

## EXECUTIVE SUMMARY

TITLE: Exploring Potential Indicators of Recreation Quality on City of Boulder Open Space and Mountain Parks

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DATE: December 2017

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SUMMARY: To identify, understand, and prioritize a set of indicators to monitor system-wide recreation quality, 20 phone interviews were conducted with recent City of Boulder Open Space and Mountain Park (OSMP) property visitors. Interviewees were asked simply about what makes for a good or bad visit, and the data were recorded, transcribed, and analyzed by coding the data into themes and categories. Emerging from this process was a list of 42 potential indicators that recreation managers could use to measure and monitor recreation quality.

## MANAGEMENT IMPLICATIONS

- Desired trail attributes include shade, appropriate wayfinding, narrow trails, and absence of ruts, loose rock, and mud.
- Desired experiences include views of nature and “escaping into nature;” evidence of other humans, such as trash and noise, inhibit achieving this experience.
- Trail use displacement due to crowding is common, especially on the weekends, but some visitors have accepted crowds and have learned to navigate them. The number of large groups passed may create stronger dissatisfaction than the total number of people passed.

- Many people choose to use a trail that is close to their home, because of convenience. At the same time, some people are willing to travel to trails away from their home for experiences requiring various levels of effort or difficulty.
- Unwanted dog approaches or uncontrolled dogs are related to bad experiences for some people, but policy that disallows dogs or disallows dogs off leash are undesirable to others.
- Visitors strongly desire safety on the trail, which primarily manifests as feeling that other people or dogs encountered are not a threat and the trail infrastructure itself is safe to use.
- Potential indicators such as seeing staff on trails, risk diversity within activities, or access to facilities (e.g., shelters, picnic tables) did not emerge as themes in this study. However, the fact that these potential indicators were not salient does not necessarily mean they are unimportant to visitors.

## ABSTRACT

Providing high quality visitor experiences is a primary goal of most land management agencies, including OSMP. The quality of an experience is often measured as overall visitor satisfaction. One way to effectively and efficiently monitor visitor satisfaction, and therefore know when and how to make changes as needed, is to identify specific, reliable, practical, relevant, and sensitive indicators of recreation experience. To help identify potential indicators, 20 semi-structured phone interviews of visitors were conducted from May to August 2017 to inductively explore and reveal what contributed to good and bad outdoor recreation experiences on City of Boulder Open Space and Mountain Park (OSMP) areas. Sampling was done in two phases: first, visitors responded to a short online survey where they provided information about their previous visits and demographics, and second, an intentionally selected subset of survey respondents that represented a broad range of visitor types and uses were invited to an interview. All interviews were recorded, transcribed, and the text data were analyzed through multiple phases of coding and grouping. The results included the identification of 42 potential indicators grouped into nine subject categories (e.g., access, conflict, policy, trails) and three primary settings (i.e., environmental, managerial, social). Fifteen indicators were derived from strong themes that were well supported by the data (i.e., mentioned by a wide variety of interviewees), while the remaining potential indicators were based on subtler themes that were supported by some data, but were not overwhelmingly evident. Theme strength was based on relative frequency of it being mentioned, among other factors. This list of potential indicators will help OSMP identify, understand, and prioritize a relevant set of indicators to monitor recreation quality. Also, results will help managers understand how visitors gauge their experience and what factors strengthen or diminish their satisfaction.

KEY WORDS: visitor satisfaction, indicators, standards, recreation setting, experience quality, phone interviews, qualitative, coding

## INTRODUCTION

The City of Boulder Open Space and Mountain Parks (OSMP) is a city government department that manages over 45,000 acres of land for multiple uses, including outdoor recreation, wildlife habitat, agriculture, community buffers, viewsheds, and more. OSMP lands receive an estimated 5.3 million individual visits annually (Open Space and Mountain Parks 2014 Annual Report). A survey of City of Boulder residents conducted in 2016 found that about 40 percent of survey respondents visited OSMP areas at least twice a week.

Visitors to OSMP lands participate in a wide variety of activities (e.g., hiking, climbing, dog walking, running), under a variety of environmental settings (e.g., landforms, weather, vegetation types, time of day) and managerial settings (e.g., dog and trail regulations), for a variety of reasons (e.g., exercise, enjoy scenery, observe nature, spend time with friends). Each combination of activity, setting, and reason, creates a unique recreation experience for visitors. One frequent goal of recreation management is to maximize the satisfaction of these experiences for all visitors, while maintaining the integrity of the resource and setting. Threats to these experiences, such as policy changes, crowding, litter, or visitor conflict, can decrease visitor satisfaction and potentially lead to visitor displacement or lack of support for the land manager. To provide high visitor satisfaction, OSMP sought to develop a system-wide set of specific, reliable, practical, relevant, and sensitive indicators and related standards of recreation quality. Monitoring appropriate indicators could help OSMP recreation planners and managers recognize when recreation quality might be falling below expected or acceptable standards. Indicators could also help staff understand where to focus efforts to improve visitor experiences.

Previous studies have used qualitative research methods to help develop a list of potential outdoor recreation indicators for further assessment (Bullock and Lawson 2007, Hallo and Manning 2009). Bullock and Lawson (2007) conducted 30 semi-structured in-person interviews with visitors at a mountain summit overlook at Acadia National Park on a mix of weekdays and weekends. Those interviews revealed how the quality of visitor experiences at their study site were generally determined by aesthetics and by the trail and overlook area feeling natural. The report suggested that land managers could improve experiences by reducing signs of human presence, such as using materials that have a ‘natural feel’ when constructing signs and walkways. Hallo and Manning (2009) conducted 39 semi-structured interviews of visitors who had been driving on Ocean Drive, a scenic road in Acadia National Park. They performed a content analysis of the text data, coding emergent themes that described the importance of the road to the visit, the positive and negative aspects of using the road, and reasons why visitors were using the road. Through these interviews, the researchers identified potential indicators of recreation quality, most notably vehicle crowding, scenery, and travel freedom/convenience, and their content analysis provided important context to results of a separate survey of park visitors.

