

# Natural Resource and Sustainable Recreation Monitoring

Eldorado Mountain/Doudy Draw Trail Study Area

Visitor Master Plan Implementation

December 17, 2008



## **EXECUTIVE SUMMARY**

### **Statement of Purpose**

The purpose of this document is to provide a summary of monitoring projects occurring in the Eldorado Mountain / Doudy Draw Trail Study Area (EM/DD TSA) and details of trail specific monitoring associated with the new Spring Brook Loop and Goshawk Ridge trails. Monitoring results, as available, will be presented at OSMP's annual meetings and as community discussions are appropriate to assist OSMP meet the management goals set forth in the EM/DD TSA Plan.

### **Background**

The EM/DD TSA Plan identifies both resource protection and recreational opportunity goals. These goals foster actions designed to:

- Protect rare, imperiled, and highly-vulnerable resources.
- Maintain and restore the high quality and natural diversity of plant and wildlife habitats.
- Prevent the spread of invasive weeds.
- Provide high-quality visitor experiences
- Provide recreational opportunities for pedestrians, equestrians, bicyclists, dog walkers, paragliders / hang gliders and people with mobility impairment.
- Provide educational / interpretive opportunities for the Trail Study Area for natural and cultural resources and low-impact visitor techniques.

To implement these goals, the TSA plan directs the Open Space and Mountain Parks Department (OSMP) to undertake new visitor management initiatives, trail and trailhead projects, and resource protection strategies. The TSA plan also calls for monitoring to provide OSMP with information on how well the plan's strategies and projects are working and to refine the nature, location, or extent of implementation. A public meeting was held on October 16, 2008 to present and gather public input on TSA monitoring projects and specifically to gather input on the proposed sustainable recreation monitoring for Spring Brook Loop and Goshawk Ridge Trails. The Open Space Board of Trustees reviewed the proposed TSA monitoring during their November 12, 2008 meeting. This document presents an overview of the monitoring planned or underway in the EM/DD TSA and includes modifications recommended to staff during the public review process.

### **System-Wide Monitoring Occurring in the EM/DD TSA**

OSMP collects system-wide monitoring information for recreation, trails and natural resources. Sites that are monitored in the EM/DD TSA as part of the system-wide data collection can provide TSA relevant information that may help implementation and adaptive management in the EM/DD TSA.

OSMP gathers system-wide vegetation data to provide an understanding of the distribution and abundance of plant associations and rare plant populations, and the condition of these resources. System-wide monitoring on the distribution and abundance of sensitive wildlife such as cliff nesting raptors, frogs, and bats provide information to aid in wildlife management across OSMP. The Grassland Ecosystem Management Plan (draft plan in review) and the Forest Ecosystem Management Plan (new conservation targets in development) will provide management goals and strategies for managing and protecting forest and grassland resources.

System-wide trail condition monitoring assesses designated OSMP trails and identifies trail sections requiring maintenance and suggests management recommendations for improving trail sustainability. Studies of visitation levels and patterns and surveys of visitor satisfaction and behaviors are periodically conducted on OSMP. Undesignated trail mapping provides information on the location, condition and extent of visitor created trails to guide management of unplanned trail networks. A sub-set of the undesignated trails that are closed are being monitored for closure success.

### **New Trail Related Monitoring**

Two new trails in the EM/DD TSA, Spring Brook Loop and Goshawk Ridge, have trail specific monitoring projects that will aid the ability of staff to assess and effectively respond to resource conditions or visitor experience opportunities that are in need of protection or improvement. Special on-trail travel restrictions on Spring Brook Loop for equestrians, bikes and dogs (on-leash) afford greater protection for the sensitive resources of the area. Staff will conduct observations of trail activity to gauge compliance with regulations and undesignated trail monitoring to assess the effectiveness of the on-trail requirements. A visitor survey will provide information about activity related conflicts and help direct staff's management response to ensure a good visitor experience for all. On Goshawk Ridge, trail condition monitoring will assess the sustainability of equestrian travel on the trail, and the condition of a stretch of previously undesignated trail incorporated into the trail alignment.

Staff has also established monitoring projects in the EM/DD TSA that will augment existing information on the presence and distribution of natural resources (wildlife and plant communities) and aid in staff's ability to assess changes post trail construction. Pellet plots are used to indicate the amount of activity and distribution of mule deer, elk and wild turkeys. The pellet plots can also provide an estimate of the effect new trails have on certain wildlife species and help staff understand wildlife use patterns (temporal and spatial) in the area. Additional wildlife monitoring includes forest bird surveys, deer and elk bed mapping, turkey activity and roost surveys, and song bird point counts.

OSMP is interested in the effects of new trail construction on vegetation. The department is assessing these effects near Flatirons Vista Trailhead and along the High Plains Trail in the Marshall Mesa / Southern Grasslands TSA.

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## ***Sustainable Recreation Monitoring***

### **Overview: *Recreation and Trail Monitoring in the EM/DD TSA***

#### *Working Together for Sustainable Recreation and Resource Protection*

The purpose of recreation and trail monitoring projects is to inform our adaptive management responses so that recreational opportunities can be maintained in the manner intended and natural resource protection goals achieved. In the EM/DD TSA, recreation and trail monitoring occurs at three different scales: system-wide monitoring that in part occurs in the TSA; recreational activity monitoring specific to the TSA; and recreational and trail monitoring specific to Spring Brook Loop and Goshawk Ridge Trail. Together, these monitoring projects will inform the continued management of recreational opportunities and resource protection in the EM/DD TSA.

#### *System-Wide Monitoring*

System-wide trail and activity monitoring provides the best means of assessing trail and recreational conditions across the OSMP system. It provides information that can track changing conditions throughout OSMP and provide a comprehensive context for particular activities and trails. System-wide monitoring for undesignated trails, trail condition, visitation, and visitor experience provides essential information about current conditions to help inform OSMP staff of management priorities and opportunities.

#### *Activity Specific Monitoring in EM/DD TSA*

Specific to the EM/DD TSA, the TSA plan identified a monitoring project to inform a two-year trial demonstration on paragliding / hang gliding activities in a designated area. Undesignated trails, weed spread, and launch zone conditions will be monitored during the trial period.

#### *Spring Brook Loop and Goshawk Ridge New Trail Monitoring*

Special on-trail regulations, activity specific restrictions, and trial periods for select activities have been established on Spring Brook Loop and Goshawk Ridge Trail. These special conditions were established to promote sustainable recreation and protect the incredible natural resources of the area. The success of these trails depends on visitors complying with the recommendations, being mindful of impacts to resources and other visitors, and stakeholder groups working with OSMP to reduce and mitigate problems. Trail specific monitoring projects will inform OSMP staff of the appropriateness and effectiveness of the protective measures and trial activities. The EM/DD TSA Plan states that OSMP will consider both restrictions to activities and modifications to trail design as responses to low levels of compliance or degraded visitor experiences. OSMP will focus on strategies to accommodate on-trail visitor activities. OSMP will work with the community and stakeholders to implement strategies that allow desired conditions to be maintained, and when possible, enhanced.

The trail specific monitoring efforts include thresholds that will be used to trigger a set of “less restrictive” strategies. These include making modifications to trails, changes to signs and educational messages, increased enforcement, and seasonal access restrictions. There may be cases however, where these approaches prove to be ineffective and additional visitor access restrictions may be necessary. Collectively, these monitoring approaches will form the basis for decisions on visitor access restrictions. OSMP managers will consider the totality of the situation (e.g., compliance estimates, trail condition status, wildlife effects, and community input) when making decisions about restrictions to visitor access.

