	< .001	.192
Owners not picking up after their dogs	1.17	1.21	1.55	2.54	.080	.105

1. Means with different superscripts differ statistically at $p < .05$

Table 25. Acceptability ratings for behaviors

	Frequency of Walking Dogs at OSMP					
	Never (%)	1 to 4 Visits per Month (%)	2+ Visits per Week (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail				11.14	.025	.023
Unacceptable	22	17	12			
Neither	22	23	15			
Acceptable	55	60	73			
Owners repeatedly calling or yelling at their dogs				11.76	.019	.113
Unacceptable	40	35	28			
Neither	36	35	29			
Acceptable	24	30	43			
Dogs "play" chasing another dog				24.52	< .001	.177
Unacceptable	34	12	10			
Neither	25	26	21			
Acceptable	41	62	69			
Dogs flushing birds				8.10	.088	.096
Unacceptable	63	51	44			
Neither	21	29	31			
Acceptable	16	20	25			
Dogs causing wildlife to flee				3.86	.425	.064
Unacceptable	69	60	58			
Neither	22	23	25			
Acceptable	9	17	17			
Dogs approaching uninvited				3.61	.462	.064
Unacceptable	46	37	34			
Neither	26	28	31			
Acceptable	28	35	35			
Dogs jumping on a visitor				0.30	.990	.018
Unacceptable	70	69	70			
Neither	17	20	18			
Acceptable	13	11	12			
Dogs licking a visitor				3.48	.480	.063
Unacceptable	37	46	39			
Neither	36	27	35			
Acceptable	27	27	26			
Dogs pawing a visitor				0.55	.969	.025
Unacceptable	65	63	61			
Neither	20	22	24			
Acceptable	15	15	15			
Dogs sniffing a visitor				8.91	.063	.100
Unacceptable	32	24	18			
Neither	33	30	29			
Acceptable	35	46	53			
Owners not picking up after their dogs				1.46	.834	.039
Unacceptable	82	85	83			
Neither	10	10	9			
Acceptable	8	5	8			

Table 26. Maximum norm tolerances for behaviors

	Maximum Norm Tolerances for Behaviors [1]					
	Frequency of Walking Dogs at OSMP					
	Never (Mean)	1 to 4 Visits per Month (Mean)	2+ Visits per Week (Mean)	*F*-value	*p*-value	eta
Dogs off trail	2.84 [a]	3.54 [a]	4.10 [b]	8.41	< .001	.199
Owners repeatedly calling or yelling at their dogs	1.95 [ab]	2.09 [a]	2.63 [b]	4.46	.012	.147
Dogs “play” chasing another dog	2.48 [a]	3.30 [ab]	3.74 [b]	7.14	.001	.188
Dogs flushing birds	1.36	1.23	1.29	0.09	.914	.022
Dogs causing wildlife to flee	1.13	1.02	1.06	0.08	.922	.020
Dogs approaching uninvited	1.83	2.19	2.42	1.77	.172	.094
Dogs jumping on a visitor	0.74	0.74	0.84	0.21	.811	.033
Dogs licking a visitor	1.40	1.51	1.56	0.14	.870	.027
Dogs pawing a visitor	0.74	0.76	0.88	0.34	.713	.042
Dogs sniffing a visitor	2.33	2.98	3.14	2.82	.061	.120
Owners not picking up after their dogs	0.47	0.66	0.72	0.65	.525	.057

1. Means with different superscripts differ statistically at $p < .05$

Table 27. Percent of time norm was exceeded

	Percent of Time Norm was Exceeded						
		Frequency of Walking Dogs at OSMP					
	Entire Sample (%)	Never (%)	1 to 4 Visits per Month (%)	2+ Visits per Week (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail	18	20	25	15	5.37	.068	.116
Owners repeatedly calling or yelling at their dogs	22	19	24	21	0.69	.709	.042
Dogs "play" chasing another dog	16	17	17	14	0.66	.720	.041
Dogs flushing birds	9	8	9	9	0.67	.967	.013
Dogs causing wildlife to flee	14	15	15	14	0.22	.897	.024
Dogs approaching uninvited	27	30	29	26	0.70	.704	.043
Dogs jumping on a visitor	22	19	23	22	0.51	.777	.035
Dogs licking a visitor	12	12	16	10	2.52	.284	.083
Dogs pawing a visitor	12	15	14	11	0.96	.620	.051
Dogs sniffing a visitor	20	26	21	18	2.20	.333	.077
Owners not picking up after their dogs	46	42	46	47	0.47	.792	.034

Table 28. Perceived problems associated with each behavior

	Frequency of Walking Dogs at OSMP					
	Never (%)	1 to 4 Visits per Month (%)	2+ Visits per Week (%)	χ^2	*p*-value	Cramer's *V*
Dogs off trail				25.55	< .001	.168
Not at all a problem	54	55	72			
Slight problem	26	32	20			
Moderate problem	10	10	6			
Extreme problem	10	3	2			
Owners repeatedly calling or yelling at their dogs				7.05	.316	.084
Not at all a problem	24	31	37			
Slight problem	43	47	41			
Moderate problem	24	16	16			
Extreme problem	9	6	6			
Dogs "play" chasing another dog				15.87	.014	.135
Not at all a problem	51	63	69			
Slight problem	23	25	23			
Moderate problem	17	8	6			
Extreme problem	9	4	2			
Dogs flushing birds				3.94	.684	.064
Not at all a problem	31	32	30			
Slight problem	27	30	29			
Moderate problem	19	22	26			
Extreme problem	23	16	15			
Dogs causing wildlife to flee				7.08	.314	.083
Not at all a problem	27	29	21			
Slight problem	19	21	24			
Moderate problem	26	18	26			
Extreme problem	28	32	29			
Dogs approaching uninvited				7.50	.277	.087
Not at all a problem	28	40	37			
Slight problem	36	32	37			
Moderate problem	19	15	18			
Extreme problem	17	12	8			
Dogs jumping on a visitor				3.35	.764	.057
Not at all a problem	22	23	19			
Slight problem	27	25	23			
Moderate problem	20	25	27			
Extreme problem	31	27	31			
Dogs licking a visitor				4.59	.597	.066
Not at all a problem	41	40	41			
Slight problem	34	33	30			
Moderate problem	12	20	17			
Extreme problem	13	7	12			
Dogs pawing a visitor						
Not at all a problem	27	26	25	2.10	.910	.045
Slight problem	33	29	27			
Moderate problem	22	27	29			
Extreme problem	18	18	19			
Dogs sniffing a visitor				9.38	.153	.096
Not at all a problem	57	56	57			
Slight problem	29	31	30			
Moderate problem	6	7	11			
Extreme problem	8	6	2			
Owners not picking up after their dogs				1.94	.925	.044
Not at all a problem	12	11	10			
Slight problem	14	16	13			
Moderate problem	22	24	27			
Extreme problem	52	49	50			

Table 29. Beliefs about off leash dogs

	Frequency of Walking Dogs at OSMP					
	Never (%)	1 to 4 Visits per Month (%)	2+ Visits per Week (%)	χ^2	*p*-value	Cramer's *V*
I enjoy watching dogs off leash at OSMP areas				49.78	< .001	.239
Disagree	17	6	2			
Neutral	37	22	12			
Agree	46	72	86			
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me				7.82	.098	.098
Disagree	18	7	8			
Neutral	14	22	20			
Agree	68	71	72			
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them				23.95	< .001	.179
Disagree	73	92	95			
Neutral	17	6	3			
Agree	10	2	2			
The behavior of off leash dogs is a problem at OSMP areas				13.68	.008	.124
Disagree	58	72	80			
Neutral	26	17	13			
Agree	16	11	7			
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas				3.70	.449	.063
Disagree	33	33	32			
Neutral	29	28	22			
Agree	38	39	46			
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash				4.43	.351	.067
Disagree	7	10	14			
Neutral	15	18	19			
Agree	78	72	67			
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control				15.24	.004	.122
Disagree	3	4	8			
Neutral	13	8	19			
Agree	84	88	73			
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas				16.40	.003	.145
Disagree	4	4	4			
Neutral	28	11	9			
Agree	68	85	87			
It bothers me when dog owners do ***not*** pick up after their dogs				7.80	.099	.179
Disagree	0	2	3			
Neutral	10	5	11			
Agree	90	93	86			

Table 30. Demographics

	Frequency of Walking Dogs at OSMP					
	Never (%)	1 to 4 Visits per Month (%)	2+ Visits per Week (%)	χ^2	*p*-value	Cramer's *V*
Sex				1.05	.593	.047
Male	48	42	41			
Female	52	58	59			
Age				56.95	< .001	.255
< 20	12	4	1			
21 to 30	20	27	6			
31 to 40	24	24	27			
41 to 50	18	24	35			
51 to 60	18	15	23			
61 to 70	5	5	6			
> 70	3	1	2			
Mean age	38.92	39.60	45.38			
Education				33.65	< .001	.204
High school or less	13	7	3			
Some college	21	6	6			
College graduate	31	39	33			
Some graduate school	8	14	12			
Masters degree	19	23	31			
Doctoral / professional degree	8	11	15			

Open-Ended Comments on Survey

Open-ended comments given	Number	Percent
No	613	65
Yes	338	35
Total	948	100

95% are very responsible. My observation is that runners w/dogs are the worse. Dogs run & poop off trail, owner proccupied w/workout. Too much horse manure on trail plus hoofs destroy trails when ground is wet like today.

99% of dogs I've encountered in OSMP areas have been fine. It's just a few irresponsible owners who fail to control their dogs that become a problem.

All of my answers are in reference to the OS north & east of Heatherwood neighborhood. Dog owners are overall very responsible & communicate well (i.e. if an off leash dog is approaching a leashed dog or a dogless walker, the understanding is to put t...

All of this depends on dog owners having good visght & voice control fo their dogs. Is there an obedience training that gives owners a certification for off leash if their dog is well trained?

Also I don't like wet dogs shaking all over me, dogs blocking the path (as well as their owners standing in the path talking to other dogownersorthe smell of waste cans alongthe trail that need more frequent emptying. Off leash dogs wandering uncon...

Although it happens very infrequently, I have had a few dogs become aggressive with my dog. I find this totally unacceptable. I do confront the owner in these cases and insist they put their dogs on a leash.

Although off leash dogs don't bother me personally, I know that in some areas they can adversely affect wildlife habitat & that's a problem. For some people any off lfeash (or on leash but not under control) dog can be a problem, my elderly mother & i...

As a runner who runs w/her dog on a leash (& wearing a gentle leader) it really perturbs me when an off-leash dog runs over to my dog. Since he can't run away b/c he's on a leash, he gets jerked around while we try to go on our way. The owner may...

As long as owners keep their dogs under control and the dogs do not bother other people, dogs or animals, I think they should be allowed off leash. More should be done to get people to pick up after their dogs.

As long as the dog owners are in denial these problems will continue.

Bad owners won't clean up after their dogs w/or w/o a leash law. Requiring leashes won't fix that. People that dislike will occasionally have little tolerance for any dog behavior normal or otherwise. Irresponsible owners should be dealt w, w/o pena...

Basically it's not the dogs who are a problem, it's the owners.

Bathrooms

Beautiful hiking trails.

Bigger problem is that owners don't ATTEMPT to control off-leash dogs. Often the dogs confront or growl at hikers.

Biggest problem as a dog owner is other dogs whose owners let them approach my dog.

Biting not ok. Killing/injuring wildlife not ok. I think the sight & voice control is a good way to control the dog situation. However I think the green tags are nothing more than a "dog tax" & have nothing to do w/a dog's obedience.

Boulder's dog haters are a sad small group of people who are getting too much attention. We're all God's creatures.

Bringing my dog to this area is extremely important to me & I hope Boulder/CO can remain one of the best places to have a dog.

Cobalt trail should be open to bikes in the uphill direction.

Confrontation w/a dog owner is not desirable.

Do not forget dogs are animals that will react instinctively-running off trail, sniffing people, etc. Leash law should control problem dogs not penalize normal canine behavior. The current sight & sound program, if ENFORCED STRICTLY, would force 95% o...

Do you think dogs consider itinappropriate for one human to sniff another? Should we be concerned ab out kidswho dont' listen to their parents in OSMP locations to parents repeatedly yelling at their kids?

Do your best. TShere's no ideal solution to all issues. But, the dog shit issue is a real bummer.

Dog excrement left in bags on the trail.

Dog laws are unrealistic & biased. Make horse owners "gardians" & give them poop bags, see videos, etc. More horses obey ?? that children don't obey. Hire teenagers to pick up poop. I'd rather instantly pay them then all the "enforcement" staff.

Dog leash rules could be in effect in certain areas. Not on trails.

Dog owners always think their dogs are perfect & friendly & will not bite!

Dog owners should occasionally agree to pick up ALL droppings on the trail on a given day (all). (I've done it!) (about 20 or more pounds).

Dog owners usual feel/think that everyone loves dogs. I have ?? experiences that make me fear dogs. Dog owners don't ?? & ?? don't understand me. They should be under control.

Dog poop is my biggest issue (& hikers going off trail).

Dogs are animals too! They should be allowed to enjoy the world as well! Thanks!

Dogs are great as long as their humans are responsible. Also horses leave more poop than dogs. What is being done about that?

Dogs are many times unpredictable & I feel owners should have complete control over dog, even leashed dog or not bring them to parks.

Dogs are not native-should stay on leash.

Dogs are only a problem w/my kids. As an adult, I'm fine w/dogs, but we have had conflict w/dog owners who are disrespectful of our kids, their fear of dogs & how the dog/kid interaction could harm the kid. Otherwise, I love dogs. We avoid "dog par...

Dogs aren't a problem to me-I enjoy seeing themn on the trails & don't mind them being off leash. But some people might be afraid of or dislike dogs & their opinions need to be respected.

Dogs must be allowed to accompany their owners to some degree. If we don't,aggression will follow, then ban the dogs alltogether. Dog parks aren't good enough. My dog is my companion, I like hiking, should I watch tv w/my dog? Not all dogs are sheph...

Dogs need socialization & space to run. Having them tied up all the time tends to make dogs ?? and aggressive???

Dogs need to be free to express & enjoy themselves outdoors. I enjoy watching them & interacting w/them as long as they are respectful & their owner is near. Dogs who show mild aggression toward people &/or dogs need to be on leash at all times.

Dogs need to be given room to be a "dog", they bark & poop & run. Some dog owners I've encountered on the trail are unpleasant & need to tell everyone how to run their lives.

Dogs need to be leashed.

Dogs not a problem in this particular open space-no birds, wildlife, etc. Dogs should be under control voice or on leash. Most guardians very good about controlling their dogs.

Dogs off leash are great as long as they're uner owner's control.

Dogs should be allowed to enjoy OS w/their owners. Dogs have long been a part of OS & Boulder culture.

Dogs should be allowed to enjoy OSMP off leash if they're well trained. I understand the greater impact they cause however the volume & type of trails also impact the natural environment. Well trained dogs will occasionally stray. Poorly trained dogs a...

Dogs should be on the leash & under control at all times.

Dogs should haave access to these areas as long as they can be somehwat "controlled" and owners are responsible.

Dogs sometimes are a problem. Over the past year I've definately seen more dogs off leash than on. Some owners are responsible, but many aren't.

Don't be a control freak, most dog owners are very responsible & it's our land also. We don't need Nazi gestapo handing out tickets & shooting dogs on sight.

Don't think putting people in jail for 90 days is at all appropriate-& Boulder is trying to hide/downplay this consequence of the government.

Dont' think dogs should be allowed off leash in an open space sucha s this that is so heavilyused & busy. Dog owners should always pick up after their dogs-no exceptions.

Enforce the rules on bad dog owners, fine them. Their dogs scare my kids.

Every election we vote for monies to maintain open space yet OSMP doesn't maintain trails-they wait too long-erosion takes place & area deteriorates. OSMP has to keep up w/maintenance.

Every time we visit OSMP dog/horse owner have been very respectful & friendly. Bringing animals to OS areas is a lifestyle that is very important to the majority of people I know!

Excellent survey-takers.

Generally, I think people are aware of their dogs behavior & are conscientious. Having 2 kids, I'm cautious when dogs approach especially if they "rush" us. What I don't get are those people that put the poop in a bag then leave it along the side of t...

Good job & behavior of owners better this year.

Good luck w/this! I think the park location makes a big difference. I don't see much difference w/the new system, although there are more dogs on leash. I never saw any out of control situations at BVR previously, maybe 1-2 times in 3 yrs-a dog not res...

Good survey. Pls also conduct survey about bikers-they have caused many more problems for my dogs than any other dogs.

Great place to hike.

Great trails-friendly dogs, Like the voice/sight response.

Have had voice & sight control in place for years. Tag program is unnecessary & costly.

Having areas where one's dog can be off leash is GREAT! Thank you OSMP.

Having moved to Colorado yesterday! I haven'texperienced any problems w/dogs in OSMP areas. I do think it would be a shame if they weren't allowed. I look forward to bringing my new (& well behaved/trained) pup to these areas. I think most people aro...

Horse manure on the trail is the biggest problem I see.

Horse manure on trails-similar to picking up dog excrement.

How will you define control & uncontrolled? What dog owner will admit to not being able to control their dog? Many dog owners seem to be unaware that just having a dog approach can be uncomfortable/scary. I've been bitten by dogs, it's frustrating to g...

I'm a City of Boulder OSMP volunteer. I wish I could get a ranger response sooner, or at all, when I see problems & violations.

I'm a dog owner & a biker. I think rude bikers are a FAR GREATER problem than off-leash dogs!

I'm a firm believer in fine-tuned seasonal restrictions over blanket ones esp. during breeding seasons when dogd impacts are large.

I'm an extremely responsible dog owner who follows any posted trail regs.

I'm going to be extremely disappointed if I can no longer bring my dog here.

I'm happy w/the way most dog owners have bee cleaning up from their dogs. I've a real problem the horse poop. It's large, attracts flies, etc & you have to leap over it. I'm NOT happy when I see that. It seems to have gotten to be more of a problem o...

I'm not a dog person. It bothers me that so many owners assume I'll enjoy meeting their dog. I can't guess how a dog that's unknown to me is going to act, so I'd rather not be approadhed by any of them. Owners who think they could control their dog if th

I'm not ok w/carrying poop bags around the loop. When I can pick it up & dispose of it on the way back (especially Dry Creek). I have found people at this trail to be very responsible w/their dogs & we mostly know each other's dogs & like interacting w...

I'm very "pro" have open spaces where dogs can run free. The one by Heatherwood where I go daily is terrific. I see VERY little, if any, undesirable activity. The only impact I see is lots of excrement. I pick up extra when I get my dog's. PLEASE do N...

I'm very discouraged by this survey. It seems to both my husband & I that the city of Boulder is getting more negative towards dogs. I have loved being able to bring my dogs on walks & to be able to let them off leash. I will be very saddened & discou...

I've been attacked by 3 dogs on this trail. 1 attack I chided the owner & said dog should be on a leash. She was nasty & said she had a leash, it was around her own neck!

I've had multiple experiences w/dogs displaying aggressive behavior & their owners 100 yds away. I've especially noticed a marked increase in the past 2 years.

I've never had a problem except an occasional dog running into me during their play. I think those complainers are the minority & would find something to complain about w/anything. Boulder is a bit too over-conscious, neurotic. I think if the dog is ve...

I've never seen any wildlife at the white rocks trail or east Boulder.

I've no problem w/dogs as long as they behave & owners clean up after them.

I've observed that most dog owners are VERY responsible, like myself. I could strangely suggest to leave some things as they are, i.e. Dry Creek is mostly used by dog owners w/their dogs, so there's no real conflict w/bikers/runners.

I've personally never had a problem w/a dog at an OSMP site. Dogs are a big part of Boulder & as long as theyremain mostly in control, I think they should be free to roam w/supervision.

I've spent MANY hours w/my dog at Marshall Mesa & have rarely seen any problems w/dogs & their owners. Only bikers who ride to fast past my dog on the trail!

I've used the Gunbarrel trail for years & find it very sad that we have to pay for tags for our dogs to be off leash on the trail. I personally think this is a great way for the city to make a few extra dollars! It's scarey to think of what will b...

I've walked a ton on OS & seen a ton of dogs off leash in the last 4 years & never had or seen a problem arise.

I agree in concept w/the new tag program. However, it all comes down to enforcement. The rules are essentiallyu the same as before they were just rarely enforced. Ithink the same will apply now unless it is enforced. Anyone can get a tag-it still d...

I am 100% in favor of the voice & sight control program.

I appreciate the off-leash program-I always keep my dog under control so that he is safe, & I also know that off-leash is a privilege-all visitors should be able to enjoy & if mydog ?? ?? non-dog visitor w/a good experience, then the non-dog person i...

I appreciate the survey to improve OS both for "dogs" & people. Gentle enforcement & education is the key. Read the ?? emailed art from the New York Times about Shamu (or what I learned from Shamu).

I appreciate the survey. Dogs should have no affect on me when I walk in OSMP, so owners should be totally responsible for their dogs.

I basically have seen positive dog & dog owner behavior in Bldr Cty. I think dogs need some freedoms too. Boulder Cty seems to have very responsible owners (of course, there are a few...)

I believe that off-leash is a privilege. Putting a dog on leash is not that big of a deal. It doesn't take away from the experience and both dog and person can still enjoy the trails Using the leash in areas where it is harder to control behavior is one w

I believe that OSMP staff have a bad attitude about dogs in general & dogs off leash in particular-thanks for asking.

I believe the OSMP is fantastic. I would liek to say that I can control my dog 100% of the time, but I can only do so apx 95% of the time. I know that doesn't meet the off-leash standard so I'm frustrated that I can't achieve that standard. My dog is v...

I don't know why you have the markers in a distance from the parking lot. My mom & dad can't walk far & theyused to come to the trailheads to watch the dogs chase balls. It's hard to walk in for them (week ankles).

I don't like being approached & sniffed, I like dogs. I appreciate dogs as companions but I don't believe owners should be allowed to negatively affect my visit to our OS. A well-mannered dog is a pleasure, but I see few of them.

I don't like it when other dogs charge mine.

I don't mind the dogs, & in fact they sometimes enhance a walk. This presupposes that the dog is well behaved & controlled.

I don't think that 2 calls is a problem for bringing your dog back to you. One seems a little extreme.

I don't think the dogs are any more of a problemthan the free roaming cows. The cows make mor eof a mess. Everyone's taxes pay for OS & trails. I definately was unaware that encouraging people to turn other is to ranger, for any reason other than a do...

I don't use trails especially w/my children that allow off leash dogs.

I enjoy being able to hike w/my dogs in all the OSMP trails in the Boulder area. My dogs are great & enjoy the outdoors being off leash. I think as long as dog owners are responsible-dogs should be allowed to enjoy these trails same as their owners.

I enjoy the freedom of teh OSMP & off leash policy. People just need to be responsible for their pets & themselves & behave accordingly.

I especially enjoy the Bobolink trail.

I feel it's a problem in case there are bears!

I feel OSMPs are a wonderful escape from the noise & stress & I'm very fortunate to have so many wonderful trails so close to my home. I hope OSMPs will be very favorable to dog owners. Boulder's recognized as a "dog friendly" community & our OSMPs...

I feel that dogs should be able to be free if they're tamed.

I have 2 dogs & am very upset by dog poop onour beautiful trails. I pick up after others every timeI go out. So do other dog lovers that I know. I feel it's a responsibility that goes along w/dog guardianship-most dogs on OS trails are well tra...

I have 2 dogs who don't like to "play" w/other dogs on most runs. I usually tell this to 3-5 owners whose dogs look "suspicious". 90% of the time owners try to control their dogs-50% of those times they are actually successful. The 10% who dont' try...

I have a permanent shoulder injury from being knocked down on a ski trail by 2 FRIENDLY (!) dogs. We live adjacent to Teller Farms OSMP where we frequently see dogs chase prairie dogs & sometimes harass cattle. When I ask owners to control their dogs...

I have never experienced but a few times that dog or owner were a problem (chasing/aggression) that warranted such a tag program)

I have never witnessed someone not picking up after their dog, but there seems to be a lot of poo on the trail (Mt. Sanitas) & who picks up all of the bags people leave behind, because there has got to be 100 of them scattered around on any giv...

I have no problem w/dogs off leash as long as they are undervoice control & owners pick up the poop. An example of a trail negatively impacted by dogs is Sanitas where, for some reason, there seem to be more irresponsible owners & more dog poop you c...

I have noticed a big change in behavior of people & their dogs since the tag program started. I have notice a lot more dogs on leash. I've notice dpeople being a lot more respectful & paying attention to their dogs behavior. I think there's an expectat...

I have seen more unpleasant behavior by CYCLISTS on the trail than by dogs.

I hope Bld Cnty continues to allow places for dogs to be off leash It's so much fun for all of us-The only problemon trails isthe bikers who don't announce behind & coming whizzing past on a path that is multi-use.

I like dogs. I feel many owners are irresponsible & minimize the impact their dogs has on OSMP & other visitors. I have been knocked down by a running dog & nipped by 1 that was off leash. In both cases the owner said "My dog has never done that." Owne...

I like the green tag program. We need more parking.

I like the new tags needed for those owners who wish to have their dogs off leash. I love how dog friendly parks have become & appreciate the steps taken to make dog owners responsible.

I like the new trailhead leash program.

I like the open space for my dogs!

I like to be able to take the dogs to the park, it's nice tolet them get out & run.

I love coming here w/my dog & he is very well trained. Wouldn't come if I couldn't come w/him.

I love dogs but it's a problem on the trails when theyare off the leash & not well trained. They scare my kids.

I love OSMP

I love the Dry Creek trailhead, best dog park ever!

I miss when the other OSMP users were friendly. People don't ?? ?? "hello" much anymore. Also, the dog problem seems better under control lately.

I place a high value on being able to bring my dog to this area off leash.

I really think the dogs & their guardian sget a long w/almost everyone & that the very few times I have seen altercations in 30 years of walking dogs have probably resulted in some kind of education on both sides after each person had some time to reflect

I see lots of dogs but generally they are all well behaved & under voice control. I don't feel this is a problem. Could use some map handouts at trailhead.

I specifically bring my dog to OSMP areas so that he may be off leash & socialized w/other dogs. If I had ato leash him I would no longer enjoy OSMP areas.

I strongly believe that responsible pet owners shouldn't be punished, or limited in what theycan do becuse of a few people. From what I have seen over the years, education, awareness & better patrolling seem to work.

I strongly support the off leash program. In fact, I did a speech about voice & sight control in college. Whhile my current dog is too young for the tag program, I intend to train her so she can participate later in life. Most dog owners are very respo...

I think it's good for dogs to have a place to run & play, but there's so much damage from dog poop/urine off trail to vegetation. Also packs of playin gdogs are dangerous because they are running & not looking at people. I've been knocked flat by do...

I think it makes more sense to invest in free classes for dogs/owners instead of paying park rangers to hand out tickets.

I think it would be great to have more doggy bags & a couple more trash cans to increase picking up after dogs.

I think OSMP is overreacting w/new policy!

I think sometimes overfriendly dogs scare smaller kids which is the only real problem I've observed firsthand. Once told that my dog was frightening birds at walden ponds which I was unaware was a problem. Apparently different jurisdiction.

I think that off-leash dogs in Boulder are more well-behaved than in most other areas.

I think the off leash tag is stupid. There is the law. If there is a problem, enforce it. Dogs are dogs. THey add much to the quality of life. Once again Boulder lets a very small group dictate laughable rules, laws & ordinances. WERE THAT THERE WAS M...

I think the same scrutiny should be used w/bikes on OS w/horses, w/children, w/runners! I think each group should be treated equally, which means educated & charged for tags showing they understand their rules. I pay large city taxes, I resent being si...

I think this trail is great, please don't mess w/it.

I think trailhead leash & voice & sight tag & education programs a wonderful idea.

I think visitors to OSMP who are offended by joy in another being are disturbed & should be prohibited from OSMP until their therapy results in some gessation of their ego-centered-ness.

I think you're overthinking this.

I think your expectations are too high. It's a dog you're talking about!!

I took training my dogs to respect other & NOT to chase any wildlife very seriously & I expect other to do so as well. I get frustrated at dog owners who don't & who don't clean up pet waste. I also want to ensure we protect habitat (esp. ground nesti...

I typically don't see problems at off leash areas. The main problem I see is when people are at the off leash area & have a strong opinion against dogs.

I understand this is about dog behavior but the issues about typical # of observations is very subjective to what TIME you are in the OS & what DAYS. Being a regular user for the past 40 years I can't generalize the observations of the stated beha...

I use open space 4-6/wk for walking, exercising dogs, biking & horseback riding & strongly feel all users should be entitled. I support the new education effortsw by open space. I've also supported open space in tax increase & volunteering & would be v...

I use OS on a daily visit. Dogs & their owners are always polite & respectful.

Most people approach my dog- & tell me how beautiful she is. I DO NOT AGREE w/the new tag system. Nor do I believe that rangers should USE binoculars to spy on us

I used to be a dog lover. Because of many encounters w/aggressive off leash dogs at OSMP I no longer feel safe hiking or running by myself. I have had off leash dogs approach me uninvited & bark & the owners repeated ly have to call them making me fe...

I used to live in Boulder County & now live in Denver, I plan to move back to Boulder in the next year & one of the biggest reasons is to be able to run w/my dogs off leash in Boulder co's OSMP areas.

I visit the dry creek area daily to exercise/play/walk my dog. Over the years I've realized that those visitors I see are part of a close knit community of dog owners. People w/dogs almost exclusively use this particular park. Right now the park suff...

I walk w/dog owners & have often talked w/them about their dogs behavior.

I wasn't on the hike today but my wife brought the survey to me. When I do go to OSMP it's chiefly for hiking & photography & wildlife watching.

I wish that Boulder would have an area (besides the awful dog park) that would allow dogs that aren't perfectly behaved (not under total voice/site control) to be off leash. It would be nice if it was more of a hiking/walking area (like Dry Creek) ins...

If a dog & its owner display mild "problem behavior" they shold be asked to give their dog an obedience class-fnot fine $1000 or thrown in jail. If an owner/dog is negligent or irresponsible & present a adanger to others, they simply should be banned...

If a dog attacks arunner, the runner should have the right to defend himself/herself against the animal (example: kicking it in the throat)

If I have to leash my dog when I cycle, I will have no use for coming to any OSMP area. We would fight this in court!

If the dog's well behaved, I think it's fine.

If the owner can control the dog off leash then great. I like dogs & enjoy watching them outside.

If you're not gonna pick up after dog make sure you don't leave the mess in a plastic bag on the trail-I saw this twice today. I enjoy dogs & seeing dogs w/o leashes if they're under control & I don't care if they poop off trail. I hate it when there's...

In areas that are posted "dogs must be leashed" then no matter if they have a green tag or not, they must be leashed. A fine should be given out to any dog owner who doesn't obey teh sign. I'd love to be able to give out tickets to the dog owners who d...

In general, "voice control" has been a joke.

In general, dogs & their owners are fine.

In general, the dogs are well behaved. Owners should definitely pick up after them. I have had dogs press their nose against me & it's gross. Owners shouldn't allow it.

In order for OSMP areas to be enjoyable to all visitors (dog owners & non-dog owners), dogs should be kept under control at all times. If I was to bring myyoung grandchildren to the park, I would want them to feel safe & be able to play in the grassy...

In owning a dog & bringing it to a PUBLIC place one assumes certain responsibilites i.e. muzzling your dog, keeping it a leash, etc. This is only propoer ?? for the ?? other people & to protect the environment of the place. ?? should be treated...

In the Indian Peaks wilderness dogs are required to be on leash. Because of VOLUNTEER uniformed ranger patrols there has over the years been more compliance. Since the OSMP dog tag has gone into effect I have seen fewer violators & fewer dogs on th...

Inforce pick-up after dogs more strictly, no dangerous dogs allowed on OSMP

Is the responsible of the owners to train their dogs before heading to trails off leash.

It's also annoying to see the bags of dog poop along the trail that people leave behind & never pick up later!

It's been frustrating that so many controls are on the majority vs the minority (there are more dog owners than non-dog owners) It would be nice if the city would put money into free programs on training rather than implementing more "tags" & controls.

It's great that Boulder allows dogs off leash at their parks. It would be a shame if they ever discontinued allowing this.

It is BS that dog owners control their dogs. I am sick of smelling & seeing poop when I hike & I am upset ?? the effect of so many dog son the environment. Off leash should NEVER be allowed.

It only takes one really bad encounter w/a dog to make a person skittish about ALL strange dogs. Dog owners who don't follow the guidelines, especially when their dog is NOT in voice control should be fined heavily >$500.

It seems Boulder is focusing too much on this issue.j People often don't have their kids under control but that seems acceptable. People come to this park to let their dogs interact & play w/other dogs & have a good time.

It should be well posted that dogs may be off leash if under control & owner is responsible.

It was a great experience, after I caught my breath.

I think dogs should be allowed off-leash.

Just for public safety, dogs need to be leashed.

Keep off leash trails please!

Keep up the good work.

Leash law is good as is.

Leashed dogs create "problem" dogs. People who are phobic about dogs create distorted reactions in dogs & should therefore deal w/their issue rather than require dogs to be leashed.

Leaving bags of poop to pick up later is not acceptable. If you have a big dog you have the responsibility to carry the poop UP the hill & DOWN the hill.

Let dogs be dogs!

Let people bring their dogs off leash (former resident & frequent OSMP user).

Let them be off leash!

Like any other area in life, teh owner needs to be responsible & held accountable.

Like most elements of the political landscape in Boulder the debate over dog/pets on OS seems to be driven by a select few people who make noise. The vast majority of those citizens who own dogs & enjoy being outside ?? ?? are responsible. Furtherm.....

Love Chautauqua! Keep up the great work!

LOVE the dogs off leash. My dog is very well trained at 10 mos., & 99% of the time she does none of these behaviors. I would be heartbroken if the off leash program went away. I'd most likely stop using the trails.