Other literature has identified criteria to characterize desirable indicators. Watson et al. (2007) summarized these characteristics as 1) measurable, 2) reliable, 3) cost-effective, 4) significant, 5) relevant, 6) sensitive, 7) efficient, and 8) responsive. Manning (2011) offered mostly overlapping, but some slightly different characteristics, suggesting that good indicators are 1) specific, 2) objective, 3) reliable and repeatable, 4) related to visitor use, 5) sensitive, 6) manageable, 7) efficient to measure, and 8) significant.

Lastly, the literature has also explored how indicators relate to previous experience, activity, encounters with other users, and other factors (Manning 2011). Identifying *good*

indicators is particularly difficult when there is considerable diversity of visitors by activity, reason, or previous experience, or when there are cultural nuances among visitors. Good indicators are also difficult to identify when there is significant variation in how visitors rank the importance of indicators or threats to them, and when the importance differs based on the setting (Manning 2011).

The objective of this study was to explore how visitors perceive their outdoor recreation experiences and judge their personal satisfaction, and to reveal what indicators may relate to these experiences and satisfaction. The research outcome is a list of potential indicators that may be appropriate to include in a future survey measuring the importance of indicators among visitors and to define standards. Additionally, this report describes insights of how visitors gauge their experience and provides recreation planners with insight to diverse perspectives, building a base of knowledge over time.

## METHODS

Twenty recent visitors to OSMP lands were interviewed in English to gain in-depth understanding about what made their recreation experiences more or less satisfying. Interviews were conducted by one interviewer over the phone. Interviews lasted 20 to 25 minutes each, and they were digitally recorded and transcribed.

The sampling plan included two phases. Phase one created a sampling frame by collecting information from 201 visitors via a very short online survey (i.e., a screener survey). The opportunity to take the online survey was advertised on temporary English language signs installed by OSMP staff at 35 of the 36 designated trailheads in the OSMP system. Starting in late May 2017, 11 or 12 signs were installed at a time, and they were stationed for about one month before rotating to a new location. OSMP staff checked the signs periodically throughout the summer, and

they reinstalled signs that were missing or vandalized. See Appendix A for more details about the screener invitation and survey.

Phase two employed a maximum-variation sampling approach (Patton 2002) to capture input from visitors with various experiences on OSMP lands (e.g., previous activities, visitation frequency) and diverse demographic attributes (e.g., age, race, income, sex). Patton described the purpose of this sampling approach: “any common patterns that emerge from great variation are of particular interest and value in capturing the core experiences and central shared dimensions of a setting or phenomenon.” The goal of phase two was to create a sample of visitors that achieved the greatest possible diversity of visitor types and uses. Maximum variation sampling was appropriate because the overall goal was to reveal the core experiences that existed across unique visitors and settings. Although it increased diversity, using maximum variation sampling decreased the representativeness of the results to the broader population of visitors because a diverse sample does not equate to a representative sample. Results from this study, consistent with the underlying assumption of qualitative research, are directly representative of the study participants, rather than the broader population. Themes that emerged from the analysis hopefully represent shared dimensions of what makes a good or bad visit to OSMP lands.

In total, interview invitations were emailed to 25 adult visitors who had completed the screener questionnaire. Selecting these 25 visitors took place cumulatively, but typically in batches at the end of each month. After the first month, all screener questionnaire responses collected by that point were reviewed, and ten individuals were selected, based on their self-reported visitor behavior and demographic attributes. Visitors who provided unique or uncommon responses to the screener survey, such as experience horseback riding or fishing on OSMP land within the past year or visitors who were not white, were emailed an interview invitation. At the end of the second

month, another subset of visitors was selected from online responses collected over the second month. Visitors with previous experience or demographic attributes that were not yet in the sample were emailed an interview invitation. Near the middle of the third month, several interview invitations were sent to people with attributes that were uncommon or not yet in the sample. Out of the 25 visitors who received an invitation, five visitors never responded to the initial invitation or follow-up requests to interview. The remaining 20 visitors scheduled and completed an interview. The demographics of the screener respondents and phone interview participants are summarized in Table 1.

The phone interviewer asked participants several pre-determined open-ended questions that explored various experience dimensions including reasons for recreating, activities, and settings (see Appendix B). The interviewer had some flexibility to deviate from the question order or ask unstructured follow-up questions about emergent themes or to probe more deeply as needed, while keeping the interview within the 20-minute timeframe. Research participants who completed the online screener survey and a full interview were given a \$25 Amazon.com gift card as a token of appreciation.

Data analysis was iterative, beginning with a thorough reading of all of the interview transcripts to become familiar with the content. Then, a list of 80 different potential indicators were extracted based on what respondents said made for good or bad recreation experiences on OSMP lands. This initial list of indicators helped the research team identify twelve broad topics, and text data were then coded into the most relevant topic. Next, text data were re-read by topic and recoded into emerging sub-themes, and data that involved more than one topic were identified. Text data were then grouped by sub-themes and re-read to confirm sub-theme relevance and to adjust, collapse, or create new sub-themes. These sub-themes were the base of the final list of

potential indicators. Specific indicators were regrouped into broader categories (e.g., conflict, crowding, policy, trails). Each indicator was assigned a primary setting and a relative theme strength (i.e., strong, moderate, weak), as determined by the relative frequency that the underlying theme of the indicator was mentioned among all participants. At least one way to measure each indicator was suggested. The same researcher who conducted the interviews also conducted the data analysis, which was reviewed by the other researcher.

## RESULTS

Forty-two distinct potential indicators emerged of high quality desired experiences of an OSMP visit (Table 2). The section below describes indicators by category (alphabetically), generally from the strongest indicators to the weakest within each category. All interviewee names are pseudonyms.

### ACCESS

Ten indicators were classified under the access category. The strongest access indicator was “close to home.” Many respondents mentioned that proximity to home was a major reason for choosing a trail. For example, Brian said *“I go there due to convenience. It's about a quarter mile from my house, so I can run over there, I can walk over there.”* Proximity was sometimes the dominant factor *“Because we live here. We just walk out our backyard...I'd rather not drive somewhere”* (Kristy), but convenience was sometimes considered along with other factors *“The closest ones to me are the ones that I tend to go to besides thinking about are [the trails] smooth and how crowded are they?”* (Maureen).