During the public discussions on proposed conflict monitoring on Spring Brook Loop, staff heard concerns about the potentially high levels of mountain bike activity and the trail becoming less enjoyable to visitors engaged in other activities. While surveys of people visiting the trail can report the level of conflict, these surveys can’t account for individuals who avoid Spring Brook Loop to find trails where they suspect they will experience fewer conflicts and have a better experience.

As a new trail, there is no information on the relative composition of the various activities occurring on Spring Brook Loop. The VMP and EM/DD Plan did not identify goals or thresholds for intended visitation by activity type. While assessing “displaced” visitors will not specifically be monitored, the system-wide visitor survey may provide information about places and reasons that visitors do not visit specific trails. Surveys of people on Spring Brook Loop and observational compliance monitoring may also provide a means of reporting changes to the relative composition of activities on the trail. Staff will be mindful that the proposed visitor survey will not detect or estimate the number or proportion of people not using the trail. Supplemental information may be needed to determine if visitors are avoiding the Spring Brook Loop Trail out of concern they will experience conflict with other visitors.

## ***Trail, Visitor & Site-Specific Activity Monitoring in the EM/DD TSA***

### **Trail Condition Monitoring**

One of the Visitor Master Plan's goals is to ensure that the designated trail system provides a high quality visitor experience while protecting and preserving physical and environmental resources. In order to accomplish this goal, OSMP implemented the trail condition monitoring program. Trail condition monitoring identifies unsustainable trail segments, documents the location and condition of constructed features, and provides management recommendations or prescriptions for trail maintenance and sustainability. By documenting the condition of the designated trail system, managers can strategically allocate staffing and materials, and prioritize trail maintenance projects.

### **Undesignated Trail Closure Monitoring**

The Eldorado Mountain/Doudy Draw (EM-DD) Trail Study Area contains approximately twenty-four miles of mapped undesignated trails. Undesignated trails are unplanned and consequently particularly susceptible to physical and environmental degradation. Because of this physical and environmental degradation, OSMP hopes to close and revegetate many of the undesignated trails throughout the OSMP system. OSMP developed the EM/DD TSA Undesignated Trail Closure and Revegetation Monitoring Project with the overall goal of assessing success in closing and restoring undesignated trails. The objectives of this monitoring project are to:

1. Systematically describe and document on-the-ground trail conditions before and after implementing closure and revegetation treatments.
2. Document closure and revegetation treatments implemented for each trail.
3. Photo-document near-trail conditions and various undesignated trail closure, erosion and vegetative treatments.
4. Use treatment condition information to inform staff of needed maintenance.

### **Undesignated Trail Mapping**

OSMP's system-wide undesignated trail mapping assesses the location, linear extent, and condition of undesignated trail development on OSMP properties. Baseline surveys conducted in 2006 and resurveys of undesignated trails at periodic intervals will reveal changing visitor travel patterns and serve as a barometer of off-trail visitation levels. Undesignated trails are located by searching for historically known social trails and those evident on recent aerial photographs. Maps are created by linking GPS coordinates recorded at 200 foot intervals along the entire visible trail. To assess the condition and impacts of undesignated trails, additional measurements are recorded at sequential 200 foot intervals from a random start point. Measurements include slope, trail alignment, width, maximum incision, and percent cover of vegetation and substrates such as bare soil. OSMP has created a system-wide database of undesignated trail conditions linked to Geographic Information System (GIS) maps that can be used to depict and analyze system-wide conditions of undesignated trails over time.

## **Visitation Monitoring & Visitor Surveys**

To better understand visitation levels and visitor patterns on OSMP, staff periodically estimates the number of visitors to OSMP. Visitation estimates are often coupled with exit surveys to characterize visitors in terms of their:

1. Demographic characteristics (e.g., sex, age, place of residence) and prior visitation rates.
2. Trip characteristics (e.g., trip duration, activity participation).
3. Evaluations of the experience (e.g., perceived conflict, satisfaction with OSMP management).

The last visitation study was undertaken in 2004-2005. The date of the next study has not yet been determined. Visitation estimates involve sampling visitor levels at many of the 236 access point locations throughout the system during each season. Visitation estimates and visitor characteristics can be compared over time to track changes and better direct departmental resources.

The potential for increased night time visitation and the effects of this visitation on wildlife is a topic of community interest and concern. Monitoring visitation on Spring Brook Loop and on Goshawk Ridge Trail will provide an opportunity to assess relative night time visitation levels and inform if additional educational messages and management responses are appropriate to reduce night time disturbance to wildlife.

## **Off-Trail Permit Monitoring**

A monitoring program was developed to track Habitat Conservation Area (HCA) off-trail permit applications and the percent of off-trail visitors in compliance with the permit requirement. The monitoring also is intended to locate areas of resource impact associated with off-trail use. Permit application monitoring is accomplished by summarizing information about off-trail permits reported by the on-line permit application system. Compliance monitoring is integrated with ranger patrols of HCAs. Rangers collect information from all visitors they encounter off trail in HCAs and document compliance with permit requirements along with the type of activities engaged in, location, and reasons for being off-trail.

## **Hanglider / Paraglider Monitoring in EM/DD TSA**

A two-year trial of paragliding / hang gliding activities in a designated area of the EM/DD TSA will include monitoring of associated impacts. Monitoring is essential for early discovery of any problems, adjustment of management actions, and implementation of new management actions to solve problems. Specific factors to be monitored by OSMP include development of new undesignated trails, physical condition of the launch zones, presence and abundance of breeding grassland birds, and the presence of jointed goat grass. OSMP will use the same methods employed for the system-wide undesignated trail inventory to detect any new undesignated trails in the paragliding / hang gliding activity area. Staff will monitor the condition of the launch zones (e.g., changes in bare ground and/or vegetation trampling) via repeated photography. Staff will conduct informal surveys

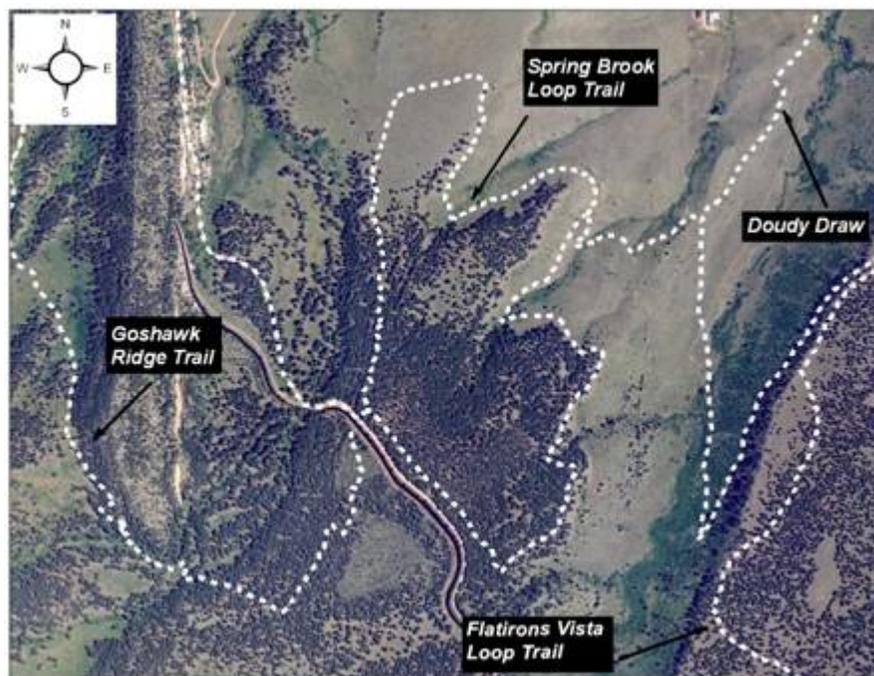
to detect the presence of jointed goat grass within the paragliding / hang gliding activity area. In 2007 and 2008, staff collected baseline information on each factor monitored (grassland breeding bird baseline data collected in 2008).