Major concerns: uninvited dogs/aggressive dogs, owners who dont' pick up after their dogs, owners who "think" they have their animals under control when teh really don't.

Majority of dogs off leash are great. I don't want the few irresponsible dog owners to ruin it for everyone else.

Many dog owners seem to reason that as long as their dog doesn't catch an animal while off leash, then they are ok to run free. This misunderstanding is what is bothersome to me-since a dog running at animals will affert their patterns too.

More bike trails (single track) !

More mountain bike single track in Boulder County.

More open spaces specifically for dogs off leash.

More recepticles for dog waste.

More trails open for dogs would ?? overuse of land/trails, same for bikes.

Most dog/owners I see are very responsible, any problems came from a small minority of dog owners, & problems voiced are from a very focal minority. I wouldn't support further OSMP tax initiatives if dogs off leash weren't allowed to visit. I support t...

Most dogs & dog owners are responsible but the dog owners that don't have voice control of their dogs yet think they do make it uncomfortable & sometimes scary if teh dog approaches unrequested or the dog runs wild.

Most dogs are better behaved & cause lower usage impact at OSMP that NEARLY EVERY child at OSMP. How about leashing the unruly, destructive (spoiled) children?

Most dogs fine but some aggressive!

Most OSMP should be off-limits to all domestic animals for sake of wildlife. Some OSMP should be off-limits to people for sake of wildlife.

Most owners in Boulder are responsible & caring. IT's especially nice to live here because you can walk dogs off leash & get better exercise.

Most people are responsible dogs love to explore, it's ok if they run around, If dogs are ?? or ?? owners know it & act responsibly.

Most pet owners are very considerate, ?? ??.

My 6 year old was pushed into a gulch at Marshall Mesa

My big problem is owners who leave dog poop bags as if someone is going to clean up after them. Sense of ENTITLEMENT.

My dog is a husky! I keep her on leash b/c of her behavior traits. Other dogs guardians should have their choice on not to be told. What about horses?!!

My dog is quite well behaved, has her OS tag. I feel strongly she should be allowed off leash on OSMP & she uses it daily. It's a huge reason I live in Boulder.

My dog isn't very good off leash so when I visit OSMP, he stays on leash. Seems simple to me.

My dog Katie is very well behaved & polite. I would hate to seethis opportunity taken away from us.

My husband suffered a stroke. Many times "friendly" dogs react agrressively to his stance & even a friendly dog approachign can knock him off balance. Many dog owners seem to feel that having their pet off leash is a right but I believe Boulder is o...

My only problem w/ off leash areas is out of control dogs. I have one unfriendly dog that I keep on leash for that reason & off leash dogs that approach her cause trouble.

Need to open the number of trails to dogs & stop discriminating against dog owners.

No big deal w/dogs. But I'm real tired w/OS closing off so many white rocks trails to bikes.

No leash laws on hiking trails!!!

No need for open space if I can't bring my dog.

Not picking up after dogs or leaving filled bags alongside trails is the most frustrating problem. In general I think that most dog owners are responsible & considerate.

Off trail dog erosion is a huge problem on Mt. Sanitas. I have witnessed 20 years of weed invasion & trail degradation that I strongly attribute to dogs off leash.

On this particular visit we were horseback riding & I do worry that dogs are goign to get kicked since most of the time people let their dogs run up to the horses & sniff them. We do warn them of that risk, then it's their problem! However, we occasio...

Once in a while my dog goes off trail but she's very friendly & doesn't bother other people or other dogs.

Only met great dogs & owners REALLY appreciate that dogs are welcome especially off leash if under good voice command.

OSMP needs a SMALLER green tag for little dogs.

OSMP should be run for benefit of people, not dogs. Unfortunately, my impression is the reverse, i.e. osmp are ?? dogs-or atl east that is the reality.

OSMP staff member conducting survey was very coureous & professional.

OSMPs are many different spaces, can't expect same behaviors (from pets or owners) at all the parks.

OUT OF COMMISSION: 2 separate visitors attempted to take on this sheet & later declined.

Overall dogs (& most owners) are great. It's usually just the few uncontrolled dogs &/or irresponsible owners that make a negative impact.

Owners leaving poop bags at side of trail to pick up later is a problem.

Parts of this form are too confusing.

People are the issue - not the animal-I discontinued my use of the open space areas due to the rude people & all the rules.

People needto pick up after there dogs & it's very important that people only have their dogs off leash if they are well trained.

People talking on their cell phones (usually loudly) ruin the experience of being outdoors in OS. These cell calls are ALWAYS long rambling discussive events, not emergency or quick "I'll be home in 20 min" calls. People yelling at each other to commu...

Please don't open any more trails to dogs!

Please only allow dogs on leash. This is NOT a dog bathroom.

Please stop limiting areas for off leash dogs. It bothers me that dogs can't be off leash in the first section of Dry Creek anymore. My paraplegic friend used to like to sit at the table and watch me throw her the ball-she can't go the depth into the par

Please, please, please outlaw dogs not on a leash. They cause tremendous environmental harm & ruin the recreational experience. Please!

Plenty of people have dogs that are NOT friendly w/other dogs, these owners should have their dog on a leash. I've encountered people w/2 dogs that act aggressively toward my one dog, this has happened many times & is very frustrating. The whole dog t...

Prairie dogs are rodents, they shouldn't be considered "equals" to canine dogs. Fines for dogs entering prairie dog's fenced area should not be $1000 as warned at Dry Creek! If prairie dogs are deemed worthy of protection to THAT level, then better (m...

Prior to the changes (voice & sight) I was unable to bring my 5 year old son here because he would get hurt/scared every time by a dog who wasn't handled properly. W/the changes people are much more respectful & I will bring hiim again to try it out. S...

Really believe that problems associate w/off leash dog are more related to meanness otherwise dogs should have places to run off leash, just like wild animals-trails & streams. Important to have these designated areas.

Remember, dogs are people too!

Seems like 5-10% of dog owners are the problems.

Some childeren should be required to have leashes.

Steep single track trails were a poor choice for leash requirements due to increased danger. New tag program is a good idea.

Survey filled out according to experience before regs. Regs have helped & I'm starting to see some good changes in the past few weeks.

Survey should distinguish between OSMP areas where dogs are allowed (& customarily frequently have been) off leash, & where they aren't. Why no questions on new green tag?

Tags are too big for small dogs.

Tend to think people who use the Chaut.trails are very responsible w/their dogs.

Thank you for this survey.

Thank you so much for well maintained trails & concern for people & pets.

Thank you very much for getting my input. I appreciate the effort to cater to all users of these areas.

Thank you!

Thanks for asking!

Thanks for the open space.

Thanks for your hard work!

Thanks!

Thanks.

I appreciate your asking.

The largest problem I see is paranoid on leash dog owners who think every dog is out to attack their dogs. Today I observed one lady drag a leashed dog off trail to avoid normal dog to dog contact on trail. Was truly bizarre but see this fairly regularly.

The license to walk your dog off leash is bogus! It doesn't in any way assure that a dog owner w/this license will behave off leash. It's simply a money maker.

The majority of owners are responsible but problem dogs do exist and their owners do not feel that it's their dogs that are the problem. I don't know what the solution is - it's not fair to make everyone use a leash, but there is no other feasible way to

The money spent for this all the legal mumbo jumbo staffing, etc is better spent fighting disease, education, helping the poor & homeless, etc.- reducing our taxes for heaven's sake!! Need depts/programs which are 1. effective (benefits outweigh cos...

The most critical issue that we face w/regard to dogs is picking up the poop!

The new regs are fine in theory, but I wonder if theywill solve the problems they seem intended to solve. Most people obey the rules already, those who don't won't get the tag. Another conflict mediation technique would be to educate non-dog owners on...

The new rules discourage the use of OSMP. The new sigs are missleading.

The off leash parks are one of the reasons I think this area is so great. I like the new tag program.

The on-leash policy has created more dog aggressive behavior-they don't have their "natural" protection.

The only thing that bothers me are dog owners who don't pick up after their dogs.

The OSMP is the reason I livein Boulder. I appreciate everything the city & county does to preserve this. Most dogs I see are well behaved & the owners respectful, so I don't see a problem, as long as they aren't affecting wildlife. Thank you for caring.

The parks has done a good job on this & even though Blue doesn't go off leash we would be very unhappy if the trails wereclosed off. Part of the reason we moved back to Boulder from Lyons.

The presence of & interaction w/so many friendly dogs greatly increases the enjoyment of these experiences & to the quality of life in this area. Please keep it as is. Thank you.

The problem I see is dog owners take the whole trail width don't move to side when necessary. But runners do that also, when running in groups.

The trails are beautiful!

The trash buckets stink w/poo.

The website to register for voice control is too difficult to remember-a longer name spelled out would be much better (boulder dogs voice control.com)

The worst part of unleashed dogs (currently) is that they are unpredictable as I approach on my bike,even when slowing down. Dog owners don't seem to understand how difficult it is to pass a moving target on a bike.

There's nothing wrong w/dogs out here as long as they are controlled. Off leash dogs can cause problems interacting w/leashed dogs when the former aren't kept in check.

There's very few problem dogs/dog owners. EVERYONE should pick up after their dogs. It's the best part of my dogs' day to visit OSMP areas.

There are plenty of places to walk, hike & watch wildlife in CO! Many of these places reqssuire dogs to be on leash. Other places dogs aren't even allowed. If people have a problem w/OSMP locations, GO SOMEWHERE ELSE!

There are so few places in Boulder where dogs can be off leash. Let's preserve these areas for dogs & their owners.

There are so many factors to this survey-it would be hard to accurately measure problems. When a dog is sick &: experiencing diarrhea-hard to pick up! Puppies aren't always perfect but need a place to run & come back-that's the whole point. Most us...

There is nothing inherently wrong w/dogs. People need to be responsible for them.

There seem to be some extremists plenty of responsible owners, spoilt by a few irresponsible selfish dog owners.

There should be somewhere that people can enjoy osmp w/o encountering dogs.

There was substatially more horse poop & dog poop than I typically observe. Also, numerous bagged dog poop left trailside. Yuk!

These trails kick ass

Things are gettinga little too extreme. As a bird watcher of long time,it is not as bad as some makeit out to be.

Things have improved so much w/waste pick up over the past few years, used to be pretty bad before teh parks took measures to correct! The largest problem I see are the animals off leash who aren't controlled by owners & chasing deer & other anim...

Think a lot of this is a waste of time & money. could be better spent in other ways. i've been at open spaces w/dogs for 10 years w/rare problems, none serious.

This is a lovely area to walk or hike.

This is my 1st time on a rec path here & it was very nice, much different then teh city bike path I'm used to.

This place is a wonderful one. I want people to enjoy & preserve this place forever.

This survey fails to differentiate among areas dog behavior that is unacceptable in some areas is perfectly all right at dry creek. almost no one comes here w/o a dog. a set of unwritten rulees has ?? that worked perfectly well w/o osmp intervention...

This survey makes it appear that dogs & dog guardians are being singled out as the biggest problem in OSMP. There are bigger problems to consider such as people/bikes making satellite trails off of the main trails, people leaving food outside their hom...
This survey needs to distinguish between os areas that allow dogs off leash & those that don't. The survey has this fatal flaw. Therefore, I am not going to fill out the entire ?? as the info isn't accurate.

Too many dogs off-leash around places like Mapleton school, N Boulder park, Eben G fine, & also around Mapleton Hill. More enforcement of leash laws would be much appreciated especially because of unpredictable dogs & young children. I've had several
Use has gone down significantly & now see more problems or potential problems w/dynamics between leashed & unleashed dogs.

Usually people & the dogs are very well behaved & no problem.

Very much enjoy bringing my dogs off leash here.

W/off trail, just concerned about erosion, destruction of habitat. I like dogs, but don't like dodging them on the trail. If there were "no dog trails" I would use these instead.

We arrive very early and meet up with one dog owner that has good control ofher pet and have had no problems with dogs.

We have had problems w/dogs jumping on us. Also concerned w/dog feces on the trails any time of the day.

We have stopped riding our bikes on weekends on bike/walking w/dog trails b/c of many near collisions we have either experienced personally or observed between bikes & dogs that weren'tbeing adequately controlled. Just too many dogs.

We just moved from NY, where there are VERY few areas dogs are allowed off leash, so we joined the program right away & have not experienced any problems.

We need a place (lots of them) to take our friendly well behaved dogs. Don't let a few politically active, outspoken people ruin it for the rest of us!

We very much enjoy hiking here w/our dog. I believe most dog owners use the open space responsibly. Thanks.

What bothers me most is when people leave their dog poop bags on the trail for someone else to pick up.

What does education have to do w/this

When dog owners leave poop in a plastic bag on the trail, it may be worse than just the poop. I don't mind being approached by a friendly dog. It's unsafe for a dog to get too close to a horse on the trail, as they could get kicked.

While I commend OSMP for attempting to gather info about this issue, I feel that the survey is too general to gain much meaningful info. For example, these questions are not site specific which biases my responses. Dry Creek is a very different site f...

With this issue-common sense needs to rule. Meaning people who are responsible dog owners & have control over there dogs should be allowed some off leash freedom. Otherwise not!

Would like to comment on HORSES: dog owners are supposed to pick up after them, horse owners aren't; horses obstruct running; some horse owners aren't having their horses under good control.

You guys have become militaristic against dogs. Through our taxes & now v & c permits, we pay your salaries & you have made Boulder a less pleasant place to live.

Visitor Tolerances and Standards for Off Leash Dogs at Boulder Open Space and Mountain Parks

Sponsored by the City of Boulder Open Space and Mountain Parks and conducted by

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Executive Summary

- This study evaluated visitors' normative tolerances for 11 off leash dog behaviors identified and collectively agreed upon by the City of Boulder Open Space and Mountain Parks (OSMP) and citizen interest groups as potentially causing conflict.

- Data for this project were obtained from on-site surveys (n = 951) conducted at 16 OSMP locations during the summer of 2006. Sampling occurred at trailheads that provide access to trails allowing dogs to be managed under voice and site control.

- Questions related to normative tolerances examined 5 *direct* (e.g., dogs jumping on visitors) and 6 *indirect* (e.g., dogs causing wildlife to flee) human-dog interactions. The direct behaviors were situations where dogs interacted with visitors other than their guardians. In the indirect behaviors, the dog interacted with the guardian, wildlife, other dogs, or the guardian failed to pick up after their dogs.

- *Summary of Key Findings*

  1. Nine of the 11 indicators reflected "no tolerance" norms. The average acceptability ratings for these behaviors were negative irrespective of the number of times the behaviors were observed. Thus, *the visitors' reported standard for each of these nine behaviors was 0.*
  2. For "dogs play chasing" and "dogs off trail," a single tolerance norm was observed with acceptability ratings only slightly above neutral (i.e., the average acceptability ratings were +0.48 for "dogs off trail" and +0.51 for "dogs play chasing with another dog"). *Given that the averages were less than 1, the visitors' standard for these two behaviors was in essence 0.*
  3. Although statistical differences between some sub-groups (e.g., guardians vs. non-guardians, frequency of walking dogs at OSMP) were identified in our analyses, the magnitude of these differences was minimal. The "no tolerance" standards for the entire sample are thus applicable to all stakeholders.
  4. These standards were exceeded 13% of the time or more. The most serious violation of a standard occurred for "owners not picking up after their dogs," which was exceeded 50% of the time. The standard for "dogs approaching uninvited" was exceeded 35% of the time.

- *Recommendations*

  1. Given the visitors' "no tolerance" standards, a management standard of "no more than 0% of the visitors should have their norms exceeded" for any of these human-dog interaction variables could be recommended. A good standard, however, should be attainable, and a standard of 0% is unrealistic short of eliminating all off leash dogs at OSMP.
  2. We recommend a standard of "no more than 10% of visitors should have their norms exceeded." This recommendation is consistent with the standards currently in the OSMP Visitor Master Plan.
  3. Although the proposed standard of 10% is never met under current conditions, OSMP's Voice and Sight Tag (VST) Program had just been implemented at the time our data were collected. The VST program should be monitored to evaluate its effectiveness in reducing dog-related conflict.

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Introduction

Most natural resource planning frameworks (e.g., Limits of Acceptable Change, Visitor Impact Management, Visitor Experience and Resource Protection) argue that resource management decisions require both descriptive and evaluative information (Graefe, Kuss, & Vaske, 1990; Shelby & Heberlein, 1986; Stankey, Cole, Lucas, Petersen, & Frissell, 1985). Descriptive information is needed to demonstrate how different management actions produce different ecological and social impacts. Evaluative information is necessary to identify management goals and objectives, and to develop specific standards that define high quality. Although management decisions require both kinds of information, the evaluative component is generally the most difficult and controversial part of the decision-making process (Vaske, Shelby, Graefe, & Heberlein, 1986).

The City of Boulder Open Space and Mountain Parks (OSMP) Visitor Master Plan establishes procedures for collecting descriptive information and sets standards for several key services that enhance visitor experiences and protect the natural areas. Success in providing these community services is defined as making meaningful progress toward a sustainable and high quality visitor experience.

The Visitor Master Plan describes seven community initiatives that deliver services to OSMP visitors and the community through a package of strategies. Performance measures enable OSMP to assess progress toward implementing those strategies and meeting the Visitor Master Plan goals and objectives. The Visitor Master Plan initiatives are:

1. Education and outreach
2. Safety and enforcement
3. Recreational opportunities
4. Trails and facilities
5. Resource protection
6. User conflict reduction
7. Public involvement

This report primarily focuses on the user conflict reduction initiative. One specific type of potential conflict involves the presence of dogs in the City of Boulder Open Space and Mountain Parks and the impact of dog behaviors on the visiting public. Dog guardians, for example, that allow their dogs to be off leash may not be in control of their animals and may be less likely to clean up after their pets. Visitors who are intolerant of the presence and / or behavior of pets in natural areas are likely to evaluate these situations as unacceptable.

In response to this situation, OSMP has initiated a Voice and Sight Dog Tag Program (VST). Under the VST program, visitors wishing to have their dogs off leash and under voice and sight control are required to have a tag visibly displayed on their dogs. To obtain a tag, a visitor must view a video describing the requirements of voice and sight control and complete a registration form. Visitors not registered in the program or who do not have a tag on their dog must keep their dog on leash while visiting OSMP and other City of Boulder properties where voice and sight control applies.

Study Objectives

During the summer of 2006, OSMP conducted an observational study to evaluate visitors' compliance with observable aspects of existing dog regulations, including the voice and sight ordinance. The study described in this document complements the OSMP observational investigation by evaluating visitor tolerances for the impacts of dogs in Open Space and Mountain Parks. Our overall study objective was to evaluate visitor tolerances for 11 behaviors identified by OSMP and citizen interest groups as causing potential conflict. More specifically, we addressed the following issues:

1. Visitors' reported frequency of observing 11 dog / guardian behaviors (e.g., dogs approaching visitors uninvited, guardians not picking up after their pets).
2. Visitors' normative acceptability ratings and tolerances for these dog / guardian behaviors.
3. The extent to which visitors perceive the presence and / or behavior of dogs to be a problem at locations managed by OSMP.
4. Visitor beliefs about off leash dogs at OSMP.

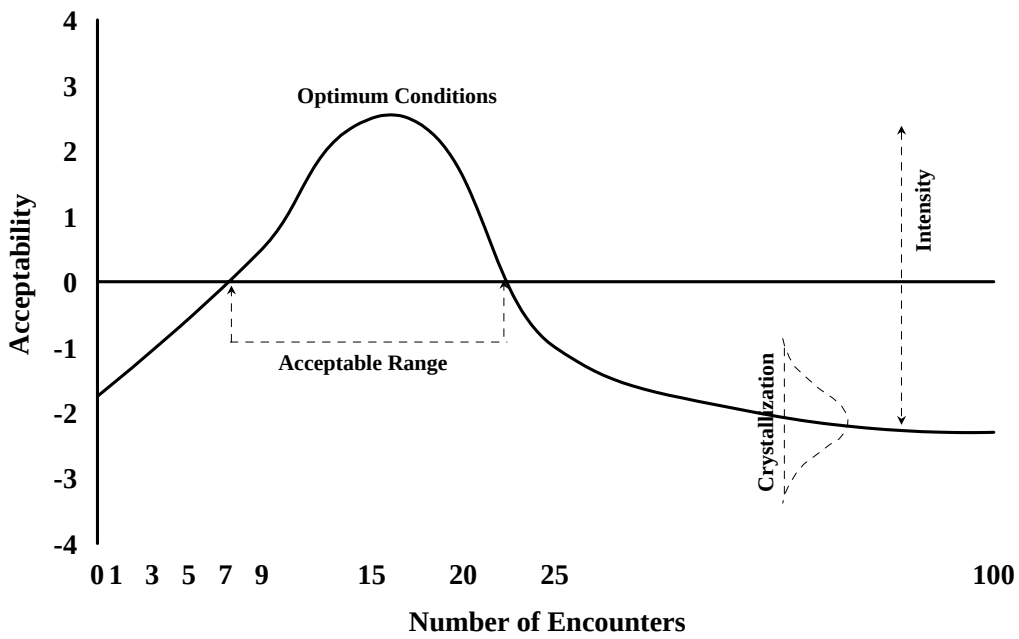
Theoretical and Methodological Contexts

Structural Characteristics of Norms

Given the need for evaluative information, a normative model has been developed as a useful way to conceptualize, collect, and organize evaluative judgments in resource management. Norms can refer to what most people are doing (a descriptive norm) or to what people *should* or *ought to* do (an injunctive norm) in a given situation (Cialdini, Kallgren, & Reno, 1991). As defined by one research tradition, norms are standards that people use to evaluate behavior or the conditions created by behavior as acceptable or unacceptable (see Shelby et al. 1996; Vaske et al. 1986 for reviews). Norms thus define what behavior or conditions should be, and can apply to individuals, collective behavior, or management actions designed to constrain collective behavior.

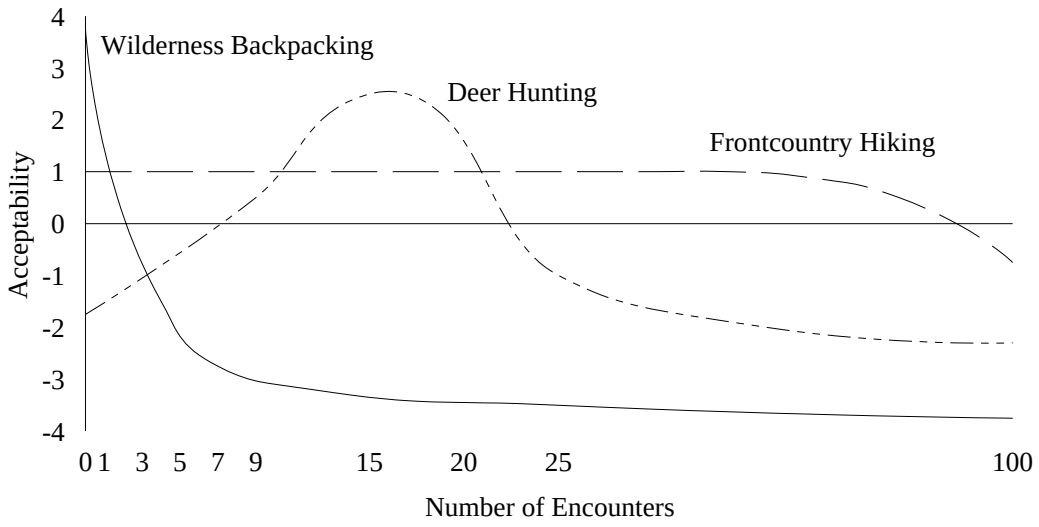
The traditional norm model focuses on the characteristics of social norms using a graphic device that Jackson (1965) initially described as the return potential model (now more generally known as impact acceptability curves). Impacts are displayed on a horizontal axis while evaluation (e.g., acceptability) is displayed on the vertical axis (Figure 1). The curves describe social norms as averages of personal norms.

Figure 1. The structural characteristics of norms



The curve can be analyzed for various structural characteristics. The high point of the curve shows the *optimum* or best situation. The range of impacts where evaluations are above the neutral line defines the *range of tolerable conditions*. The height of the curve (both above and below the neutral line) describes the *intensity* of the norm (one measure of strength), while variation among evaluations at each impact level shows the amount of agreement or *crystallization* (a second measure of strength). Evaluative standards for backpacking in a wilderness setting (Figure 2), for example, often have an optimum of zero encounters, a low range of tolerable contacts, high intensity, and high crystallization. Norms for hiking in a developed recreation area tend to show a greater tolerable range, lower intensity, and less agreement (Shelby et al., 1996). For deer hunting, too few and too many people can be evaluated negatively; hunters want enough people to move deer, but not so many that crowding or competition problems appear.

Figure 2. Hypothetical norm curves for three activities



Jackson's model has been extensively applied to natural resource applications; often with respect to encounter norms that describe how many people are too many in a recreation setting (see Donnelly, Vaske, Whittaker, & Shelby, 2000; Manning, Lawson, Newman, Laven, & Valliere, 2002; Shelby et al., 1996; Vaske & Donnelly, 2002, for reviews). Other applications have extended the structural approach to other impact issues such as campsite or attraction site sharing (Heberlein & Dunwiddie, 1979; Shelby, 1981); the number of people in sight at attraction areas (Manning, Lime, Freimund, & Pitt, 1996); fishing competition (Martinson & Shelby, 1992; Whittaker & Shelby, 1993); discourteous behavior incidents (Whittaker & Shelby, 1988; 1993; Whittaker, Vaske, & Williams, 2000); capacities on wildlife viewing platforms (Whittaker, 1997); or other resource issues such as instream flow requirements for different river recreation activities (Whittaker & Shelby, 2002); the amount of bare ground and size of fire rings in campgrounds (Shelby, Vaske, & Harris, 1988); and the acceptability of wildlife management practices (Wittmann, Vaske, Manfredo, & Zinn, 1998; Zinn, Manfredo, Vaske, & Wittmann, 1998) and wildfire policies (Kneeshaw, Vaske, Bright, & Absher, 2004). In all of these applications, researchers have explored either acceptable behaviors or acceptable conditions caused by behavior (Vaske, Donnelly, & Whittaker, 2000).

For many of the behaviors / conditions examined in past research, “less” impact is often deemed more acceptable than “more.” Encountering no other visitors in a wilderness (or at a campsite or attraction site), for example, is consistently evaluated more positively than seeing many visitors. Other research (e.g., Whittaker & Shelby, 1988), however, suggests that “no tolerance” norms may exist when visitors agree that any level of impact is unacceptable. A “single tolerance” norm exists when visitors show similar agreement at impact levels greater than zero.

Overall, the normative approach is powerful because it facilitates the development of standards for acceptable social and physical conditions that are central to visitor impact management frameworks such as Limits of Acceptable Change, Visitor Impact Management, or Visitor Experience and Resource Protection (Shelby & Vaske, 1991). In addition, the visual representation has proven useful to the process of communicating normative concepts to resource managers. Crystallization or level of agreement about the norm, however, is typically not visually displayed on a norm curve. Understanding the amount of agreement regarding a given issue allows decision makers to avoid or at least plan in advance for potential conflicts between users. When agreement among respondents is high, confidence in a management action increases. In cases with low levels of agreement, caution should be exercised when adopting a given decision.

The potential for conflict index (PCI) developed by Manfredo, Vaske, and Teel (2003) advances the graphic representation of social norms by visually displaying information about their central tendency and dispersion (Vaske, Needham, Newman, Manfredo, & Petchenik, 2006).

Potential for Conflict Index (PCI)

If the goal of human dimensions research is to inform management decisions, researchers working in this arena must improve their ability to effectively communicate. Basic summary statistics describe variables in terms of central tendency (mean, mode, median), dispersion (e.g., standard deviation, variance, range), and form (e.g., skewness, kurtosis) (Loether & McTavish, 1976). Although these statistics can efficiently convey meaning, an accurate understanding of a variable’s distribution requires consideration of all three indicators simultaneously.

Crystallization in the structural norm approach has commonly been defined as the standard deviation (Shelby et al., 1996), but norm agreement can be conveyed in other ways. The potential for conflict index (PCI), for example, describes the ratio of scoring on either side of a rating scale’s center point and displays this ratio as bubble graphs. A standard deviation is centered on the mean while the PCI is centered on the neutral point. Although both statistics can communicate agreement, the PCI bubble graphs have a more intuitive appeal.

Surveys using the structural norm approach commonly measure variables using response scales with an equal number of response options surrounding a neutral center point. Numerical ratings are assigned in ordinal fashion with the neutral point being 0 (e.g. -2, -1, 0, 1, 2, where -2 = highly unacceptable, 0 = neutral, and 2 = highly acceptable.). The potential for conflict index (PCI) requires this common form of measurement. The greatest possibility for conflict (PCI = 1) occurs when there is a bimodal distribution between the two extreme values of the response scale (e.g., 50% strongly support, 50% strongly oppose, 0% neutral). A distribution with 100% at any one point yields a PCI of 0 (i.e., no conflict).

PCI results can be displayed as bubble graphs to visually and simultaneously describe a variable’s form, dispersion, and central tendency. The size of the bubble depicts the PCI and indicates degree of dispersion (e.g., extent of potential conflict regarding the acceptability of a behavior). A small bubble suggests little potential conflict; a larger bubble suggests more

potential conflict. The center of the bubble, which is plotted on the Y-axis, indicates the mean response (central tendency) to the measured variable. With the neutral point of the response scale highlighted on the Y-axis, it is apparent that respondents' average evaluations are situated above or below the neutral point (i.e., the action, on average, is acceptable or unacceptable). Information about a distribution's skewness is reflected by the position of the bubble relative to the neutral point (i.e., bubbles at the top or bottom of the graph suggest high degrees of skewness). In this study we combine the PCI and the structural norm methodologies to analyze normative tolerances for dog associated behaviors at the City of Boulder Open Space and Mountain Parks.

Methods

Sampling Design

Data for this project were obtained from on-site surveys (n = 951) conducted at 16 locations managed by the City of Boulder Open Space and Mountain Parks during the summer of 2006 (Table 1). Representatives from OSMP distributed the self-administered surveys. Surveys were randomly distributed during July (43%), August (49%) and early September (8%). Both weekdays (47%) and weekends (53%) were included in the sample. Surveys were administered in the morning (44%), midday (32%) and evening (24%). Sampling occurred at trailheads that provide access to trails allowing dogs to be managed under voice and site control.

Table 1. Survey locations

Survey locations	Number	Percent
East Boulder – Gunbarrel	53	6
East Boulder – Teller Farm	21	2
Dry Creek	79	8
Bobolink	72	8
South Boulder Creek at EBCC	31	3
Marshall Mesa	66	7
Greenbelt Plateau	12	1
Doudy Draw	18	2
South Mesa	107	11
Shanahan Ridge	52	5
Chautauqua	216	23
Sanitas	64	7
Foothills	15	2
Sage	44	5
Eagle	53	6
Gregory Canyon	48	5
Total	951	100

Variables Measured

The one-page survey included general questions related to: (a) frequency of visitation, (b) dog ownership, (c) activities participated in on the day the individual was interviewed, (d) demographics (sex, age, education, place of residence), and (e) beliefs about off leash dogs at OSMP. The actual survey wording and basic descriptive findings are presented in Appendix A.

Questions related to normative tolerances examined 11 specific behaviors that could potentially create conflict for OSMP visitors. This list of behaviors was developed collectively from input

provided by OSMP and interested citizen groups. For presentation purposes these items were arranged into *direct* and *indirect* human-dog interactions. The direct behaviors involved situations where dogs interacted with visitors other than their guardians. In the indirect behaviors, the dog interacted with the guardian, wildlife or other dogs, or the guardian failed to pick up after their dogs.

The direct behaviors included:

- Dogs jumping on a visitor
- Dogs pawing a visitor
- Dogs licking a visitor
- Dogs sniffing a visitor
- Dogs approaching uninvited

The indirect behaviors included:

- Owners not picking up after their dogs
- Dogs causing wildlife to flee
- Dogs flushing birds
- Owners repeatedly calling their dogs
- Dogs off trail
- Dogs "play" chasing another dog

For each of these 11 behaviors, respondents indicated: (a) the frequency of observing the specific behavior for off leash dogs, (b) their acceptability ratings of the behavior, and (c) their maximum tolerances for the behavior on a typical OSMP visit. Response categories for the frequency of observing the behavior ranged from 0 to 6 or more times. Acceptability ratings were coded on 5-point scales ranging from -2 (very unacceptable) to +2 (very acceptable) with 0 as the mid-point of the scale. The maximum number of times that a respondent would find the observed behavior acceptable on a typical visit to OSMP ranged from 0 to 6+ times.

Results

Descriptive Findings

Fifty-six percent of the sample was female and 44% male (Table 2). Half of the respondents were between the ages of 31 to 50, with another quarter over 50. The average age was 42 years old. A third of the sample held a bachelors degree and 53% had attended some graduate school or held masters or doctoral / professional degrees. Nearly half of the sample (48%) lived within the city limits of Boulder (Table 3).

A quarter of the sample had visited OSMP locations two years or less; over a third (38%) had been visiting more than 10 years (Table 4). The average number of years visiting OSMP locations was 11. Forty-one individuals (4%) had been visiting for more than 30 years.

About a quarter (26%) of the individuals in the sample had made between 1 and 10 visits to OSMP locations within the past 12 months. On the other extreme, 38% had made more than 90 visits during the previous year. The average number of visits per year was 92 and ranged from 1 to 365 visits.

A third of the respondents had made between 1 and 3 visits during the past month (Table 4). Another third had visited 4 to 10 times, and a third had made more than 10 visits in the last month. The average number of visits per month was 10 and the range was from 1 visit to more than 31 visits.