The second strong access indicator was “parking available<sup>1</sup>,” which manifested as the hassle experienced finding parking at desired trailheads or displacement from desired areas by choosing trailheads where parking would likely be available. For example, Georgia said *“As much as I like the Mesa Trails I avoid Chautauqua because of the parking,”* indicating displacement. Matt said, *“it's harder to find parking...the biggest inconvenience, I would say...[is] not the amount of people actually on the trails, it's more getting to it,”* suggesting that trailhead access was a stronger driver of positive experience than crowding on the trail. A weaker sub-theme to parking available was “paying for parking,” which was not strongly crystalized. Some people, like Rob, appreciated the outcome of paying for parking *“I understand why they charge [for parking], otherwise those places will get overcrowded real quick... If there's nowhere to park, if it's overly crowded that would be not so great,”* but others, such as Greg, were disappointed that the policy did not change when the trailhead was not crowded *“I went during the weekday and there was hardly... four or five cars in the parking lot that day... so it felt just a little bit like why do we need to [pay to park] when there's not that many people here today?”* The last strong access indicator was “variety of effort or difficulty in the OSMP system,” meaning people like the ability to choose easier or difficult trails. Brian and Trevor both said this was important based on who they were going hiking with, such as with local friends or family visiting from out of town. Maureen talked about desiring different types of trails based on the activity *“I like to run on...smooth trails...And then go hiking on trails that are elsewhere that have more rocks and more steepness.”*

Four access indicators emerged with moderate strength. “Dogs allowed” was seen by some as a strong reason for choosing a trail *“I like [Boulder Valley Ranch] because it allows dogs.”*

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<sup>1</sup> In the summer of 2017, OSMP initiated a temporary shuttle service to transport visitors to and from Chautauqua on weekends. During this time, OSMP also started charging for parking in designated areas around Chautauqua on weekends only.

(Stef); however, others purposefully avoided trails that allowed dogs *“Trails that I tend to enjoy tend to have stricter dog laws or no dog access...it's kind of a byproduct of the regulation that makes the trail more enjoyable for me.”* (Maureen). “Bridges” was an indicator for some visitors, especially when it blocked significant access, such as for Lindsey *“The only users who can't use the bridge are horseback riders... It cuts in half all of our access to that large area,”* but sometimes bridges were mentioned as improving the trail experience. The indicator “displacement due to people experiencing homelessness,” emerged as a theme during interviewing. Georgia said *“If you have a transient community that's just decided they're going to camp in the area that you want to walk in. That's a little bit troubling.”* Lastly, “access to destinations,” especially to water destinations, was a moderate indicator, which most often manifested as access for dogs to play in or cool off. Candie said *“I love that there's always a ton of people out there with dogs [in the] water,”* and Georgia said *“There is water there, which is nice in that the dogs can get in the water.”*

#### CONFLICT

Four indicators were classified under the conflict category. “Dog conflict” was the strongest conflict indicator, and was expressed as undesirable encounters with other dogs. The conflict is sometimes between the visitor and another visitor’s dog *“I find it disruptive and unwelcome when dogs run up to me and either begin sniffing or pushing up against me. This can happen even when dogs are on leash, but even more so when they are not leashed. I have not yet had an encounter that caused physical harm or danger, but I do not enjoy them”* (Charles) or between their own dog and another visitor’s dog *“There are plenty of people who just let their dogs run free and they run up to my dog and my dog might get aggressive with them, so I really have to be careful”* (Eva). Both quotes above demonstrate how this indicator is also related to the “feeling unsafe when encountering other people or dogs” indicator in the safety category below.

The remaining three conflict indicators had moderate strength. “Impeded progress” was almost always related to slowing or yielding to others. For example, Matt mentioned “*It seems like you're standing, waiting for someone to pass a narrow area more than you are actually hiking sometimes,*” and David said, “*We crossed over [a road] like multiple times and kind of had to wait for traffic and so that's probably the only thing I really disliked.*” Often, “impeded progress” was related to crowding, because the felt effect of impeded progress was amplified with more people “*[There are] a lot of other people out there, and it's causing me to go slower than I would like, or maybe the lack of etiquette from other hikers on the trail, and clogging up the trail*” (Brian). As alluded to above, “impeded progress” was sometimes related to another indicator “lack of awareness among others,” although lack of awareness was broader and included lack of awareness of yielding rules, social-trail use, norms, etc. For example, Maureen said, “*I think sometimes people don't even know once a new little side trail gets going, they don't even realize that that's not the trail, so they end up following that and then that becomes trampled down.*” Social trail use was also a behavior classified under the “nature disturbance seen” indicator, which included seeing others disturbing plants or wildlife. Kristy said, “*I always thought the lake had some more wildlife in the marshes and stuff. And there are people in there. But, I don't know. I always thought that wasn't really ... you're not supposed to be wading in the lake.*”

#### CROWDING

Three indicators were classified as crowding, and all three are indicators commonly measured in other natural resource recreation monitoring programs. A strong indicator was “displacement by crowds,” which was often mentioned in terms of weekend use, especially at Chautauqua “*I don't go to Chautauqua too often just because there are a ton of tourists there all the time and it's just very, very busy trails.*” (Candie). Eva said similarly, “*I generally don't go up*

*the main trail up to Chautauqua, and not because it's a bad experience, just because it's always busy.*” However, there was a weaker theme of crowd acceptance when using trails in the front-country *“I don't mind too much seeing other people. It's different I guess if we're going to hike somewhere and camp. Then I don't want to be camping that close with other people, but just hiking it's not usually an issue.”* (David), and one person expressed crowd enjoyment *“I also enjoy going to Chautauqua on weekends, when there's a lot of families out because it's kind of fun”* (Mollie). Lindsey explained her crowd acceptance *“You know, I want to be realistic. I'd love to be the only person out there, but everybody else wants to be out there also. I want to have trails and trail access so I don't want to restrict people.”*

The two other crowding indicators were “people passed on a trail” and “groups passed on a trail,” which was not mentioned by as many people than the former. Stef said, *“When you get there it's just a mob scene, and that's not pleasant for a hike,”* and Kristy said, *“It's kind of nice to go hiking when there are fewer people.”* This indicator is related to the “escape into nature” indicator in the experience category, as Eva described, *“My least enjoyable part is just when the trails are crowded, just all the other people, because that detracts from the wildness of it.”* Trevor concurred, *“I guess the more people I see, the less of a natural nature experience I feel like it is.”* The group size indicator also emerged when some recent visitors mentioned that passing larger groups was more distracting than passing smaller groups or individuals *“It would be preferential to not be encountering large groups and just passing one or two or three people every once in a while is not so bad”* (Maureen). One respondent said a large group would be ten or more people.