## ***Sustainable Recreation Monitoring for Spring Brook Loop and Goshawk Ridge***

### **Spring Brook Loop Trail On-Trail Travel & Dog Regulation Monitoring – Ranger Patrol and Contact**

**Objective:** Track the frequency with which rangers encounter visitors and dogs off-trail<sup>1</sup> or out of compliance with area specific dog regulations. Concurrently, educate visitors about the resources and regulations in effect at Spring Brook Loop Trail and provide regulatory enforcement.

**Methods:** Rangers will patrol the Spring Brook Loop Trail area and tally parties<sup>2</sup> of cyclists, equestrians, and pedestrians observed on and off the trail. Rangers will also tally the number of dog guardians observed and compliance with the specific dog regulations in effect. The ranger on patrol will contact cyclists, equestrians, and dog guardians who are out of compliance with regulations to improve OSMP's understanding



of the motivations for traveling off trail and visitors' awareness of Spring-Brook Loop Trail regulations. Rangers will also provide information about the resources OSMP is seeking to protect and the rules in effect to accomplish this and provide warnings and issue citations as appropriate. Rangers will report the percentage of visitor parties observed off-trail or out of compliance with monitored dog regulations to inform management decisions.

<sup>1</sup>Off-trail means that all of a person's feet/horse's hooves/dog's feet/or bike's tires are off the trail tread. Exceptions to this definition are:

- a) A person leaving the trail tread yielding to another visitor
- b) A person leaving the trail tread to pass another visitor
- c) A person leaving the trail to avoid an isolated obstacle, where the person returns to the trail once past the obstacle
- d) A dog leaving the trail for fewer than 30 seconds and traveling no further than ten feet from the trail margin

<sup>2</sup> A visitor party is defined as an individual or group of individuals who, in the opinion of the observer, appear to be visiting OSMP as one unique group.

### Thresholds and Responses for On-Trail Travel

Threshold	Response
≥95% observed on-trail compliance of equestrian parties, bike parties, and parties with dogs	<ol style="list-style-type: none"> <li>1. Maintain or consider reducing levels of outreach, education and patrol</li> <li>2. Acknowledge/Thank visitors</li> </ol>
< 95% observed on-trail compliance of equestrian parties, bike parties, and parties with dogs	<ol style="list-style-type: none"> <li>3. Close and restore undesignated trails</li> <li>4. Changes in education, outreach, signs, or enforcement</li> <li>5. Address maintenance concern(s) on designated trails that have resulted in off-trail travel</li> <li>6. Create physical barriers to keep people on trail</li> <li>7. Meet with stakeholders and implement strategies aimed at improving compliance</li> <li>8. Seasonal or temporary access restrictions</li> </ol>
<p>OSMP would use values and trends of this indicator, along with those from trail segment observation and undesignated trail monitoring to make determinations about prohibiting a particular activity</p> <p>Adopting regulations prohibiting specific activities would be considered after less restrictive strategies were demonstrated to be ineffective at achieving targeted compliance rates</p>	<ol style="list-style-type: none"> <li>9. Prohibit off-trail travel by pedestrians</li> <li>10. Disallow one or more activity groups on Spring Brook Loop Trail</li> </ol>

### Thresholds and Responses for Dogs On-Leash

Threshold	Response
≥90% of parties comply with on-leash requirements	<ol style="list-style-type: none"> <li>1. Maintain or consider reducing existing levels of education, outreach and enforcement</li> <li>2. Acknowledge/Thank visitors</li> </ol>
<90% of parties comply with on-leash requirements	<ol style="list-style-type: none"> <li>3. Changes in education, outreach, signs, or enforcement</li> <li>4. Meet with stakeholders and implement strategies aimed at improving compliance</li> </ol>
<p>OSMP would use values and trends of this indicator for on-leash compliance, along with levels of on-leash compliance measured during trail segment observations to make determinations about prohibiting dogs</p> <p>Adopting regulations prohibiting dogs would be considered after less restrictive strategies were demonstrated to be ineffective at achieving targeted compliance rates</p>	<ol style="list-style-type: none"> <li>5. Disallow parties with dogs on the Spring Brook Loop Trail</li> </ol>

**Considerations:**

- The potentially low numbers of equestrians and dogs may make it difficult or cost prohibitive to obtain desired sample size
- Ranger presence may influence visitor behavior. Compliance is likely to change when rangers are absent or under reduced levels of patrol.

**Spring Brook Loop Trail**  
**Undesignated Trail Monitoring – Evaluation of Location, Condition & Extent**

**Objective:** Locate, measure, and characterize the condition of undesignated trails near the Spring Brook Loop Trail.

**Methods:** OSMP will document the location, length, condition class<sup>3</sup>, and discernable visitor activity on undesignated trails in a defined area around the Spring Brook Loop Trail. Undesignated trails include parallel trails, shortcutting of climbing turns and undesignated trails to new destinations. Photographs will also be used to document undesignated trail condition and any type of discernable visitor activity.

**Thresholds and Responses**

Threshold	Response
Reduction in the extent of pre-existing undesignated trails and Conditions of pre-existing trails are less severe and No new undesignated trails detected	<ol style="list-style-type: none"> <li>1. Close and restore any remaining undesignated trails</li> <li>2. Maintain or consider reducing levels of education, outreach and patrol</li> <li>3. Acknowledge/Thank visitors</li> </ol>
No reduction in the extent or condition of pre-existing undesignated trails or Conditions of pre-existing trails more severe or New undesignated trails detected	<ol style="list-style-type: none"> <li>4. Close and restore undesignated trails</li> <li>5. Change education, outreach, signs, or enforcement</li> <li>6. Address maintenance concern(s) on designated trail that have resulted in off-trail travel</li> <li>7. Create physical barriers to keep people on trail</li> <li>8. Include minor reroutes or spur trails to popular overlooks or resting spots</li> <li>9. Meet with stakeholders and implement strategies aimed at improving compliance</li> <li>10. Seasonal or temporary access restrictions</li> </ol>
OSMP would use values and trends of this indicator, along with those from trail segment observation and ranger patrols to make determinations about prohibiting a particular activity  Adopting regulations prohibiting specific activities would be considered after the use of less restrictive strategies and clear indication of off-trail travel by a particular activity	<ol style="list-style-type: none"> <li>11. Prohibit off-trail travel by pedestrians</li> <li>12. Disallow one or more activity groups on the Spring Brook Loop Trail</li> </ol>

<sup>3</sup> OSMP’s trail condition class methodology is consistent with : Marion, J.L., Leung, Y., Nepal, S.K., 2006. Monitoring trail conditions: new methodological considerations. The George Wright Forum 23:36-29.

**Considerations:**

- Clear evidence of undesignated trail use by a particular activity may be difficult to determine. When hoof prints, foot prints, bike tire treads, etc. are present, they suggest a visit by a person engaged in an activity; however other activities may have contributed to the establishment and impact of the trail.

**Spring Brook Loop Trail  
On-Trail Travel Monitoring – Trail Segment Observation**

**Objective:** Estimate the percentage of cyclists, equestrians, pedestrians, and dogs that remain on observed trail segments.

**Methods:** Observer(s) will document parties of cyclists, equestrians, pedestrians, and dogs staying on or leaving specific segments of the Spring Brook Loop Trail.

