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Trail conditions and preferences from a mountain bike users perspective in Cottonwood Valley

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<u>Trail Conditions and Preferences from a Mountain Bike Users Perspective in Cottonwood Valley.</u>

A Thesis submitted in partial satisfaction
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By

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Abstract

The purpose of this study was to gather baseline data and user preferences from a mountain bike user's perspective about the current condition of the multiple use trails in Cottonwood Valley. Cottonwood Valley is an area located at the southern tip of the Red Rock Canyon National Conservation Area. Multiple use includes hiking, biking and horseback riding and does not include motorized vehicles. The area was set aside for conservation by an act of Congress because of the inherent value that it represents.

Because the public is allowed to access and use the trails in the area, there has been degradation to the land. Educating this user group on rules and etiquette may be beneficial for future use in the area. The impact to the trail and surrounding areas will need to be addressed by the users to find out if these impacts are negative or positive as viewed by the users. A Visitor Employed Photography survey was used to capture what trail attributes effects cyclists in a negative or positive way. These results were fed into the second part of the study.

Phase two gathered specific criteria and places where attributes arose. Re-occurring attributes of the trail that were attained during this study were categorized and used to establish preferences and effects of impacts to users of the trail system. From these a deeper investigation into what the problem aspects are and why they occur were addressed. The positive aspects were also analyzed and categorized to determine if they can be replicated in future trails. This gives some insight into what mountain bikers' preferences are on established trails. This information will help establish a baseline of criteria to use if future studies are done on trail conditions and user groups.

Problem Statement

The purpose of this study is to gather baseline data, and user preferences from a mountain bike user's perspective about the current conditions of the multiple use trails in Cottonwood Valley. Cottonwood Valley is located at the southern tip of the Red Rock Canyon National Conservation Area (RRCNCA) in Clark County, Nevada (Figure 1a). The area is covered with approximately 75 miles of trails that are designated for multiple use by an Environmental Assessment (EA) that is incorporated in the General Management Plan (GMP) that governs the Conservation Area. Multiple use, as defined by the EA, includes hiking, biking, and horseback riding, but does not include motorized vehicle use on trails. It is important to point out that this study will only be focusing on the aspects of trail conditions from mountain bikers and will not consider other preferences or values that other user groups retain. Motorized vehicle use, wild horses, hunters, campers and any illegal activities are all examples of perspectives that will not be considered. Trails that are observed will be singletrack trails not including dirt roads. Flink, Olka and Searns (2001) define a singletrack trail as one only wide enough for one user to travel and requires one user to yield the trail to allow another user to pass.

Figure 1a
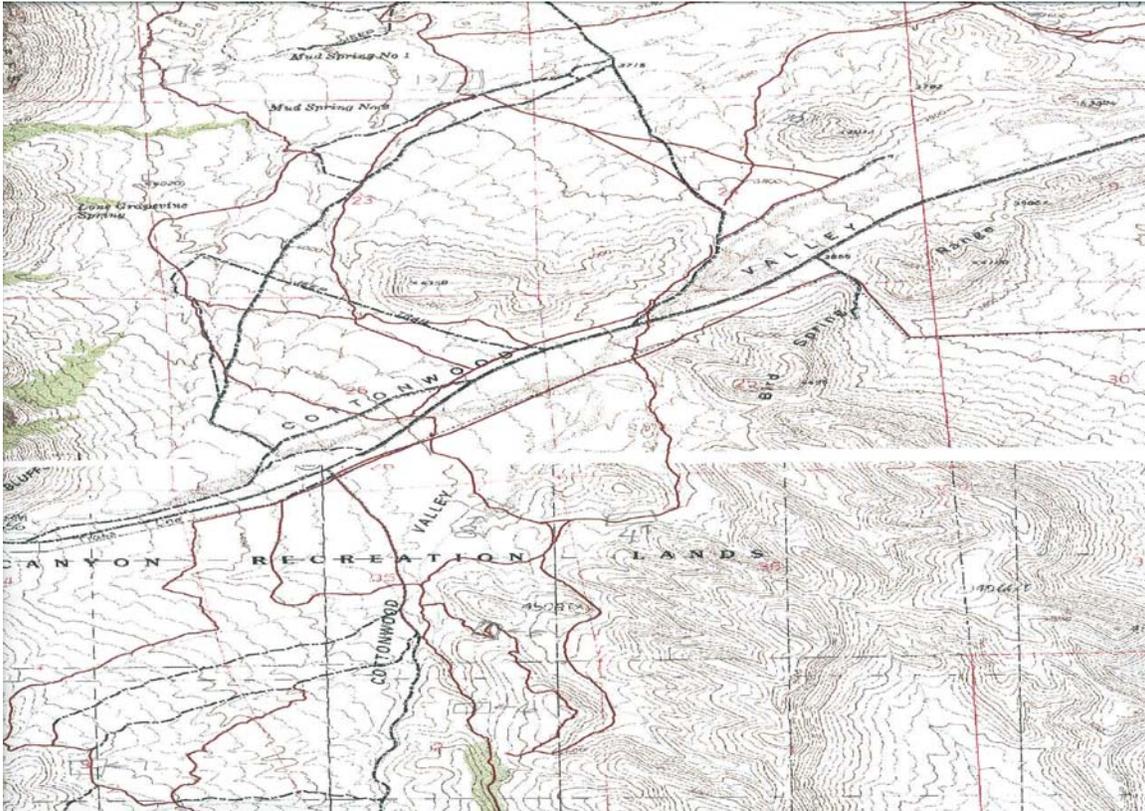
      The Congressional intent of the designation of the RRCNCA was to protect the