#### *EXPERIENCE*

Eight indicators were classified under the experience category. Among these, the strongest indicators were “escape into nature,” “trash,” and “views of nature.” Many people expressed their

recreation goal as an escape into nature, often as a psychological cleanse, or to just feel like they are away from the city. For example, Christine said *“I want to be able to do like a hike or something that's away from the city, so to speak,”* and Erica mentioned, *“Studies show that if you spend time in nature ... it increases your health benefits and gets rid of depression and stuff like that and I think that that's really important.”* A threat to escaping into nature is seeing undesirable signs of humans, especially trash, and more specifically dog waste bags left on the side of the trail *“I'd say the poop bags. They are the worst, just because they are the most constant. And the lack of people picking up.”* (Kristy). But it was rare for respondents to say they often see other trash (e.g., snack wrappers), except for seeing transients' campsites, *“...sometimes [homeless people] leave their trash and stuff all around, it's pretty frustrating sometimes to see that. It's a lot around here. And it seems like this time of year especially”* (Matt).

Several indicators are related to viewsheds, the strongest being “Views of nature,” which could be of mountains, rock formations, trees, flowers, water, or even just openness *“It looks nice and has a nice view... you can see the Flatirons pretty unobstructed...open mountains makes good scenery”* (Rob), *“it's really pretty right now with all the wildflowers and it's really green”* (Eva), and *“I just love seeing the lake”* (Maureen). Some people expressed their enjoyment of seeing “views of the city” and some enjoyed both views of nature and of the city *“seeing all the beautiful views. Being out in nature and seeing the scenery, having an awesome view of Boulder City and actually being above the valley rim, that 36 meets Lafayette and Superior. I think that that's really like being able to see even the towers of downtown Denver from the Flatirons.”* (Erica). A related indicator was a lack of “human influenced views,” especially views dominated by houses and roads. Mollie said, *“I like...trails that you can't see houses or neighborhoods from.”*

Lastly, two moderate-to-weak experience indicators dealt with soundscapes: “natural sounds heard” and “unpleasant human-caused sounds.” Some respondents mentioned specific sounds they liked hearing “*There was no other sounds but the creek and it was quiet and I actually have it on my phone, just about a 30 second clip of just the sound of the water flowing*” (Greg). Lara enjoyed “*Hearing the birds’ songs ... and trying to distinguish them,*” but also mentioned the conflict with undesired human-caused sounds “*...any kind of human activity is gonna interfere with the birds. But yeah, hearing the wildlife. I would miss that a lot if I lost it...They're not making a lot of noise, but a tire going on gravel makes some noise and it disrupts the birds.*” Charles mentioned unpleasant human-caused sounds are annoying but tolerable “*...occasionally you get other trail users who are loud or just being disruptive. Even like sometimes like just talking loudly as they're walking along...it's a brief interruption, you know. It's not terrible.*”

#### *POLICY*

Two potential indicators were grouped into a policy category. “Voice and sight allowed” was the stronger of the two themes, and is related to the “dogs allowed” indicator. People who expressed desire for places where they could take their dog typically, but not always, desired voice and sight policies. Brian said, “*I have to keep my dog on a leash in that area at all times, so that's probably number one factor of what I like the least is dog on a leash on a trail*” and Lindsey said, “*Any place that allows...the dogs off lead, I will be drawn to those policies.*” The second policy indicator is “access to rules,” although this was only mentioned by a couple of respondents “*There was proper signage when you pulled in, letting you know all the rules and parking, the fee and all that*” (Rob).

#### *SAFETY*

Three safety indicators emerged as a theme during interviewing. The two strongest indicators were “feeling unsafe when encountering other people/dogs” and “unsafe trail conditions.” The former indicator has already been mentioned as “dog conflict.” Additionally, some visitors specifically mentioned feeling unsafe when encountering people who appear to be homeless. Maureen said “*[Seeing someone who is homeless makes me] a little nervous, especially if I'm alone. It's just a sense of just being a little bit more alert.*” However, others expressed only minor concern encountering homeless people “*I've never had a problem with a homeless person on the trail. Every now and then, it's just kind of unsightly and sad. And there's trash*” (Kristy). There is another dimension of personal safety for women, especially when traveling alone. Mollie mentioned “*Being female, there's...places that I've been to [like Joder] where the parking area...is completely concealed by trees and bushes from the road, so it doesn't feel real ... It feels sort of isolated... I mean, you do want to go because you get away to nature, but I just noticed that that seemed a little bit of a creepy parking area.*”

Feeling trail conditions were unsafe was a strong theme related to loose, rocky, steep, or uneven trail conditions “*There's some places where it's like little mini mud cliffs and stuff, 6 feet deep... And it makes it easier to turn an ankle*” (Mollie). Feelings of unsafe trail conditions were amplified when they were alone on the trail. The third potential safety indicator was “collision with other users,” which was dominated by non-bikers being worried about colliding with a bike rider “*people that are biking, sometimes that can be kind of dangerous if you got a hill and turning areas*” (Rob). Hannah added concern about potential danger of avoiding a collision “*Sometimes [bike riders] feel like they own the whole trail and they're going really fast. And, you know, there's nowhere for either of us to go... I don't really want to step in the grass because there might be rattlesnakes.*”

## SOCIAL

Two themes emerged that were categorized as social. “Sharing the experience with family and friends” was described by Jackson *“It’s always better to hike with some friends...If I go alone it’s just kind of boring...And you can appreciate nature more because everyone points out stuff.”* Georgia mentioned *“Getting to share it with a friend. That’s a lot of fun. Well you have good conversation, typically it’s a friend with dogs that I’m going with, and they play with each other.”* Brian sometimes had a social desire while also experiencing nature *“Part of me being outside in nature is maybe I want to be alone or just with the people that I’m with.”* A few respondents mentioned desire for “opportunities to meet others.”