**Thresholds and Responses**

Threshold	Response
≥95% on-trail compliance of equestrian parties, cycling parties and parties with dogs	<ol style="list-style-type: none"> <li>1. Maintain or consider reducing existing levels of education, outreach and enforcement</li> <li>2. Acknowledge/Thank visitors</li> </ol>
<95% on-trail compliance of equestrian parties, cycling parties and parties with dogs	<ol style="list-style-type: none"> <li>3. Changes in education, outreach, signs, or enforcement</li> <li>4. Address maintenance concern(s) on designated trail that have resulted in off-trail travel</li> <li>5. Create physical barriers to keep people on trail</li> <li>6. Meet with stakeholders and implement strategies aimed at improving compliance</li> <li>7. Seasonal or temporary access restrictions</li> </ol>
<p>OSMP will examine the rate of compliance and visitation levels observed from each activity, along with data from ranger patrols and undesignated trail monitoring to make determinations about prohibiting or restricting a particular activity</p> <p>Adopting regulations prohibiting specific activities would be considered after less restrictive strategies were demonstrated to be ineffective at achieving targeted compliance rates</p>	<ol style="list-style-type: none"> <li>8. Prohibit off-trail travel by pedestrians</li> <li>9. Disallow one or more activity groups on the Spring Brook Loop Trail</li> </ol>

**Considerations**

Because of potentially small sample sizes, and practical limitations of observational monitoring, it is difficult to estimate the actual on-trail compliance rate for all visitors while they travel on the Spring Brook Loop Trail. Open Space and Mountain Parks will use the sample compliance rate as an estimate for the compliance rate for all visitors traveling on the Spring Brook Loop Trail.

**Spring Brook Loop Trail  
Dog Regulation Monitoring - Trail Segment Observation**

**Objective:** Estimate the rate of dog guardian compliance with regulations requiring dogs to be leashed or prohibiting dogs on observed segments of the Spring Brook Loop Trail.

**Methods:** Observer(s) will document parties with dogs that are leashed or unleashed on monitored trail segments. They will also document parties with dogs that comply or do not comply with dog prohibitions on the southern segment of Spring Brook Loop Trail. The percentage of parties with dogs in compliance with leash and dogs-prohibited restrictions will be calculated and reported.

**Thresholds and Responses**

Threshold	Response
<p>≥90% of parties comply with on-leash requirements and ≥90% of parties comply with dog prohibition on the southern Spring Brook Loop Trail</p>	<p>1. Maintain or consider reducing existing levels of education, outreach and enforcement 2. Acknowledge/Thank visitors</p>
<p>&lt;90% of parties comply with on-leash requirements; or &lt;90% of parties comply with dog prohibition in southern Spring Brook Loop Trail</p>	<p>3. Changes in education, outreach, signs, or enforcement 4. Meet with stakeholders and implement strategies aimed at improving compliance</p>
<p>OSMP would use values and trends of this indicator for on-leash compliance, along with levels of on-leash compliance measured during ranger patrols to make determinations about prohibiting dogs. To make determinations about compliance with dog prohibited on the southern Spring Brook Loop, OSMP would only use values and trends of this indicator.</p> <p>Adopting regulations prohibiting dogs would be considered after less restrictive strategies were demonstrated to be ineffective at achieving targeted compliance rates</p>	<p>5. Disallow parties with dogs on the northern Spring Brook Loop Trail</p>

**Considerations:**

Because of potentially small sample sizes, and practical limitations of observational monitoring, it is difficult to estimate the actual on-leash compliance rate for all visitors while they travel on the Spring Brook Loop Trail. Open Space and Mountain Parks will use the sample compliance rate as an estimate for the compliance rate for all visitors traveling on the Spring Brook Loop Trail.

**Spring Brook Loop Trail  
Recreation Conflict Monitoring – Visitor Survey**

**Objective:** Estimate the percentage of visitors who experience conflict arising from interactions with other visitors on the Spring Brook Loop Trail.

**Methods:** Visitors exiting the Spring Brook Loop Trail will be asked to complete a questionnaire.

**Thresholds and Responses**

Threshold	Response
<p>≤20% of visitors report having ever experienced conflict in the Spring Brook Loop Trail area and                      ≤5% report having experienced conflict in the Spring Brook Loop Trail area on the day of the survey.</p>	<p>1. Maintain or consider reducing existing levels of education, outreach and enforcement                      2. Acknowledge/Thank visitors</p>
<p>&gt;20% of visitors report having ever experienced conflict in the Spring Brook Loop Trail area or                      &gt;5% report having experienced conflict in the Spring Brook Loop Trail area on the day of the survey.</p>	<p>3. Changes in education, outreach, signs, or enforcement                      4. Meet with stakeholders and implement strategies aimed at reducing conflict (e.g., bike patrol, dog walker patrol)                      5. Spatial, temporal, or directional activity separation                      6. Construct trail modifications or modify trail (e.g., obstacles to slow speed)</p>
<p>Adopting regulations prohibiting specific activities would be considered after less restrictive strategies were demonstrated to be ineffective at achieving targeted compliance rates</p>	<p>7. Disallow cyclists, equestrians, or dogs on the Spring Brook Loop Trail</p>

**Considerations:**

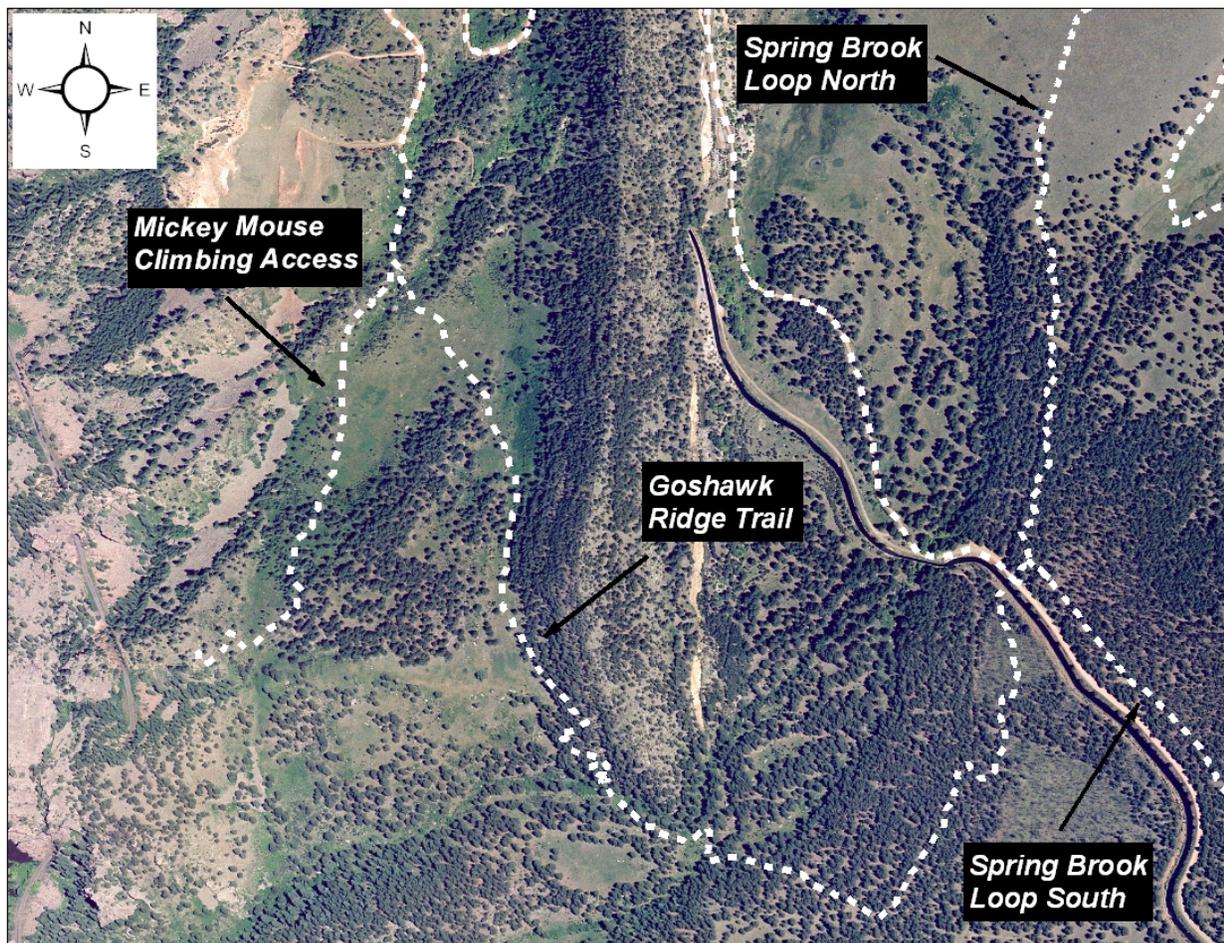
- Changes in reported level of conflict after implementation of a management response may be due to a variety of demographic or activity level shifts rather than the effectiveness of management strategies. For example, the displacement of visitors (e.g., non-cyclists abandon the area because of high conflict with cyclists) could reduce conflict, as a result of an activity group avoiding the trail.
- The potentially low number of equestrians and individuals with dogs on the trail may make it difficult or cost prohibitive to obtain desired sample sizes.
- The survey will only detect conflict reported by those visiting the Spring Brook Loop. Individuals who choose not to use the trail because they expect or have experienced conflict with other activities will **not** be represented in the survey. The survey includes recording the type of activity for each visitor passing the observer. This information,