Table 2. Demographic profile

	Respondents	
	Number	Percent
Sex		
Male	386	44
Female	492	56
Age		
< 20	32	4
21 to 30	155	18
31 to 40	206	24
41 to 50	228	27
51 to 60	170	20
61 to 70	56	6
> 70	14	1
Mean age	42.24	
Education		
High school or less	41	5
Some college	71	8
College graduate	307	35
Some graduate school	95	11
Masters degree	245	28
Doctoral or professional degree	119	14

Table 3. Place of residence

	Respondents	
	Number	Percent
Boulder (within city limits)	419	48
Louisville	51	6
Lafayette	44	5
Superior	23	3
Longmont	21	2
Unincorporated Boulder County	122	14
Other city in Boulder County	10	1
Metro Denver	94	11
Other area in Colorado	31	3
Out of state	63	7
Out of country	5	1

Table 4. Frequency of visitation

	Respondents					
	Number	Percent	Mean	Standard Deviation	Minimum	Maximum
Number of years visiting OSMP			10.94	10.48	0	61
1st year	84	9				
1 to 2 years	146	16				
3 to 5 years	147	16				
6 to 10 years	190	21				
11 to 20 years	216	24				
21 to 30 years	96	10				
More than 30 years	41	4				
Number of visits during past 12 months			92.56	107.62	1	365
1 to 10 visits	246	26				
11 to 30 visits	179	19				
31 to 90 visits	158	17				
91 to 180 visits	172	18				
181 to 365 visits	194	20				
Number of times visited OSMP during past month			10.34	10.36	1	60
1 visit	171	18				
2 to 3 visits	139	15				
4 to 5 visits	126	13				
6 to 10 visits	188	20				
11 to 20 visits	188	20				
21 to 31 visits	109	12				
More than 31 visits	18	2				

Over half (54%) of the respondents considered themselves to be dog guardians (Table 5). Of these individuals, 71% owned one dog and another quarter owned two dogs. Over half (56%) walk their dogs two or more times per week at OSMP areas. The average number of dogs per dog walker was 1.35.

Fifty-six percent were not visiting OSMP with a dog on the day they completed the survey; about a third were visiting with one dog and about a tenth (11%) with 2 or 3 dogs. On the day the respondent was interviewed, over a quarter (28%) considered their activity to be walking a dog (Table 6). More than half (57%) were walking or hiking without a dog and a fifth (21%) were runners.

Table 5. Dog guardians

	Respondents	
	Number	Percent
Are you currently a dog guardian?		
No	431	46
Yes	509	54
Number of dogs currently owned		
1	364	71
2	121	24
3	21	4
4	3	1
Number of dogs with you on today's visit		
No dogs	495	56
1 dog	283	32
2 dogs	93	10
3 dogs	11	1
4 dogs	4	< 1
5 dogs	3	< 1
Frequency of walking dogs at OSMP		
Never	78	15
1 to 4 visits per month	146	29
2+ visits per week	285	56

Table 6. Activities on day of interview [1]

	Respondents	
	Number	Percent
Walking Dog	263	28
Walking / Hiking	524	57
Running	198	21
Bicycling	54	6
Bird watching	61	7
Wildlife viewing	67	7

1 Because respondents could check more than one activity, percents do not sum to 100.

All behaviors were thought to be a slight to extreme problem. The most problematic behaviors were owners not picking up after their dog, dogs causing wildlife to flee, dogs jumping on a visitor, dogs pawing a visitor and dogs flushing birds.

Across all 11 potential problem behaviors, “owners not picking up after their dogs” was considered to be an “extreme problem” by 57% of all respondents (Table 7). Almost all (91%) individuals rated this behavior as at least slightly problematic. Only 10% indicated that they had observed this behavior on the day they completed the survey.

Among the other “indirect” behaviors, “dogs causing wildlife to flee” (35%) and “dogs flushing birds” (24%) were also evaluated as extreme problems, with about three quarters indicating that these behaviors were slightly to extremely problematic. These behaviors, however, were only observed by 3% and 2%, respectively, on the day they were interviewed.

Nearly half of the respondents rated “dogs off trail” (47%) and “dogs ‘play’ chasing another dog” (44%) as problematic to at least some extent. A third observed dogs off trail and nearly a fifth reported seeing dogs play chasing another dog.

Among the five “direct” human-dog interaction variables, “dogs jumping on a visitor” was considered an extreme problem by 35% of the respondents; 82% rated this behavior as at least a “slight problem.” “Dogs pawing a visitor” was considered a problem (slight to extreme) by three quarters of the visitors. Both of these behaviors, however, were observed by only 3% or less of the respondents on the day the survey was completed.

“Dogs approaching another visitor uninvited” and “dogs sniffing a visitor” were seen as a problem (slight to extreme) by two thirds and half of the visitors, respectively. These two behaviors were observed by about a fifth of the respondents on the day they were surveyed.

Table 7. Perceived problems associated with human-dog interactions

	Extent of Problem *if* Behavior Occurs [1]				
For dogs off leash:	Not at all a problem %	Slight problem %	Moderate problem %	Extreme problem %	Percent Observing Behavior Today
Indirect interaction					
Owners not picking up after their dogs	9	12	22	57	10
Dogs causing wildlife to flee	23	20	22	35	3
Dogs flushing birds	28	26	22	24	2
Owners repeatedly calling their dogs	30	39	22	9	12
Dogs off trail	53	29	13	5	32
Dogs “play” chasing another dog	56	26	13	5	18
Direct interaction					
Dogs jumping on a visitor	18	22	25	35	3
Dogs pawing a visitor	24	26	26	24	2
Dogs licking a visitor	35	30	19	16	6
Dogs approaching uninvited	32	32	20	16	19
Dogs sniffing a visitor	48	29	14	9	18

1. Cell entries are row percents

Consistent with perceived problem measures, 91% of the respondents agreed with the statement "It bothers me when dog owners do not pick up after their dogs" (Table 8). Over three-quarters agreed that "Dog owners who *cannot* control their dogs off leash *should not* be allowed to visit OSMP areas with their dogs off leash" and that "It is OK for a visitor to say something to a dog owner who does *not* have his or her dog under control." Seventy-five percent, however, felt that "Most dog owners are responsible individuals who keep their dogs under control at OSMP areas."

Over three quarters disagreed that "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them" and over half enjoyed watching dogs off leash at OSMP areas."

Table 8. Beliefs about off leash dogs [1]

	Disagree	Neutral	Agree
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them	78	13	9
The behavior of off leash dogs is a problem at OSMP areas	60	20	20
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas	42	25	33
I enjoy watching dogs off leash at OSMP areas	17	25	58
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me	17	20	63
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas	9	16	75
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash	10	13	77
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control	6	16	78
It bothers me when dog owners do ***not*** pick up after their dogs	2	7	91

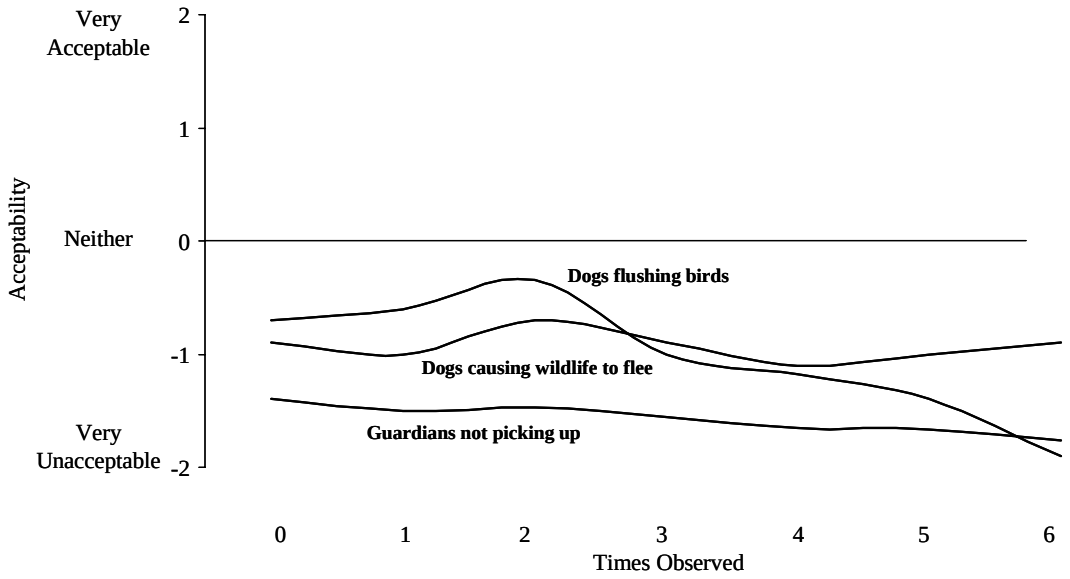
1. Cell entries are row percents

Normative Tolerances

Acceptability Ratings: Normative Tolerances

Social norm curves for the acceptability of the 11 behaviors are shown in Figure 3 (indirect interaction) and Figure 4 (direct interaction). These plots show the average acceptability ratings across all respondents. Four of the six indirect behaviors were always rated as unacceptable (i.e., no tolerance norms) regardless of the number of times the behavior was observed. Dogs off trail was consistently only marginally above the neutral line and dogs play chasing was somewhat acceptable across the number of times the behavior was observed (Figure 3). All of the direct interaction behaviors were "no tolerance norms" with acceptability ratings consistently below the neutral line (Figure 4).

Figure 3. Social norm curves for “indirect” human-dog interactions



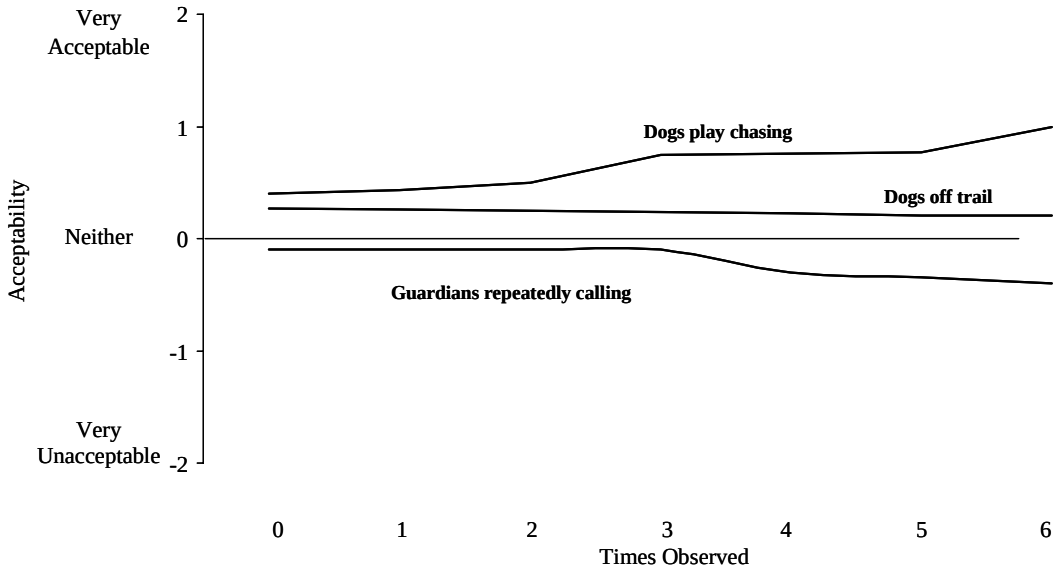
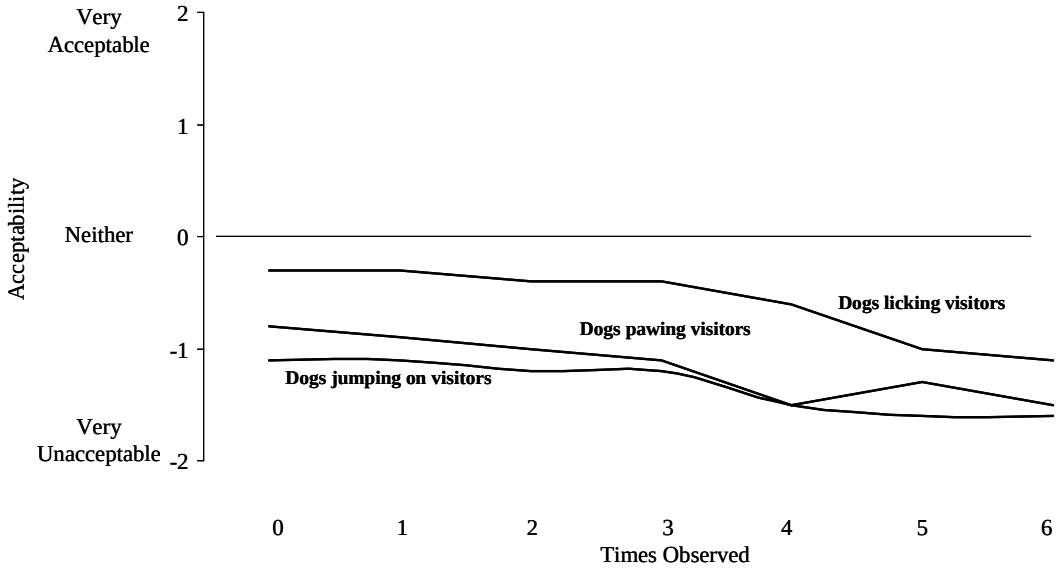
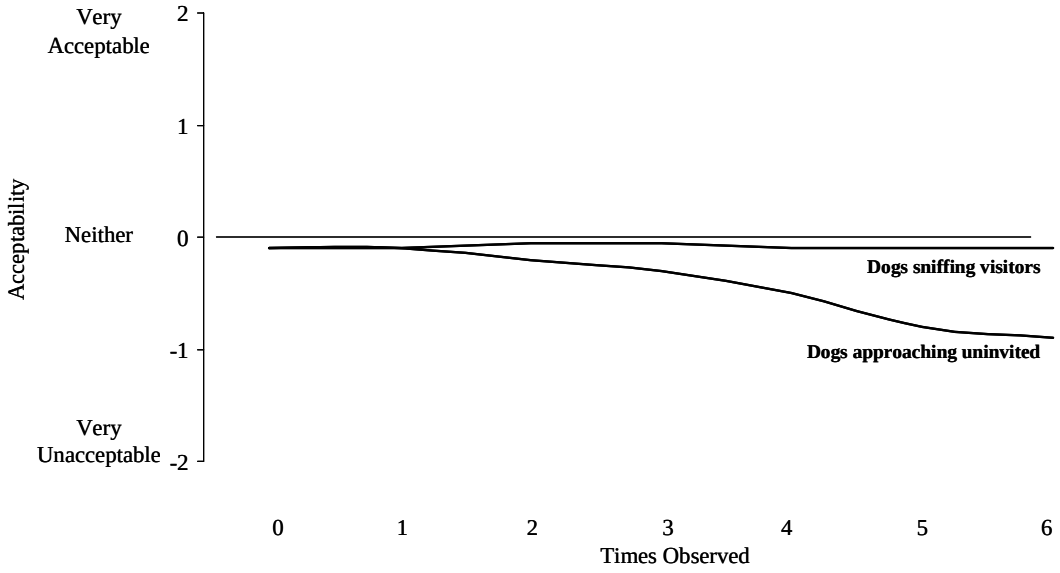


Figure 4. Social norm curves for “direct” human-dog interactions





Acceptability Ratings: Potential for Conflict Indices

Given the "no tolerance norms" (Figures 3 and 4) regardless of the number of times the behavior was observed, the next analysis step focused on respondents' level of agreement regarding the acceptability of each of the 11 behaviors. These findings (Figures 5 and 6) are shown as Potential for Conflict Indices (PCI). A PCI value can range from 0 (no conflict) to 1 (maximum conflict). The size of the bubble depicts the PCI and indicates degree of dispersion (e.g., extent of potential conflict regarding the acceptability of a behavior). A small bubble suggests little potential conflict; a larger bubble suggests more potential conflict. The center of the bubble is plotted on the Y-axis, with averages above the neutral line indicating an acceptable evaluation and those below the neutral line suggesting an unacceptable rating. Skewness is reflected by the position of the bubble relative to the neutral point (i.e., bubbles at the top or bottom of the graph suggest high degrees of skewness).

Consistent with the findings noted above, the average acceptability ratings for four of the indirect interaction behaviors fell below the neutral line and two were slightly above the neutral line (Figure 5). The most consensus (i.e., smallest bubble) occurred for guardians not picking up after their dog (PCI = .10). The least amount of agreement (PCI = .45) was for guardians repeatedly calling their dogs. This bubble straddled the neutral line suggesting that some individuals found this behavior slightly acceptable and some slightly unacceptable. The bubbles for "dogs causing wildlife to flee" and "dogs flushing birds" were both below the neutral line with PCI values of .24 and .30, respectively. Thus, on average, both of these behaviors were rated as slightly unacceptable with a "fair" amount of consensus. Conversely, the bubbles for "dogs off trail" and "dogs play chasing another dog" were both above the neutral line (i.e., on average slightly acceptable) with PCI values of .35 and .30, respectively.

The average acceptability ratings and associated PCI values for the direct interaction behaviors are shown in Figure 6. The least acceptable ratings and most consensus occurred for "dogs jumping on visitors" and "dogs pawing visitors." Both of these behaviors were considered slightly unacceptable with PCI values of .18 and .21, respectively. At the other extreme of Figure 6, the bubble for "dogs sniffing visitors" straddled the neutral line and the PCI value of .48 indicated less consensus than for the other behaviors.

To further understand individuals' normative tolerances, Table 9 displays (a) the average number of times each behavior was typically observed, (b) the maximum number of times the behavior would be tolerated, and (c) the percent of time the norm was exceeded. To calculate this latter estimate, we followed the procedures outline in Vaske and Donnelly (2002). Each respondent's reported number of times a behavior was observed was compared to his/her maximum number of times the behavior would be tolerated. If the reported observation of the behavior was greater than the maximum tolerance for that behavior, the individual saw more than his/her norm. For example, if a person saw the behavior three times on a typical visit and his/her tolerance for the behavior was zero, the individual's norm was exceeded. The last column of Table 9 is the percent of individuals in the sample who reported seeing more than their norm on a typical visit.

For "owners not picking up after their dogs," the average number of times the behavior was observed was 1.57 times. The maximum number of times that the behavior would be tolerated was .54. For the entire sample, this norm was exceeded 50% of the time. As a second example, "dogs approaching uninvited" was observed on average 2.08 times, while the maximum number of times people would tolerate this behavior was 1.92. The norm for this behavior was exceeded 35% of the time.

Figure 5. PCI acceptability norms for “indirect” human dog interactions: Entire sample

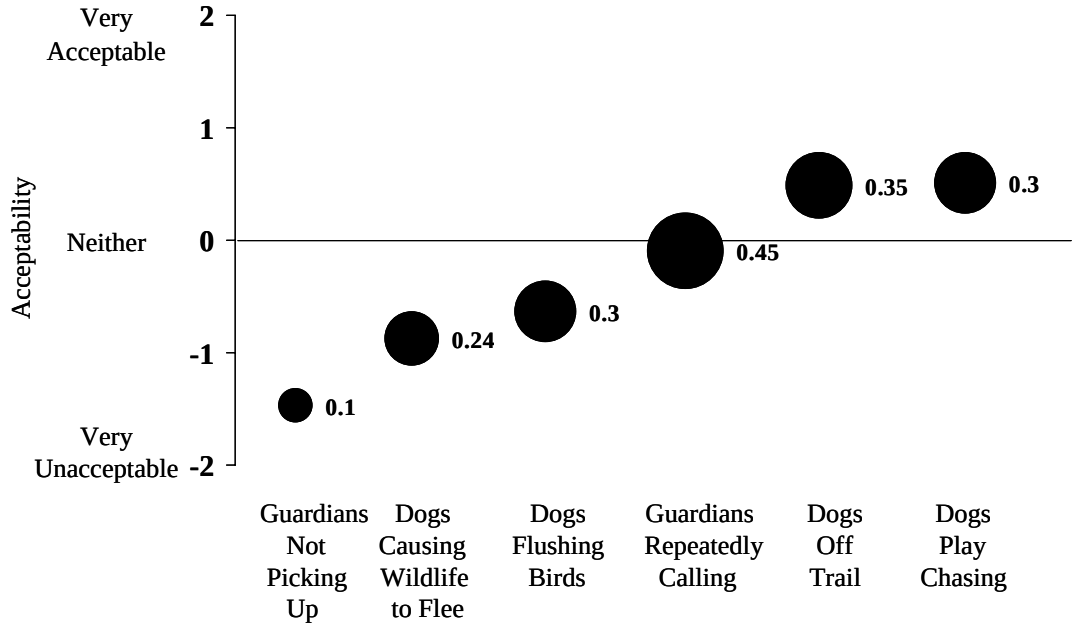


Figure 6. PCI acceptability norms for “direct” human dog interactions: Entire sample

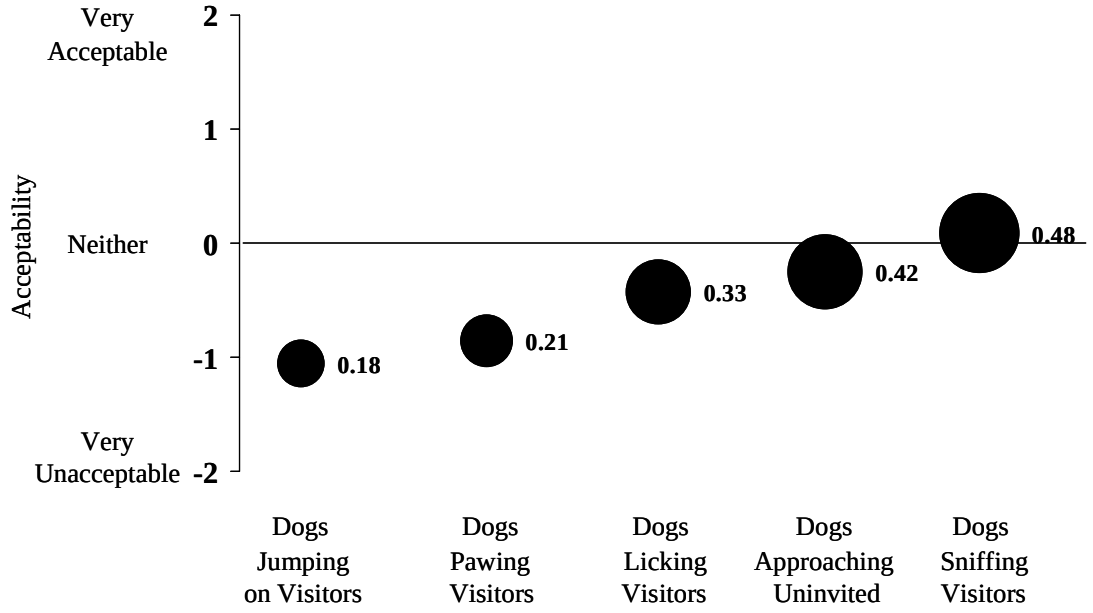


Table 9. Normative tolerances for dog behaviors

	Average Number of Times Behavior Observed	Average Maximum Number of Times Behavior Tolerated	Percent of Time Norm Exceeded
Indirect interaction			
Owners not picking up after dogs	1.57	.54	50
Owners repeatedly calling	1.73	2.04	28
Dogs off trail	2.95	3.21	28
Dogs “play” chasing another dog	2.14	2.82	18
Dogs causing wildlife to flee	.58	.86	17
Dogs flushing birds	.51	1.00	13
Direct interaction			
Dogs approaching uninvited	2.08	1.92	35
Dogs sniffing a visitor	2.13	2.39	27
Dogs jumping on a visitor	.79	.67	27
Dogs licking a visitor	.86	1.26	19
Dogs pawing a visitor	.55	.70	17

Figures 7 (indirect interaction) and 8 (direct interaction) display the norm curves and PCI values for guardians and non-guardians. As might be expected, the average acceptability ratings given by guardians were slightly more positive (although still generally negative) than those reported by non-guardians for all 11 behaviors. For the indirect interactions (Figure 7) there was slightly less agreement (i.e., larger PCI bubbles) among the guardians than the non-guardians for “guardians not picking up after their dogs,” “dogs causing wildlife to flee,” and “dogs flushing birds.” The bubble for the guardians’ evaluation of “guardians repeatedly calling their dogs” straddled the neutral line suggesting that some individuals rated this behavior as acceptable, while others did not. The guardians rated “dogs off trail” and “dogs play chasing,” as slightly acceptable. The evaluations given by the non-guardians for these two behaviors straddled the neutral line. There was more agreement among the guardians (smaller bubbles) than there was among the non-guardians for these two behaviors. Similarly, for the direct interaction situations, guardians evaluated each behavior slightly more positively than the non-guardians. The guardians’ PCI bubble (PCI = .5) for “dogs approaching uninvited” split the neutral line, while non-guardians judged this behavior as unacceptable and there was more agreement (PCI = .33). Guardians rated “dogs sniffing visitors” as slightly acceptable, while non-guardians evaluated this behavior as slightly unacceptable. Overall, differences between guardians and non-guardians across all 11 behaviors were minimal.

Our analyses also explored other potential predictors of the norm acceptability ratings (Table 10 and Appendix B). No significant differences were found between the demographic variables (sex, age, education) and the norm acceptability ratings for 10 of the 11 human-dog interaction behaviors. When residents living within the city limits of Boulder were compared with non-Boulder residents no significant differences emerged across all 11 acceptability ratings. Similarly, analyses contrasting Boulder city limit residents vs. Boulder County residents vs. respondents from other locations, revealed no significant differences. A similar pattern of findings (i.e., no / limited significant differences) emerged for frequency of visitation over the past year and past month, as well as for participation in activities such as walking, hiking, running and bicycling on the day the respondent was interviewed.

Table. 10. Summary of other potential predictors of norm acceptability ratings

Independent Variable	Number of Significant Differences on 11 Norm Acceptability Ratings	Acceptability Ratings with Significant Differences
Demographics		
Sex	1	Owners not picking up after their dogs
Age	1	Dogs sniffing a visitor
Education	1	Owners not picking up after their dogs
Place of Residence		
Boulder vs. Non-Boulder Residents	0	
Boulder vs. Boulder County vs. Other	0	
Frequency of Visiting		
Past 12 months	0	
Past Month	1	Owners not picking up after their dogs
Activities		
Walking / Hiking	1	Dogs play chasing
Running	0	
Bicycling	0	

Summary of Normative Tolerances

- Nine of the 11 indicators reflected "no tolerance" norms. The average acceptability ratings for these behaviors were negative irrespective of the number of times the behaviors were observed. Thus, *the visitors' reported standard for each of these nine behaviors was 0.*
- For "dogs play chasing" and "dogs off trail," a single tolerance norm was observed with acceptability ratings only slightly above neutral (i.e., the average acceptability ratings were +0.48 for "dogs off trail" and +0.51 for "dogs play chasing with another dog"). *Given that the averages were less than 1, the visitors' standard for these two behaviors was in essence 0.*
- Although statistical differences between some sub-groups (e.g., guardians vs. non-guardians, frequency of walking dogs at OSMP) were identified in our analyses, the magnitude of these differences was minimal. The "no tolerance" standards for the entire sample are thus applicable to all stakeholders.

Figure 7. PCI acceptability norms for “indirect” human-dog interactions: Guardians vs. Non-guardians

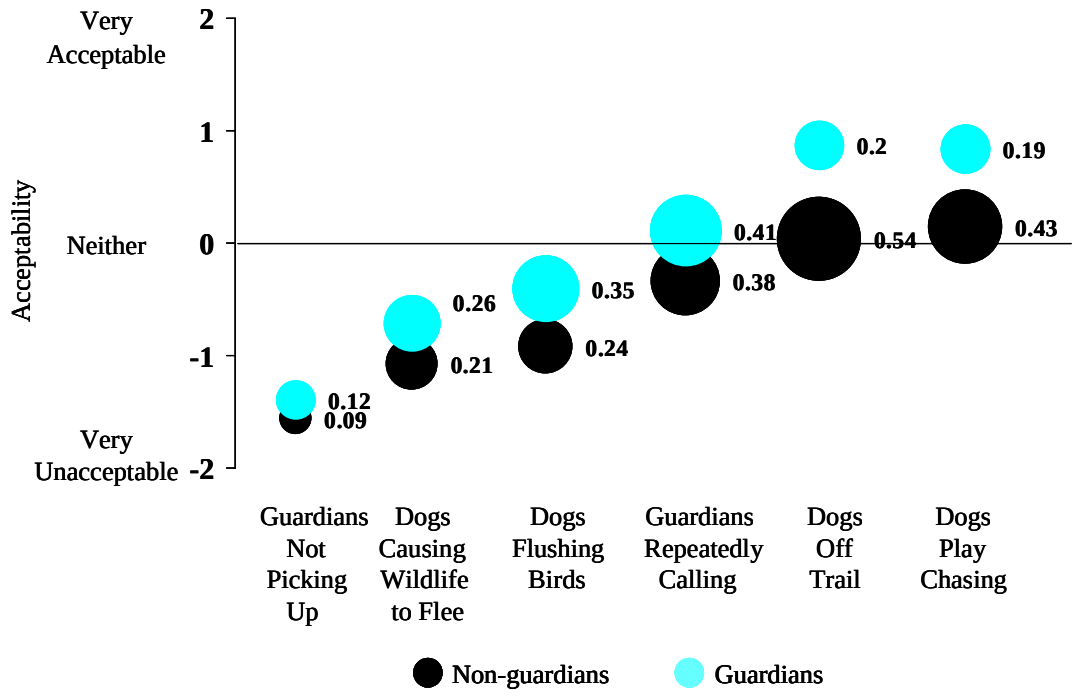
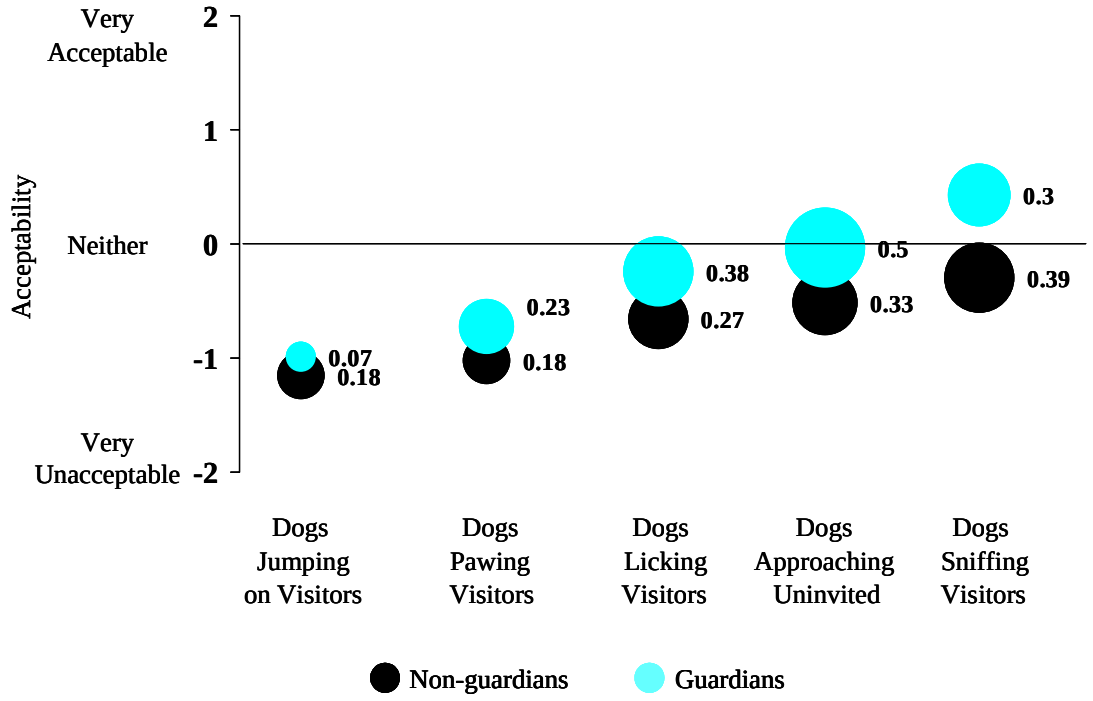


Figure 8. PCI acceptability norms for “direct” human-dog interactions: Guardians vs. Non-guardians



Discussion

Virtually all natural resource planning frameworks recommend identifying and establishing *quantitative* impact indicators and standards (e.g., the Limits of Acceptable Change [LAC], Stankey et al. 1985; Visitor Impact Management [VIM], Graefe et al., 1990; Visitor Experience and Resource Protection [VERP], National Park Service 1997). *Indicators* are the biophysical, social, managerial, or other conditions that managers and visitors care about for a given experience. *Standards* restate management objectives in quantitative terms and specify the appropriate levels or acceptable limits for the impact indicators (i.e., how much impact is too much for a given indicator). Standards identify conditions that are desirable (e.g., all visitors picking up after their dogs), as well as the conditions that managers don't want to exceed (e.g., no uninvited dogs interacting with visitors). Specific standards are established for each impact indicator and define an acceptable level of impact for each indicator. Just as impact indicators reflect management goals and objectives, standards are quantifiable value judgments concerning what the agency is attempting to achieve.

Quantitative standards serve several important functions. First, standards articulate in unambiguous terms what outputs management is trying to provide. Natural resource experiences are created through the interaction of social, biological, and physical conditions, and the visitors' expectations and preferences for those conditions. While managers do not create *experiences*, they are responsible for creating *opportunities* for experiences by manipulating social, environmental, and managerial conditions. Quantitative standards help shape those opportunities (i.e., a demand function) and signal whether or not that opportunity is possible given existing conditions (i.e., a supply function).

Second, standards help establish priorities for management, focus on future conditions, and allow managers to be proactive. There is a need to look ahead to what actions might be employed to meet standards, as well as a need to look back at the goals management is trying to achieve (Vaske et al., 2000). Standards define minimum or optimal conditions and allow managers to note when impacts are approaching defined levels, rather than waiting for problems to occur and then reacting to them (Whittaker & Shelby, 1992).