## TRAILS

Ten potential indicators were categorized under trails, including four strong themes: quality, shade, wayfinding, and width. The “quality of trail surface” indicator generally refers to the ease of traveling on the trail; poor quality trails tend to be loose, very rocky, uneven, or rutted. Georgia described trail quality as *“...a well-maintained trail, so that your footing’s good...”* but she caveated her comment by saying she does not need completely smooth trails, *“I don’t particularly need crusher fine...trail.”* Experience with poor trail quality was often said to be due from the 2013 floods, *“The trails could be better. Like after the flood, they are a little kind of rocky in places.”* (Kristy). This indicator is related to “muddy trails” indicator, described below, as Candie points out *“Muddy trails are also not super great. Especially when they get rutted out 'cause they’ve been being used while they are muddy.”* Another strong indicator about trails was amount of “shade from trees,” especially along trails. Candie connected the trail features with the benefits *“...just having that irrigation ditch that runs through there is nice...[because] trees that grow along it...provides shade for [when we are eating] snacks.”* Shade may have been salient for

interviewees because interviews were conducted in the summer. The “wayfinding” indicator refers to directional signs on trails as well as system maps. Mollie shared *“The first time I got to a point, pretty far up on the mountain, and I wanted to get back down, there was no sign there...three [trails] going uphill had signs. But the trail going downhill had no sign and so to get back to my car, I wasn't sure if I had to take the one going downhill from there or to take one of the slightly uphill trails and then a different down,”* and Trevor said, *“I see some of the signage, like the maps, aren't the best...I've seen areas where there's a map...[and] you're not even on the actual map.”* But other respondents mentioned that trails were well marked. “Width” was the last strong trail indicator, and it was typically described as narrow trails getting wider over time, frequently due to visitors walking off trail *“And you know the trails [at Coot Lake<sup>2</sup>], they've gotten very wide”* said Hannah, who continued with *“...so I definitely like the Chautauqua and those trails...they're narrower.”* Maureen mentioned an improved experience due to narrow trails *“I do look for [trails that are] narrowing and enjoy something that's narrower because then you've got the vegetation and plants...and flowers a lot of time right up next to you.”* However, not all respondents desired narrow trails, some desired wider trails that make passing easier, and one person desired a trail that was accessible by a stroller.

Additional “trail” indicators included mud, loops, and variety of effort or difficulty per visit. A lack of desire for muddy trails was mentioned by some respondents, frequently relating it to increasing trail width. Some people mentioned preferring loop trails *“I don't really like out-and-back [trails] just because you're seeing the same thing twice”* (David), but Rob described that although a loop is preferred, an out-and-back is fine if there is a sense of conclusion, such as *“...a destination that you know how far you got to go to get to where you can turn around.”* Lastly,

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<sup>2</sup> Coot Lake is managed by City of Boulder Parks and Recreation, rather than City of Boulder Open Space and Mountain Parks.

several people mentioned that variety within a trail or visit was desired “*I like the variety...throughout the hike...Some not as extreme parts and then more elevation change, like going up a little steeper and then kind of alternating back and forth so it's not just all flat or all straight up*” (Matt), and Hannah said, “*[I like] something that varies in the difficulty. So something that's...a challenge but not the entire time.*”

## DISCUSSION

This research elicited salient attributes related to high quality desired experiences on OSMP lands. The result is a list of 42 potential indicators that recreation planners can use as the basis for questions on a future representative study of visitors. However, the *quality* or *usability* of these indicators are unlikely to be equal. While this research did not assess indicator quality, a few observations and insights can be made. Some indicators would be very difficult to measure quantitatively, such as those under the social category (i.e., “opportunities to meet others” and “sharing the experience with friends and family”), and OSMP may have very little influence over a visitor’s ability to share their experience. Likewise, the indicator “fun trails” will be difficult to measure, or at least to see agreement among various users and activities on what makes a fun trail experience. This does not mean that these attributes are not important, just that they may not be the best indicators to track, considering the challenge of doing so.

Some potential indicators saw considerable variation in how visitors relayed opposing threats to their satisfaction. Dogs policies, for example, strongly divided visitors between those whose satisfaction was threatened by the presence of dogs and those whose satisfaction was threatened by policies disallowing dogs. These dueling perspectives demonstrate the need for tracking indicators, but they also underline the importance of carefully constructing them.

Each indicator was assigned a category, primary setting, and theme strength, for discussion and analysis purposes, but many indicators cross categories and settings. For example, parking availability, which was a category under access, may help limit the number of trail users and therefore reduce feeling crowded and reduce goal conflict. Simply increasing parking, even if feasible, may improve visitor satisfaction regarding access but subsequently decrease satisfaction in terms of crowding. Considering the exploratory nature of this research, we did not seek to understand these attribute tradeoffs, and further discreet choice or conjoint analysis may help further reveal how attributes are valued.

Lastly, it may be helpful to consider what is unexpectedly missing from this list. Staff presence, such as seeing staff on trails or at trailheads, did not develop as a theme, nor did risk diversity (although effort diversity was a strong theme). Facilities, such as bathrooms, picnic tables, or shelters, did not develop as a theme in the text, although, two interviewees mentioned a desire for more bathrooms. The level of trailhead development did not emerge as a theme, but the level of trail development was frequently mentioned. Potential indicators, such as staffing or facilities, that lacked presence in this study are not necessarily inadequate indicators, although their absence should raise concern of their relevance. Recreation managers should consider all data available when deciding which indicators to include in further research.