natural resources found in the area. Conservation of this land is important because of the

unique geological and historical aspects that define the Canyon (US BLM, 2002). Unlike

other land designations that may favor recreational use, this area has been set aside for

conservation and that is why it has been deemed a National Conservation Area (NCA).

Because of the inherent value associated with the area, degradation to trails or

surrounding areas should not be accepted. A GMP that is in place after a full

Environmental Impact Statement (EIS) had been conducted protects the area, and the

document has specific language restricting unsustainable use (US BLM). The

conservation of this land is a priority and any activities taking place in the NCA needs to

reciprocate that priority. If impact to an area becomes excessive, the BLM may close

sections of trails to rehabilitate vegetation. It is important that these public lands remain open for the public to enjoy. The responsibility of this user group to understand and comply with the rules of this area in order to continue use rests in their hands. Unfortunately there is evidence users are not either aware of the rules or do not intend to follow them. This is evident in the way use occurs

The unwillingness of users to yield other users is one of the major problems with trail use. When one person approaches another person coming from the opposite direction, neither generally stops to allow the other to pass. Instead both users cut away from the trail to allow ample space for two people to pass. This not only widens the trail, but also frequently adds unnecessary webbing to the trail system. This practice causes problems such as increased habitat destruction and soil erosion. Vegetation loss, compaction of soils and intrusion to wildlife are also affected by webbing (Flink, Olka and Searns, 2001). Webbing (also known as braiding) refers to trails that do not serve a necessary purpose; they are informal, parallel tracks. They commonly closely parallel existing trails and do not offer alternate access to different areas or other trails. They follow the same route and provide the same scenery and terrain, while doubling the visual and physical impacts on the land. These trails are mostly illegal trails that have been developed over years of unsustainable use.

Properly designed trails work with the environment. Being located in the RRCNCA means that sustainable use is a priority that will need to be enforced and followed by users. This particular area is considered to be in its adolescent stages and baselines need to be established before too much degradation can occur. It is important

that the existing trail conditions are identified. This will allow managers to have baseline data to work with.

Las Vegas is the fastest growing metropolitan area in America over the last decade (USA Today, 2000). Increased growth in the valley continues to push development and people closer to the trail system. The availability of nearby recreational trails promotes use, according to the travel-cost method (Goodstein, 2002). Cottonwood Valley experiences increased visitation annually according to the BLM (Recreation Management Information Systems (RMIS) US BLM, 9-30-02). This increased use of the land will no doubt also increase the impact that occurs. Having knowledge of what trail aspects users find as problems and conversely as desirable conditions is essential to properly managing the area. The BLM estimates that mountain bike users represent nearly seventy percent of the total number of people using the trails (US BLM, 2002). However, cyclists were only recently considered as a user group of the area for management policies to address. Today growing interests in mountain biking has escalated use to an unexpected level; this study is designed to help understand what this user group values.