Third, standards focus attention on specific conditions and problems or benefits and turn managers' attention to the quality of recreation opportunities. By concentrating on the conditions that create experiences, the probable causes of unacceptable impacts as well as the potential benefits to different stakeholders can be identified (Graefe et al., 1990).

Fourth, indicators and standards provide a base for measuring the rate and magnitude of change and for evaluating the acceptability of that change. The literature sometimes confuses the concepts of impact change and evaluation (Shelby & Heberlein, 1986). The confusion can be illustrated by the term "wildlife harassment." Harassment refers to both a change (an objective impact – e.g., the birds flew away when humans approached) and a value judgment that the impact exceeds some standard. While most people would agree that management actions are necessary when wildlife harassment occurs, there is less consensus about what constitutes harassment. All human use has some impact. Whether the impact is harassment depends on management objectives (e.g., protect the migratory birds), standards (e.g., migratory birds should never be flushed from their nesting areas because of the presence of humans or dogs), expert opinion, and public values. Breaking concepts like harassment into two parts – the impact component (change in wildlife behavior or experiential change) and the evaluative component (the acceptability of the change) – provides a foundation for thinking about potential problem situations.

Fifth, standards link concrete, on-the-ground conditions with more intangible, qualitative experiences. While experiences are social psychological entities, standards are tangible and specific. With the development of quantitative standards, a more rational discussion of the area's objectives can occur with the different stakeholders (Whittaker & Shelby, 1992). For example, comparing existing conditions against the standards provides a quantitative estimate of whether any experiential changes are within the limits specified by standards, and whether the benefits suggested to accrue to stakeholders have been realized.

Based on previous work (Graefe et al., 1990; Vaske et al., 2002; Whittaker & Shelby, 1992) and the findings in this report, the following discusses (a) several important characteristics of good standards and (b) offers recommendations for setting standards at OSMP.

Characteristics of Good Standards

As noted by some investigators (Vaske et al., 2002; Whittaker & Shelby, 1992), a good standard is: (a) quantifiable, (b) attainable, and (c) output oriented. Standards restate management objectives in *quantitative terms*. A good standard unequivocally states the level of acceptable impact. Such statements define how much is acceptable in quantitative terms. For example, a good standard might specify that less than 5% of OSMP visitors will be approached uninvited by dogs off leash. Specifying that there should only be "a few" visitors that will be approached by unleashed dogs is not a good standard because it does not define how many constitutes "a few."

Management standards need to be reasonably *attainable*. When standards are too easy, little is accomplished. If they are too difficult to achieve, both managers and visitors are likely to become frustrated. Good objectives and standards should "moderately challenge" the manager and staff (Whittaker & Shelby, 1992).

For each important indicator, standards should be set at levels that reflect management's intent for resource or experiential outcomes in the area (Vaske et al., 2002). While standards that are difficult to attain are generally undesirable, they may still be necessary. A "no litter" standard, for example, may not be attainable, but is still correct. The cynical excuse for not setting appropriate standards is that managing for some conditions is "too hard." On the other hand, management strategies designed to meet a standard may produce sufficient positive change to warrant the effort. Without standards, it is too easy to do nothing (management by default).

Standards should be "*output*" rather than "input" oriented (Vaske et al., 2002; Whittaker & Shelby, 1992). This distinction suggests that managers should focus on the conditions to be achieved rather than the way the standard is met. For example, a standard that specifies "only 50 unleashed dogs per day in an OSMP area" is not a good standard because it refers to an action (use limits) rather than an acceptable impact. "Less than 5% of visitors should be approached by unleashed dogs" is a better standard because it emphasizes the acceptability of different impact conditions.

Potential Standards for Human-Dog Interactions at OSMP

This report examined 11 human-dog interaction indicators in terms of respondents' normative tolerances for these behaviors. These indicators had been identified and collectively agreed upon by OSMP staff and citizen interest groups. Nine of the 11 indicators reflected "no tolerance" norms. In other words, the average acceptability ratings were negative for these behaviors (Column 1, Table 12). This implies that the evaluations of these behaviors were unacceptable, regardless of the number of times the behaviors were observed. *The visitors' reported quantitative standards for these nine behaviors were thus 0* (Column 2, Table 11).

The other two indicators were "single tolerance" norms with acceptability ratings near the neutral line (i.e., the average acceptability ratings were +0.48 for "dogs off trail" and +0.51 for "dogs play chasing with another dog," Column 1, Table 11). *Given that the averages were less than 1, the visitors' standard for these two behaviors was in essence 0.*

Results indicated that these standards were exceeded 13% of the time or more. The most serious violation of a standard occurred for "owners not picking up after their dogs." This standard was exceeded 50% of the time. The standard for "dogs approaching uninvited" was exceeded 35% of the time.

Table 11. Reported "no tolerance" normative standards for human-dog interaction indicators

	Visitors Mean Acceptability Ratings [1]	Visitor Standards Based on Mean Acceptability Ratings	Percent of Time Standard Exceeded
Indirect interaction			
Guardians not picking up after dogs	– 1.47	0	50
Guardians repeatedly calling	– 0.10	0	28
Dogs causing wildlife to flee	– 0.88	0	17
Dogs flushing birds	– 0.64	0	13
Dogs off trail	+ 0.48	0	28
Dogs "play" chasing another dog	+ 0.51	0	18
Direct interaction			
Dogs approaching uninvited	– 0.25	0	35
Dogs sniffing a visitor	– 0.09	0	27
Dogs jumping on a visitor	– 1.06	0	27
Dogs licking a visitor	– 0.43	0	19
Dogs pawing a visitor	– 0.86	0	17

1. Means based on Figures 5 and 6.

Although statistical differences between some sub-groups (e.g., guardians vs. non-guardians, frequency of walking dogs at OSMP) were identified in our analyses, the magnitude of these differences was generally minimal. The "no tolerance" standards for the entire sample are thus applicable to all stakeholders.

Given the "no tolerance" standards for the 11 indicators, one might recommend a management standard of "no more than 0% of the visitors should have their norms exceeded" for any of these human-dog interaction variables. A good standard, however, should be attainable. A standard of 0% is likely to be unrealistic short of eliminating all off leash dogs at OSMP. As alternatives, management could consider less restrictive standards. Table 12 outlines three scenarios for situations where no more than 5%, 10% and 20% of visitors have their standards exceeded for each of the 11 human-dog interaction indicators. If the management standard is set at "no more than 10% of all visitors should have their norms exceeded," the visitors' standards would be exceeded under current conditions for all 11 indicators. Setting the standard at 20% implies that the visitors' standards would be met for three of the indirect (i.e., dogs causing wildlife to flee, dogs flushing birds, dogs play chasing other dog) and two direct (i.e. dogs licking a visitor, dogs

pawing a visitor) interaction indicators. Remember, however, that when standards are too easy, little is accomplished. We, therefore, do ***not*** recommend this third scenario where "no more than 20% of visitors have their norms exceeded."

Table 12. Potential management standards based on visitor reported percent time standard was exceeded

	Visitor Reported Percent of Time Standard Exceeded	Management Standard: No more than ___ % of visitors should have their normative standards exceeded [1]		
		5%	10%	20%
Indirect interaction				
Owners not picking up after dogs	50			
Owners repeatedly calling	28			
Dogs causing wildlife to flee	17			✓
Dogs flushing birds	13			✓
Dogs off trail	28			
Dogs "play" chasing another dog	18			✓
Direct interaction				
Dogs approaching uninvited	35			
Dogs sniffing a visitor	27			
Dogs jumping on a visitor	27			
Dogs licking a visitor	19			✓
Dogs pawing a visitor	17			✓

1. ✓ indicates that the standard would be met; a blank indicates that the standard would not be met.

If one accepts the logic presented here, the "no more than 0% (or 20%) of visitors having their norms exceeded" are not viable options. The former management standard (0%) is likely to be unachievable. The latter management standard (20%) may not result in desired visitor experiences and is likely to fall short of management goals and objectives. Of the other two suggested management standards for off leash dogs, the "no more than 10% of visitors having their norms exceeded" is consistent with the standards currently in the OSMP Visitor Master Plan. For example, one OSMP standard states that there should be 90% compliance with dog control and excrement removal. Although the proposed standard of 10% is never met under current conditions, OSMP's Voice and Sight Tag (VST) Program had just been implemented at the time our data were collected.

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Appendix A

Survey and Descriptive Findings

1. About ***how many years*** have you been coming to Open Space & Mountain Parks?

	Respondents	
Number of years visiting OSMP	Number	Percent
1st year	84	9
1 to 2 years	146	16
3 to 5 years	147	16
6 to 10 years	190	21
11 to 20 years	216	24
21 to 30 years	96	10
More than 30 years	41	4
Total	920	100
Mean	10.94	
Standard Deviation	10.48	
Minimum	0	
Maximum	61	

2. ***During the past 12 months***, about how many times did you visit OSMP locations?

	Respondents	
Number of visits during past 12 months	Number	Percent
1 to 10 visits	246	26
11 to 30 visits	179	19
31 to 90 visits	158	17
91 to 180 visits	172	18
181 to 365 visits	194	20
Total	949	100
Mean	92.56	
Standard Deviation	107.62	
Minimum	1	
Maximum	365	

3. ***During this past month***, about how many times did you visit OSMP locations?

	Respondents	
Number of times visited OSMP during past month	Number	Percent
1 visit	171	18
2 to 3 visits	139	15
4 to 5 visits	126	13
6 to 10 visits	188	20
11 to 20 visits	188	20
21 to 31 visits	109	12
More than 31 visits	18	2
Total	952	100
Mean	10.34	
Standard Deviation	10.36	
Minimum	1	
Maximum	60	

4. Many people enjoy visiting Open Space & Mountain Parks (OSMP) with their dogs off leash.
In thinking about ***a typical visit*** to OSMP areas, for dogs off leash, please estimate:
   a) The number of times you ***personally observed each*** of the following behaviors on a typical visit to OSMP?
   b) In general, please rate how acceptable ***each*** of the behaviors is at OSMP areas.
   c) What would be the ***maximum number of times*** that you would find the observed behavior acceptable on a typical visit to OSMP areas?

For dogs off leash:	(a) Number of times *personally observed* on a typical visit to OSMP areas (*Circle one number*) %							(b) In general, how acceptable is this behavior at OSMP areas? Very Unacceptable % Very Acceptable					(c) ***Maximum number of times*** that you would find the observed behavior acceptable on a typical visit to OSMP %						
	0	1	2	3	4	5	6+	-2	-1	0	+1	+2	0	1	2	3	4	5	6+
A. Dogs off trail	17	17	14	14	7	7	24	11	14	22	24	30	18	13	12	11	6	10	30
B. Owners repeatedly calling or yelling at their dogs	29	29	17	9	4	4	8	15	25	28	19	13	27	22	17	12	6	6	10
C. Dogs "play" chasing another dog	27	21	16	10	8	6	12	9	13	26	23	29	21	19	12	10	7	7	24
D. Dogs flushing birds	75	13	5	3	1	1	2	37	21	24	8	11	64	12	6	8	3	2	5
E. Dogs causing wildlife to flee	71	16	6	3	1	1	2	45	20	19	6	9	66	14	7	4	2	2	5
F. Dogs approaching uninvited	26	18	20	14	9	4	9	22	23	25	17	13	36	19	12	10	6	5	12
G. Dogs jumping on a visitor	61	20	10	4	1	1	3	52	21	15	8	7	70	14	7	3	2	1	3
H. Dogs licking a visitor	60	19	10	5	2	2	3	27	22	28	13	10	51	20	10	7	2	2	8
I. Dogs pawing a visitor	73	15	5	2	2	1	2	41	25	21	6	7	69	15	6	5	1	1	3
J. Dogs sniffing a visitor	27	20	16	15	6	6	10	15	17	29	20	19	28	16	15	12	6	5	18
K. Owners not picking up after their dogs	39	23	14	9	4	3	8	72	13	8	3	4	77	10	5	3	2	1	2

5. To what extent do you feel ***each*** of the following is a ***problem for <u>you</u> if it ever occurs*** at OSMP areas? (***Circle one number for each statement***)

For dogs off leash:	Not at all a problem %	Slight problem %	Moderate problem %	Extreme problem %
A. Dogs off trail	53	29	13	5
B. Owners repeatedly calling or yelling at their dogs	30	39	22	9
C. Dogs "play" chasing another dog	56	26	13	5
D. Dogs flushing birds	28	26	22	24
E. Dogs causing wildlife to flee	23	20	22	35
F. Dogs approaching uninvited	32	32	20	16
G. Dogs jumping on a visitor	18	22	25	35
H. Dogs licking a visitor	35	30	19	16
I. Dogs pawing a visitor	24	26	26	24
J. Dogs sniffing a visitor	48	29	14	9
K. Owners not picking up after their dogs	9	12	22	57

6. From the list of items (*A* to *K*) in Question 5, did you observe any of the off leash dog-related behaviors ***today***? (***Circle all letters from the list in Question 5 that apply to today's visit***)

	Percent
A. Dogs off trail	32
B. Owners repeatedly calling or yelling at their dogs	12
C. Dogs "play" chasing another dog	18
D. Dogs flushing birds	2
E. Dogs causing wildlife to flee	3
F. Dogs approaching uninvited	19
G. Dogs jumping on a visitor	3
H. Dogs licking a visitor	6
I. Dogs pawing a visitor	2
J. Dogs sniffing a visitor	18
K. Owners not picking up after their dogs	10

7. ***On today's visit***, ***about*** how many dogs did you see at this OSMP location?

Number of dogs **off leash**	Respondents Number	Respondents Percent
0	114	13
1	94	11
2	109	12
3	72	8
4	67	8
5	94	11
6 to 10	214	24
11 to 20	86	10
More than 20	23	3
Total	873	100
Mean	6.11	
Standard Deviation	8.84	
Minimum	0	
Maximum	50	

Number of dogs **on leash**	Respondents Number	Respondents Percent
0	139	17
1	139	17
2	151	18
3	104	13
4	93	11
5	68	8
6 to 10	105	13
11 to 20	20	2
More than 20	11	1
Total	830	100
Mean	3.54	
Standard Deviation	4.71	
Minimum	0	
Maximum	50	

8. Do you own a dog?

	Respondents	
	Number	Percent
No – I have never owned a dog	151	16
No – But I used to own a dog	280	30
Yes	509	54
Total	940	100

If yes, how many dogs do you currently own?

Number of dogs currently owned	Respondents Number	Percent
1	364	71
2	121	24
3	21	4
4	3	1
Total	509	100

If yes, about how frequently do you visit OSMP locations with your dog? (***Check one response***)

	Respondents	
	Number	Percent
Never	78	15
Once a month	55	11
Twice a month	32	6
3 times per month	18	3
4 times per month (once a week)	41	8
2 times per week	59	12
3 to 4 times per week	89	18
5 to 6 times per week	68	13
Daily	69	14
Total	509	100

9. During this visit ***today***, how many dogs did you have with you? (***Check one response***)

	Respondents	
	Number	Percent
No dogs	495	56
1 dog	283	32
2 dogs	93	10
3 dogs	11	1
4 dogs	4	< 1
5 dogs	3	< 1

10. Were the dogs that you had with you today: (***Check all that apply***)

	Respondents	
	Number	Percent
Leashed ***all*** of the time?	72	17
Leashed ***part*** of the time?	237	55
Leashed ***none*** of the time?	76	18
Did not have a dog with me	258	48

11. Which activities did you participate in ***today*** at this particular OSMP location? ***(Check all that apply)***

	Respondents	
	Number	Percent
walking / hiking	524	57
walking your dog	263	29
running	198	21
bird watching	61	7
wildlife viewing	67	7
bicycling	54	6
climbing	18	2
other	20	2

12. Please indicate whether you agree or disagree with ***each*** of the following statements.
(***Circle one number for each statement***)

	Percent				
	Strongly disagree %	Disagree %	Neutral %	Agree %	Strongly agree %
I enjoy watching dogs off leash at OSMP areas	8	9	25	23	35
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me	7	10	20	32	31
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them	60	18	13	6	3
The behavior of off leash dogs is a problem at OSMP areas	35	26	19	13	7
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas	16	27	24	17	16
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash	5	5	13	37	40
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control	1	4	16	45	34
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas	2	6	17	45	30
It bothers me when dog owners do ***not*** pick up after their dogs	1	1	7	26	65

13. What is your sex?

	Respondents	
Sex	Number	Percent
Male	386	44
Female	492	56
Total	878	100

14. What is your age?

	Respondents	
Age categories	Number	Percent
≤ 20	32	4
21 to 30	155	18
31 to 40	206	24
41 to 50	228	27
51 to 60	170	20
61 to 70	56	6
71 +	13	1
Total	860	100
Mean	42.24	
Standard Deviation	13.09	
Minimum	15	
Maximum	84	

15. Where do you live? (***Check one response***)

	Respondents	
	Number	Percent
Boulder (within city limits)	419	48
Louisville	51	6
Lafayette	44	5
Superior	23	3
Longmont	21	2
Unincorporated Boulder County	122	14
Other city in Boulder County	10	1
Metro Denver	94	11
Other area in Colorado	31	3
Out of state	63	7
Out of country	5	1
Total	883	100

16. What is the highest level of education that you have completed? (***Check one response***)

	Respondents	
	Number	Percent
8th grade or less	2	< 1
some high school	5	< 1
high school graduate or GED	34	4
business / trade school, some college	71	8
college graduate	307	35
some graduate school	95	11
masters degree	245	28
doctoral / professional degree	119	14
Total	878	100

Month of Interview	Number	Percent
July	406	43
August	471	49
September	74	8
Total	951	100

Time of Interview	Number	Percent
am	416	44
midday	307	32
pm	228	24
Total	951	100

Day of Interview	Number	Percent
Monday	76	8
Tuesday	84	9
Wednesday	99	10
Thursday	100	11
Friday	85	9
Saturday	228	24
Sunday	279	29
Total	951	100

Location of Interview	Number	Percent
East Boulder – Gunbarrel	53	6
East Boulder – Teller Farm	21	2
Dry Creek	79	8
Bobolink	72	8
South Boulder Creek at EBCC	31	3
Marshall Mesa	66	7
Greenbelt Plateau	12	1
Doudy Draw	18	2
South Mesa	107	11
Shanahan Ridge	52	5
Chautauqua	216	23
Sanitas	64	7
Foothills	15	2
Sage	44	5
Eagle	53	6
Gregory Canyon	48	5
Total	951	100

Version of Survey	Number	Percent
Open-ended norms questions	396	42
Closed-ended norms questions	554	58
Total	950	100

Appendix B

PCI Graphs for Selected Sub-Groups of Respondents

Figure B1. PCI acceptability norms for "indirect" human-dog interactions: Frequency of walking dogs at OSMP

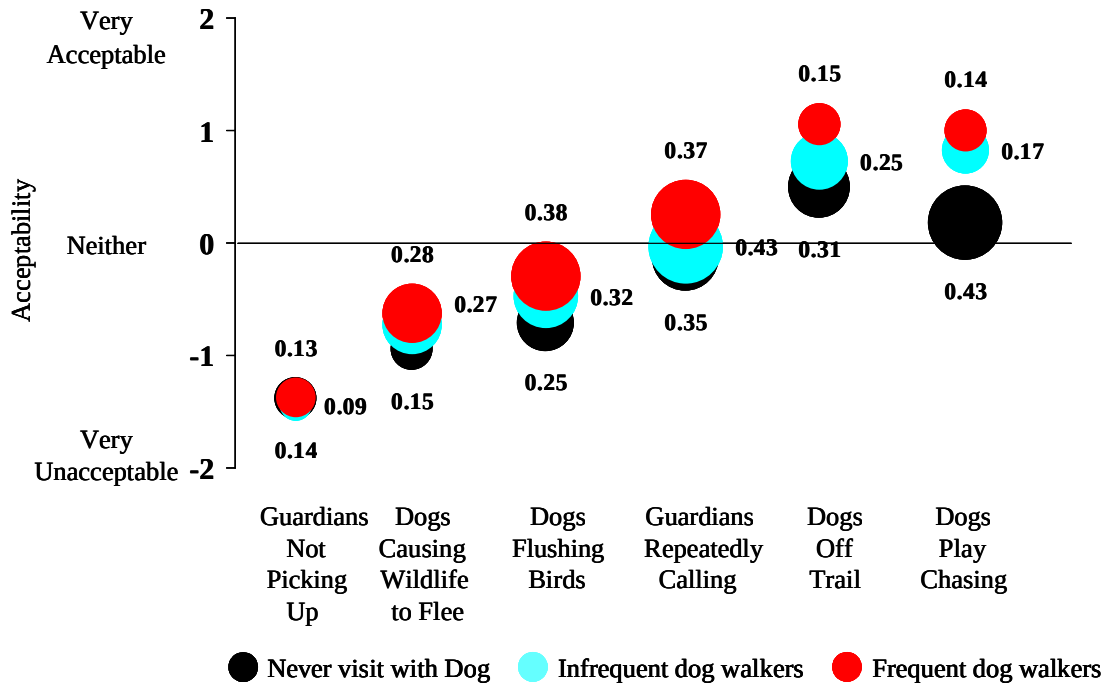


Figure B2. PCI acceptability norms for "direct" human-dog interactions: Frequency of walking dogs at OSMP

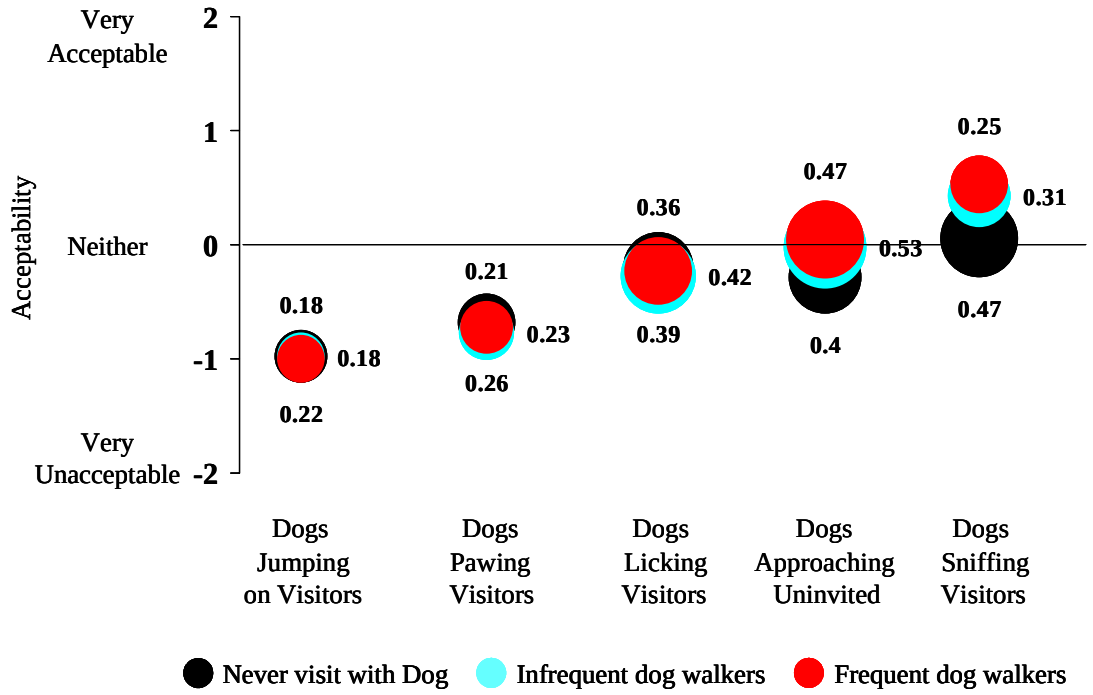


Figure B3. PCI acceptability norms for "indirect" human-dog interactions: Walking dog on day of interview

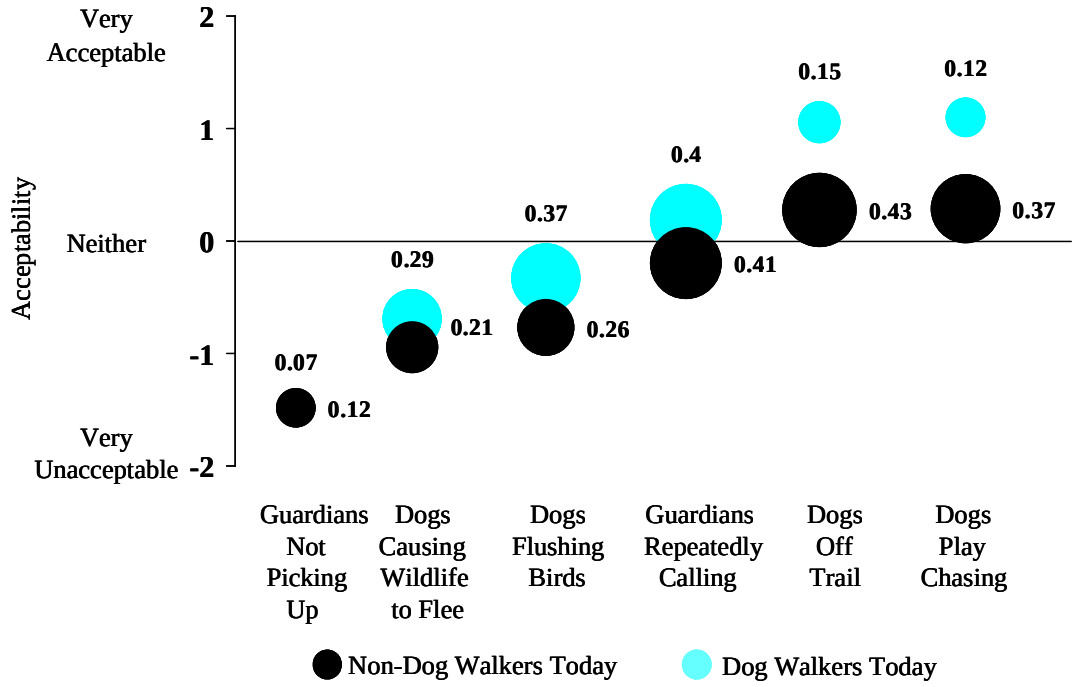


Figure B4. PCI acceptability norms for "direct" human-dog interactions: Walking dog on day of interview

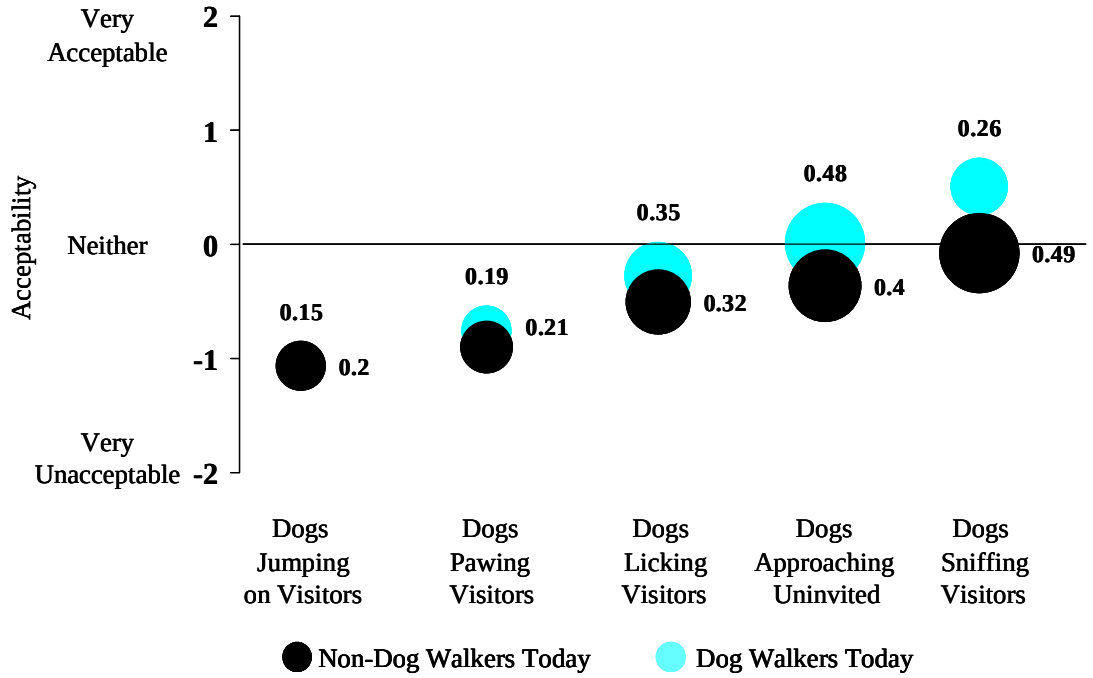


Figure B5. PCI acceptability norms for “indirect” human-dog interactions: Years visiting OSMP

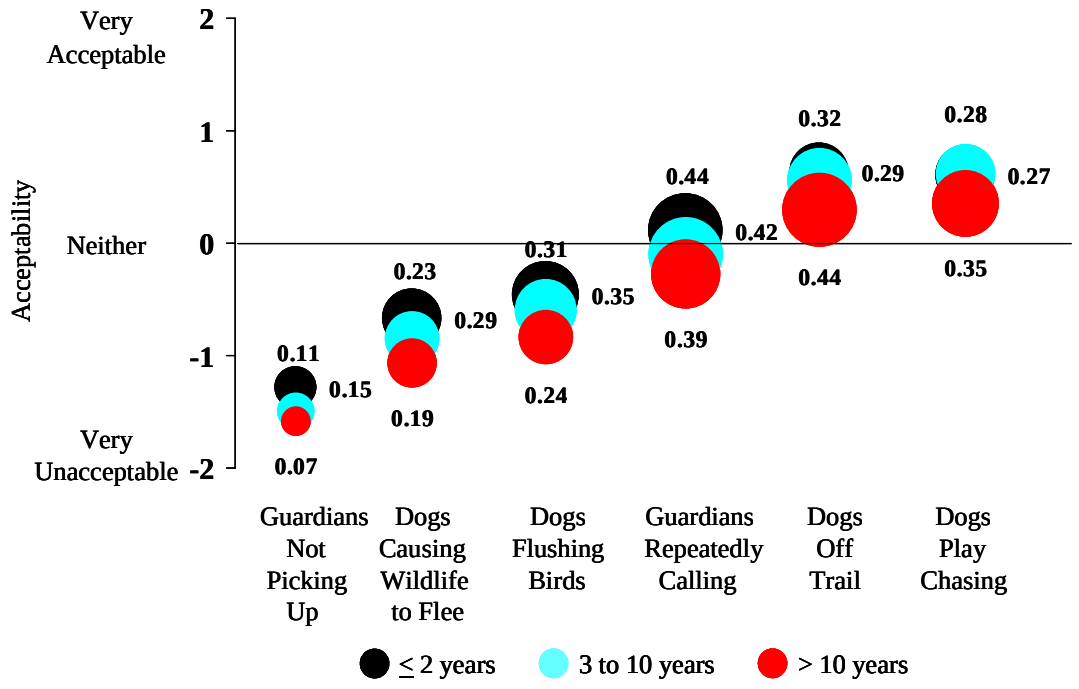
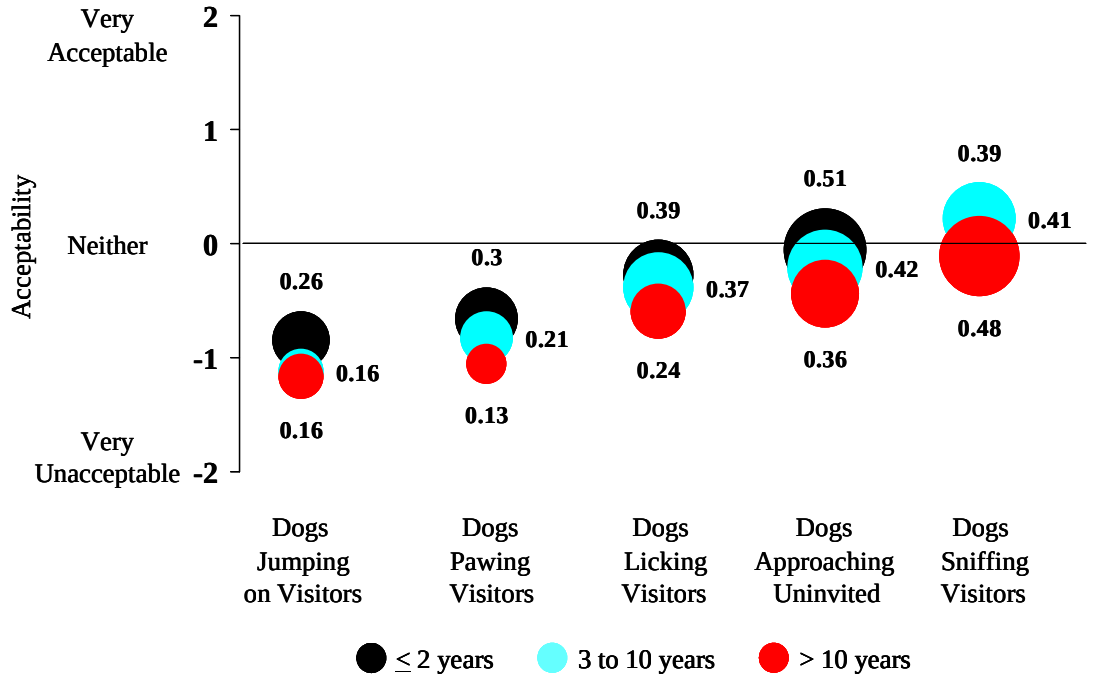


Figure B6. PCI acceptability norms for “direct” human-dog interactions: Years visiting OSMP



Appendix C

Multivariate Cluster Analyses

Visitor Clusters: Normative Tolerances

To provide a multivariate perspective on the normative acceptability ratings, we conducted a series of cluster analyses (Table C1). Cluster analysis allows classification of individuals into smaller more homogeneous groups based on patterns of responses across the 11 acceptability rating variables. The variables included in these analyses were the percent of time the norm had been exceeded for each of the acceptability evaluations. These variables were coded as 0 (norm not exceeded) and 1 (norm exceeded). A series of cluster analyses ranging from 2 to 6 group solutions showed that the 4-group solution provided the best fit for the data. To validate this solution, we randomly sorted the data and conducted a cluster analysis after each of 3 random sorts. These additional analyses supported the solution identifying four distinct groups of individuals.