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## TABLES

Table 1: Phone interviewees demographics and visitation characteristics

<b>Demographic Characteristic</b>	<b>Category</b>	<b>Number of Screener Responses</b>	<b>Number of Interview Participants</b>
Age	18-34	58	8
	35-54	66	5
	55 or older	76	7
OSMP visits per month	3 or fewer visits	36	5
	4-9 visits	69	6
	10 or more visits	88	8
Activities when visiting OSMP areas or trails in the past 12 months	Climbing/Bouldering	36	5
	Photography	86	7
	Social gathering	48	3
	Hiking/Walking	175	16
	Running	73	10
	Walking dog(s)	93	7
	Picnicking	45	1
	Contemplation/Meditation	61	6
	Biking	67	6
	Pleasure driving	37	3
	Viewing scenery	137	11
	Viewing wildlife	109	8
	Horseback riding	2	1
	Nature study	44	4
Fishing	14	2	
Current residence	Boulder (within city limits)	112	12
	Boulder County (outside Boulder city limits)	55	5
	Metro Denver (outside Boulder County)	14	3
Total years lived in Boulder County	Less than two	20	5
	Two to ten	48	3
	More than ten	99	9
Gender	Female	90	11
	Male	109	9
Household income	Less than \$40,000	32	6
	\$40,000 to less than \$75,000	50	2
	\$75,000 or more	110	12
Race or ethnicity*	White	185	17
	Hispanic	8	1
	Asian	4	2
	Black of African-American	1	1
	Native American or American Indian	3	1

(\*) Race and ethnicity categories were not exclusive.

Table 2: Potential indicators by category, name, example, primary setting, and theme strength

<b>Category</b>	<b>Indicator Name</b>	<b>Indicator Example(s)</b>	<b>Primary Setting</b>	<b>Theme Strength</b>
Access	Close to home	Proportion of households with open space access within two miles	Managerial	Strong
Access	Parking available	Frequency that there is parking available at trailheads; Duration that parking is available	Managerial	Strong
Access	Variety of effort or difficulty in system	Number of easy, moderate, and difficult miles in system	Managerial	Strong
Access	Bridges that are out	Number of bridges that are out; Number of bridges needed or planned but not in place	Managerial	Moderate
Access	Displacement due to people experiencing homelessness	Number of times did not go to a desired open space because of expected encounters with people who appear homeless	Social	Moderate
Access	Dogs allowed	Proportion of areas that allow dogs	Managerial	Moderate
Access	Water access	Number of places with water (pond, creek); Number of water access points	Environmental	Moderate
Access	Access to destinations	Number of trails that access a destination (e.g., summit, waterfall, rock formation)	Environmental	Weak
Access	Buses to trailheads	Frequency of buses to open space	Managerial	Weak
Access	Pay for parking	Number of times paying to park; Number of open spaces with no pay to park requirement	Managerial	Weak
Conflict	Dog conflict	Frequency of uncontrolled dogs approaching; Frequency of off-leash dogs not under voice and sight control	Social	Strong
Conflict	Impeded progress	Number of times progress was impeded (had to yield to others, wait for cars)	Social	Moderate

<b>Category</b>	<b>Indicator Name</b>	<b>Indicator Example(s)</b>	<b>Primary Setting</b>	<b>Theme Strength</b>
Conflict	Lack of awareness among others	Number of visitors encountered that showed a lack of awareness or lacked trail etiquette; Distance/time between visitors encountered that showed a lack of awareness	Social	Moderate
Conflict	Nature disturbance seen	Number of people/dogs seen disturbing wildlife; Number of people seen stepping on vegetation; Distance/time between seeing people/dogs disturb wildlife	Social	Moderate
Crowding	Displacement by crowds	Number of times did not go to most desired open space/trail/climbing route because expectation of it being too crowded; Frequency of visitors saying they will go somewhere else next time, due to crowding.	Social	Strong
Crowding	People passed on trail	Number of people passed on a trail	Social	Strong
Crowding	Groups passed on trail	Number of large groups (10+) passed on a trail	Social	Moderate
Experience	Escape into nature	Amount of time experiencing nature without interruption; Number of trails that facilitate escape into nature; Amount of time feeling alone or with party; Frequency of visitors stating they were able to “escape into nature”	Social	Strong
Experience	Trash	Number of trash items encountered (wrappers, dog poop bags); Number of signs of vandalism. Percentage of visits where transient campsites were encountered	Social	Strong
Experience	Views of nature	Number of: views of mountains/rock features; Viewscapes of vegetation (wildflowers, forests); Viewscapes without signs of	Environmental	Strong

<b>Category</b>	<b>Indicator Name</b>	<b>Indicator Example(s)</b>	<b>Primary Setting</b>	<b>Theme Strength</b>
		development (no buildings or roads); views of water		
Experience	Trail/visit information	Number of trails with detailed information (photos, trail length, elevation gain, hazards, etc) about them listed online; Amount of trail information at trailhead; Bits/images per trail	Managerial	Moderate
Experience	Human influenced views	Number of viewscapes dominated by apparent human influence; Number of features encountered that seem unnatural (roads, machines, water tanks)	Environmental	Moderate
Experience	Unpleasant human-caused sounds	Number of human-caused sounds heard away from trailheads (cars, radios)	Social	Moderate
Experience	Views of city	Number of view spots overlooking the city	Managerial	Moderate
Experience	Natural sounds heard	Ability to hear natural sounds (birds, running water)	Environmental	Weak
Policy	Voice and sight allowed	Proportion of areas that allow voice and sight; Miles of trail that are voice and sight	Managerial	Moderate
Policy	Access to rules	Trailheads where rules are posted and easily understood	Managerial	Weak
Safety	Feeling unsafe when encountering other people/dogs	Number of times felt unsafe, due to other people/dogs	Social	Strong
Safety	Feeling trail conditions are unsafe	Number of times didn't feel safe, due to trail or trailhead conditions; Ratio of single female visitors.	Managerial	Strong
Safety	Collisions with other users	Number of collisions with other trail users; Number of potential collisions with other trail users	Social	Moderate

<b>Category</b>	<b>Indicator Name</b>	<b>Indicator Example(s)</b>	<b>Primary Setting</b>	<b>Theme Strength</b>
Social	Sharing with friends and family	Ability to connect with friends or family in open space; Ability to share the experience with friends or family	Social	Moderate
Social	Opportunities to meet others	Number of other people met at an open space, not on purpose	Social	Weak
Trails	Quality of trail surface	Length of trail that is loose, very rocky, or rutted	Environmental	Strong
Trails	Shade along trail	Percentage of trail that has shade from trees	Environmental	Strong
Trails	Wayfinding	Number of times unclear which way to go (which trail to take); Number of trail intersections without maps or signs	Managerial	Strong
Trails	Width of trail	Increase in trail width over time; Length of trails that are braided	Managerial	Strong
Trails	Loops	Number of non-out-and-back only trails; Loop trails available per trailhead	Managerial	Moderate
Trails	Mud	Number of consistently muddy spots; Number of closures due to mud per distance/time	Environmental	Moderate
Trails	Variety of effort or difficulty per visit	Percentage of trail that is very steep; Lengths of hikes available per trailhead.	Managerial	Moderate
Trails	Elevation gain	Amount of elevation gained per mile	Managerial	Weak
Trails	Fun trails	Percentage of trail that is “fun” to travel on: Number of trailheads with trails that are reported to be “fun” to travel on	Environmental	Weak
Trails	Length of trail	Opportunities to travel on a trail for 10+ miles	Managerial	Weak