It is of interest to this study that the sport of mountain biking by definition takes place in natural areas and is not limited to an exercise motivated sport. Goeft and Alder (2002) state that "most riders prefer natural settings to ride in and riders prefer trails with a variety of features such as slopes and curves." Being regarded as a form of adventure recreation (Priest & Dixon, 1990), mountain biking inherently has impacts associated with it that are directly reflected on the trails. These preferences are important to consider when trying to establish, and maintain trails on public land.

What is considered a "positive" aspect of the trail from the view of a cyclist? And in turn what defines a "negative" trail aspect according to mountain bike users? It is hard to determine what specific users of recreational lands will base their criteria on for evaluating conditions of a trail. However this study will try to place specific criteria on assessing trail conditions, determined by the actual user's themselves. It is important that values can be categorized, as this is a qualitative study.

Hypothesis

I think this study will show that this user group will not recognize conservation-degrading impacts due to unsustainable use of mountain bikers. Because the impact that is occurring on the trails is due to the actual users of the area, I am going to look to the source for solutions. The assumption is that mountain bikers will not recognize this feature and have consideration for the importance of conservation. Using Chenoweth's (1984) Visitor Employed Photography (VEP) technique for surveying to help gather information that will define what a particular user feels the condition of a trail. This type of survey allows visitors to use photographs to answer questions about a particular area. "Photographs can express so many subtleties that a questionnaire survey can never reveal" (Chase, Carlisle and Becker, 1993). This type of survey is used quite often in landscape architecture and federal agencies such as the National Park Service and the National Forest Service (Flick and Taylor).

A second hypothesis to this study is that I feel that mountain bike riders will value and prefer diverse trail conditions with scenic backdrops and challenges to the trail.

It is equally important that only issues concerning this study are evaluated. Developing a focused study is essential if the process is to accomplish what is intended. The standards will be derived from photographs that were taken by users of the area.

Methods

The first step in conducting this survey was to define where the participants would gather their information. A well-defined route was established to incorporate as many diverse trails conditions that presently exist in the system within an eight-mile loop. The criterion for this trail was established by the content advisor and I, which both have extensive experience with the trail system in question and are avid mountain bikers. This is the starting point for the VEP. This delimiting of trail to be studied is essential in finding key areas within the system to address. Once a trail was established a survey was designed to collect specific information about the users of this area. The survey went through a human subject's board on the UNLV Campus and was approved (Appendix A). The survey (Appendix B) included demographic information, rider preference, and knowledge the user had about the area. The survey also asked participants if there was something they could change about the area, what it would be. Appealing aspects of mountain bike trail systems that the user had been exposed to was also asked in the survey. Specific site information addressing the weather conditions and outside sources affecting the participant were also gathered. It was also important to log when the survey took place and how long it took for completion, because this may reveal a difference in why participants focused on what they did. Participants were told to follow this specific trail (Figure 1b) and take pictures of positive and negative conditions and aspects of the

trail. It is important that the participants follow the same trail as this assures that the individuals were exposed to the same visual attributes.