coupled with similar data from observational and ranger monitoring, will provide OSMP with a picture of the relative level of the activity types occurring on the Spring Brook Loop. Although OSMP seeks to encourage a variety of activities on the Spring Brook Loop, the department has no set objectives how activity type should be distributed.

**Goshawk Ridge Trail**  
**Equestrian Activity Sustainability**  
**Trail Condition Monitoring – *Evaluation of Changes in Tread Width & Incision***

**Objective:** Estimate the change in tread width and incision on the Goshawk Ridge Trail.

**Methods:** OSMP will measure tread width and tread incision at intervals along the trail. Any point along the trail greater than 45 inches wide (not including constructed fords or switchbacks) will also be documented. Any point along the trail with tread incision five inches greater than the median baseline incision or any trail section with more than 10 feet of continuous tread incision at least two inches greater than the median baseline incision will also be documented.



## Thresholds and Responses

Threshold	Response
<p>The trail width is not more than 45 inches wide anywhere</p> <p style="text-align: center;">and</p> <p>The trail is not incised more than five inches from baseline median anywhere</p> <p style="text-align: center;">and</p> <p>No section of the trail 10 feet or longer is incised two inches or more beyond baseline median</p> <p style="text-align: center;">and</p> <p>≤ 25% of tread width sample points &gt;30 inches</p> <p style="text-align: center;">and</p> <p>≤25% of incision sample points incised two inches or more beyond baseline median</p>	<ol style="list-style-type: none"> <li>1. Continue routine maintenance</li> <li>2. Acknowledge/Thank visitors</li> </ol>
<p>Any point where the trail width is greater than 45 inches</p> <p style="text-align: center;">or</p> <p>Any point where the trail is incised more than five inches from baseline median</p> <p style="text-align: center;">or</p> <p>Any section of trail 10 feet or longer incised two inches or more beyond baseline median</p>	<ol style="list-style-type: none"> <li>3. Immediately correct to trail design standard (Class 2 Equestrian Trail) through maintenance or minor trail adjustments</li> </ol>
<p>Trail Width: &gt;25% of sample points &gt;30 inches</p> <p style="text-align: center;">or</p> <p>Incision: &gt;25% of sample points are incised 2 inches or more beyond baseline median</p>	<ol style="list-style-type: none"> <li>4. Correct to trail design standard (Class 2 Equestrian Trail) through maintenance or minor trail adjustments</li> <li>5. Add additional trail/drainage structures</li> <li>6. Changes in education, outreach, signs, or enforcement</li> <li>7. Physical barrier/s to restrict widening</li> <li>8. Meet with stakeholders to determine strategies to minimize tread incision and trail widening associated with visitor activity</li> <li>9. Cover excess width with locally harvested organic material</li> <li>10. Visitor activity restrictions (e.g., temporal closure)</li> </ol>
<p>Clear indication of off-trail travel by equestrians</p> <p>Prohibiting equestrian activities would be considered after less restrictive strategies were demonstrated to be ineffective at achieving targeted compliance rates</p>	<ol style="list-style-type: none"> <li>11. Disallow equestrians on the Goshawk Ridge Trail</li> </ol>

**Considerations:**

- Monitoring does not include the provisional use of segments one (Conda Mine Road) or two<sup>4</sup>.
- While OSMP may observe increases in tread width or incision, it may be difficult to determine that equestrian use is responsible for the observed change. Other visitors, wildlife, or other factors (e.g., weather, trail design elements, slope, and soil type) can affect tread width and incision.
- OSMP's trail design specifications (trail classes and standards) are a credible first iteration of standards adapted from other land management agencies by OSMP staff. On the ground experience *across* the OSMP system, including the Goshawk Ridge Trail, will provide information about how and if OSMP's trail classes should be adjusted to address "real world" conditions.

For example, if monitoring consistently demonstrated trail widening and incision resulted from legitimate visitor activity, OSMP could respond in three ways. First, the department could attempt to maintain the trail to the original class by increasing the maintenance frequency. This is likely to be expensive, time-consuming, and potentially unsustainable. Another alternative would be to change the allowed activities, reducing them to those that would likely allow the original trail class to be sustainable without increasing maintenance. The third alternative is to change the trail class (and thus design) to accommodate the levels of allowed activities.

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<sup>4</sup> Segment two is the stretch of previously undesignated trail now incorporated into the trail. Segment two will be monitored through an already approved threshold and response framework.

**Goshawk Ridge Trail  
Equestrian Activity Sustainability  
Undesignated Trail Monitoring - *Evaluation of Location, Condition & Extent***

**Objective:** Characterize the condition and extent of undesignated trails adjacent, parallel, or emanating from the Goshawk Ridge Trail.

**Methods:** OSMP will document the location, length, condition class <sup>5</sup>, and discernable visitor activity on undesignated trails intersecting or parallel to the Goshawk Ridge Trail. Undesignated trails include parallel trails, shortcutting of climbing turns and undesignated trails to new destinations. Photography will be used to document undesignated trail condition and discernable visitor activity.

**Thresholds and Responses**

Threshold	Response
Reduction in the extent of pre-existing undesignated trails and Conditions of pre-existing trails less severe and No new undesignated trails detected	1. Close and restore remaining undesignated trails 2. Maintain or consider reducing levels of education, outreach and patrol 3. Acknowledge/Thank visitors
No reduction in the extent or condition of pre-existing undesignated trails or Conditions of pre-existing trails more severe or New undesignated trails detected	4. Close and restore undesignated trails 5. Changes in education, outreach, signs, or enforcement 6. Strengthen “stay off undesignated trail” message in off-trail permit guidelines 7. Address maintenance concern(s) on designated trail that have resulted in off-trail travel 8. Create physical barriers to keep people on trail 9. Meet with stakeholders and implement strategies aimed at improving compliance 10. Re-route part of trail 11. Access restrictions (e.g., seasonal closure)
Clear indication of off-trail travel by equestrians  Regulations prohibiting equestrian activities would be considered after less restrictive strategies were demonstrated to be ineffective at achieving targeted compliance rates	12. Disallow equestrians on the Goshawk Ridge Trail

<sup>5</sup> OSMP’s trail condition class methodology is consistent with Marion, J.L., Leung, Y., Nepal, S.K., 2006. Monitoring trail conditions: new methodological considerations. *The George Wright Forum* 23:36-49.