1 **Appendix A**

2 *Figure 1: Screener invitation*



**City of Boulder**  
Open Space & Mountain Parks

*We Want Your Input!*

Want to help make Boulder's Open Space and Mountain Parks an even better place to visit? You can by participating in a short research project. To start, go to this website and answer a few short questions. If you qualify and take part in the full 20-minute study, you will get a \$25 Amazon.com gift card.

*How to Participate*

Access the questionnaire on your phone or record the link to access at home.  
*You must be at least 18 years of age to participate.*

<http://coronainsights.com/OSMP> 

**Contacts**

This research is being conducted by Corona Insights on behalf of City of Boulder Open Space & Mountain Parks. All responses are confidential. If you have questions, please contact OSMP at 303-441-3440 or Corona Insights at 303-894-8246.

Photo: Doug Goodin

4 *Table 1: Screener invitation locations*

<b>Sign Location</b>	<b>Month</b>
Cottonwood	June
Crown Rock	June
Doudy Draw	June
Dry Creek	June
Eagle	June
East Boulder Trail at White Rocks	June
Flagstaff Summit East	June
Four Mile Creek	June
NCAR	June
Settler's Park	June
Teller Farm South	June
Wonderland Lake	June
Boulder Valley Ranch	July
Cherryvale	July
Flagstaff Summit West	July
Flatirons Vista	July
Greenbelt Plateau	July
Gregory Canyon	July
Halfway House	July
Joder Ranch	July
Left Hand	July
Realization Point	July
South Boulder Creek West	July
Teller Farm North	July
Bobolink	August
Buckingham Park	August
Centennial	August
Chapman Drive	August
Chautauqua	August
Enchanted Mesa	August
Foothills	August
Marshall Mesa	August
Panorama Point	August
Sawhill Ponds	August
South Mesa	August

6 *Figure 2: Screener invitation sign at Crown Rock. Screener signs were placed facing toward*  
 7 *visitors when entering the trail system.*



8

9 *Figure 3: Screener survey*

10

### Introduction

11 Thank you for playing a part in this research. We first need to gather some basic information from you.  
 12 Please answer the following questions. If you are then selected for a phone interview, and you complete your  
 13 interview, we will send you a \$25 Amazon gift card as a thank you.

14 *Click the “next” button below.*

- 15 1. What is your age? [Required]
- 16 a. Younger than 18 [Terminate screener]  
 17 b. 18 to 24  
 18 c. 25 to 34  
 19 d. 35 to 44  
 20 e. 45 to 54  
 21 f. 55 to 64  
 22 g. 65 to 74  
 23 h. 75 or older
- 24 2. How many times have you ever visited any City of Boulder Open Space and Mountain Parks area  
 25 or trail? [Required]
- 26 a. 2 or more visits [Go to Repeat Visitors]  
 27 b. 1 visit only [Skip to First Time Visitors]  
 28 c. Never visited [Terminate screener]

29 Repeat Visitors

30 [Must have visited 2 or more times]

31 3. In the past 12 months, about how frequently have you visited City of Boulder Open Space and  
32 Mountain Parks areas or trails?

- 33 a. 10 or more visits per month  
34 b. 4 to 9 visits per month  
35 c. 3 or fewer visits per month  
36 d. I did not visit an Open Space and Mountain Parks area or trail in the past 12 months  
37 [Terminate screener]

38 4. Which of the following activities have you done when visiting City of Boulder Open Space and  
39 Mountain Parks areas or trails in the past 12 months? (*mark all that apply*) [Randomize, anchor  
40 other]

- 41 a. Climbing/Bouldering  
42 b. Photography  
43 c. Social gathering  
44 d. Hiking/Walking  
45 e. Running  
46 f. Walking dog(s)  
47 g. Picnicking  
48 h. Contemplation/Meditation  
49 i. Biking  
50 j. Pleasure driving  
51 k. Viewing scenery  
52 l. Viewing wildlife  
53 m. Horseback riding  
54 n. Nature study  
55 o. Fishing  
56 p. Other

57 5. Is there at least one City of Boulder Open Space and Mountain Parks area or trail you avoid or no  
58 longer visit because you expect to have a bad experience there if you did visit?

- 59 a. No  
60 b. Yes

61 [Skip to About You]

62 First Time Visitors

63 [Must have visited 1 time only]

64 6. Which of the following activities did you do (or will you do) on your one visit to a City of Boulder  
65 Open Space and Mountain Parks area or trail? (*mark all that apply*) [Randomize, anchor other]

- 66 a. Climbing/Bouldering  
67 b. Photography

- 68 c. Social gathering
- 69 d. Hiking/Walking
- 70 e. Running
- 71 f. Walking dog(s)
- 72 g. Picnicking
- 73 h. Contemplation/Meditation
- 74 i. Biking
- 75 j. Pleasure driving
- 76 k. Viewing scenery
- 77 l. Viewing wildlife
- 78 m. Horseback riding
- 79 n. Nature study
- 80 o. Fishing
- 81 p. Other

82 The next two questions ask about your visits to any natural outdoor areas or trails. Please consider and  
83 include outdoor areas and trails beyond the Boulder Open Space and Mountain Parks system.

84 7. In the past 12 months, about how frequently have you visited any natural outdoor areas or trails?

- 85 a. 10 or more visits per month
- 86 b. 4 to 9 visits per month
- 87 c. 3 or fewer visits per month
- 88 a. I did not visit any natural outdoor areas or trails in the past 12 months [Terminate  
89 screener]

90 8. Is there at least one natural outdoor area or trail you avoid or no longer visit because you expect  
91 to have a bad experience there if you did visit?