Across all indirect and direct human-dog interaction variables, 60% of all respondents never had their norm exceeded (cluster 1). Cluster 2 contained individuals whose norm had been exceeded primarily for the indirect interactions (16%), while cluster 3 included respondents whose norm had mostly been exceeded for the direct interaction variables (12%). The final cluster reflected those individuals who norm had been consistently exceeded across all 11 acceptability evaluations (12%).

Tables C2 through C7 examine the relationships between the 4-group cluster solution and selected independent variables. We used Cramer's *V* to compare the strength of the relationships. A value of .1 on this effect size statistic can be considered a "minimal" relationship (Vaske, Gliner, & Morgan, 2002). A Cramer's *V* of .3 is considered "typical" and effect sizes of .5 or greater are "substantial" relationships.

Table C1. Visitor clusters: Normative tolerances

	Cluster 1 Norm Never Exceeded	Cluster 2 Mostly Indirect	Cluster 3 Mostly Direct	Cluster 4 Norm Always Exceeded
Indirect interaction				
Owners not picking up after their dogs	0	1	1	1
Dogs causing wildlife to flee	0	0	0	1
Dogs flushing birds	0	0	0	1
Owners repeatedly calling their dogs	0	1	0	1
Dogs off trail	0	1	0	1
Dogs "play" chasing another dog	0	0	0	1
Direct interaction				
Dogs jumping on a visitor	0	0	1	1
Dogs pawing a visitor	0	0	1	1
Dogs licking a visitor	0	0	0	1
Dogs approaching uninvited	0	1	1	1
Dogs sniffing a visitor	0	0	0	1
Percent of sample	60%	16%	12%	12%

Coding: 0 = Norm not exceeded 1 = Norm exceeded

The variables of sex, age, education and one of the place of residence variables (i.e., within Boulder city limits vs. outside city limits) did not vary statistically by norm tolerance clusters ($\chi^2 \leq 21.81$, $p \geq .058$ in all cases, Table C2). The effect sizes for these relationships were minimal (Cramer's $V = .097$ to .116). This implies, for example, that females were no more likely to have their norm exceeded than males. Individuals with college graduate degrees were no more likely than those with a high school education to have their norm exceeded.

For the second place of residence variable (i.e., within Boulder city limits, within Boulder County, outside Boulder county), there was a statistical difference among the four clusters ($\chi^2 = 24.43$, $p < .001$). Individuals who live outside of Boulder County were less likely to have their norm exceed (70%) compared to those living within Boulder County (45%) or within the city limits of Boulder (55%). Although these distributions varied statistically, the effect size was only .143; suggesting that there was not a strong relationship.

Table C2. Demographics by norm tolerance clusters [1]

	Norm Never Exceeded	Mostly Indirect	Mostly Direct	Norm Always Exceeded	χ^2	*p*-value	Cramer's *V*
Sex					6.51	.089	.106
Male	62	18	9	11			
Female	57	14	14	16			
Age					21.81	.240	.116
< 20	69	12	11	8			
21 to 30	62	20	6	12			
31 to 40	56	12	20	12			
41 to 50	60	17	12	11			
51 to 60	57	15	11	17			
61 to 70	54	25	7	14			
> 70	50	12	0	38			
Mean age	40.30	40.95	40.01	42.82			
Education					17.33	.299	.097
High school or less	69	19	6	6			
Some college	68	5	12	15			
College graduate	60	19	12	9			
Some graduate school	62	14	11	13			
Masters degree	57	15	11	17			
Doctoral / professional degree	49	16	17	18			
Place of Residence					7.48	.058	.114
Within Boulder city limits	55	17	11	17			
Outside city limits	63	16	12	9			
					24.43	< .001	.143
Within Boulder city limits	55	17	11	17			
Within Boulder County	45	23	15	17			
Outside Boulder County	70	13	10	7			

1. Cell entries are row percentages

Three frequency of visitation variables were examined (Table C3). Significant differences were observed between the four cluster groups and (a) number of years visiting OSMP ($\chi^2 = 48.61$, $p < .001$), (b) number of visits during the past 12 months ($\chi^2 = 47.63$, $p < .001$), and (c) number of times visiting OSMP locations during the past month ($\chi^2 = 32.54$, $p = .019$). In general, for all three visitation variables, those with more prior visitation experience were more likely to have their norm exceeded. The effect sizes for these relationships were again in the minimal range (Cramer's $V = .133$ to .160).

Table C3. Frequency of visitation by norm tolerance clusters [1]

	Norm Never Exceeded	Mostly Indirect	Mostly Direct	Norm Always Exceeded	χ^2	*p*-value	Cramer's *V*
Number of years visiting OSMP					48.61	< .001	.160
1st year	90	6	2	2			
1 to 2 years	65	16	11	8			
3 to 5 years	60	16	12	12			
6 to 10 years	64	12	10	14			
11 to 20 years	49	22	13	16			
21 to 30 years	43	25	16	16			
More than 30 years	44	13	26	17			
Number of visits during past 12 months					47.63	< .001	.159
1 to 10 visits	80	11	5	4			
11 to 30 visits	54	22	8	16			
31 to 90 visits	52	17	15	16			
91 to 180 visits	48	17	20	15			
181 to 365 visits	59	14	15	12			
Number of times visited OSMP during past month					32.54	.019	.133
1 visit	77	10	5	8			
2 to 3 visits	62	21	8	9			
4 to 5 visits	54	21	11	14			
6 to 10 visits	52	17	18	13			
11 to 20 visits	52	16	14	18			
21 to 31 visits	62	11	14	13			
More than 31 visits	60	10	20	10			

1. Cell entries are row percentages

Two of the four dog guardian variables were statistically related to membership in the four clusters (Table C4). Individuals who are currently dog guardians were less likely to have their norm exceeded than those who were not dog guardians ($\chi^2 = 33.85$, $p < .001$). Respondents visiting with two or more dogs on the day they were interviewed were also less likely to have their norm exceeded ($\chi^2 = 30.34$, $p < .001$). The number of dogs currently owned and the frequency of walking dogs at OSMP were not statistically related to the norm tolerance clusters. Again, however, the strength of all of these relationships can be characterized as minimal.

Table C4. Dog guardian indicators by norm tolerance clusters [1]

	Norm Never Exceeded	Mostly Indirect	Mostly Direct	Norm Always Exceeded	χ^2	*p*-value	Cramer's *V*
Are you currently a dog guardian?					33.85	< .001	.234
No	52	19	10	19			
Yes	67	13	14	6			
Number of dogs currently owned					7.70	.261	.102
1	63	15	15	7			
2	74	9	13	4			
3+	86	7	7	0			
Number of dogs with you on today's visit					30.34	< .001	.156
No dogs	54	19	11	16			
1 dog	67	14	14	5			
2+ dogs	74	10	13	3			
Frequency of walking dogs at OSMP					5.59	.471	.093
Never	72	11	9	8			
1 to 4 visits per month	60	18	15	7			
2+ visits per week	69	11	15	5			

1. Cell entries are row percentages

Three of the six activity participation variables (i.e., walking dog, walking / hiking, bird watching) were statistically related to the norm tolerance clusters ($\chi^2 \geq 9.90$, $p < .019$ in all cases). For example, more walkers / hikers always had their norm exceeded than those not participating in these activities (Table C5). Those who were bird watching were more likely to have their norm exceeded than those not engaged in this activity. Although these differences were statistically significant, the effect sizes were minimal. Running, bicycling and wildlife viewing were not related to the extent to which the norm was exceeded.

Table C5. Activities by norm tolerance clusters [1]

	Norm Never Exceeded	Mostly Indirect	Mostly Direct	Norm Always Exceeded	χ^2	*p*-value	Cramer's *V*
Walking Dog					15.81	.001	.156
No	57	17	11	15			
Yes	66	13	15	6			
Walking / Hiking					12.60	.006	.144
No	60	16	16	8			
Yes	59	16	9	16			
Running					5.93	.115	.102
No	62	14	11	13			
Yes	52	21	15	12			
Bicycling					5.91	.116	.093
No	59	16	13	12			
Yes	76	6	6	12			
Bird Watching					9.90	.019	.136
No	61	15	12	12			
Yes	41	28	8	23			
Wildlife Viewing					2.55	.466	.067
No	61	15	12	12			
Yes	52	23	9	16			

1. Cell entries are row percentages

All nine belief statements regarding off leash dogs were statistically related to cluster membership ($\chi^2 \geq 13.11$, $p < .041$). For five of these relationships, the Cramer's *Vs* were greater than .3, suggesting a "typical" strength of relationship (Table C6). Individuals who agreed with the statement "the behavior of off leash dogs is a problem at OSMP areas" were more likely to have their norm always exceeded (44%) than those who disagreed (3%). Those who agreed that "I do not think that there are any real impacts from off leash dogs at OSMP areas" were less likely to have their norm exceeded (81% norm never exceeded) than those who disagreed with the statement (37% norm never exceeded). Respondents who disagreed with the statement "Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them" were less likely to have their norm exceeded (67% norm never exceeded) than those who agreed (15% norm never exceeded). Individuals who enjoyed watching dogs off leash were less likely to have their norm exceeded (73% norm never exceeded) than those who disagreed (27% norm never exceeded).

Table C7 shows the relationships between perceived human-dog interaction problems and the norm tolerance clusters. All 11 relationships were statistically significant at $p < .001$. Individuals who perceived the indirect and direct interaction issues to be problematic, were more likely to have their norms exceeded. For example, those who felt that dogs off trail was an "extreme problem," were more likely to have their norm exceeded (23% norm never exceeded) than those who felt that this behavior was "not at all a problem" (77% norm never exceeded). Forty-nine percent of respondents who felt that dogs sniffing a visitor was an extreme problem, always had their norm exceeded, compared to only 5% of those who thought that this behavior was not a problem.

Table C6. Beliefs about off leash dogs by norm tolerance clusters [1]

	Norm Never Exceeded	Mostly Indirect	Mostly Direct	Norm Always Exceeded	χ^2	*p*-value	Cramer's *V*
Just knowing that off leash dogs are allowed in OSMP areas is a problem for me, even if I never see them					106.88	< .001	.323
Disagree	67	15	12	6			
Neutral	43	16	8	33			
Agree	15	22	18	45			
The behavior of off leash dogs is a problem at OSMP areas					173.02	< .001	.403
Disagree	76	12	9	3			
Neutral	55	23	15	7			
Agree	18	21	17	44			
I do ***not*** think that there are any real impacts from off leash dogs at OSMP areas					118.10	< .001	.312
Disagree	37	22	16	25			
Neutral	71	14	12	3			
Agree	81	9	6	4			
I enjoy watching dogs off leash at OSMP areas					112.19	< .001	.314
Disagree	27	26	12	36			
Neutral	50	20	11	19			
Agree	73	11	13	3			
It's OK that off leash dogs use OSMP areas as long as they do ***not*** affect me					50.49	< .001	.229
Disagree	36	19	10	35			
Neutral	59	16	14	11			
Agree	65	15	12	8			
Most dog owners are responsible individuals who keep their dogs under control at OSMP areas					82.31	< .001	.308
Disagree	20	12	12	56			
Neutral	45	21	17	17			
Agree	67	15	11	7			
Dog owners who ***cannot*** control their dogs off leash ***should not*** be allowed to visit OSMP areas with their dogs off leash					27.74	< .001	.146
Disagree	69	13	9	9			
Neutral	83	5	9	3			
Agree	54	18	13	15			
It is OK for a visitor to say something to a dog owner who does ***not*** have his or her dog under control					13.11	.041	.100
Disagree	69	9	9	13			
Neutral	73	5	10	12			
Agree	57	18	12	13			
It bothers me when dog owners do ***not*** pick up after their dogs					22.83	.001	.119
Disagree	79	0	21	0			
Neutral	79	3	15	3			
Agree	56	17	12	14			

1. Cell entries are row percentages

Table C7. Perceived problems by norm tolerance clusters [1]

	Norm Never Exceeded	Mostly Indirect	Mostly Direct	Norm Always Exceeded	χ^2	*p*-value	Cramer's *V*
Indirect interaction							
Owners not picking up after their dogs					30.22	< .001	.124
Not at all a problem	83	5	7	5			
Slight problem	68	13	11	8			
Moderate problem	67	17	11	5			
Extreme problem	53	17	13	17			
Dogs causing wildlife to flee					33.41	< .001	.135
Not at all a problem	68	13	12	7			
Slight problem	69	14	11	6			
Moderate problem	63	9	16	12			
Extreme problem	50	22	10	18			
Dogs flushing birds					32.32	< .001	.138
Not at all a problem	70	13	11	6			
Slight problem	65	12	14	9			
Moderate problem	60	19	11	10			
Extreme problem	46	20	11	23			
Owners repeatedly calling their dogs					88.45	< .001	.226
Not at all a problem	80	10	8	2			
Slight problem	61	16	16	7			
Moderate problem	48	21	9	22			
Extreme problem	31	20	13	36			
Dogs off trail					146.41	< .001	.297
Not at all a problem	77	9	13	2			
Slight problem	50	23	15	12			
Moderate problem	33	28	5	34			
Extreme problem	23	17	9	51			
Dogs "play" chasing another dog					67.58	< .001	.195
Not at all a problem	71	13	12	4			
Slight problem	52	17	14	17			
Moderate problem	39	26	9	26			
Extreme problem	44	17	4	35			
Direct interaction							
Dogs jumping on a visitor					65.98	< .001	.184
Not at all a problem	80	16	3	1			
Slight problem	71	13	10	6			
Moderate problem	60	13	17	10			
Extreme problem	45	20	13	22			
Dogs pawing a visitor					64.11	< .001	.184
Not at all a problem	67	12	7	4			
Slight problem	64	18	15	3			
Moderate problem	60	13	12	15			
Extreme problem	41	20	14	25			
Dogs licking a visitor					81.78	< .001	.216
Not at all a problem	79	9	9	3			
Slight problem	56	21	13	9			
Moderate problem	52	16	16	16			
Extreme problem	34	22	12	32			
Dogs approaching uninvited					159.17	< .001	.301
Not at all a problem	85	7	7	1			
Slight problem	65	14	15	6			
Moderate problem	38	24	20	18			
Extreme problem	31	23	6	40			
Dogs sniffing a visitor					100.05	< .001	.256
Not at all a problem	73	12	10	5			
Slight problem	58	19	15	8			
Moderate problem	33	23	16	28			
Extreme problem	35	11	5	49			

1. Cell entries are row percentages

The *Multivariate* analyses of the norm acceptability ratings suggested the following conclusions:

- Cluster analyses identified four norm tolerance segments:
  - √ 60% of all respondents *never* had any of their norms exceeded
  - √ 16% had their norms exceeded for *indirect* interactions
  - √ 12% had their norms exceeded for *direct* interaction variables
  - √ 12% had their norms exceeded for *all* 11 acceptability evaluations
- Demographic, visitation pattern and activity participation variables that were statistically related to membership in the four clusters included:
  - √ one *demographic* indicator (place of residence) (within Boulder city limits vs. within Boulder County vs. Outside Boulder County)
  - √ all three *frequency of visitation* variables (number of years visited, number of visits during past 12 months, number of visits during past month)
  - √ two *dog guardian* variables (currently a dog guardian, number of dogs on today's visit)
  - √ three *activity participation* variables (walking dog, walking / hiking, bird watching)

  The strength of all these relationships, however, was minimal.
- All nine *beliefs* statements regarding *off leash dogs* were statistically related to norm cluster membership and the effect sizes were generally larger.
- All 11 relationships between *perceived human-dog interaction problems* and the norm tolerance clusters were statistically significant.

Monitoring

This plan establishes the community's standards for several key services related to the use and protection of the environment on Open Space and Mountain Parks. OSMP defines success, in the context of this plan, as making meaningful progress towards a sustainable and high quality visitor experience. The VMP monitoring program is designed to measure success by answering three key questions.

Is the quality of the visitor experience being maintained or enhanced?
Are impediments, threats and challenges to sustainable management being addressed?
Are our partnerships successfully involving community members?
in decision-making and stewardship?

Monitoring provides information needed to assess OSMP's progress towards success. Monitoring should measure both the conditions "on the ground" and the status of impediments that stand between OSMP and acceptable conditions. Monitoring is also used to identify appropriate adjustments in our efforts to reach our goals—providing the information to all members of the community involved in the dynamic and adaptive management of Open Space and Mountain Parks lands.

Unfortunately, there is often a time lag between when we begin taking action and when monitoring detects meaningful changes on the ground. This is especially true for detecting changes in ecological systems and human behaviors, where teasing apart the many factors at work can be time consuming and responses are often hard to detect.

Fortunately, some changes can be detected more quickly. The monitoring plan has sought to identify measurable attributes that are reliable and sensitive. Reliability is based upon a number of conceptual models that describe our understanding of the cause and effect relationship for a particular situation. Several conceptual models are provided as part of the monitoring program in appendix 1.

As useful as models are, they are often oversimplified. Therefore the monitoring plan may also include measurements to validate our models—especially those that we are least sure about. Therefore the adaptive framework proposed has three levels of monitoring:

Implementation or "Did we do what we said we were going to do?"
Effectiveness or "Did our strategies have the intended direct effect?"
Research/Validation or "Did the system respond according to the way our models of cause and effect predicted?"

<u>Implementation Monitoring</u>
An effective program to monitor implementation includes tools for tracking and documenting projects. Individual project reports can be assembled to build a review of annual accomplishments to share with the OSBT, the City Council and the community at large. Implementation monitoring will also be used to evaluate programs to determine which are working and which need to be modified or discontinued. As new management needs arise, a

clear understanding of how the department is taking action will allow an intelligent response for allocating resources and identifying where greater funding or staffing are needed.

Open Space and Mountain Parks management projects vary in scope and duration. Consequently, implementation monitoring will be varied as well. For example, OSMP's educational programs are currently tracked in a database, providing the department with the ability to create periodic reports of the number, type and location of programs presented.

Monitoring implies thresholds or service standards against which the department can measure its progress. For example, safety is a key component of the visitor experience. OSMP's implementation standard for visitor safety is to: "Resolve all avoidable hazards to visitors. For hazards that cannot be resolved immediately, the department will advise visitors until the hazards can be resolved". OSMP can provide periodic reports describing how the department has met this service standard (or failed to meet it), and recommending changes to ensure that the department will be able to continue to meet the standard in the future.

OSMP has not developed measurable implementation standards for all key aspects of the Visitor Master Plan. As part of plan implementation, staff teams responsible for different services will develop measureable service standards. Implementation standards will be developed with the participation of affected members of the public and will consider the goals of the Visitor Master Plan, past practices and existing capacity.

Table 1: Service standards for key attributes of the Visitor Master Plan

Target	Key Factor	Service Standard(s)
Visitor Experience	**Safety**	Resolve all avoidable hazards to visitors. Provide warnings between time of identification and resoultion
	ATD	Provide a ***satisfactory*** and ***environmentally compatible*** level of access and facilities for a variety of passive recreational uses over a range of challenge levels.
	Connection	Cultivate a sense of welcomeness for visitors to OSMP Provide information and activities that promote awareness, appreciation and stewardship of OSMP values
	Conflict	Encourage understanding, respect and ***compatible*** behavior among visitors to OSMP who engage in different activities
	Aesthetics	Emphasize the natural beauty of the Open Space and Mountain Parks landscape. Provide clean and attractive facilities for visitors
Visitor Infrastructure	**Physical Sus**	Modify the infrastructure so that maintenane service standards can be achieved.
	Maint Cond	Maintain OSMP visitor facilities to standard at an annual expenditure of $500,000 (or the current budgeted amount)
	Design	Build new infrastructure that improves the quality of the visitor experience, is both physically and environmentally ***sustainable***
Ecological Systems	**Size**	Minimize significant adverse impact to enviornmental systems Engender stewardship for environmental systems
	Condition	
	Context	
Agricultural Operations		
Cultural Resources		
Public Involvement		Provide a satisfactory process for community members to participate in decision-making that affects visitor use.

Effectiveness Monitoring

Effectiveness monitoring is used to address both direct and indirect effects of OSMP's actions. For some services, the relationship between what OSMP does and the effect is well understood. For example, there are several places where OSMP trails and busy roads intersect. The conceptual model below shows the relationship of these road crossings with visitor safety. There is little debate about whether this relationship is true.

Figure 1: Simple cause and effect model for trail/road crossing

Visitor safety, a key part of the visitor experience, would be enhanced if these intersections could be improved. One strategy is the construction of underpasses to separate the trail from the roadway.

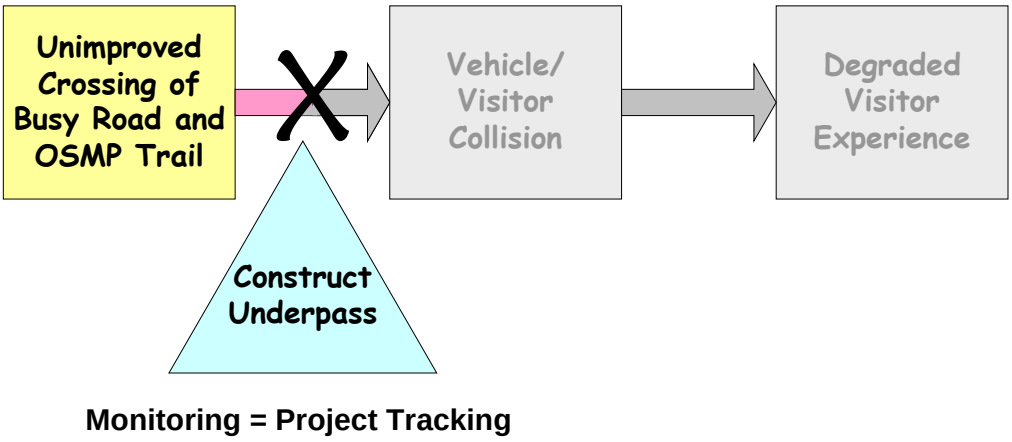


Figure 2: Road crossing model with strategy and implementation monitoring

OSMP is very sure that an underpass would address the safety issues associated with the intersection of trails and busy roads. Therefore there would be no pressing need to monitor or demonstrate the effectiveness of this strategy.

In other cases, there is less certainty about the cause and effect relationships between OSMP's actions and the desired effect. For example, the Visitor Master Plan proposes a variety of techniques to increase the overall rate of compliance with existing voice and sight regulations. Here too, the basic cause and effect relationship associated with the problem is widely agreed upon.

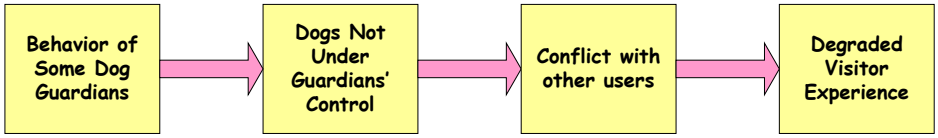


Figure 3: Cause and effect model for dog control

The Visitor Master Plan lists a number of strategies to increase compliance. These include: creating new signs, placing more signs, increasing enforcement of existing rules, requiring guardians view an instructional video before allowing their dogs to be unleashed, and developing educational materials with interested stakeholders. These strategies are summarized as "Enforcement" and "Education & Outreach" in the figures below.

Will taking these actions necessarily result in higher levels of compliance with dog control regulations? There is enough uncertainty about this relationship that OSMP is proposing additional monitoring to find out. Effectiveness monitoring is designed to improve our understanding of the relationship between the VMP strategies and the rate of compliance with dog regulations.

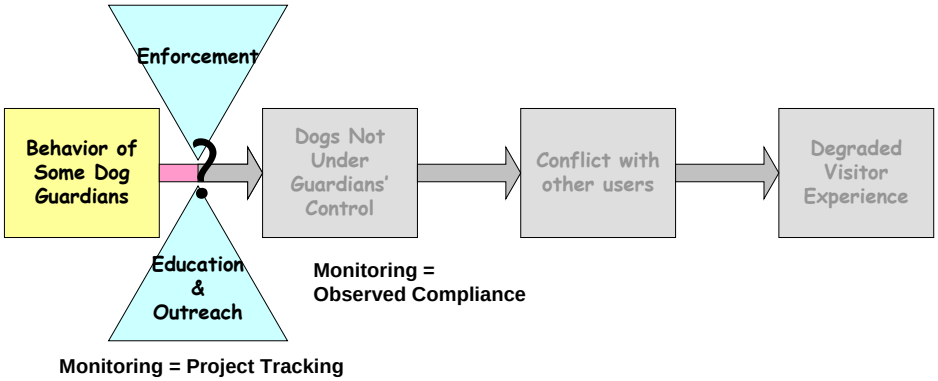


Figure 4: Dog control model with selected strategies, implementation *and* effectiveness monitoring

Effectiveness monitoring must include a method of determining if strategies are having their intended effect. In this example, compliance is assessed by observing dog/guardian interactions. This can provide an estimate of the percent of dogs that are under control of their guardian. Effectiveness monitoring must also include a standard or threshold of acceptability. What is the minimum level of compliance necessary? In this example, the Visitor Master Plan sets the effectiveness standard at 90% compliance.

While there is general agreement about the basic relationships of the models in figures 3 and 4, there is significant dissent about the severity or scope of the issue. Effectiveness monitoring will build an information base that can clarify how widespread the issue is and how significantly it affects aspects of the visitor experience or the OSMP environment.

Effectiveness standards for each of the key VMP services and problems (see table **3**) can be found in appendix --. These effectiveness standards are based upon historic and on-going OSMP monitoring, best available science, documented practices of land managers and community input. Over the course of the VMP implementation, effectiveness monitoring will be used not only to describe the current situation, but also to refine, or when needed, establish specific and measurable effectiveness standards.

Validation Monitoring

Some of the cause and effect relationships described in the VMP have many links. Some of the links are better understood and widely accepted, while others are poorly understood and therefore in greater need for further investigation by experts. Consider the example in figure 5 dealing with weeds.

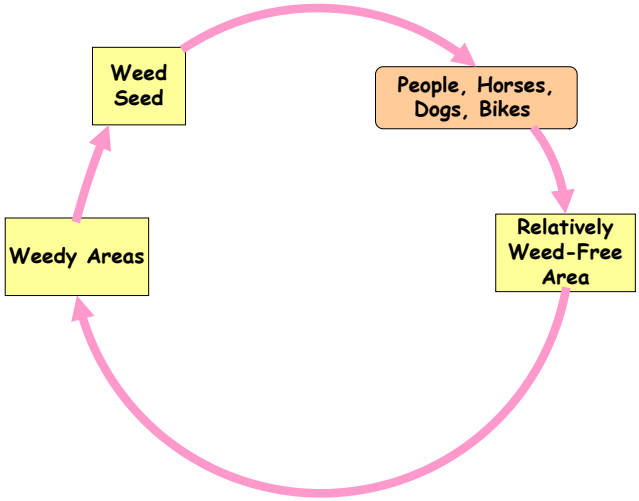


Figure 5: Weeds as a function of visitor use (part 1)

It is well understood that people, dogs, horses and bikes spread weeds and that when weed seeds are brought to relatively weed free areas, they can become infested with weeds. The links in this chain of cause and effect are well documented and supported by common experience. In this example, effectiveness monitoring provides information about how well certain strategies prevent weeds from increasing in certain areas (figure 6).

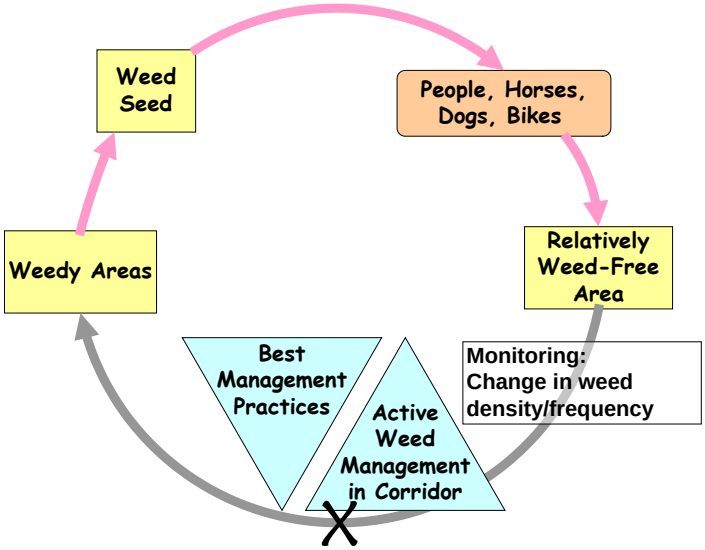


Figure 6: Weeds as a function of visitor use (part 2)

Concerns about weeds are based upon a wide range of far-reaching ecological effects. Figure 7 presents a very simplified model showing some of these effects. OSMP managers know a great deal about how widespread or severe weed infestations are on OSMP lands. In addition, scientific studies have some documented these relationships, further research will be needed to better understand others. Nevertheless, our stewardship responsibilities require us to consider the potential threat of weeds in developing our management strategies. In this example, validation monitoring would be used to confirm or refute that plant and animal populations respond to weeds as the model predicts.

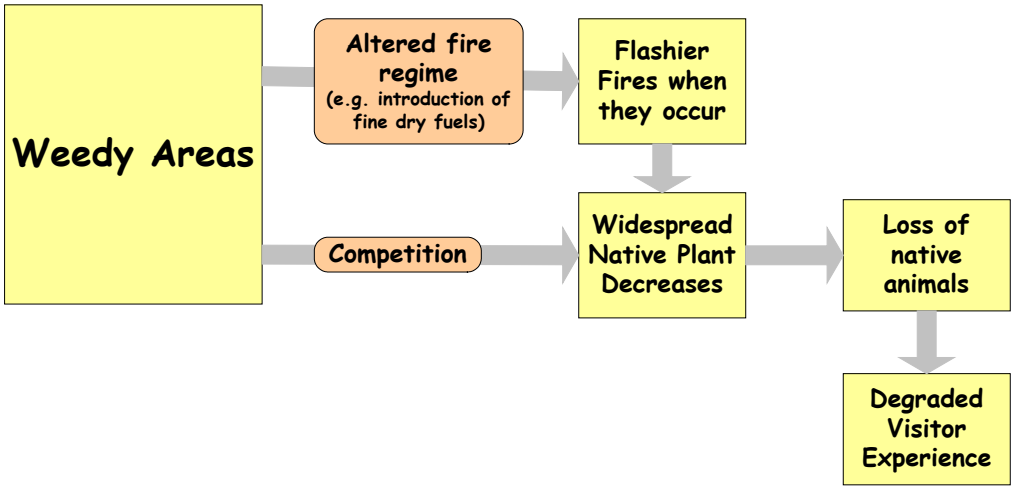


Figure 7: Selected Ecological Effects of Weeds

Validation monitoring may involve teasing apart a large number of interconnected factors that contribute to a problem. Consequently, this sort of monitoring is usually expensive and requires a long-term commitment to provide meaningful results. However, in demonstration of the department's commitment to better understand these difficult topics, OSMP has worked with university researchers and sponsored graduate students to help clarify the relationships in a variety of management models. OSMP staff also relies upon the research programs of other academic institutions as well as resource management, visitor use and conservation organizations around the world. These resources contribute to an improved understanding about the ecology of species and natural systems and how visitors to OSMP lands interact with them.

General Service Measures

The Open Space and Mountain Parks Department has identified some general measures, which we feel are useful in describing the amount and quality of service provided to the community. One group of general service measures describes visits to OSMP (table **2**). The Open Space Real Estate Department last studied visitation in 1993-4; and the Mountain Parks Division in 1995-6. The first visitation study for the consolidated OSMP program began in 2004.

Table 2: Visitation Measures

- Number of visits
- Duration of visits
- Location of visits
- Seasonal visitation patterns
- Origin of visitors
- Frequency of visitation
- Type of activity

Measures of visitation are unlike others because there is currently no threshold or set service standard. OSMP uses information about the extent and distribution of visits to better plan for and deliver the visitor and environmental services described in this plan.

The other general services measure is "overall satisfaction". Open Space and Mountain Parks has used a resident survey to provide a glimpse of the general level of approval with the facilities and services provided by OSMP. The specific question asked in the survey is:

As a whole, how would you rate the facilities and services of the City's Open Space and Mountain Parks areas, such as trails and signs, education and law enforcement?

This question was most recently asked in the spring of 2004. Ninety percent of the people responding answered "good" or "excellent". The department's service standard for this measure is that the combined responses of "good" or "excellent" will be at least 90%. This is a good indication that we are meeting the level of service committed to in our service standards.

A series of monitoring program descriptions can be found in appendix 1. Each addresses either a specific service that OSMP is seeking to deliver through the VMP, or a problem that the department needs to solve in order to provide a public service. The monitoring program descriptions begin with a statement of the service or problem and then list the related priority actions that have been identified to deliver the service or solve the problem. What follows are implementation measures (including a rough implementation plan), effectiveness measures and standards, and if appropriate, recommended research to validate OSMP's understanding of a particular service or problem. Conceptual models are provided for some of the services and problems to help clarify OSMP's approach to and understanding of the key cause and effect relationships.

Implementation thresholds are not included in the monitoring summaries. These will be developed by staff teams responsible for implementing the various priority actions as part of annual work program development. Implementation standards will be developed with public participation and take into consideration staffing levels and budget.

In many instances there are, or will be opportunities for OSMP to collaborate with other land management agencies, community groups, and interested members of the public to measure the success of the VMP and to fill critical information gaps. The Department will seek out these opportunities as specific monitoring projects are implemented. Open Space and Mountain Parks

views involvement in monitoring as a way to extend OSMP's to achieve its objectives, and build community involvement and support for the Visitor Master Plan.