**Considerations:**

- While OSMP may observe new undesignated trails, staff may not be able to determine that equestrian travel is responsible for the new trail or at what level and frequency of activity that changed occurred. Other visitors or wildlife can contribute/or cause new undesignated trail development.
- OSMP is not proposing the creation of new spur trails as a management response because the management of HCA's is directed at minimizing new trail development. The TSA planning process was used to identify acceptable locations for trails in the Eldorado Mountain HCA.

**Goshawk Ridge Trail**  
**Physical Sustainability of Segment Two (Incorporated undesignated trail section)**  
**Trail Condition Monitoring – *Trail Condition & Undesignated Trail Development***

**Objective:** Estimate the change in tread width, tread incision, trail braiding, and undesignated trail development on Segment Two of the Goshawk Ridge Trail. OSMP will also track the number of structures (e.g. drainage bars, steps etc.) in place or recommended for improving the physical sustainability of the trail.

**Background:** OSMP included a section of an undesignated trail into the alignment of the Goshawk Ridge Trail on a provisional basis. Although, this section will be subject to some initial maintenance and minor improvements prior to trail opening, it was not designed or constructed to OSMP trail standards as were other sections of the trail. OSMP is committed to early detection and correction of problems with the physical sustainability of this part of the trail. OSMP developed a site-specific monitoring program for this purpose.

Thresholds have been set for indicators that specify an acceptable amount of change. If the indicator falls outside the threshold, management options are identified to return the segment to acceptable conditions. Thresholds and management options have been developed for each indicator. By the end of 2010, staff will evaluate the physical condition of Segment Two, monitored natural resources, and visitation levels to determine if a different alignment is necessary.

**Methods:** OSMP will measure tread characteristics at intervals along the trail. Tread width and trail braiding will be documented in linear length based upon the respective indicator standard and each trail braiding occurrence will be assigned a condition class. Any point along the trail with undesignated trail development will also be documented. OSMP will document the location, length, condition class<sup>6</sup>, of undesignated trails intersecting or parallel to the Goshawk Ridge Trail. Photography will be used to document undesignated trail condition and discernable visitor activity.

OSMP will also keep track of the number of structures (e.g., drainage dips, water bars, or steps) constructed to support the physical sustainability of the trail, and the number of such structures recommended to address trail degradation.

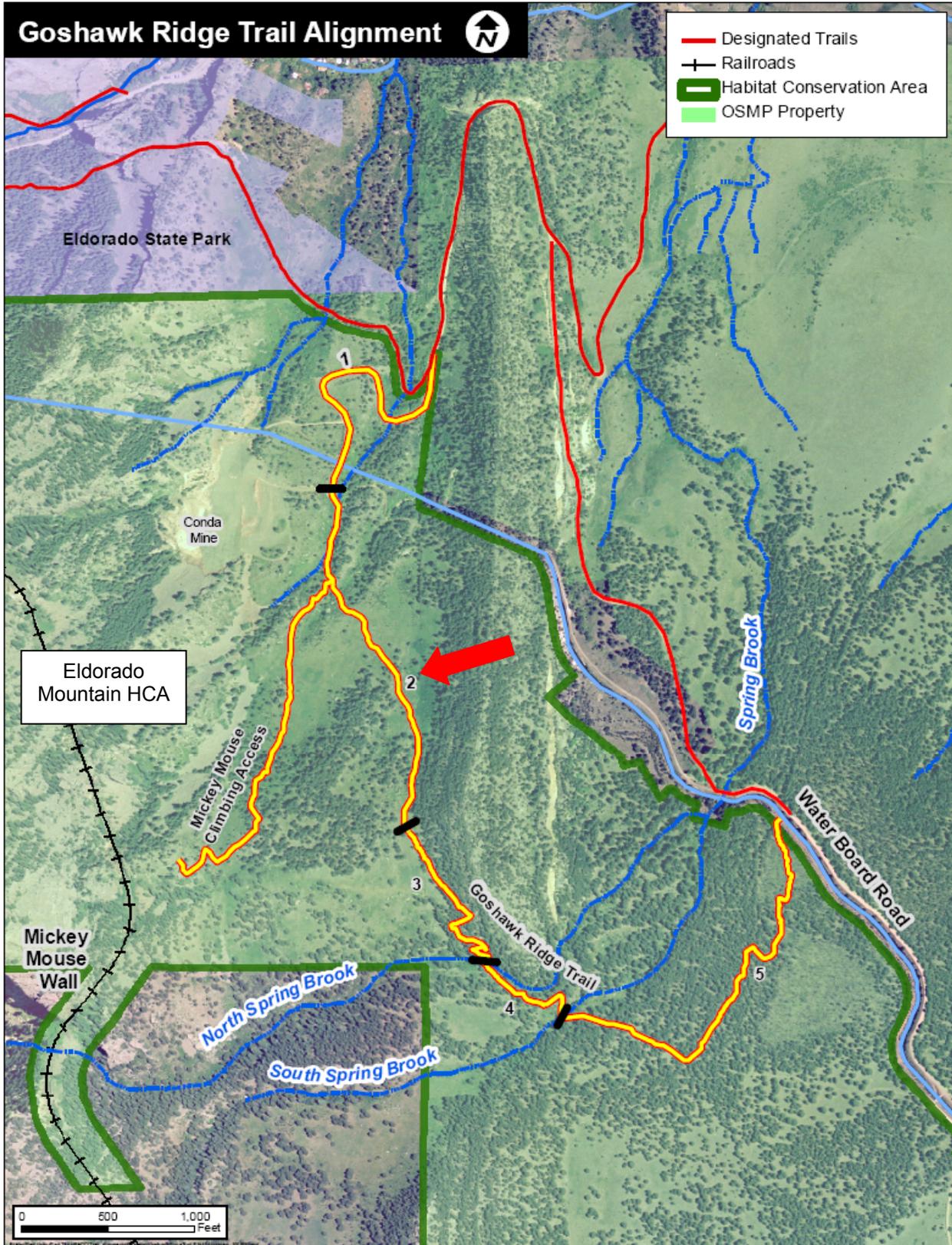
Monitoring will continue to determine the effectiveness of corrective actions. If over the long term, continued maintenance and new infrastructure fail to maintain indicators within the range of acceptability, a trail reroute will be considered for this section of trail.

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<sup>6</sup> OSMP's trail condition class methodology is consistent with Marion, J.L., Leung, Y., Nepal, S.K., 2006. Monitoring trail conditions: new methodological considerations. *The George Wright Forum* 23:36-29.