- 92 a. No
- 93 b. Yes

#### 94 About You

95 9. Where do you currently live?

- 96 a. Boulder (within city limits)
- 97 b. Boulder County (outside Boulder city limits)
- 98 c. Metro Denver (outside Boulder County)
- 99 d. Colorado (outside Metro Denver)
- 100 e. Outside Colorado

101  
102 10. [If lives in Boulder City / Boulder County] For how many years, in total, have you lived in Boulder  
103 County?

- 104 a. Less than 2 years
- 105 b. 2 to 10 years
- 106 c. More than 10 years

107 11. What is your current gender identity? (*check all that apply*)

- 108 a. Male  
 109 b. Female  
 110 c. Prefer to self-describe: \_\_\_\_\_  
 111

112 12. Are you a member of an organized OSMP stake holder group, such as an environmental or  
 113 recreation group?

- 114 a. Yes  
 115 b. No

116 13. **[If yes]** Which group(s) are you a member? (*choose all that apply*) **[Randomize, anchor other]**

- 117 a. Boulder Mountain Bike Alliance (BMA)  
 118 b. Friends Interested in Dogs and Open Space (FIDOS)  
 119 c. Boulder County Horse Association (BCHA)  
 120 d. Boulder Trail Runners  
 121 e. Boulder County Nature Association (BCNA)  
 122 f. Boulder Area Trails Coalition (BATCO)  
 123 g. Friends of Boulder Open Space (FOBOS)  
 124 h. Other

125 14. Last year, that is in 2016, what was your total family income from all sources, before taxes?

- 126 a. Less than \$40,000  
 127 b. \$40,000 to less than \$75,000  
 128 c. \$75,000 or more

129 15. Which of the following describes your race and/or your ethnicity? (*you can select as many as apply*)

- 130 a. White  
 131 b. Hispanic, Latino, or Spanish origin (such as Mexican, Puerto Rican, or Cuban)  
 132 c. Asian or Asian-American  
 133 d. Black or African-American  
 134 e. Native American/American Indian/Alaska Native  
 135 f. Native Hawaiian/Other Pacific Islanders  
 136 g. Some other race

137

138 Lastly, we need to get some information so we can contact you if you are selected for an interview. We  
 139 take privacy and data security seriously, and we will never use your information for anything besides this  
 140 research.

141 First name: \_\_\_\_\_ **[REQUIRED]**

142 Phone number: \_\_\_\_\_ **[REQUIRED]**

143 Email address: \_\_\_\_\_ **[REQUIRED]**

144 **[If terminated]** Thank you for your time, but we are looking for people who fit a different profile.

145 [If completed] Thank you very much for your time. If you are selected for an interview, we will notify you  
146 by email.

147 **Appendix B**148 *Figure 1: Phone interview guide*149 **Introduction**

150 Hello. This is \_\_\_\_\_ with Corona Insights; I am calling on behalf of the City of Boulder Open Space  
151 and Mountain Parks. Thank you again for taking the time to speak with me.

152 We are talking with a lot of different people about what makes for a good or bad visit to the City of Boulder  
153 Open Space and Mountain Parks. Please provide your honest feedback. While I am recording this conversation,  
154 your responses will be completely confidential, meaning your name will never be associated with your answers.

155 The interview will last about 15 to 20 minutes, and at the end I'll ask for your email address so we can send  
156 you the \$25 thank-you gift card. Do you have any questions for me before we get started?

157 **Most Recent Visit**

158 [Throughout, encourage responses beyond forces outside of OSMP control. If they answer "weather," say  
159 "besides weather"]

160 1. How well do you understand what trails and areas the City of Boulder Open Space and Mountain  
161 Parks manages? (vs. county, state, federal, etc.)?

162 a. [If they seem to have a low understanding, give a summary to ensure they are not  
163 considering county, state, or federal land]

164 **I WILL NOW START RECORDING**

165 For our record keeping purposes, can you tell me your name

166 2. Can you briefly describe your most recent visit to city Open Space and Mountain Parks?

167 a. What were you doing? [listen/probe for activities]

168 b. [Optional/Low-priority] Can you describe the setting? [listen/probe for environmental,  
169 social, and managerial factors]

170 c. Why were you there? [listen/probe for reasons and motivations]

171 3. [High-priority] What made you choose that trail/site/area to visit? [listen/probe for  
172 preference/acceptability/displacement]

173 4. What did you enjoy most about that visit?

174 a. How important is [response above] to your enjoyment on a typical visit to city Open Space  
175 and Mountain Parks?

176 5. What did you enjoy least about that visit?

177 a. How important is it to avoid [response above] on a typical visit to Open Space and  
178 Mountain Parks?

## 179 Activities

180 Now we will talk about your experiences besides your most recent visit. I'm still only interested in your  
 181 experiences related to visits to City of Boulder's Open Space and Mountain Parks.”

- 182 6. What do you do most often in City of Boulder Open Space and Mountain Parks? [If unclear, specify  
 183 we are asking about what activity they do most often]
- 184 7. What is your favorite thing to do in City of Boulder Open Space and Mountain Parks? [If unclear,  
 185 specify we are asking about what activity is their favorite]
- 186 8. [If not the same] What are the reasons you do [activity A] more than [activity B] in City of Boulder  
 187 Open Space and Mountain Parks?
- 188 9. What things make for a good \_\_[favorite activity]\_\_?
- 189 10. What things make for a bad \_\_[favorite activity]\_\_?

## 190 Experiences

- 191 11. Are there trails or areas in the City of Boulder Open Space Mountain Park system you don't visit  
 192 because you think you would have a bad experience?
- 193 a. [If yes and needed] What is the name of the trail or area? [To confirm they are thinking of a  
 194 Bolder OSMP trail/area]
- 195 b. [If yes] Can you explain why you avoid these trails or areas?
- 196 12. What is most likely to make your next visit excellent?
- 197 13. What would make your next visit poor?

## 198 Closing

- 199 14. What else would you like to say about visiting City of Boulder Open Space Mountain Parks, if  
 200 anything?
- 201 • Email address (needed for Amazon gift card): \_\_\_\_\_
- 202 • Phone, in case of an issue (optional): \_\_\_\_\_