Table **3** lists the Visitor Master Plan initiatives and the community services for which monitoring surveys have been prepared. Each monitoring survey has been developed to provide a general picture of how OSMP intends to document implementation, measure effectiveness and help validate relevant assumptions and models.

Table 3: Visitor Master Plan Initiatives and Services

Initiative 1: Visitor Access
- Visitor Opportunities p.11
- Infrastructure Condition & Sustainability p.15

Initiative 2: Safety & Conflict
- Safety p. 34
- Resolving User Conflicts p. 41

Initiative 3: Resource Protection
- Invasive Exotics p. 44
- On-Trail Travel p.15

Initiative 4: Dog Management
- Dog Control p. 10
- Dog Excrement Removal p.13

Initiative 5: Public Information and Involvement
- Public Involvement p.38
- Connecting OSMP and the Community p. 29

APPENDIX N.1

MONITORING SUMMARIES

Initiative 1: Visitor Access

Service: Visitor Opportunities

Strategy Package

- Assess the need for, plan and construct sustainable trails to appropriate destinations and appropriate trail linkages in the overall trail system
- Work with community groups to examine the feasibility of possible new mountain biking/multiple-use trails
- Provide facilities and services for people with disabilities
- Construct additional trailheads, and increase parking capacity as appropriate
- Designate areas and conditions for off-trail activities
    - fishing
    - launch and landing area(s) for hang gliding
    - model glider flying
- Continue to implement and evaluate a program for bolt replacement and limited new climbing bolt placement
- Complete planning and infrastructure improvements prior to opening newly acquired properties for public access.
- Implement a process to determine whether or not "new" recreational activities or uses are passive and appropriate on Open Space and Mountain Parks lands.

Related Strategies *Monitoring procedures for these strategy can be found in the appropriate summary*
Initiative 4: Dog Management Service: Dog Control Strategy: - Establish additional no-dog opportunities on some existing and new trails Initiative 5: Public Information and Involvement Service: Building Community Connections with the OSMP Mission Strategies: - Work with authors and publishers of maps and outdoor recreation guides so that Open Space and Mountain Parks opportunities are appropriately placed and described. - Coordinate the departmental website and production of informational signs

Monitoring

Implementation

Track and report on:

- Construction of new trails
- Need for and completion of accessibility improvements
- Construction of new trailheads

- Increased parking
- Infrastructure improvements aimed at improving the amount of visitor access
- Identification, designation or construction of additional routes for bicycling
- Identification of potential launch sites for para/hang gliding
- Designation or construction launch sites for para/hang gliding
- Designation of areas for off-trail activities
- Proposals and OSMP decisions regarding bolt placement and replacement
- Actual bolt placement/replacement
- Completion of plans and infrastructure improvements on newly acquired properties
- Compatibility reviews completed of "new" activities.

Effectiveness

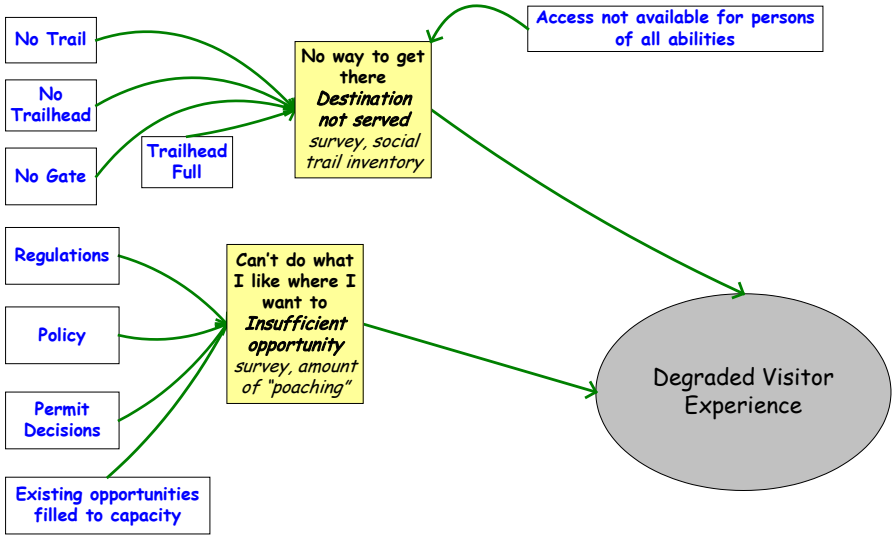
Experience shows that when the existing infrastructure does not provide sufficient access to destinations, visitors respond by either creating their own access or by proposing that the department alter policies, or build facilities to provide the desired access. Measures of the effectiveness of strategies to provide access can use both visitor behavior and attitudes as indicators to define and measure how successful the department is in providing an acceptable level of access.

Measure	**Current Estimate**	**Proposed Standard**
Miles of undesignated trails	205	< 50
New undesignated trails	n/a	0
Observational Study: LNT study, *Stick to Trail principle*	99%*	98%*
	* complied with the "stick to trail" principle	
OSMP staff and external reviewers have expressed concern that the methodology for this component of the LNT study underestimated the amount of off-trail travel. OSMP proposes improvements to the methodology to better assess the current situation		
Public Opinion		
Usefulness of signs and brochures? Visitation Study q. 10c	n/a	B
	Grade: A, B, C, D and F	
What single thing about OSMP is most in need of improvement? Resident Survey q.4	7%	10%
	Responded "Build More Trails"	

Measure	Current Estimate	Proposed Standard
How would you rate your ability to access the destinations you would like to visit on OSMP? Resident Survey *proposed* Visitation Study *proposed* Using scales: *A-F* or *Very Adequate, Somewhat Adequate, Somewhat Inadequate, Very Inadequate*	unknown unknown %**	B or 90%**
	**Respond "somewhat adequate" or "very adequate" or Grade: A, B, C, D and F	

Validity-Awareness/Appreciation and Action

The conceptual model for "access to destination" is relatively simple (below). Open Space and Mountain Parks staff has not identified any significant assumptions that require additional validation. However, the model does point out that changes to visitor access proposed in the Visitor Master Plan are likely to have a mixed effect upon the nature and level of community satisfaction with access to Open Space and Mountain Parks. Policies proposed in the VMP will result in new regulations that reduce access in order to protect other OSMP values. Effectiveness monitoring indicator thresholds have nonetheless been set to provide a high level of community satisfaction with access to destinations on OSMP. Because of the complexity associated with introducing strategies aimed at increasing access to destinations, and those that reduce such access, more complicated research would be necessary to try to differentiate the effect of these opposing forces upon public opinion and visitor behavior.



Initiative 1
Visitor Access
Visitor Opportunities
Thursday, October 28, 2004

Initiative 1: Visitor Access

Service: Infrastructure Condition & Sustainability

Strategy Package

- Complete routine maintenance of OSMP visitor infrastructure.
- Evaluate conditions and implement localized, temporary closures as necessary in response to natural events (storms, snowmelt) which represent critical threats to infrastructure
- Manage undesignated trails
  - Designate and improve undesignated trails as appropriate
  - Re-route undesignated trails as appropriate
  - Close undesignated trails as appropriate
  - Require on-trail access in Habitat Conservation Areas and Agricultural Areas
  - Encourage visitors to limit their use to designated trails
- Correct major infrastructure deficiencies (a.k.a. major maintenance and rebuild/reroute)
  - Address management challenge areas
  - Reconstruct trailheads (safety, visual appeal)
  - Other facilities
- Develop trail hierarchy and standards (see effectiveness monitoring)

Related Strategies
Monitoring procedures for these strategies can be found in the appropriate summary

Initiative 3: Resource Protection
Service: Addressing Vulnerabilities of Native Species and Natural Systems

- Develop and implement trail and facility best management practices (BMPs)
  - trampling of vegetation,
  - soil erosion and compaction,
  - the spread of non-native species
  - Cultural resource protection.

Initiative 5: Public Information and Involvement
Service: Connecting OSMP and the Community
Strategies:

- Foster volunteer opportunities that create stewardship connections and augment staff resources.

Monitoring

Implementation

Track and document:

- Maintenance work logs for:
  - Trails
  - Trailheads
  - Other Facilities
- Temporary Closures
  - Establish standards for closures (locations, weather/environmental conditions)
  - Ordinance/rule changes
  - Location, duration, frequency of use
- Progress in managing undesignated trails (designate, close, other)
- Regulatory and informational groundwork for HCA/AA on-trail requirement
- Number, location and timing of:
  - programs, activities, materials to encourage on-trail use
  - education and outreach contacts where on trail message is communicated
- Completion of projects identified in the *Open Space and Mountain Parks Trails Assessment and Prioritization Report,* VMP Implementation section, CIP and other relevant documents
- Progress/completion of BMP's that address environmental sensitivity

Effectiveness

- *Facility condition assessment*

  Open Space and Mountain Parks is integrating its trail condition monitoring with newly developed protocols developed by the US Forest Service (USFS). In addition, OSMP is using developing trail condition standards using federal management guidance in development by the USFS, the Bureau of Land Management and the National Park Service.

  Revision of OSMP's trail monitoring procedures will link trail condition and maintenance project tracking. Linking condition and project completion will allow managers to:

- Document and communicate the location, extent and severity of regular trail maintenance needs on OSMP's trail system,
- Identify and prioritize deferred maintenance and unsustainable trail segments and
- Provide updated estimates of the staffing and funding needs to meet the trails sustainability standards

- Public opinion

  Although professional standards are intended to incorporate community concerns and are the fundamental standard for assessing trail and facility condition, visitor satisfaction is a key for the delivery of this service.

Measure	Current Estimate	Proposed Standard
Trail Condition Assessment Measures *grade, clearance, % change in width, compaction, erosion, undesignated trails, braiding, weed measures, etc.*	Vary by trail segment	TBD
Trailhead Condition Assessment	n/a	TBD
Facility Assessment *Structural integrity, exits, security, integrity of utility systems, hazardous materials, associated machinery, signs, paint, etc.*	n/a	
Public Opinion		
Quality of facilities and services. Resident Survey q. 3 Responding: Good or Excellent	93% Responding "good" or "excellent" (of those providing a response)[1]	90%
Most needed improvement Resident survey q. 4 Responding: "Trails" or "Trail Maintenance"	20% Responding: "Trails" or "Trail Maintenance" of those responding	TBD
Trail conditions and maintenance Visitation Study q. 10a	n/a Grade: A, B, C, D and F	B
Trash cans and bag dispensers (visitation study q. 10b)	n/a Grade: A, B, C, D and F	B
Fixing eroded or trampled areas (visitation study q. 10e)	n/a Grade: A, B, C, D and F	B
Restroom cleanliness (visitation study q. 10b)	n/a Grade: A, B, C, D and F	B

Validity

Facility maintenance is a straightforward service that is not based upon any significant uncertainty. Standards and guidelines are available from federal land and resource management agencies. No validity monitoring or research is proposed.

[1] *Not sure how to approach this. Need to discuss with someone more knowledgeable with statistics of public opinion*

Initiative 2: Safety and Conflict Reduction

Service: Visitor Safety

Strategy Package

- Respond to fires, medical emergencies, hazardous situations, law enforcement incidents, and rescue operations.
- Identify and respond to unsafe conditions and access associated with infrastructure.
- Respond to identified natural hazards
- Address safety issues where trails cross roads
- Establish and enforce roadside parking prohibitions where appropriate
- Establish and implement best management practices for livestock in the presence of visitors.

Related Strategies Monitoring procedures for these strategies can be found in the appropriate summary
Initiative 1: Visitor Access Service: Visitor Opportunities Strategies: - Complete planning and infrastructure improvements prior to opening newly acquired properties to public access. - Continue to implement and evaluate a programs for bolt replacement and limited new climbing bolt placement - New Trails and Linkages, specifically improvements to dangerous road crossings Service: Infrastructure Condition and Sustainability - Trail, trailhead and facility maintenance are critical to provide visitor safety Initiative 3: Resource Protection Services: Addressing Ecological Vulnerabilities Strategies: Implement temporary closures in response to environmental conditions and patterns of visitor use Initiative 4: Dog Management Services: Dog Control, Dog Excrement Removal Strategies: A variety of strategies have been proposed to address safety issues related to dog management

Monitoring

Implementation

Many of these strategies require that standards and procedures be documented, so that tracking and reporting can be placed in the appropriate context. Suggestions for specific documentation tasks appear italicized.

Track and report:

- Responses to medical emergencies, fires, hazardous situations, and rescue operations and safety related law enforcement incidents
- Inspections for and responses to infrastructure hazards
  Document infrastructure safety standards and inspection and response procedures
- Responses to natural hazards
  Document natural hazard response procedures
- Projects to warn the public or resolve road crossing hazards.
- Tasks to address roadside parking hazards (regulatory authority, location of new signs, increased patrol, etc.).
- Track and report tasks associated with of signs advising visitors how to behave around livestock prior to calving time.
  Document livestock/agricultural safety standards and responses

Effectiveness

Incidents requiring emergency response are dispatched through the Boulder Communications to OSMP rangers; who then respond. There are other incidents and hazards (dog bites, holes in trails, etc.) that are reported directly to the department by the victims or witnesses. It is likely that the department is informed on most significant safety related incidents that take place on OSMP. Accidents on the Boulder Creek Path and other greenways trails may not be as regularly reported to the department because those involved may be unaware that the paths are located on OSMP lands. Incident reports and response logs are probably the most direct measures that we have of tracking safety-related problems on OSMP lands. By tracking of the number, type and location of these occurrences, the department can adapt its prevention and response programs

Visitors' perceptions of safety are also an important component of the visitor experience. In recent public opinion surveys, we asked residents of Boulder and visitors to OSMP to respond to questions about how safe they considered their experience.

Effectiveness Thresholds: Existing Measures

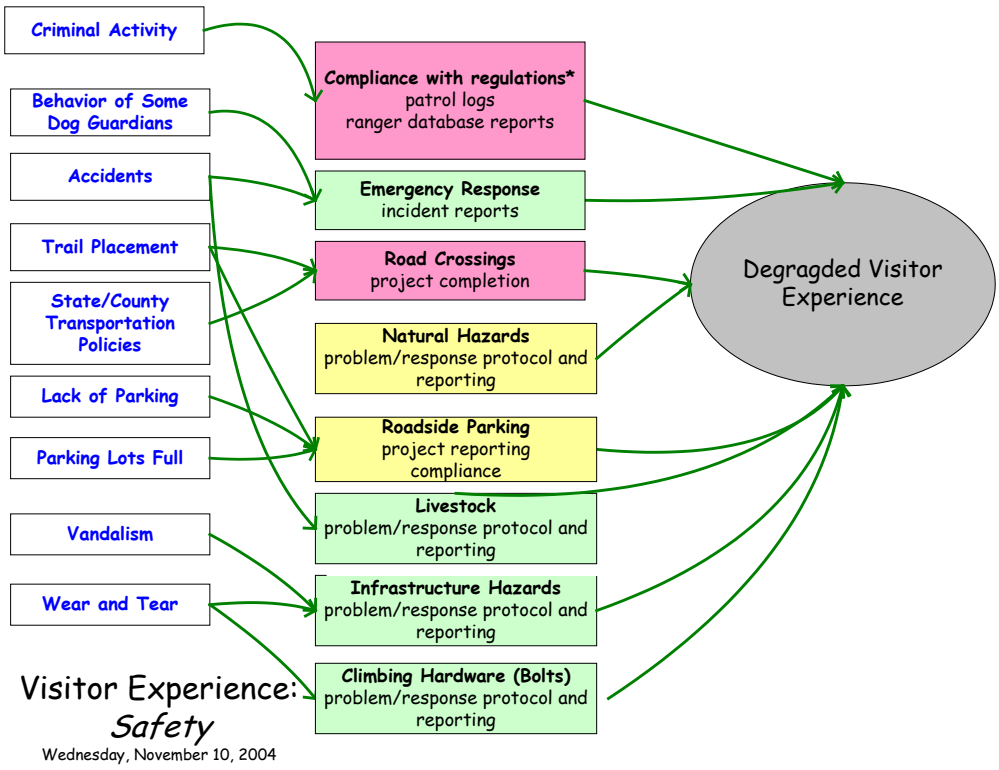
Dog measures provided in other monitoring documentation—"Behavior of Some Dog Guardians: Dog Control" & "Behavior of Some Dog Guardians: Dog Excrement)"

Measure	**Current Estimate**	**Proposed Standard**
Number of avoidable safety related incidents	?	0
Location of safety related incidents	Used for adaptive prevention and response	
Type of safety-related incidents	Used for adaptive prevention and response	
Public Opinion		
Did you encounter any problems or conflicts? (+ description) Visitation survey q.	Used for adaptive prevention and response	
Adequacy of enforcement Visitation survey q.	n/a	B

How safe do you feel during your visits to OSMP? Resident survey q. 26	98%*	95%
	Responding "very safe" or "safe" *of those responding	
Reasons for feeling safe/unsafe Resident survey q. 2?	Used for adaptive prevention and response	
Adequacy of signs warning of hazards Resident survey q. 23	95%*	90%
	Responding "very adequate" or "somewhat adequate" *of those responding	

Validity-Awareness/Appreciation and Action

The conceptual model developed for *safety* as a component of the visitor experience does not currently identify any critical assumptions that cannot be validated through implementation and effectiveness monitoring. OSMP staff anticipates that the strategies (in use and proposed) will both address the significant problems associated with providing visitors a safe experience, and identify new issues as they develop.



Initiative 2: Safety and Conflict Reduction

Service

Resolving User Conflicts

Strategy Package

- Revise the special use permits program to implement a lower group size threshold and include educational groups
- Implement a commercial use permit program.

Related Strategies Monitoring procedures for these strategies can be found in the appropriate summary
Initiative 1: Visitor Access Service: Opportunities to Enjoy OSMP Strategy: ⊃ Implement a process to determine whether or not new recreational activities or uses are passive and appropriate on Open Space and Mountain Parks lands [One criteria is: "Compatibility with Other (Visitor) Uses of OSMP Lands"] Initiative 5: Public Information & Involvement Service: Connecting OSMP and the Community Strategy: ⊃ Continue to implement the front-country Leave No Trace program, which delivers consistent and repeated messages about "sharing the trail". Service: Public Involvement Strategy: ⊃ Community Outreach Programs; specifically, "Integrate Front Country Leave No Trace principles into visitor groups' *codes of ethics* to reduce potential conflicts between specific activities and other visitors" Initiative 4: Dog Management Services: Dog Control, Dog Excrement Removal Strategies: A variety of strategies have been proposed to address safety issues related to dog management

Monitoring

Implementation

Track the development and dissemination of codes of ethics for various user groups, especially programs that seek to reduce conflict among users. Integrate with the existing front country leave no trace principles (e.g. "Share the Trail"). Some examples include:

- *Horses appear large, dangerous, skittish and unpredictable to many users. Pedestrians fail to yield to large skittish and potentially dangerous horses.*
  How can visitors best approach equestrians? What can equestrians do to reduce the level of concern among other visitors?

- *Cyclists approach at high rates of speed, or silently from behind frighten or startle other visitors/Pedestrians seem slow and unyielding to some cyclists.*
  How can visitors best respect the cyclist's experience? What can cyclists do to reduce the level of concern among other visitors?

Track the number of contacts made by rangers, education and outreach staff providing information about sharing the trail and appropriate trail etiquette behaviors.

Track the implementation of new policies for special uses, commercial uses and new types of recreational activities on OSMP.

Effectiveness

Measure		**Current Estimate**	**Proposed Standard**
Public Opinion			
Experience with bikers Visitation Study q. 10d		n/a	B
		Grade: A, B, C, D and F	
Most needed improvements Resident survey q. 4		0%	0%
		Responses: bikes, equestrians or other uses	
Adequacy of different kinds of management: Resident survey q. 20		32%	10%
		enforce bike regulations[1] as "somewhat inadequate" or "very inadequate"	
Activities of others that could make your experience less pleasant (resident survey q. 30-35)	Biker	44%	5%
	Horse	34%	
	Runner	11%	
	Hiker	2%	
		Percent responding "somewhat less pleasant" or "much less pleasant"	

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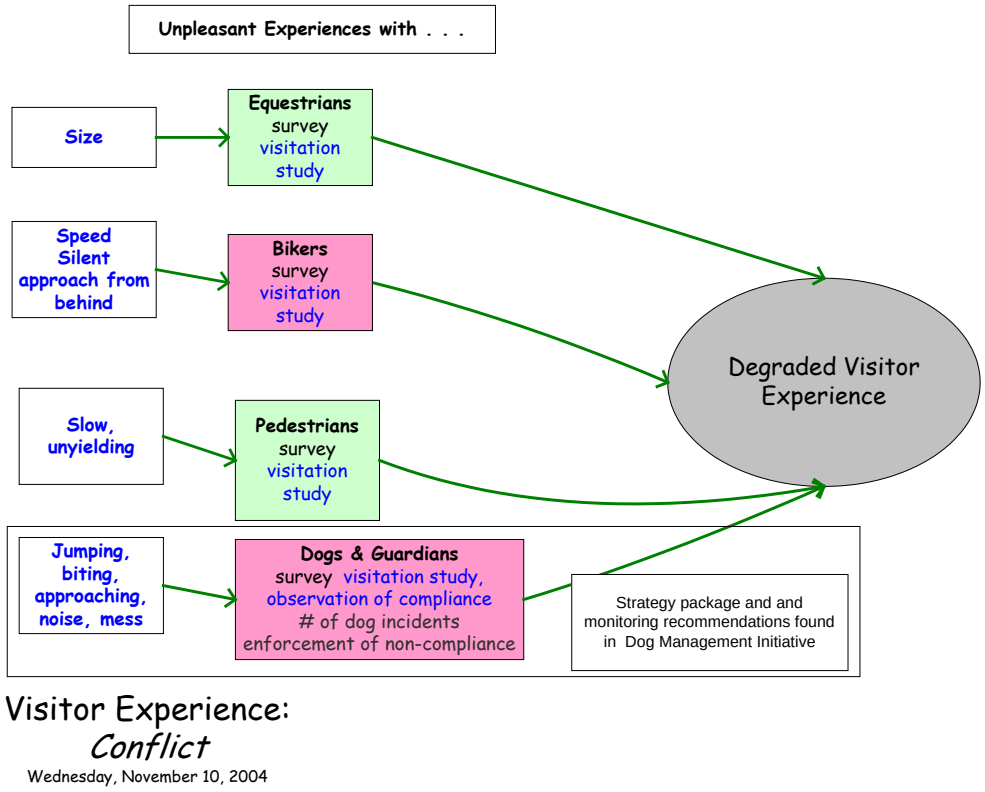
[2] The only regulation that deals specifically with bicycling on OSMP is the prohibition of riding on trails not designated for cycling. Although the department encourages courteous behavior there are no law requiring cyclists to warn of their approach or go slowly in the vicinity of other visitors. The survey asked about enforcement of regulation, but there is considerable data to suggest that conflicts of visitors and thus their responses dealt more with cyclists moving too fast around others, and failing to warn of their approach from the rear.

Validity

The conceptual model developed for conflict among visitors does not identify any difficult to establish assumptions. The Open Space and Mountain Parks department has a high level of confidence in the relationships contained in this model. No validity testing monitoring is proposed.



Visitor Experience:
Conflict
Wednesday, November 10, 2004

Initiative 3: Resource Protection

Service

Protection of native species and ecological systems
Protection of agricultural land uses

Problem to be Addressed

Visitor Use and Infrastructure contribute to the threat of exotic invasive species (weeds, diseases, introduced invasive, exotic animals)

Strategy Package

- Develop and implement best management practices for trail construction and maintenance

Related Strategies
Monitoring procedures for these strategy can be found in the appropriate summary

Initiative 1: Visitor Access and Opportunity
Service: Visitor Opportunity
Strategy:
- Designate areas and conditions for off-trail activities (fishing)

Service: Infrastructure Condition and Sustainability
Strategies:
- Complete routine maintenance of OSMP visitor infrastructure.
- Manage undesignated trails
- Correct major infrastructure deficiencies

Initiative 3: Resource Protection
Service: Addressing Vulnerabilities
Problem: Direct Impacts of Visitor Activity
- Improve and enhance localized protection measures for sensitive resources.
- Implement temporary closures in response to environmental conditions and patterns of visitor use
- Encourage visitors to limit their use to designated trails
- Require on-trail access in Habitat Conservation Areas and Agricultural Areas
- Complete planning and infrastructure improvements prior to opening newly acquired properties to public access

Initiative 4: Dog Management
Service: Dog Control
- Require dogs to be on trail and on leash in Habitat Conservation Areas and Agricultural Areas (see “Behavior of Some Dog Guardians: Dogs out of Control”)

Initiative 5: Public Information and Involvement

Service: Connecting OSMP and the Community
Strategy:
- Community Outreach Programs, specifically ensuring the content of user group "codes of ethics" include appropriate recommendations for activities to minimize the establishment or spread of exotic invasive species
- Continue to implement the front-country Leave No Trace program

Monitoring

Implementation
Track and report on:
- Management for emerging aquatic pests
  - Evaluation of ponds for the presence of chytridiomycosis.
  - The closure/management of ponds free of Eurasian water-milfoil cythridmicosis-free
- The documentation of OSMP fishing opportunities and identify the species and locations for exotic fish removal.
- Review of educational materials and activity-groups' codes of ethics for appropriate content regarding invasive exotics

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Effectiveness
The OSMP staff has a great deal of experience in implementing to integrated pest management strategies and is skilled at responding to these issues. Information is available to help set standards and thresholds.

- Weed mapping shows the location of exotic invasive plant species on OSMP lands
- Weed mapping may also reveal areas that are not currently infested and thus represent the most promising areas for conservation (within any of the management zones)
- Fishery inventories have been conducted on OSMP waters

Effectiveness

Measure	**Current Estimate**	**Proposed Standard**
Incidence of chytridmycosis among amphibian populations	Pathogen coincident with visitor use is found	Pathogen restricted to 2004 distribution
Composition of native/exotic fish in OSMP waters	Native fish habitat a sink *Native fish productivity lower than mortality*	Sustainable native and sport fisheries
Non-native species cover, number of species at trailheads, areas of concentrated visitor use,	10-25% cover 3-5 exotic indicator species present	0-10% non-native cover fewer than 3 indicator

Measure	Current Estimate	Proposed Standard
and along trails (grassland)		species present
Percent canopy cover of highest priority weeds at trailheads, areas of concentrated visitor use and along trails (grassland)	0-5%	0-5%
Percent cover, # infestations trail-related perennial invasive rhizmatous grasses (~~F~~forest)	15-50% cover 6-10 occurrences	5-15% cover 2-5 occurrences
Percent cover, # infestations trail-related highest priority weed species (f~~F~~orest)	15-50%	5-15%
Canopy cover of selected indicator xeric tallgrass species (IS) (grassland)	IS- ~~Indicator species (s~~Subdominants 11-40% and dominants 41-100%~~).~~	IS-~~Indicator species (s~~Subdominants 11-40% and dominants 41-100%).
Percent of total vegetative cover of indicator species of Needle and thread - blue grama -Front Range variant (grassland)	IS >20% relative cover	IS Subdominants 11-40% and dominants 41-100 %?)?
Cover of selected characteristic, indicator species of New Mexico needle grass (grassland)	Indicator species >20% relative cover	IS-Subdominants 11-40% and dominants 41-100%).

Validity-Awareness/Appreciation and Action

The certainty of relationships among visitor use and the establishment and spread of exotic species are variable. Some steps in the relationship are well established and simple (see figure below—green/solid lines). For example ground disturbances resulting from a variety of causes (e.g. hikers, horses, bikes, dogs, trail building and maintenance activities) create disturbed or bare ground.
Disturbed soil conditions are the preferred substrate for many weed species. Weed seeds are plentiful in the landscape around Open Space and Mountain Parks.

Other relationships are less well established (see figures below red/dotted lines). For example, ecologists have established that some weeds respond with vigorous growth and spread when nitrogen in added to the naturally nitrogen-limited soils of the Boulder Valley. Animal excrement, including dog excrement is rich in nitrogen. Some land managers and scientists have proposed that it is likely that the large amount of dog excrement left on OSMP is creating environmental conditions that could favor weed establishment and growth. The figures below show some of the relationships among visitor use/facilities and weeds.

There are a number of research projects that could increase the level of certainty for some of these chains of causality, and improve our level of knowledge of the relationships shown below.

- Soil nitrogen level response to dog (horse, human) excrement
- Weed response to changes in soil nitrogen (+/- resulting from dog excrement) in terrestrial, wetland and aquatic systems
- Native plant composition shifts in response to weed establishment along trailsides or in areas of high visitor use (base of climbing areas, trailheads, etc)
- Fire regime characteristics (intensity, flame height, etc.) as a function of exotic species occurrence.
- Impacts of the introduction of cythridmicosis on amphibian populations

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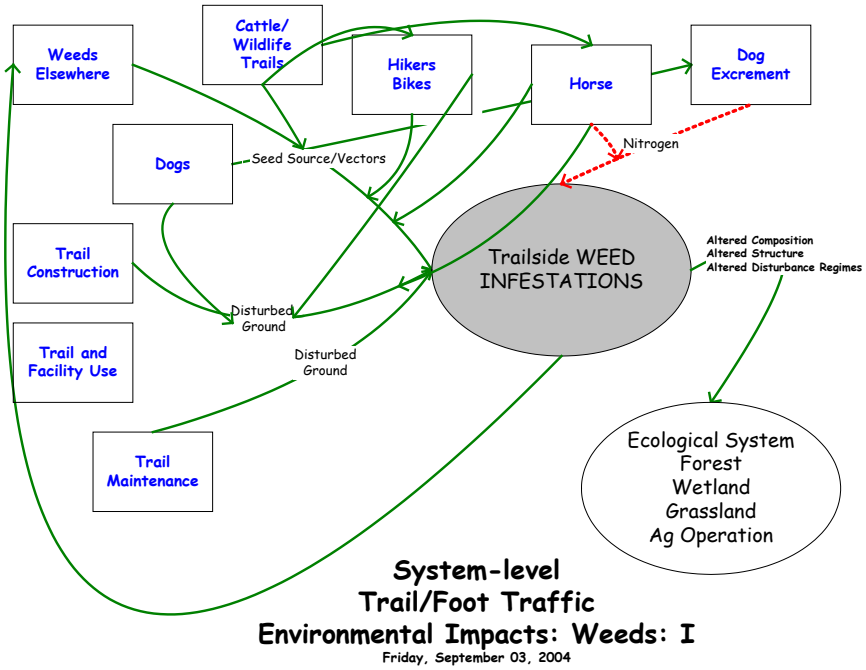
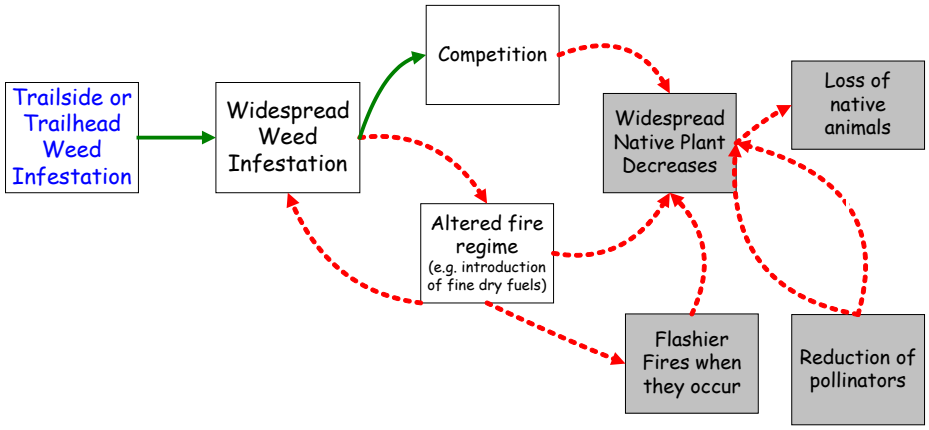
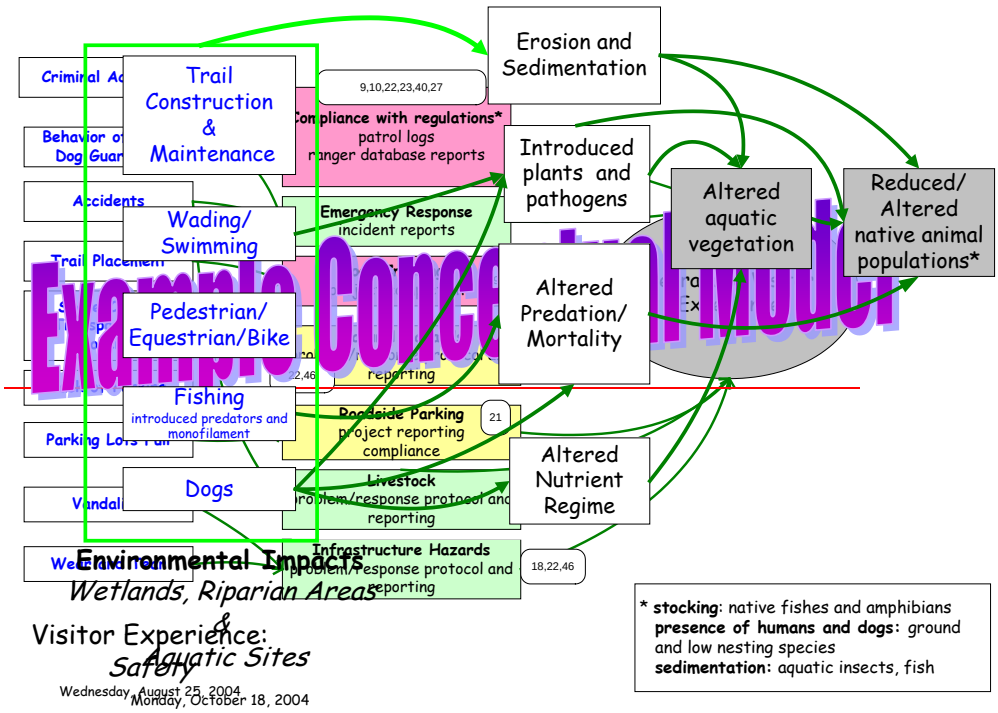




System-level
Trail/Foot Traffic
Environmental Impacts: Weeds: II
Friday, September 03, 2004


Trail Construction & Maintenance
Wading/ Swimming
Pedestrian/ Equestrian/Bike
Fishing
introduced predators and monofilament
Dogs
Erosion and Sedimentation
Introduced plants and pathogens
Altered Predation/ Mortality
Altered Nutrient Regime
Altered aquatic vegetation
Reduced/ Altered native animal populations*
9,10,22,23,40,27
Compliance with regulations*
patrol logs
ranger database reports
Emergency Response
incident reports
Roadside Parking
project reporting compliance
21
Livestock
problem/response protocol and reporting
Infrastructure Hazards
problem/response protocol and reporting
18,22,46
Criminal Ac
Behavior of Dog Guar
Accidents
Trail Placement
Parking Lots Full
Vandal
Wetland Impacts
Example Conceptual Model
Environmental Impacts
Wetlands, Riparian Areas & Aquatic Sites
Visitor Experience: Safety
Wednesday, August 25, 2004
Monday, October 18, 2004
* stocking: native fishes and amphibians
presence of humans and dogs: ground and low nesting species
sedimentation: aquatic insects, fish

Initiative 3: Resource Protection

Service

Protection of native species and ecological systems

Problem to be Addressed

Direct adverse effects of visitor activity

Strategy Package

- Complete planning and infrastructure improvements prior to opening newly acquired properties to public access.
- Improve and enhance localized protection measures for sensitive resources.
- Implement temporary closures in response to environmental conditions and patterns of visitor use
- Encourage visitors to limit their use to designated trails
- Require on-trail access in Habitat Conservation Areas and Agricultural Areas.
- Enforce nighttime parking curfew and institute nighttime closure in Habitat Conservation Areas.