## Thresholds and Responses

Indicator	Thresholds	Possible Management Responses
Trail Width	< or = 2.5ft	None (acceptable)
	2.5-3ft	De-berm trail tread, drain dips
	>3ft, < 200 linear ft	Add use of wood or rock water bars and risers
	>3ft, > 200 linear ft	Re-route
Presence of Trail Braiding	Condition Class 0	None (acceptable)
	Condition Class 1	Install drainage structure, temporary closure
	Condition Class 2-3, <100 linear ft	Install drainage structure, temporary closure
	Condition Class 2-3, >100 linear ft	Re-route
Trail Tread Incision/Depth	0-2 inches	De-berm trail tread and drain dips
	3-7 inches	Add use of rock or wood water bars
	> or = 8 inches	Add use of risers
Number of Undesignated Trails	no trails	None (acceptable)
	1-3 trails	Take action to close undesignated trails that is consistent with condition class, increase ranger patrols, adjust number of off-trail permits
	>3 Undesignated trails	Re-route
	Presence of Condition Class 3 trail	Re-route
Undesignated Trail Condition Class	Condition Class 0-1	Install closure sign
	Condition Class 2	Install closure sign, seeding (if needed) and matting, increase ranger patrol
	Condition Class 3	Re-route
Number of Structures	<30 structures/ Segment 2	None (acceptable)
	> 30 structures/ Segment 2	Re-route



## ***Natural Resource Monitoring***

### **Overview: *Natural Resource Monitoring in the EM/DD TSA***

Natural resource monitoring helps to locate sensitive resources, inform if resource protection actions are needed and allows the effectiveness of resource protection and restoration efforts to be assessed. Natural resource monitoring occurs at three different scales: system-wide monitoring that in part occurs in the TSA; resource monitoring specific to the TSA; and trail-related resource monitoring for Spring Brook Loop and Goshawk Ridge. Together, these monitoring projects aid OSMP's ability to protect resources, restore impacted areas, and adaptively manage recreational activities and trails in the EM/DD TSA.

#### **System-Wide Monitoring**

System-wide natural resource monitoring provides the means of assessing resource conditions across the OSMP system. It provides information that can track changing conditions and provide an overall context for resource protection priorities and restoration opportunities. OSMP gathers system-wide vegetation data on rare plants, weeds, and vegetation alliances to provide a better understanding of the distribution, composition, and abundance of plant communities and rare plant populations. This information helps staff place specific areas in context of their ecological importance and contribution to local and regional biodiversity and directs management action where it is most needed. Wildlife monitoring across OSMP provides useful information on the abundance and distribution of sensitive wildlife species and communities. Surveys for bats, frogs, grassland nesting birds, and cliff nesting raptors identify potential protection sites and restoration opportunities.

#### **EM/DD TSA Site-Specific Resource Monitoring**

OSMP is interested in the effects of new trail construction on vegetation. The department has two site-specific vegetation monitoring projects designed to improve the understanding of these effects. One of the projects is associated with the Greenbelt Connector Trail in the EM/DD TSA while the other is associated with the High Plains Trail in the Marshall Mesa / Southern Grasslands TSA. The monitoring on the Greenbelt Connector Trail provides data on changes in vegetation cover and composition after trail construction which can help inform trail management decisions. These projects are staff time-intensive and require long-term commitments. Consequently, OSMP establishes them very selectively.

Grassland bird monitoring transects were established in the vicinity of the seasonal ground-nesting bird closure to learn more about the distribution and abundance of breeding grassland birds. This data can be compared to other grassland sites and help inform relative conservation values.

### Spring Brook Loop and Goshawk Ridge Resource Monitoring

The EM/DD TSA plan specifically directs wildlife monitoring to: 1) collect information to augment existing wildlife data; 2) measure changes in wildlife abundance and use patterns in response to new trail construction. Monitoring to assess the impacts of new trails (Spring Brook Loop & Goshawk Ridge) on wildlife communities in this area began in July 2007. These efforts include: songbird surveys in the Spring Brook drainage and throughout the study area, pellet plots used to detect changes in deer, elk, and turkey abundance, and forest raptor surveys to locate nest sites. Additionally, deer and elk bed mapping and wild turkey activity and roost site monitoring improve the available information on local habitat preferences and affinity for specific sites. While some survey efforts occur continuously as staff resources allow (e.g., ungulate bed mapping and turkey roost observations), other surveys (pellet plots, songbird counts, forest raptor surveys) occur on specific schedules with pre-trail baselines completed in September 2008. The monitoring schedule to assess post-trail changes is set for years 1, 2, 3, 5, 7, and 10.

Both Spring Brook Loop and Goshawk Ridge will be added to regular weed assessments and field surveys. New occurrences of management priority weeds will be documented and integrated into the IPM program priorities for weed treatment. Annual or biannual assessments along the trails will be used to track the success of managing priority weeds.

## ***Wildlife and Vegetation Monitoring in the EM/DD TSA***

### **Frog Monitoring**

Specific bodies of water throughout OSMP are surveyed for frog populations. In the EM/DD TSA, several sites are surveyed each year to monitor the abundance of native and non-native frogs. The surveys began in 2007 and were continued in 2008. Riparian and wetland sites supporting only native frogs are of conservation importance because northern leopard frogs are a focal conservation target. Several strategies proposed in the Grassland Ecosystem Management Plan (in draft) are aimed at managing ponds to improve leopard frog habitat. The frog monitoring project has identified potential restoration sites to improve leopard frog habitat and augment stable populations on OSMP. Because annual frog populations are dynamic, monitoring will continue in the foreseeable future.

### **Cliff Nesting Raptors**

Breeding sites for cliff-nesting raptors (peregrine & prairie falcons, golden eagles) are monitored annually throughout OSMP. On cliffs in the EM/DD TSA, at least one pair of peregrine falcons has annually nested and observations of golden eagles and prairie falcons are consistently recorded. Monitoring nest success and productivity of falcons at this site will continue as part of OSMP's cliff-nesting raptor monitoring program, which is largely a volunteer effort. Peregrine falcons are a state-listed sensitive species and reproductive data is provided to the Colorado Division of wildlife.

### **Bat Monitoring**

Surveys for bats species present on OSMP occur at several sites such as ponds and streams where bat activity is likely to be concentrated. Bats are annually surveyed during summer months using mist nets placed over water bodies and via direct observations of known roost sites. Volunteers contribute significantly to the observational effort. Two ponds in the EM/DD TSA are surveyed with the intent on providing information on two rare and important conservation focused species, fringed myotis and Townsend's big-ear bats.

### **Grassland Bird Monitoring**

Grassland bird monitoring throughout OSMP was initiated to learn more about the system-wide distribution and abundance of ground-nesting birds, especially the grasshopper sparrow, a focal conservation target. Eleven transects were surveyed in 2008 in the vicinity of grassland bird seasonal closures in the EM/DD TSA. In comparing these data with data from other bird monitoring projects on OSMP grasslands, staff will have a better understanding of the conservation value of the grasslands between State Highway 93 and Doudy Draw, relative to other monitored sites.

### **Rapid Assessment Weed Mapping**

The rapid assessment weed (RAM) mapping project is based on a widely used protocol adopted from Utah State University. This is a system-wide effort to quickly and consistently map weeds across OSMP. In 2008 staff focused on areas of the mountain backdrop including the EM/DD TSA, and also mapped all designated and high use undesignated

trails in the West TSA. This mapping gives staff comprehensive weed information and a way to track changes in weed density, patch size and species occurrence. The trails specific data will inform where weed populations are changing along trail corridors and is used to inform treatment planning.

### **Rare Plant Inventory**

OSMP keeps a system-wide database and geographic information system (GIS) coverage of rare plant occurrences on the system. In 2007, staff began revisiting historic records and collecting data using a standard protocol for all occurrences. The goal is to revisit all populations of rare plants on a five-year cycle, adding new occurrences as they are discovered. For each occurrence record, the species and location are recorded as well as information about the population size, habitat, and threats. Having a consistent inventory of rare plants allows OSMP to track population trends and plan facilities such as new trails and reroutes and management activities away from sensitive plant species.

