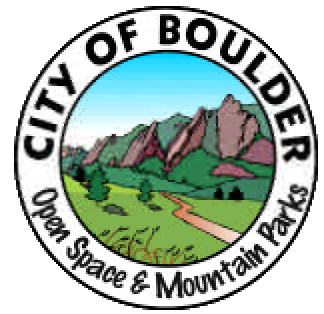


City of Boulder Open
Space and Mountain Parks



Compliance with Leave No Trace Frontcountry Principles

A preliminary examination of visitor
behavior



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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

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.

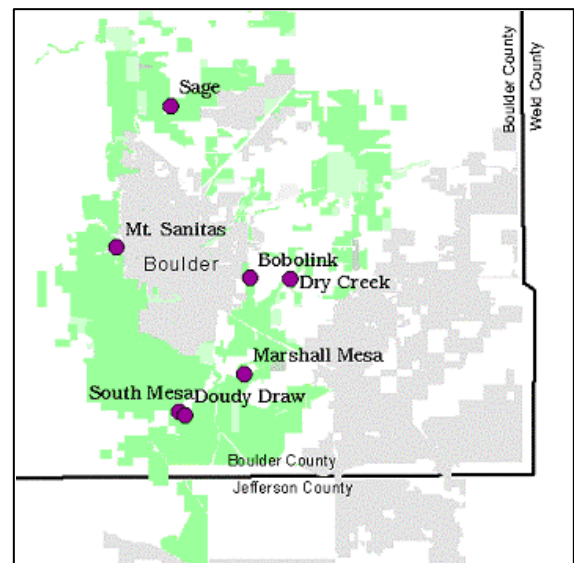
Inconspicuous observers were stationed at vantage points near trailhead parking lots from where they could observe approximately 100 meters down the trail. The observers were engaged in typical visitor activities, and not identifiable as Open Space staff members.

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 1: Location of study area in western USA



• 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

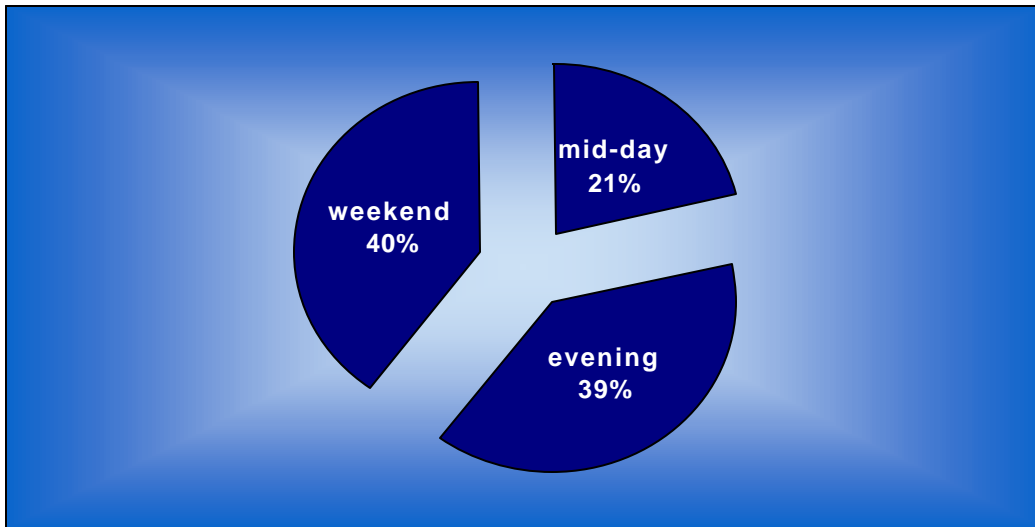
Observers recorded the number of times visitors left trash or other debris with no apparent intent to return for it.

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

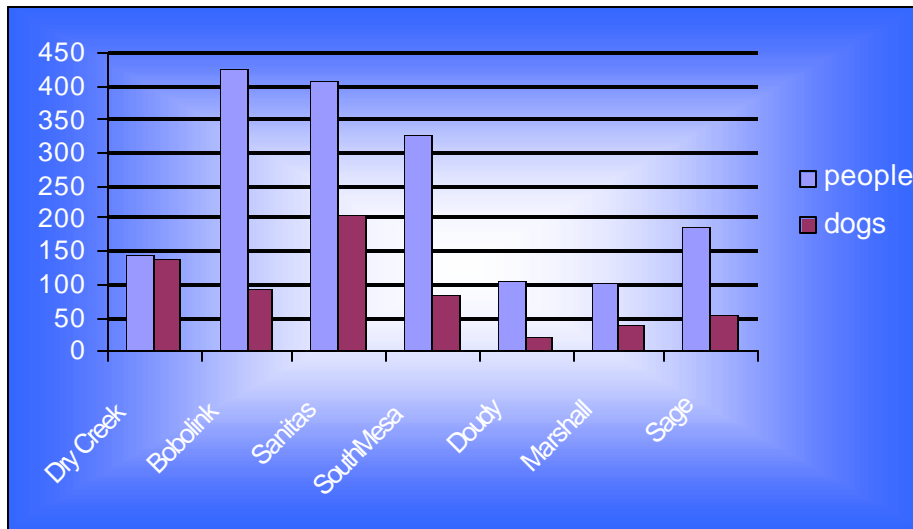
A total of 1,898 people, 720 dogs and 15 horses were observed during the 63 hours of observation. Most visitors were observed in the evenings and during the weekend (figure 3).



• 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

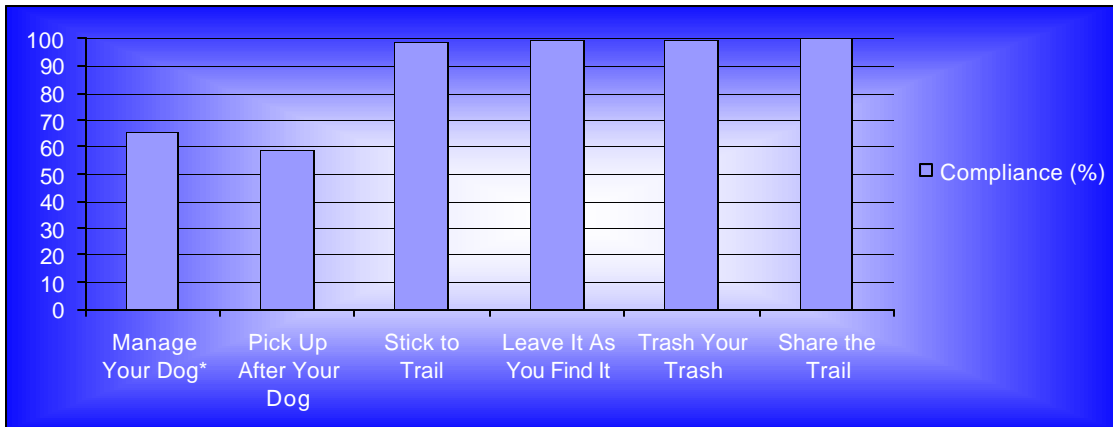
Table 3 provides a breakdown of the behaviors that resulted in non-compliance for dog management.

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.