Related Strategies *Monitoring procedures for these strategy can be found in the appropriate summary*
Initiative 1: Visitor Access and Opportunity Service: Infrastructure Condition and Sustainability - Complete routine maintenance of OSMP visitor infrastructure. - Manage undesignated trails - Correct major infrastructure deficiencies Initiative 3: Resource Protection Service: Addressing Vulnerabilities Problem: Exotic Invasive Species - Develop and implement best management practices for trail construction and maintenance - Complete planning and infrastructure improvements prior to opening newly acquired properties to public access Initiative 4: Dog Management Services: Dog Control, Dog Excrement Removal Strategies: A variety of strategies have been proposed to address resource impacts related to dog management External to VMP Management of livestock to reduce the creation of livestock trails in sensitive areas.

Monitoring

Implementation
Track and Document:
- The establishment of a template and approach for new property evaluations which includes criteria for evaluating the effect of visitor use upon the management of invasive exotic species (among other things).
- Completion of new property management plans
- Identification of areas within any of the management zones that may require local protection measures
- Establishment of localized protection measures
- Identification of areas where environmental conditions and patterns of visitor use suggest that temporary closures would effectively protect OSMP resources
- Establishment of temporary closures.
- Approval of ordinances (or revisions to ordinances) to require on trail travel in HCA and AA's, as well as to establish nighttime closures in HCA's

Effectiveness
- Compliance with:
  - with new property closures
  - on-trail regulations in HCA's and AA's
  - on-trail principle elsewhere
  - localized protection measures (as appropriate)
  - temporary closures/restrictions
- Number of undesignated trail miles
- Status (condition, size, etc.) of individuals or populations "protected" by localized protection measures and temporary closures.

Effectiveness

Measure	Current Estimate	Proposed Standard
Overall compliance with on-trail principle	n/a	95%
Compliance with "on-trail" regulation	n/a	90%
Undesignated trail miles	205	<100 miles
Change in streamside and wetland cover trampled	5-50%	5%
Percent of baseline cover of trailside occurrences of rare species	% of baseline cover of rare species	No more than 1-5% loss
Percent change in baseline cover for selected trailside shrub stands	15-50% decrease in baseline cover	No more than 1-5% loss
Percent change in number and cover of trailside populations of larval food plants of rare or	n/a	No more than 1-5% loss of individuals or

Measure	Current Estimate	Proposed Standard
endangered butterflies		No more than 1-5% loss of baseline cover
Percent change in number and cover of sensitive species in selected locations	n/a	0% loss of individuals or No more than 1-5% decrease in baseline cover or
Density of trailside occurrences of *Physaria bellii*	Density reduced less than 5%	No more than 5% reduction in density
Trailside population size of V*iola pedatifida;*	Population size reduced less than 5%	No more than 5% reduction in population size
Trailside density of *Amorpha nana*	??	No more than 5% reduction in density
Compliance with raptor closures		
Compliance with bat closures		
Compliance with bear closures		

Validity-Ecological Impacts

Off trail travel is identified as being an important cause for creating undesignated trails, and for "fragmenting" wildlife habitat. The relationship between off trail use and the development of undesignated trails is direct and generally accepted. Wildlife and livestock play some role in establishing undesignated trails although human use typically makes these trails more pronounced. Because undesignated trails are typically established without thought of maintenance, these trails are often non sustainable. It is especially costly to repair or attempt to close these trails.

There are a variety of ecological impacts of undesignated trails. All trails introduce people and dogs into otherwise undisturbed areas (see figure below). The mere presence of humans and dogs can result in changes in behavior by some animal species (fleeing, hiding, nest abandonment). Hikers and other visitors often bring along snacks. The crumbs and litter can attract scavengers and predators (e.g. crows and magpies) to areas where these birds would not typically forage. Once human food waste is devoured, these birds may begin hunting for additional food, increasing predation rates beyond natural conditions. Dogs can also increase rates of predation, especially to sensitive species such as ground nesting birds, small mammals, reptiles and amphibians. Off-trail use leads to trampling of vegetation and potential adverse impacts to plant populations, including rare species. If trails become wide enough they may create edge habitat attractive to cowbirds, which parasitize nests of other birds, decreasing the productivity for of sensitive songbird species.

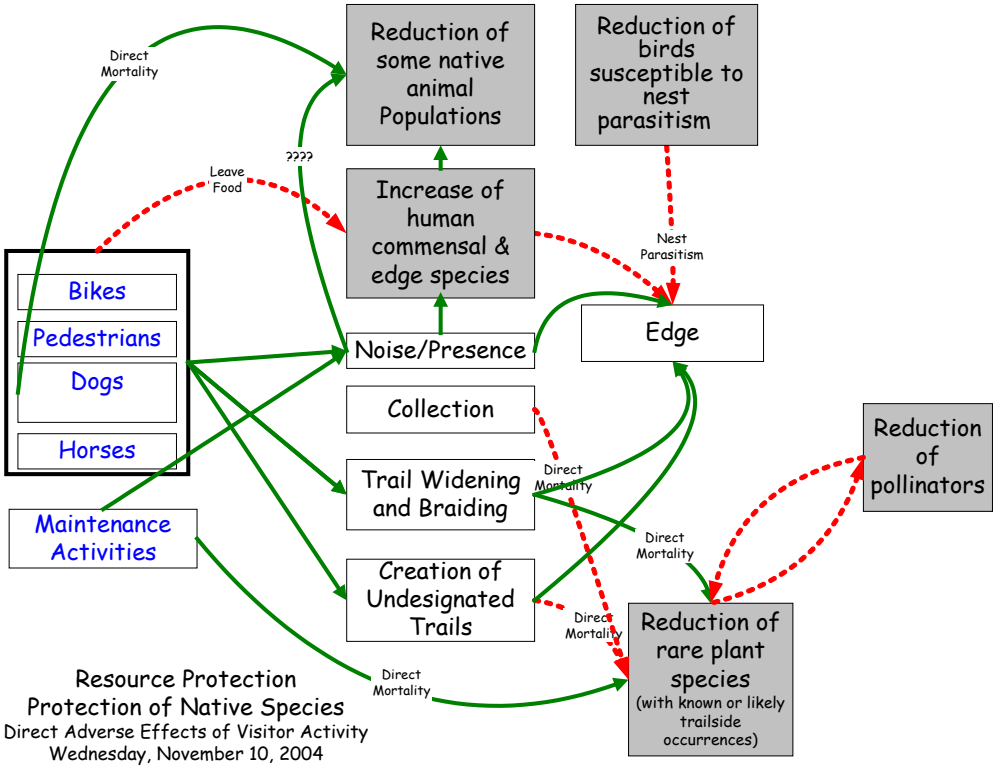
Some areas cannot withstand the impacts of undesignated trails. Soil conditions, slope and drainage patterns combine to create significant erosion problems. In addition to the aesthetic

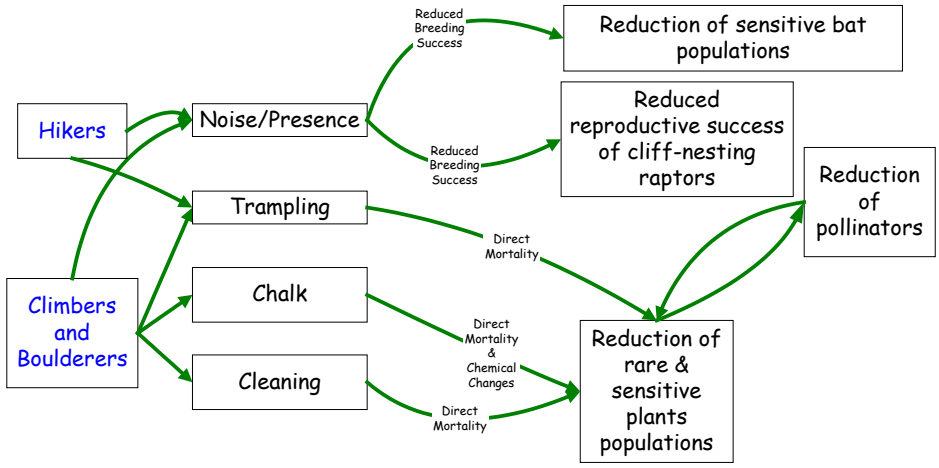
impacts of gullying, erosion also causes sedimentation of creeks and wetlands. This in turn affects aquatic plant and animal populations including the federally protected Preble's meadow jumping mouse.

Although rock climbing has been taking place on OSMP since the establishment of Boulder's public lands, OSMP has not provided an infrastructure to accommodate the existing levels of climbing use or comprehensively evaluated or responded to the environmental impacts of climbing. Beginning in 19?? the city, working with the state of Colorado established closures to protect cliff-nesting raptors. However there have been no assessments of the impacts of climbing to rare plant populations or natural communities. Some of the concerns about climbing are summarized in the conceptual model presented below.

Potential Research Questions

- What are the origins of undesignated trails on OSMP (cattle, dog, wildlife, and people)?
- How long does it take to restore undesignated trails?
- How do native animal populations respond to the presence of people in areas distant from trails?
- Are predator (e.g. corvid) populations higher in association with trails due to availability of food scraps?
- Are rates of nest predation and parasitism related to proximity to trails (designated or not)?
- To what degree to trails on Open Space and Mountain Parks result in sedimentation of creeks, ponds or wetlands?
- Which, if any, rare plants or natural communities are vulnerable to impacts from climbing?
- What is the relationship between off-trail travel and the introduction and spread of weeds?
- How does productivity of cliff nesting raptors, bats, and eagles relate to documented rates of compliance with closures?


Reduction of some native animal Populations
Reduction of birds susceptible to nest parasitism
Direct Mortality
????
Leave Food
Increase of human commensal & edge species
Nest Parasitism
Bikes
Pedestrians
Dogs
Horses
Noise/Presence
Edge
Collection
Reduction of pollinators
Trail Widening and Braiding
Direct Mortality
Maintenance Activities
Direct Mortality
Creation of Undesignated Trails
Direct Mortality
Reduction of rare plant species (with known or likely trailside occurrences)
Direct Mortality
Resource Protection
Protection of Native Species
Direct Adverse Effects of Visitor Activity
Wednesday, November 10, 2004



Rock Face/Rock Base
Species-Level
Environmental Impacts
Thursday, September 16, 2004

Initiative 3: Resource Protection

Service

Cultural Resource Protection

Strategy Package

- Complete inventories and vulnerability assessment of Open Space and Mountain Parks cultural resources.

Related Strategies *Monitoring procedures for these strategy can be found in the appropriate summary*
Initiative 3: Resource Protection Service: Address Ecological Vulnerabilities - Complete planning and infrastructure improvements prior to opening newly acquired properties to public access.

Monitoring

Implementation

Track and Document:

- Completion of cultural resource inventories
- Completion of cultural resource vulnerability assessments

Effectiveness

- Incidence of unintended impacts to cultural resources
- Condition assessments of cultural resources

Effectiveness Thresholds

The objective of the Open Space and Mountain Parks department is to avoid *all* significant impacts to cultural resources resulting from department sponsored activities or the actions of visitors.

Validation

Cultural resource management is a straightforward service that is not based upon any significant uncertainty of cause and effect relationships. No validity monitoring or research is proposed.

Initiative 4: Dog Management

Services being Delivered

Protection of native species and ecological systems
Protection of agricultural operations
Visitor Safety
Resolving User Conflict

Problem to be Addressed

Behavior of some dog guardians resulting in dogs out of control

Strategy Package

- Focus enforcement on compliance with dog regulations for voice-and-sight control.
- Implement a voice-and-sight video and tag program that requires dog guardians to watch an educational video as a prerequisite for having dogs off leash
- Revise voice and sight control regulations to improve clarity and enforceability.
- Require dogs to be on trail and on leash in Habitat Conservation Areas and Agricultural Areas
  - Implement on-corridor voice-and-sight control to the mountain peaks for selected trails.
- Require dogs to be on leash at selected trailheads.
- Establish additional no-dog opportunities on some existing and new trails, .
- Establish a graduated system of fines for violations for dog voice-and-sight offenses.
- Implement a dog voice-and-sight certification system for repeat offenders who want to regain voice-and-sight privileges (and voluntary for others).
- Expand the use of seasonal dog restrictions, where warranted, as an alternative to year-round restrictions.
- Implement a voice-and-sight video and tag program that requires dog guardians to watch an educational video as a prerequisite for being allowed to have dogs off leash.
- Collaborate on monitoring and research studies to target critical issues or information gaps.
  - Assess baseline level of compliance with voice-and-sight regulations.
  - Implement a dog voice-and-sight control demonstration project for selected trails, in collaboration with FIDOS and other stakeholders.

Related Strategies *Monitoring procedures for these strategy can be found in the appropriate summary*
Initiative 5: Public Information & Involvement Service: Connecting OSMP and the Community Strategy: - Continue to implement the front-country Leave No Trace program, which delivers consistent and repeated messages about *controlling dogs.* - Collaborate with community groups to convey LNT messages

Monitoring

Implementation

- Development of ranger enforcement protocol and reporting of enforcement (e.g. location, frequency and duration)
- Number of contacts, warnings and summonses for violations of voice and sight control regulations
- Approval of ordinances (or revisions to ordinances) for penalty changes, video/tag requirement, certification requirement to regain voice-and-sight privileges, management area regulations, no-dog opportunities and trailhead leashing
- Number and extent of areas affected by modification of year-long to seasonal restrictions for dogs
- Implementation of video/tag program:
  - Creation of video,
  - Cooperative agreement with administrating entity
- Creation and implementation of monitoring program

Effectiveness

- Level of compliance with applicable dog control regulation (no dogs, voice and sight control, dogs on leash)[3]
  - Observed compliance
  - Public opinion
  - Livestock incidents reported

Effectiveness Standards

[3] Per recommendations of FIDOS, this monitoring should include 1) sampling at Sage Trail and Little Bluestem and 2) a specific monitoring protocol designed to evaluate compliance with trailhead leashing.

Measure	Current Estimate	Proposed Standard
Compliance with control requirement (observation)	65%	90%
Compliance with control requirement (upon request)	n/a	90%
Availability of certification program	n/a	Respond to all concerns
Livestock incidents reported	Variable	< 1/month on average system-wide
Participation in video/tag program	n/a	TBD
Public Opinion		
Adequacy of enforcement of dog control regulations Resident Survey q. 21	37%	75%
Observation of Dog/Wildlife Interaction Proposed	n/a	TBD
Conflict Resident Survey q.28	23%	No more than 5%
	Responded that dogs were in conflict with other activities	
Effect of Dogs on experience Resident survey q. 32-33	35%	No more than 7%
	Responded that dogs made experience less pleasant	
Experience with dogs Visitation Study q. 10g	n/a	B
	Grade: A, B, C, D and F	

Validity-Ecological Impacts

The conceptual models developed for the VMP identify dogs out of control as the source of significant ecological stress. These models are based upon research conducted on OSMP and elsewhere, as well as observations of land managers in Boulder and throughout the world. OSMP staff is confident that the models provide a useful perspective from which to take action.

Designing and implementing a research project (or program) to increase the level of confidence in OSMP's models about dogs or other effects would be useful for long term (10 years or more) adaptive management. The department should consider the long-term benefits of validating our fundamental assumptions, to improve the quality of information available for future planning and management.

Potential Research Questions

- To what degree does the presence of dogs affect native animal populations?
  - Is there enhanced mortality of sensitive species (i.e. ground nesting birds, small mammals, reptiles and amphibians)?
  - Do some animals avoid areas where dogs are active?
  - Does the presence of dogs affect energy use and survival of native animal species
- What role do dogs play in the establishment of undesignated trails?

Initiative 4: Dog Management

Services being Delivered

Aesthetics of the Visitor Experience
Resolving User Conflict
Protection of native species and ecological systems
Visitor Safety

Problem to be Addressed

Behavior of some dog guardians: dog excrement not removed.

Strategy Package

- Focus enforcement on compliance with dog regulations
- Establish a graduated system of fines for violations of dog waste removal regulations

Related Strategies *Monitoring procedures for these strategy can be found in the appropriate summary*
Initiative 4: Dog Management Problem to be Addressed: Behavior of some dog guardians resulting in dogs out of control Strategy: ▫ Require dogs to be on leash at selected trailheads. ▫ Revise voice and sight control regulations to improve clarity and enforceability (dogs "not in sight" are thought to be major contributor to the problem of dog excrement not being removed) Initiative 5: Public Information & Involvement Service: Connecting OSMP and the Community Strategy: ▫ Continue to implement the front-country Leave No Trace program, which delivers consistent and repeated messages about "picking up after pets". ▫ Collaborate with community groups to convey LNT messages ▫ Encourage compensatory (dog excrement pick up) behavior by others (e.g. "The 1+1 Program")

Monitoring

Implementation

- Development of ranger enforcement protocol and reporting of enforcement (e.g. location, frequency and duration)
- Ordinance revision for fee changes.

Effectiveness

- Level of compliance with applicable excrement removal regulation
  - Observed behavior compliance (see Jones and Lowry, 2004)[4]
  - Amount of excrement
  - Public opinion

Effectiveness Standards

Measure	Current Estimate	Proposed Standard
Compliance with excrement removal requirement (measured via "roving transect" and direct observation)	60%	90%
Amount of dog excrement (measured via "roving transect" and direct observation)	n/a	TBD
Public Opinion		
What one thing on OSMP is most in need of improvement? (Resident survey q. 4)	37%	10%
	Responded: "too much dog excrement"	
Public Opinion: Adequacy of regulations about dog excrement (Resident survey q 22)	37%	90%
	Responded: "adequate"	

Validity-Ecological Impacts

The conceptual models developed for the VMP identify dog excrement as a factor degrading the visitor experience and ecological systems. Dog excrement degrades the visitor experience by affecting aesthetics and safety. Aesthetic impacts are straightforward, the sight and smell of dog excrement make the visitor experience less pleasant. The health impacts of dog excrement include surface and ground water contamination, and potential health risks, especially to children and other dogs. Ecological effects of dog excrement include the potential for introducing diseases to wildlife populations and altering soil and water chemistry. Changes to water and soil chemistry can have far reaching implications for plant and animal populations.

Potential Research Questions

- What amount of dog excrement do OSMP visitors consider acceptable?
- How does dog excrement affect soil and water chemistry?
- What are the ecological responses of these changes?
- What pathogens found in dog excrement pose a threat to native animal populations? What is the severity and scope of this problem?
- What human health risks are associated with dog excrement?

[4] Jones, MK and R Lowry. 2004. Effectiveness of trailhead education on cleaning up dog litter. Presentation abstract for International Symposium on Society and Resource Management. Keystone, Colorado. June 5, 2004.

Initiative 5: Public Information and Involvement

Service

Welcoming Visitors and Building Connections

Strategy Package

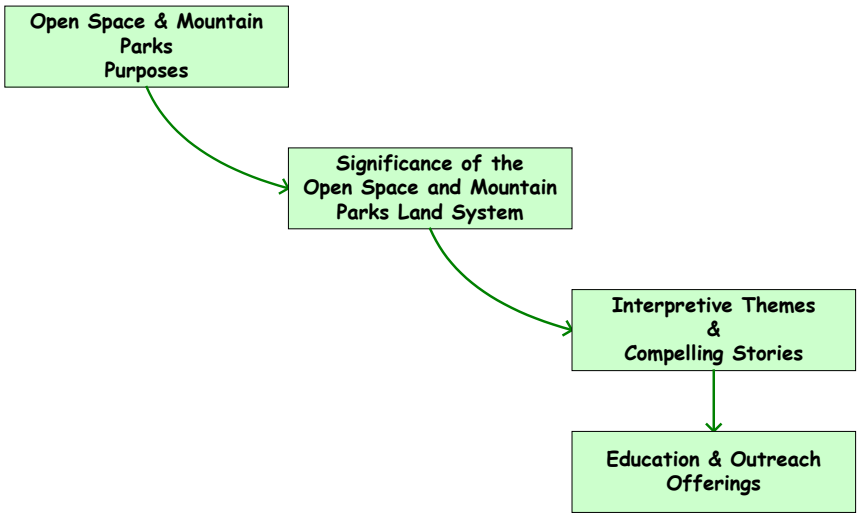
- Provide news and useful information through attractive signs and brochures at OSMP trailheads, access points and other facilities as well as along OSMP trails.
- Provide news and useful information through an attractive and easy to use OSMP web site and electronic media
- Provide news and useful information through printed materials such as the OSMP trails map.
- Provide on-site, direct, personal OSMP staff contact with the public to provide news and useful information.
- Provide volunteer opportunities for community members to deepen their commitment and formalize their relationship to OSMP.
- Administer the Junior Ranger program
- Communicate the essential stories about Open Space and Mountain Parks lands (geological, ecological, cultural, and agricultural).
- Communicate the range of experiences and opportunities for connection that are available for the public to enjoy
- Communicate the values of Open Space and Mountain Parks lands (e.g. why they were set aside from development and made available for the public)
- Work with authors and publishers of maps and outdoor recreation guides so that Open Space and Mountain Parks opportunities are appropriately placed and described
- Continue to communicate the front-country Leave No Trace program, which delivers consistent and repeated messages about how visitors can enjoy OSMP while minimizing their impact.
    - **Manage your dog**
    - **Pick up after your dog**
    - **Stick to trail**
    - Leave it as you find it
    - Trash your trash
    - Share the trail
- Collaborate with community groups to convey LNT messages.

Monitoring

Implementation

- Assessment of **on-site** information (trail signs, trailhead interpretative materials)
    1. Does information address the range of topics reasonably expected to be useful to visitors? If not, what additional information is needed?
       (e.g. area or activity specific brochures)
    2. Is information accurate and current?
    3. Are signs in good repair?
    4. Is it presented in an appealing and easy to understand way?

- Assessment of **on-line** information
  - 1-4 above
  - Is the information organized in a way that visitors to our website can find it?
  - Can visitors to our website easily print or download the information that we make available there?
  - Number of (unique) non-OSMP "hits"
- Assessment of **printed** materials
  - 1-4 above
  - Is the information readily available in locations where visitors (or community members) are most likely to look for it?
  - Requests for and sales of printed materials
- Number of contacts (ranger, education, outreach)
- Number of active OSMP volunteers
- Number of hours contributed by volunteers[5]
- Participation in the junior ranger program
- Other volunteer measures (tenure of volunteers, initiative-based time/effort analysis)
- Completion of Environmental Education curriculum/themes
  - The essential stories are. . .
  - Range of experiences are best communicated by . . .(compelling stories,, effective techniques)
  - Values of OSMP land are best communicated by. . .
- Number of educational programs on the shelf (developed for departmental use)
- Number of collaboratively developed educational or outreach programs
- Number of educational programs requested
- Number of educational programs given



[5] All volunteer projects listed in the most recent summary of Volunteer Programs and Projects build connections between members of the community and the OSMP land system.

Effectiveness Thresholds: Existing Measures

Measure	Current Estimate	Proposed Standard
Outreach Evaluation Percent who characterize outreach effort as "of high quality" "welcoming" "participant could repeat message"	n/a	60%
Education Evaluation Percent who are very satisfied with either environmental education programs or public programs	??	90%
Volunteer Satisfaction Percent who are very satisfied with their volunteer opportunity	??	90%
Junior Ranger Satisfaction Percent who (experience a deeper connection with OSMP?) are very satisfied with their junior ranger experience	??	90%
Public Opinion		
What one thing is most in need of improvement? Resident survey q. 4	7% (of those responding)	10%
	Responding "better education/information"	
Usefulness of signs and brochures Visitation Survey q. 10c	n/a	B
	Grade: A, B, C, D and F	
Trailhead and nature education Visitation Survey q. 10h	n/a	B
	Grade: A, B, C, D and F	
Awareness of public programs Resident Survey q. 24	73%	80%
Outreach quality *Proposed*	n/a	60%
	"very high" or "high"	
Outreach characterized as "welcoming" *Proposed*	n/a	60%
	"very welcoming" or "welcoming"	
Participant knew outreach message *Proposed*	n/a	60%

Measure	Current Estimate	Proposed Standard
Satisfaction with either environmental education programs or public programs *Proposed*	??	90%
	"very satisfied" or "satisfied"	
Satisfaction with volunteer opportunities *Proposed*	??	90%
	"very satisfied" or "satisfied"	
Satisfaction among Junior Ranger participants *Proposed*	??	90%
	"very satisfied" or "satisfied"	

The Visitor Master Plan calls for the OSMP department to build connections by communicating the department's purpose and significance. New measures are needed to determine if we are meeting these goals. Survey questions could be used to assess the level of familiarity with OSMP functions directly, and how much people know about how OSMP has achieved that goal. For example:

What are the purposes of OSMP?

- Natural area preservation/restoration
  - (plants, animals, ecosystems, geology)
- Water resource preservation
- Flood plain protection
- Scenic area/vista/aesthetic preservation
- Passive recreation
  - (hiking, nature study photography, bicycling, horse back riding, fishing)
- Agriculture
- Urban shaping, limiting sprawl, disciplining growth

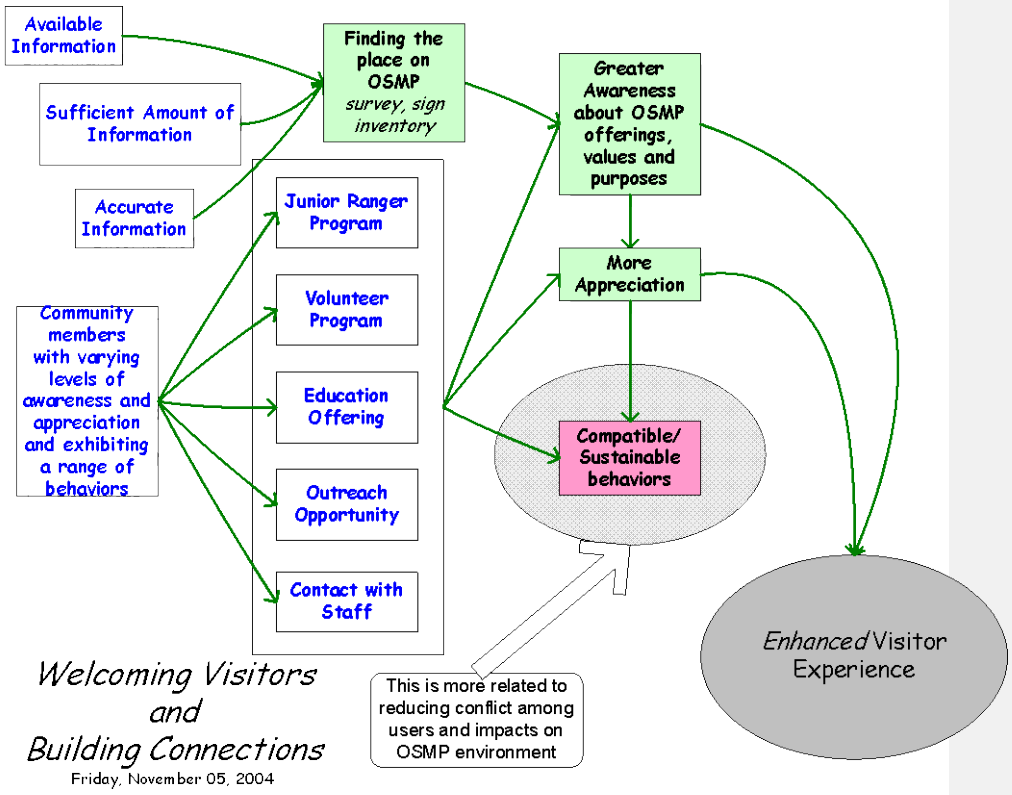
Has OSMP made significant contributions to:
Natural area preservation and restoration (yes/no examples)
. . .

Do you value the contributions that OSMP has made in
Natural area preservation and restoration (scale or yes/no)
. . .

Validity-Awareness/Appreciation and Action

"Welcoming Visitors and Building Connections" is an important visitor service because it enhances the quality of life for OSMP visitors. The conceptual model developed for this service links awareness, appreciation and action. For the purposes of the VMP, "Connections with OSMP" deals with offering visitors opportunities to enhance their level of awareness and appreciation for OSMP. The department is also interested in building connections that foster compatible and sustainable behaviors. Assessing the impact of environmental education upon public awareness is challenging. The

relationship between educational programming and the level of appreciation for OSMP values is even less direct and more difficult to measure. OSMP has conducted research to determine the effect of the Frontcounty Leave No Trace educational initiative upon visitor awareness, appreciation and behavior. Further research on the following topics would be useful to help clarify the uncertainty in the conceptual model presented below:



Initiative 5: Public Information and Involvement

Service: *Ensuring High Quality Public Involvement*

Strategy Package

- Establish a passive recreation coordinator role as a way for community groups to provide input to OSMP on the Visitor Master Plan.
- Assign OSMP staff to work as liaisons with community groups on an ongoing basis to provide specific points of contact within the OSMP department.
  - Conduct periodic meetings with community groups to check in on plan implementation and adjust as necessary.
  - Work with recreational user groups to develop user codes of ethics, which incorporate the principles of Leave-No-Trace and encourage care taking and stewardship of OSMP lands.
- Convene public forums at least annually to coincide with the timing of Open Space and Mountain Parks' annual assessment of monitoring results and/or formulation of the annual work plan, budget, and capital improvements program.
- Continue *ad hoc* public process for significant management proposals
  - Use issue-specific, short-term groups on an ad hoc basis for specific issues or projects, as necessary.
- Work with the Open Space Board of Trustees to come up with some ways to improve the public participation process at OSBT meetings.
  - Promote greater dialogue
  - Encourage connections among people/groups
  - Maintain focus on specific issues
  - Communicate the Board's openness to change as an outcome
- Use survey results to track community attitudes, values, desires, and trends, which help inform implementation decisions for the Visitor Master Plan.

Monitoring

Implementation

- Create position and hire, or assign a staff member to fill role of passive recreation coordinator
- Identify staff liaisons, and document responsibilities
- Staff liaisons' charters written and relationships established with community groups
- Number of meetings held with groups to discuss plan implementation and specific projects
- Documentation of "codes of ethics" and other education/communication efforts with community groups
- Number of public meetings held to discuss "Progress Toward our Goals" or "Next Year's Work Program
- Public process for other management proposals
- Discussions held with OSBT regarding improvements to public participation
- Documentation of how public opinion survey results are integrated into Visitor Master Plan.

Effectiveness

There are currently no formal measures of the effectiveness of our public involvement strategies. The following recommendations could be implemented either as part of existing public opinion surveys or separately.

Measure (no estimates or standards proposed)
Public Opinion (Resident Survey): • How adequate is your opportunity to communicate your concerns about OSMP management to staff, the OSBT and City Council? • What impedes you from communicating your concerns? • Could the city do more to encourage your involvement? • If so, what city-provided services facilitate your input? • How often do you provide your comments to staff, OSBT or the City Council?
Public Opinion (OSBT meeting exit survey) • How would you rate your interaction with the OSBT? • Did you understand how the board came to their decision about the issue on which you came here to speak? • Do you feel that that decision was reached after a reasonable discussion of the relevant issues? • Was the issue that you brought before the board discussed? • Did you have an opportunity to respond to the Board's questions or concerns?
Surveys of Community Groups • Does the OSMP liaison with your group keep you informed of projects and happenings that affect your interests? • Is your liaison available to discuss your concerns? • Are your issues addressed promptly by staff? • When a staff level response is not appropriate, do you feel that your concern/issues are adequately included/integrated in memos and other materials presented to the board?

Validity-Awareness/Appreciation and Action

OSMP has not articulated a formal model for how it seeks to integrate the community in decision-making about land acquisition and management. The LRMP (Open Space/Real Estate Department, 1995) provide little guidance beyond describing a planning approach that will involve the public through a variety of citizen participation techniques.

A model based upon an evaluation of existing practice and public input received during the Visitor Master Plan development suggests that OSMP could improve the quality public discourse by addressing these key factors:

Demonstrate that community issues are understood by staff and the OSBT through the content of memos and the nature of board discussion/deliberations.