### **Undesignated Trail Restoration Monitoring**

Undesignated trail closure and restoration is often coordinated with new trail development and reroute projects. The undesignated trail closure monitoring is designed to document restoration techniques, describe on-the-ground trail conditions, and track the success of management. Vegetation cover is a key variable to be measured during this monitoring to assess the effectiveness of closure and restoration efforts. Most of this monitoring is focused in the EM/DD TSA and consists of a sample of the undesignated trails being restored. Restoration work is ongoing and in conjunction with undesignated trail mapping, resource staff will have data about the success of closure and restoration efforts.

### **FEMP Monitoring**

General vegetation monitoring and sampling in the forested systems of OSMP is done as part of the implementation of the Forest Ecosystem Management Plan. Monitoring sites are established to coincide with treatment areas as well as common forest vegetation types. The forest understory monitoring plots are designed to measure native and non-native plant cover, species richness, and tree canopy density. In the EM/DD TSA area a number of forest monitoring plots have been established. While these plots are not directly associated with trail effects they do monitor the general condition and composition of the vegetation in the area.

### **Trail Related Vegetation Changes Monitoring**

A site-specific monitoring project was contracted to ESCO Associates from 2004-2007. It was designed to provide a descriptive understanding of the effects of a new trail on vegetation after construction. The study consisted of six transects placed at varying distances from the Greenbelt Connector Trail. Vegetation cover and composition were measured along each transect. Transects were placed in common vegetation types that may allow the data to be extrapolated to other areas of the OSMP system.

## ***Spring Brook Loop and Goshawk Ridge Related Wildlife Monitoring***

### **Pellet Plot Monitoring for Deer, Elk and Wild Turkey**

**Objective:** Pellet plot sampling provides OSMP staff with current condition (pre-trail development) baseline data on the amount of use of these areas by mule deer, elk and wild turkeys. Re-sampling pellet plots (post-trail development) will provide an estimate of the effect these trails have on certain wildlife species as well as continue to help staff understand wildlife use patterns (temporal and spatial) in the area.

**Methods:** Staff randomly placed five meter radius circle plots in the vicinity of the Spring Brook Loop and Goshawk Ridge Trails to act as treatments as well as two “control” areas away from trails. Control plots will serve as indicators of population level changes (i.e., not trail associated) such as disease and effects of weather and will be cleared simultaneously with treatment plots. Control samples are also invaluable in determining the natural variation inherent in wildlife use indices.

Plots are cleared of all animal droppings. For each plot, staff records the species present, number of pellets and number of pellet groups (any group of pellets  $\geq 5$  pellets). These are the metrics of interest. Staff cleared 25 treatment and 25 control plots for Spring Brook Loop and 88 treatment and 25 control plots for Goshawk Ridge Trail. The increased number of treatment plots for Goshawk Ridge Trail will allow staff to estimate the distance of the trail effect on species’ use of the area.

Spring Brook Loop pellet plot sampling schedule is between 3-9 months. Treatment and control plots were simultaneously cleared in July 2007, October 2007, and July 2008. Plot clearing events for 2009 are planned in July and October.

Goshawk Ridge sampling schedule is approximately ten months. Treatment and control plots were simultaneously cleared in November 2007 and September 2008. Plot clearing events for 2009 are planned in September.

**Use of Data:** These data will be used to augment baseline information on locally rare species like elk and wild turkey as well as determine the amount of natural variation in estimates of wildlife use indices and population size. Because natural systems inherently possess considerable variation, multiple seasons/years of wildlife monitoring may be required before this variation can be interpreted. When natural variation can be evaluated, staff will develop appropriate acceptable variation ranges. These data can also be applied to estimate the “trail-effect” distance on wildlife because the pellets plots are located at variable distances from the trails. This monitoring data can be useful if integrated into future decisions regarding trail density and its displacement effect on multiple species of wildlife.

## Deer and Elk Bed Mapping

**Objective:** Augment existing data on local habitat preferences for ungulate (i.e., deer and elk) resting sites, and to identify heavily used bedding sites in EM/DD TSA that can be monitored for re-use after trail development.

**Methods:** Staff located beds by walking line transects spaced 50 meters apart. Site specific habitat characteristics were collected on a subset of located beds, including but not limited to: current bed condition, canopy cover, habitat type (grassland or forest), bed aspect, nearest tree species, its diameter at breast height, and its distance to the bed. So far in 2008, 1,685 total beds were mapped in the EM/DD TSA and bed characteristic data collected on 900 of the sites. Habitat characteristics of known bedding sites will be compared with habitat characteristics of randomly placed sites to delineate specific habitat preferences for resting ungulates. To monitor re-use of areas that contain numerous beds, sampling plots of 50 square meters were established near trail and far from trail. OSMP staff will check on these plots periodically to determine the level of re-use.

**Use of data:** Habitat preferences for resting ungulates in EM/DD TSA can be used to guide future management decisions regarding new trail placement, trail re-routes, and undesignated trail restoration in forested habitats on OSMP. Staff will also be able to assess the effect of new trails on heavily used resting sites. Resting usually occurs during warm parts the day so these data may provide different information on ungulate displacement than the pellet plots.

## Wild Turkey Activity and Roost Site Monitoring

**Objective:** Locate active turkey roosts, categorize turkey user groups and monitor use of roosts before and after trail construction.

**Methods:** Staff walked line transects 100 meters apart and identified potential sites that indicated signs of turkey activity (scat, foraging areas). Staff also located potential sites opportunistically as part of other projects (bed mapping, pellet plots). Once identified, roosts were observed during dawn or dusk throughout the year to determine if roosts are used seasonally or year-round.

**Use of data:** Potential impacts from recreational activities to active roost sites will be assessed to determine if access restrictions in the area adjacent to roosts are needed. Seasonal or temporal access restrictions, education and outreach, and additional roost site monitoring may be appropriate responses to protect active roost sites. Local site characteristics will be measured and used for wild turkey preferred habitat modeling for aiding in the protection of potential wild turkey habitat in other forested habitat on OSMP.

## Forest Raptor Monitoring

**Objective:** Locate occupied nests, monitor reproductive output, and assess impact of visitor use on raptor behavior at occupied nest sites.

**Methods:** For owl surveys, staff sampled 11 stations three times each in suitable habitat by broadcasting calls of flammulated owls and great horned owls. For forest hawks, staff censused the study area in 2007 by broadcasting raptor food-begging calls every 225 meters twice in forested habitat. Staff passively surveyed for northern goshawks in spring 2008 using dawn acoustical surveys (i.e., listening stations with no broadcasting) following an observation of a foraging adult in late February.

**Use of data:** Recreational activity and potential impacts to occupied nest sites will be assessed to determine if access restrictions in the area adjacent to nests is appropriate. Seasonal or temporal access restrictions, education and outreach, and additional nest site monitoring may be appropriate responses to protect active nests.

## Forest and Shrub-Nesting Songbird Monitoring

**Objective:** Augment existing baseline data on forest and shrub-nesting songbirds in the area as well as monitor the impacts of new trails on these communities.

**Methods:** Songbirds were passively surveyed using variable distance point counts (10 minute sampling period) at 34 listening stations throughout the study area. Each station was surveyed three times from mid May to mid July. Listening stations were spaced at least 200 meters apart to maximize sampling effort. Some stations were established far from trails to act as controls while others were placed close to trails (i.e., treatments), similar to the design of pellet plots.

**Use of data:** These data will be used to augment baseline information on bird communities of high conservation value as well as determine the amount of natural variation in estimates of abundance. Because natural systems inherently possess considerable variation, multiple seasons/years of wildlife monitoring may be required before this variation can be interpreted. When natural variation can be evaluated, staff will develop appropriate acceptable variation ranges for these communities (i.e., forest and shrub-nesting). These data will also guide OSMP future management decisions regarding new trail placement in similar habitat, trail re-routes, and the efficacy of undesignated trail restoration.