Figure 1b. This is a map of the actual trail that participants were told to follow.
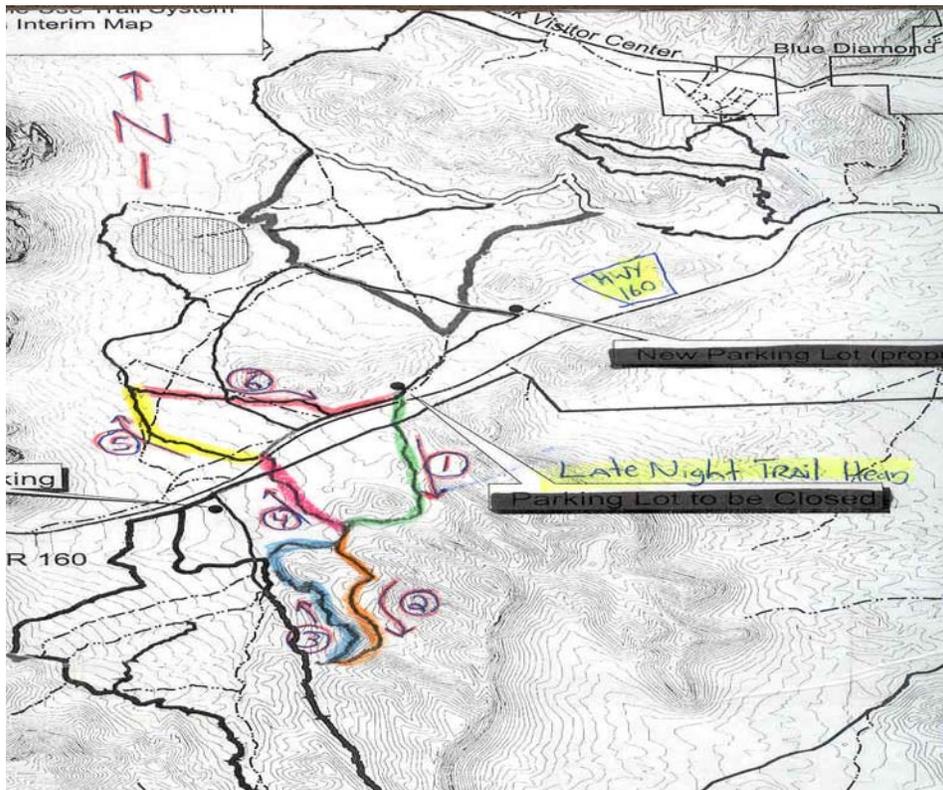
 This control group area was the sample used to represent the trail system as a whole in this study. Each volunteer was asked to take ten to fifteen pictures. For every picture that was taken a photo log sheet was to be filled out. The photo log sheet (Appendix C) was designed to capture in words what the picture was of, how it affected the participant and a brief description of why it affected the participant. These photo log sheets were be used in conjunction with the actual photos to translate and analyze the information being gathered. Nine local users of the area were recruited to compile information. This

resulted in one hundred and twenty nine pictures. Each participant was given the following instructions before they were sent out to do the survey:

> "Follow this trail and take a picture of anything that affects you in a positive or negative way about the **trail**. For each picture, fill out a photo log sheet. I am looking for between 10 and 15 photos, but do not limit yourself from taking a picture of something if you feel it is important. Please refrain from taking pictures of scenic views and focus pictures on the trail itself."

An Olympus C-3020 digital camera was used during this process, which allowed the participants to feel unlimited as to the amount of pictures they could take. This left the participant open to shoot away and not feel confined as to what pictures they could take. It was important to tell the participants not to take pictures of scenic views and focus on the trail itself, because of the natural beauty of the area. Once the data had been gathered, it was analyzed and two main categories were drawn from the data collected. These categories helped establish patterns and aspects of the trail. The first category was made up of what participants viewed as positive aspects of the trail. The second category consisted of perceived negative aspects of the trail.

Once data had been tabulated and categorized, the information was entered into an Excel datasheet to be visually analyzed by graphs. These graphs can then be used to show visually the raw data that was compiled.

Specific plots were chosen depending upon frequency of photos taken and whether they were positive or negative aspects to the trail system. These plots (2) then were analyzed to try and understand why these attributes are negative or positive and how they can be remedied or replicated. At each plot that was chosen to represent a positive or negative aspect of the trail, pictures were taken of greater detail in order to identify

specific aspects that resulted in the labeling of these areas. Paralleling trails, washed out

trails, soft soils and improperly placed signs were among the criterion that was used when

observing negative trail conditions. Flowing, uninterrupted, and smooth natural trails

were among the positive criterion that was looked at. Once an established criterion had

been reached, specific conditions of the trail now had a label that could be assigned. In

the discussion section of this paper data that was gathered from the study was used to

critically compare attributes of the trails to existing studies that have been done on this

subject. Those groups were then entered into an excel spreadsheet to be graphed for

visual reference.

Results

The pictures that were taken of the trail conditions were divided into positive and

negative aspects as determined by the participants of the surveys using a one to five

rating scale. The number three was defined as being neutral. Responses to positive

aspects of the trail (Positive= 64) were almost to twice as many compared to negative

impacts (Negative= 33). This is illustrated below in Figure 2 along with neutral

responses that totaled nine.