Demonstrate an understanding of the relationship of community concerns with the common good as described by the City Charter and other guiding principles of OSMP management.

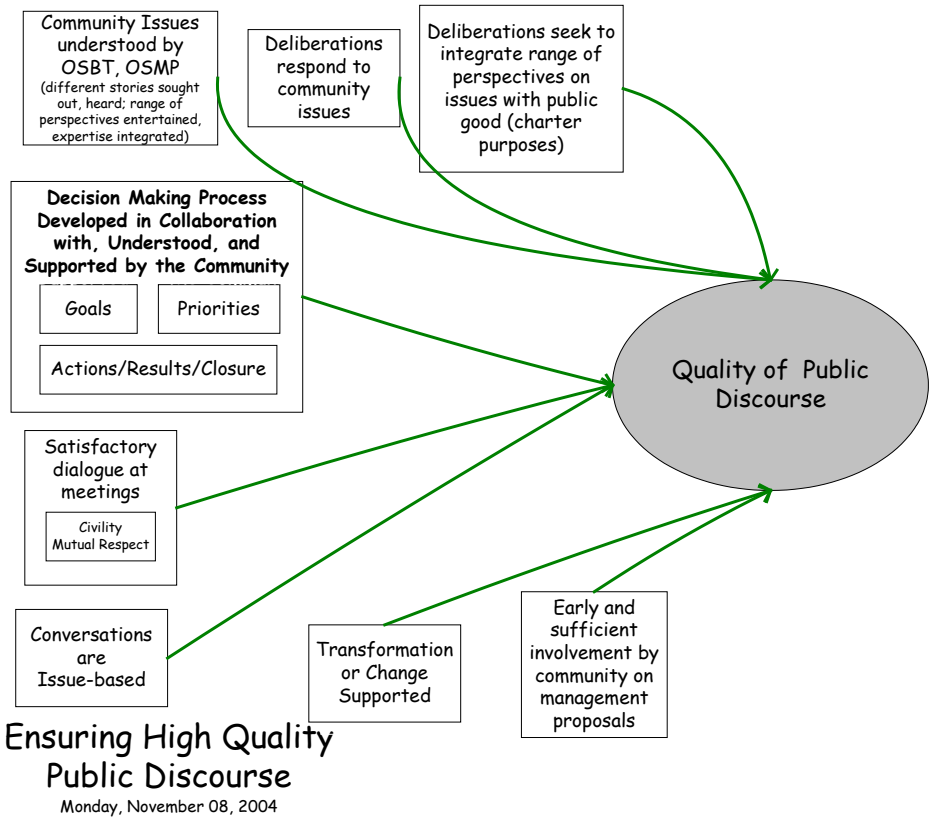
Integrate expert opinion in the decision making process

Provide the community clarity about the decision making process. This includes clear articulation of goals and objectives, identification of priority actions and demonstration of progress toward meeting goals and taking action.

When problem solving, be clear about if and how much change would be supported.

Engage in good dialogue at public meetings, focusing discussion upon issues, stressing civility and mutual respect.

Ensure early involvement of stakeholders. Continue stakeholder involvement as needed.



City of Boulder
Open Space and Mountain Parks
Visitor Master Plan Management
February 28, 2006
Updated November 2010

Monitoring Protocol for the Voice and Sight Dog Tag Program

1.0 Background

The Voice and Sight Dog Tag (VST) program is a management strategy within the Education and Outreach Initiative of the Visitor Master Plan (City of Boulder 2005). Under the VST program, visitors wishing to have their dogs off-leash and under voice and sight control are required to have a Voice and Sight tag visibly displayed on their dogs. To obtain a Voice and Sight tag, a visitor must view a video describing the requirements of voice and sight control and complete a registration form. Visitors not registered in the program or who do not have a Voice and Sight tag on their dog must keep their dog on-leash while visiting OSMP and other City of Boulder properties where voice and sight control applies.

2.0 Project Goal and Objectives

The overall goal of the VST program is to:

Increase the proportion of dog guardians visiting OSMP with their dogs who have control over their dogs as required by applicable regulations (BRC 6-1-16)

The program objectives are to:

1. Improve understanding of voice and sight control.
2. Improve compliance with dog control regulations.
3. Increase OSMP outreach to and education of the public with respect to voice and sight control.
4. Decrease conflict involving dogs on OSMP properties.

3.0 Monitoring

Effectiveness monitoring was originally proposed to determine whether the VST program was achieving objectives 1, 2, and 4, and implementation monitoring was proposed to track progress toward objective 3. At the direction of the Visitor Master Plan coordinator, the monitoring associated with objective 1 (improving understanding of voice and sight control) was suspended in late summer 2006 due to difficulties with administering the web-based survey. (Monitoring/sampling objectives, methods, QA/QC, and data analysis have been removed from this updated protocol.) The effectiveness monitoring associated with objectives 2 and 4 was implemented in the spring of 2006 (prior to initiation of the VST program) and again in spring 2007 (following initiation of the VST program). A third monitoring period scheduled for spring of 2010, three and a half years after initiation of the VST program, is proposed. (During the third monitoring period, only the observation component described below will be

conducted.) The effectiveness monitoring associated with VST program objectives 2 and 4 above consists of two components.

3.1 ***Component 1*** of the effectiveness monitoring is an observational study. The observational study is designed to evaluate program participants' compliance with specific, observable aspects of existing dog regulations including the Voice and Sight ordinance. The observational study will also evaluate the level of conflict involving dogs on OSMP property. There are three sampling objectives associated with Component 1.

3.1.1. Sampling objective 1

Sampling objective 1: Estimate the proportion of dog-containing visitor parties that comply with the existing dog regulations with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure

Number of

- dogs out of their guardians' sight
- dog guardians with more than two dogs off leash
- incidents where dogs fail to respond appropriately to guardians' commands
- incidents where a guardian demonstrates failure to comply with excrement removal regulations
- incidents where a guardian fails to comply with the regulation prohibiting charging, chasing, or other displays of aggression toward a person or another dog
- incidents where a guardian fails to comply with the regulation prohibiting chasing, harassing or disturbing livestock or wildlife

Statistic

- Proportion of dog-containing visitor parties which comply with existing dog-related regulations

3.1.2. Sampling objective 2

Sampling Objective 2: Estimate the proportion of dog-containing visitor parties that are involved in dog-related conflict[1] with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure

Number of incidents of the following dog, guardian, or other visitor behaviors:

- dog flushes or causes wildlife to flee

[1] Vaske et al. (2007) found a majority (i.e. more than 50%) of OSMP visitors perceived each of the conflictive behavior listed here, except for three, to be a problem if the behavior occurs on OSMP. The three exceptions, dogs barking repeatedly, guardians engaged in a verbal confrontation, and visitor(s) kicking, hitting, "macing" or otherwise attempting to hurt a dog, were identified by a citizen group as potentially conflictive but were not measured in the study.

- dog chases another dog, wildlife, livestock, and/or person other than a member of the dog's party
- dog barks repeatedly
- dog makes physical contact with another visitor and that contact was NOT initiated by a visitor and does not result in injury
- dog makes physical contact with another visitor and that contact results in an injury
- guardian repeatedly calls the dog
- guardians engage in yelling or other verbal confrontation related to dog activity
- visitor(s) kick, hit, "mace", or otherwise attempt to or actually harm a dog
- other behaviors by dogs, guardians, or other visitors that might be considered conflictive and involve dogs

Statistics

- Proportion of dog-containing visitor parties in which at least one conflictive behavior is observed
- Proportion of dog-containing visitor parties in which dog or guardian engages in a specific conflictive behavior

3.1.3. Sampling objective 3

Sampling Objective 3: [2]

a. Estimate the proportion of dog-containing visitor parties where leashed/unleashed dogs and/or people in the party leave the trail tread with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

b. Estimate the proportion of dog-containing visitor parties that use an undesignated trail with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure

Number of:

- unleashed dogs/party that leave the trail tread
- leashed dogs/party that leave the trail tread
- people in parties with dogs that leave the trail tread
- dog containing visitor parties that use an undesignated trail

Statistics

- Proportion of dog-containing visitor parties in which at least one leashed dog leaves the trail tread
- Proportion of dog-containing visitor parties in which at least one unleashed dog leaves the trail tread
- Proportion of dog-containing visitor parties in which at least one person leaves the trail tread

[2] While this data was collected, it was not analyzed because it is not directly related to one of the Voice and Sight Tag program objectives outlined on page 1.

- Proportion of dog-containing visitor parties that use an undesignated trail

3.2. Component 2 of the effectiveness monitoring is a visitor interview. Originally, the interview consisted of two parts: 1. a demonstration that the guardian possessed a leash for each dog they were managing under voice and sight control and 2. a demonstration of the guardians' ability to cause their dog(s) to come to and stay by their side upon command. Field testing showed that the second part of the interview was not easy to implement, and consequently, the Visitor Master Plan coordinator directed OSMP monitoring staff to discontinue this part of the interview.

3.2.1. Sampling objective 1

Sampling objective 1: Estimate the proportion of dog containing visitor parties that comply with the leash requirement of the Voice and Sight ordinance with 90% confidence intervals that are no greater than ± 10% of the estimated true value.

Indicators to measure

Number of

- dog guardians in possession of a leash for each dog in their party

Statistic

- Proportion of dog-containing visitor parties in which the guardian(s) has a leash for each dog in the party

4.0 Study Sites

Attachment 1 presents a list of monitoring sites for Components 1 and 2. Staff used the following process to select monitoring sites. First, staff created a list of all trails in the OSMP system that allowed voice and sight management of dogs. Second, staff reduced the number of trails on the list by eliminating trails where visitation levels are expected or known to be low or very low based on Vaske et al. (2009). Staff took this step to maximize the number of visitor parties observed during each monitoring period and therefore increase efficiency of data collection. As a result of selecting monitoring sites using this method, compliance estimates generated by this study can only be generalized to the population of visitors that visit trails on OSMP that allow voice and sight dog management AND experience very high, high, or moderate levels of visitation.

Staff field-checked the remaining trails on the list to evaluate their potential as monitoring sites. In the field, staff considered how well an observer could see and how much of the trail the observer could see from potential monitoring locations (i.e. visibility). Staff also considered the location along the trail and the presence/absence of a potentially challenging situation for implementing voice and sight control when selecting monitoring sites. Staff selected locations where visibility was generally high. Staff also selected locations at various distances from the start of the trail because some models suggest dog behavior differs at various points along a trail (e.g. at the start of the trail, dogs may be excited about being out and may exhibit excited behavior that could be considered conflictive to others; dogs are more likely to defecate at the

start of their excursion; etc.). Slightly less than two thirds of the monitoring sites (65%) are located along the trail, and slightly more than one third (35%) are located at or near the start of a trail. Finally, staff considered the presence/absence of a potentially challenging situation for implementing voice and sight control such as proximity to a prairie dog town or water in selecting sites. The final list of monitoring sites includes sites with a potential challenge (35% of the sites) and ones without an obvious challenge (65% of the sites).

It is important to note that the monitoring study is designed to gain an understanding of the level of compliance with voice and sight and other existing regulations across all trails on the OSMP system that allow voice and sight dog management and experience very high, high, or moderate levels of visitation. Staff will pool data from the study sites and will not attempt to compare the individual study sites to each other. This design allows data to be collected efficiently and therefore with the minimum amount of resources.

5.0 Methods

5.1. Scheduling of monitoring sessions for Components 1 and 2

During the months of March, April, and May 2006, the Component 1 monitoring was conducted by two people, each monitoring on 7 days (5 weekdays and two weekend days) during each month for a total of 14 days of monitoring each month. Each day consisted of two three-hour monitoring periods. On the weekdays, monitoring occurred in the morning (approximately three hours after sunrise) and the late afternoon/early evening (approximately three hours prior to sunset). Generally, in March and April, the morning monitoring periods lasted from 6:30-7:15 to 9:30-10:15 AM, while the late afternoon monitoring periods lasted from 3:00-3:15 to 6:00-6:15 PM. In April, following the switch to daylight savings time, the late afternoon monitoring periods lasted from 4:30 to 7:30 PM. In May, the monitoring period lasted from 6:30 to 9:30 AM and the later afternoon period generally lasted from 4:45 to 7:45 PM. Weekday monitoring period times are summarized in Table 1. On weekend days, monitoring occurred in the morning (approximately 7-10 AM) and midday (approximately 10:30 AM -1:30 PM).

Table 1. Weekday monitoring period times

Month	Morning	Evening
March	6:30-7:15 to 9:30-10:15 AM	3:00-3:15 to 6:00-6:15 PM
April	6:30-7:15 to 9:30-10:15 AM	4:30 to 7:30 PM
May	6:30 to 9:30 AM	4:45 to 7:45 PM

Similarly, during the months of March, April, and May 2006, Component 2 monitoring was conducted by two people, each monitoring on 7 days (5 weekdays and two weekend days) each month for a total of 14 days of monitoring each month, using the same monitoring periods described above.

Each month, the monitoring project scheduler used a random number sequence to determine which days in the month Component 1 monitoring was conducted. Once

the Component 1 monitoring days were assigned, the scheduler generated a second random number sequence to determine which days Component 2 monitoring would be conducted. If a number in the second random number sequence corresponded to a day that was already scheduled for the Component 1 monitoring, the scheduler used the next number in the sequence to schedule the Component 2 monitoring.

Once the Component 1 and 2 monitoring days were scheduled, the scheduler randomly selected sampling sites, without replacement, for each day on which monitoring was scheduled. This process was repeated each month so that monitoring staff would have a monitoring schedule prior to the start of each month.

If monitoring did not occur on a day scheduled for monitoring (e.g. monitoring staff is ill, weather is not appropriate for sampling, etc.), “make up” monitoring sessions were completed on the next available day.

At the end of May 2006, the number of observations from Component 1 and interviews from Component 2 was evaluated to determine if additional monitoring should be scheduled for June 2006.

In 2007, OSMP changed the sampling randomization for Component 1. (Component 2 monitoring was not conducted in 2007.) On weekdays, under the 2006 sampling schedule, staff had to work either a split-shift or 11-14 hours on a day scheduled for monitoring. In 2007, staff used the following scheduling procedure to eliminate the need for split-shifts or long days while still maintaining the same total number of monitoring periods per month (i.e. 14 days of monitoring per month, 10 weekdays and 4 weekend days, with 2 monitoring periods per day for a total of 28 monitoring periods per month).

The monitoring project scheduler used a random number sequence to select 12 monitoring days (10 weekdays and 2 weekend days) for each month for Monitoring Staff Person 1. The monitoring project scheduler repeated this step, selecting another 12 monitoring days (10 weekdays and 2 weekend days) for each month for Monitoring Staff Person 2. The selection of monitoring days was completed independently for each staff member allowing the possibility of selecting the same days for both staff members. On weekdays, Monitoring Staff Person 1 conducted monitoring only during the morning time periods, while Monitoring Staff Person 2 monitored only during late afternoon/evening time periods. On weekends, each staff member conducted a monitoring session in the morning and midday.

Following selection of the monitoring days each month, the scheduler used another random sequence to assign sampling sites to each scheduled monitoring period. Site assignment occurred without replacement allowing each site to be monitored at least once each month. Because there are only 25 monitoring sites for Component 1, staff monitored three sites twice each month.

Randomization and scheduling for the 2010 field sampling will use the same procedure utilized in 2007.

5.2. Component 1 field procedures

Field personnel will arrive at the monitoring site at least five minutes prior to the start of the monitoring period. (Some monitoring sites require a short hike from the trailhead or other parking area.) Field personnel will ***not*** wear attire that identifies them as OSMP staff. Field personnel will bring at a minimum, a datasheet (Attachment 2), clipboard, and pencil to each monitoring session. For monitoring sites that are set off some distance from the trail(s) being observed, field personnel will also bring binoculars to the monitoring session. Upon arrival at the monitoring location, the observer will enter the header information in the datasheet. This includes the date, time, and location of the monitoring session, the initials of the observer, and the weather at the time of the monitoring session. Details about the weather at the time of the monitoring session should include the approximate temperature at the start and end of the session, cloud cover, wind level, precipitation, and any other weather information that may be important in understanding visitation levels that day and time.

Once the monitoring session begins, the observer will observe the first dog containing visitor party that enters the observation area. The observer will record the number of dogs and people in the visitor party. The observer will watch the visitor party the entire time the party remains in the observation area.

The observer will record the following attributes of the visitor party:

1. The observer will note the number of dogs in the visitor party that are leashed the entire time the visitor party is in the observation area.
2. For dogs that are unleashed for at least some portion of the observation area, the observer will note the number of dogs with and without a green VST tag and the number of dogs for which no determination could be made regarding whether they were wearing a VST tag or not. (Due to the location of the some of the monitoring sites and the characteristics of some dogs (e.g. dogs with shaggy coats), monitoring personnel may not be able to determine whether a dog is wearing a VST tag or not.)
3. The observer will note whether there are others in the observation area that may present an opportunity for interaction. The observer will characterize the others as other visitors (H), other dogs (D), livestock (L), or wildlife (W) are present. (While the monitoring personnel will likely be able to determine if other visitors, other dogs, or livestock are present in the observation area, it is acknowledged that monitoring personnel may not be able to readily observe all wildlife in the observation area.) When wildlife are observed in the observation area, the species or general category (e.g. deer, waterfowl, prairie dogs, etc.) of wildlife will be noted in the “Notes” section.
4. The observer will record all listed behaviors observed. (Attachment 3 provides a list of dog, guardian, and visitor behaviors to be recorded.) The observer will record any pertinent notes regarding the behavior observed in

the “Notes” section of the datasheet. (e.g. if the observer notes that a dog was barking repeatedly, the observer will record his/her speculation regarding what the dog is barking at, or if a dog jumps on another dog, the observer will record the guardians’ reaction to the incident.) If no listed behaviors are observed, the observer will record a “0” in the “Behavior Observed” column of the datasheet.

5. The observer will record the number of people, unleashed dogs, and leashed dogs that leave the trail.
6. The observer will record whether the visitor party used a social trail while in the observation area.
7. The observer will record the number of dogs that are not within view of their guardians. Within view means the guardian can see the dog immediately or by turning his or her head. Tall vegetation, topography, and winding trails are possible reasons why a dog is not within view. The reason the dog is not within view should be noted in the “Notes” section of the datasheet.
8. If the guardian issues any commands to the dog(s) in the party, the observer will note number of the dogs that obey all commands issued and the number of dogs in the party that do not obey at least one of the commands. The guardian is given two chances to obtain the appropriate response from the dog before the observer records that the dog did not obey the guardian’s command. For example, if the guardian says “Here *Griswald*.” and the dog does not come, the observer will not record anything. If the guardian says “Here *Griswald*.” again and the dog fails to come after this second calling, the observer will record that the dog did not obey guardian’s commands. If the guardian says “Here *Griswald*.” and the dog comes to the guardian, the observer will consider that obeying the guardian’s commands. If the guardian does not issue any commands to the dog(s) while in the observation area, “NA” will be recorded in both columns under “Response to call” on the datasheet.
9. The observer will note whether or not there were more than two unleashed dogs per guardian in the visitor party.
10. The observer will note the number of times the dog(s) in the visitor party poop in the observation area. If none of the dogs in the visitor party poop while in the observation area, the observer will record a “0” in the first column under “Excrement” on the data sheet and a “NA in the four following columns under “Excrement”. For each poop incident, the observer will note the whether the guardian picked up the excrement or not. If the guardian picked up the poop, the observer will note whether the guardian took the poop with him or her out of the observation area or whether the guardian left the poop, presumably in a bag, in the observation area.
11. The observer will record anything unusual about the observation or anything that helps explain data entered in specific columns of the datasheet about the observation.

Once the dog-containing visitor party that is being observed leaves the observation area, the observer will begin observing the next dog-containing party that enters the

observation area repeating the process described above. (It is possible that a dog-containing visitor party will have entered the observation area while the observer was already observing a dog-containing visitor party that entered the observation area first. This dog-containing visitor party will not be observed since the observer would not have had the opportunity to view this party the entire time.)

5.3. Component 2 field procedures

Field personnel will arrive at the monitoring site at least five minutes prior to the start of the monitoring period. (Some monitoring sites require a short hike from the trailhead or other parking area.) Field personnel ***will*** be attired in field gear that identifies them as OSMP staff. Field personnel will have a small pocket notebook and a pencil with them. Staff will use the notebook to record the following data:

<u>For dog walking/hiker parties</u>:
Total number of dog walking parties
Number of parties with a leash visible for each dog
When leashes are NOT visible
Number of parties with a leash for each dog
Number of parties that do not have a leash for each dog
Number of parties that refuse to show leash

<u>For runners and cyclists</u>:
Total number of dog-containing running or cycling parties
Number of parties with a leash visible for each dog
Number of parties with a leash NOT visible for each dog

Attachment 4 provides an example of the data to be recorded in the notebook.

When the interview session begins, the staff member conducting the interviews will observe all visitor parties with a dog that enter the observation zone. For ***dog walking/hiking parties***, if staff sees that the guardian has a leash for each dog being managed under voice and sight, staff will document this in their field notebook, recording one tally under “Total number of dog walking parties” and one tally under “Number of parties with a leash visible for each dog”. (For many visitor parties, the leashes for each dog being managed under voice and sight will be visible in the guardians’ hands or on their bodies.) Staff will not attempt to contact the visitor party when leashes for all dogs in the visitor party are present.

When no leash was visible or the number of visible leashes was less than the number of dogs being managed under voice and sight, the interviewer will approach the dog-containing visitor party and ask the party’s willingness to engage in an interview using a script similar to the following:

Hello. My name is interviewer’s name*. I am with OSMP. We are in the field today conducting visitor interviews to help us get an understanding of the conditions in the*

field and improve our management related to these conditions. I was wondering if you would be willing to help us by answering one question.

If the visitor declines to participate in the interview, the interviewer will thank them. If the visitor agrees to participate, the interviewer will continue with the interview using a script similar to the following:

The question is related to dog management so before I ask it I want you know that I am not a ranger; I'm not going to ask your name; and I can't and won't be issuing a summons for any answers you give. We are simply trying to understand the current conditions on the ground.

If the visitor still appears willing to participate, the interviewer will ask:

Would you show me a leash for each of your dogs you are managing under voice and sight control?

After the interview, thank the visitor for his or her time and willingness to help OSMP. If the visitor party did not have a leash for each dog in the visitor party, the interviewer will offer the visitor party the appropriate number of complementary OSMP leashes. Once the visitor party leaves the interviewer and party continues their hike, the interviewer will record information contained in Attachment 4, as appropriate, in their pocket notebook:

After the interviewer has completed recording his/her notes from the interview, the interviewer will approach the next dog-containing dog walking/hiking visitor party encountered in the interview area and repeat the process.

For dog-containing running or cycling parties, the interviewer will only observe whether the party has a leash visible for each dog being managed under voice and sight. If no leash is visible or the number of visible leashes is less than the number of dogs being managed under voice and sight, the interviewer will document this in the notebook, but will not attempt to stop running or cycling parties.

6.0 Quality Assurance/Quality Control Procedures

Monitoring staff will implement the quality assurance/quality control procedures listed below.

<u>Training</u>

Prior to the start of the Component 1, staff members responsible for collecting observational data will receive training in the field at an area of high dog use. This will provide an opportunity for staff to observe the behaviors being evaluated by this monitoring.

<u>Adherence to monitoring protocols</u>

Staff will make efforts to adhere to all monitoring protocols. Training will be provided to assure understanding of the protocols and definitions. When a variance to methods must occur, this will be noted and considered in the analysis.

Data entry quality check

All data entry will be checked for accuracy by a staff member who did not enter the data. Errors found during this quality control procedure will be tracked.

7.0 Data reduction and analysis

Results for each of the indicators will be compared over three time periods.

8.0 Literature Cited

City of Boulder, Open Space and Mountain Parks Department. 2005. Visitor Master Plan. City of Boulder, Boulder, Colorado.

Vaske, J.J., L.B. Shelby, and M.P. Donnelly. 2009. Estimating visitation to Boulder Open Space and Mountain Parks. HDNRU Report No. 80. Report of Boulder Open Space and Mountain Parks. Colorado State University, human Dimensions in Natural Resources Unit, Fort Collins, Colorado.

Vaske, J.J. and M.P. Donnelly. 2007. Perceived conflict with off leash dogs at Boulder Open Space and Mountain Parks. HDNRU Report No. 76. Report of Boulder Open Space and Mountain Parks. Colorado State University, human Dimensions in Natural Resources Unit, Fort Collins, Colorado.

Attachment 1: List of monitoring sites

Site	Site name	Associated trails	Location along trail continuum	Interview (I), Observation (O), or both (B)	Obvious Challenge
1	East Boulder-Gunbarrel Farm	East Boulder-Gunbarrel Farm	start of trail	B	N
2	East Boulder-Gunbarrel Farm	East Boulder-Gunbarrel Farm	top of hill	B	N
3	East Boulder-Teller Farm-Trailhead	East Boulder-Teller Farm	TH	B	N
4	East Boulder-Teller Farm-Trail	East Boulder-Teller Farm	trail	B	Y (water)
5	East Boulder-Teller Farm-Trail	East Boulder-Teller Farm	trail jcn	I	N
6	Dry Creek Trail – tree	Dry Creek	trail	O	Y (water)
7	Dry Creek Trail - water	Dry Creek	trail	I	Y (water)
8	Bobolink	South Boulder Creek	TH	B	Y (water)
9	South Boulder Creek at EBCC	South Boulder Creek	start of trail	B	Y (water)
10	Marshall Mesa	Marshall Mesa	trail	O	Y (water)
11	Marshall Mesa/Community Ditch	Marshall Mesa, Community Ditch	trail jcn	I	Y (water)
12	Greenbelt-Trail	Greenbelt, Marshall Mesa, Community Ditch	trail	B	N
13	Greenbelt-Trailhead	Greenbelt	TH	B	N
14	Doudy Draw/Community Ditch	Doudy Draw, Community Ditch	trail	B	Y (water)
15	South Mesa-Trail	South Mesa, South Boulder, Big Bluestem,	trail	O	N
16	South Mesa-Trail	South Mesa, South Boulder, Big Bluestem,	trail	I	N
17	Shanahan Ridge	North and South Fork Shanahan	start of trail	B	N
18	Mesa/Shanahan	Mesa, North Fork Shanahan	trail	B	N
19	North Fork Shanahan	North Fork Shanahan	trail	I	Y (water)
20	Mesa/Enchanted Mesa	Mesa, Enchanted Mesa	trail	B	N
21	Upper Chautauqua	Chautauqua, Bluebaird	trail	B	N
22	Sanitas	Sanitas Valley	trail	B	N
23	Foothills-Trailhead	Foothills	TH	B	Y (pdog)
24	Foothills-Trail	Foothills	trail	B	N
25	Eagle West	Eagle, Hidden Valley, Mesa Reservoir	start of trail	B	N
26	Eagle Shelter	Eagle, Mesa Reservoir	trail	B	Y (pdog)
27	Eagle-Trailhead	Eagle	TH	B	N
28	Sage-Trailhead	Sage, Cobalt	TH	B	N
29	Red Rocks-Trailhead	Red Rocks, Boulder Creek path	TH	B	N
30	Red Rocks-Trail	Red Rocks	trail	O	N
31	Red Rocks jcn	Red Rocks	trail	I	N

Attachment 2: Data sheet for Component 1 – Observational Study

Voice and Sight Video and Tag Project Monitoring Data Sheet (Component 1 - Observational study)

Date (mm/dd/yy): Weather:

Time (24-hour): Location: Observer:

Obs. #	Visitor data						Presence/absence of listed behaviors			Off trail use			Voice and Sight Compliance				Excrement				
	People (0-n)	Dogs (0-n)	# Leashed thru	Unleashed dogs	Unleashed dogs	Unleashed dogs	Opport for interactio	Other(s) present	Behavior observed	People off trail (0-n)	Leashed dog off	Unleashed dog	Out of sight (0-n)	Response to call		More than two dogs	Poop (# of times, 0-n)	Picked up	Did not pick up	Took bag	Left bag
														Obeys (0-	Does not						

Notes:

Attachment 3: List of conflictive or potentially conflictive behaviors with associated data sheet code

No listed behavior observed

0. No listed behavior observed

No physical contact by dog

1. Flushing or fleeing wildlife (requires 2 of the 4 modifiers)
    a. Dog is leashed
    b. Dog is unleashed
    c. Dog is on trail
    d. Dog is off trail
2. Chasing
    a. Dog on dog (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
    b. Wildlife
    c. Livestock
    d. Person other than member of party (requires 1 modifier)
        i. Positive
        ii. Negative
        iii. Unknown
3. Repeated barking (more than 7 barks in succession)

Physical contact by dog

5. Physical contact NOT initiated by a visitor and not resulting in injury (requires at least 1 modifier) (Notes should describe the interaction.)
    a. Jumping on
    b. Licking
    c. Pawing
    d. Sniffing
    e. Other
6. Physical contact resulting in injury (requires at least 1 modifier)
    a. Person,
    b. Another dog,
    c. Wildlife
    d. Livestock

Incidents of the following behaviors by dog guardians or other visitors

7. Repeatedly calling the dog (more than two times)
8. Yelling/verbal confrontation
9. Kicking, hitting or “macing” of dogs by humans

Other

10. Other (Notes should describe the interaction/situation)

Giolitto, Marianne. 2007. Voice and Sight Tag Effectiveness Monitoring Project: Summary of Results. City of Boulder, Colorado Open Space and Mountain Parks Department. 2 pp.

Voice and Sight Tag Program
Effectiveness Monitoring Summary of Results
Report Pending
Last updated April 30, 2008

Program Goal and Objectives

The overall goal of the VST program is to:

Increase the proportion of dog guardians visiting OSMP with their dogs who have control over their dogs as required by applicable regulations (BRC 6-1-16)

The program objectives are to:

1. Improve understanding of voice and sight (V&S) control.
2. Improve compliance with dog control regulations.
3. Increase OSMP outreach to and education of the public with respect to V&S control.
4. Decrease conflict involving dogs on OSMP properties.

Observation monitoring was established to measure the effectiveness in achieving Objective 2 and 4. An on-line survey was established initially to try to measure whether the program met Objective 1. There were several difficulties with the survey and a decision was made to both remove the survey from the web site and not to conduct a follow-up survey after implementation of the V&S Tag program.

Participation in the Tag program (n=712 dogs):
75% of unleashed dogs had a green tag visibly displayed; 95% confidence interval: (72.23%, 78.68%)

Monitoring Results

Indicator*	Before V&S Tag**	After V&S Tag**	Is change statistically significant?
Percent of dogs leashed in observation zone	14.7% (n=1076)	25.6% (n=1029)	Yes
Percent of visitor parties in which at least one conflictive behavior was observed	14.2% (n=1076)	8.5% (n=1029)	Yes
Percent of visitor parties complying with V&S ordinance	76.1% (n=1076)	84.8% (n=1029)	Yes
Percent of visitor parties complying with excrement regulation	63.3% (n=188)	50.0% (n=100)	Yes
Percent of visitor parties complying with all observed regulations	72.4% (n=1076)	81.0% (n=1029)	Yes

* See back of page for definitions
** Percentages refer ***ONLY*** to the observation zone; for example, before the V&S Tag program 72.4% of the visitor parties were observed complying with regulations while in the observation zone. Compliance rates for the entire visit were NOT measured and are not presented here.

Indicator definitions

"***Conflictive behaviors***"

- dog flushes or causes wildlife to flee
- dog chases another dog, wildlife, livestock, and/or person other than a member of the dog's party
- dog barks repeatedly
- dog makes physical contact with another visitor and that contact was NOT initiated by a visitor and does not result in injury
- dog makes physical contact with another visitor and that contact results in an injury
- guardian repeatedly calls the dog
- guardians engage in yelling or verbal confrontation related to dog activity
- visitor(s) kick, hit, "mace" or otherwise attempt to or actually harm a dog
- other behaviors by dogs, guardians, or other visitors that might be considered conflictive and involve dogs (There's really no typical example of this, but the following were recorded in the observers' notes and provide some insight into what else was considered conflictive: dog tried to get into another visitor's car; wet dog shook water on a visitor (not the guardian); dog jumped up on a fence behind which were prairie dogs several times; dog stuck it's head in another visitor's backpack; dog approached, but didn't chase, a calf and got close enough to where a cow chased the dog away.)

"***Complying with V&S***"

We only measured ***observable*** indicators in determining whether a visitor party complied with V&S. We attempted to measure two potentially unobservable components of V&S (if the guardian had a leash for each dog managed under V&S and if the guardian could recall the dog), but were unsuccessful in establishing methodology that would allow us to measure visitors' ability to recall their dog(s). We were able to estimate the proportion of visitors that have a leash for each dog they were managing under V&S. This estimate is not included in the numbers reported for "complying with V&S" in the table above.

A visitor party was assumed to be complying with V&S if, the dog(s) were within sight of the guardian; if the dog(s) responded within ***two*** calls to the "come" or "here" commands or having its/their name(s) called by the guardian; if the dog(s) did not chase, charge, harass wildlife, other dogs, and/or visitors; and if the guardian did not have more than two dogs off leash at any one time. A dog was considered within sight of a guardian if the guardian could see the dog directly or by turning his or her head or body. In other words, dogs walking behind guardians were considered within sight of the guardian, provided there was no visual barrier between the two. Compliance was only measured within the observation zone, not for a visitor party's entire visit.

"***Complying with excrement regulation***"

This refers to whether the visitor party picked up all excrement left by their dog(s) ***and*** whether the visitor party took the excrement rather than leaving it in a "poop bag" along the trail. Compliance was only measured within the observation zone, not for a visitor party's entire visit.

"***Complying with all observed regulations***"

The percent of visitor parties that "complied with V&S" as defined above ***and*** the excrement regulation. Compliance was only measured within the observation zone, not for a visitor party's entire visit.