Figure 2. Dispersion of photos in categories depending upon how participant rated the
subject is below.
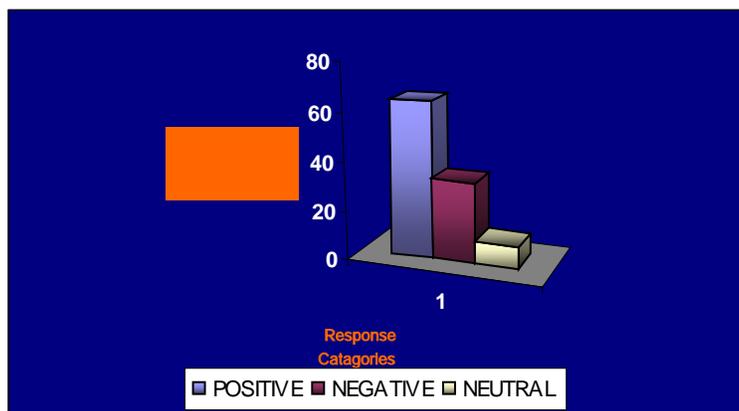
The actual rating of the subject on a scale from one to five was also a question on the survey that was taken into consideration and was used to establish categories. The distribution of this scale can be seen in Figure 3 below.

Figure 3. This graph represents the dispersal of photographs using a 1 to 5 rating of how they affected participants.
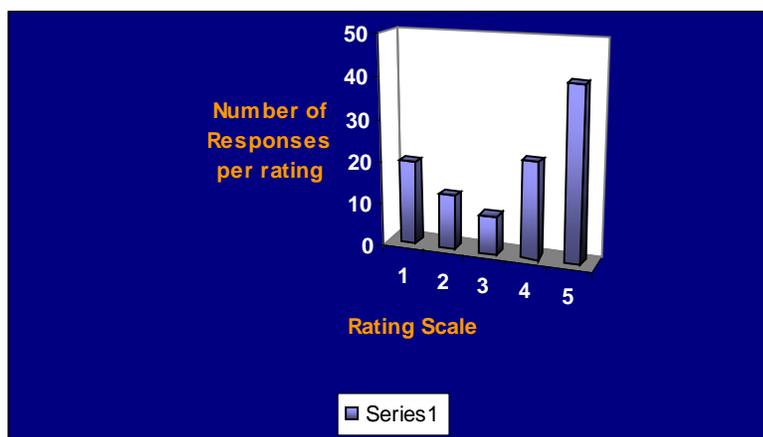
Under positive results the responses were summed up into three sub-categories (Figure 4). These sub-categories are: Trail Diversity, Scenic Aspects, and Trail Signage. Negative results were also grouped into three distinct sub-categories; Trail Condition, Closed Trail, and No Signage. These sub-categories have distinct aspects related to each of the photos that were taken. Common attributes or patterns were used in order to divide into groups trail conditions determined by responses on photo log sheets, along with corresponding photographs of the actual conditions that each picture encompassed. If each picture encompasses the same criteria as the others, this will allow for proper grouping.

Figure 4. This chart shows dispersion of aspects under positive results
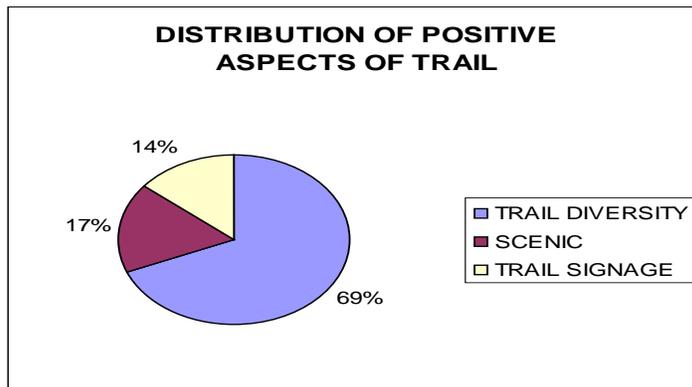
Positive results from the survey had distinct characteristics that allowed them to be grouped into three sub-categories. The first sub-category is Trail Diversity. This sub-category received the most attention by this user group. Forty-one percent of the total responses to this survey had attributes dealing with Trail Diversity, sixty-nine percent in the category: positive aspects. Trail Diversity includes twists, turns, and switchbacks, steep as well as gradual grades, rocky (technical) and smooth terrain and many other attributes. Jumps and obstacles on the trail were also looked at as positive aspects. Participants explained these diverse trail conditions as challenges and looked at them as positive aspects of the trail. These challenges to the trail were a popular response among this user group. The picture below (Figure 5) is an example of Trail Diversity as well as Scenic aspects of the trail. This picture was described as being very scenic and the small cliff to the right of the trail was a desired aspect.

Figure 5.

Scenic aspects to the trail were the second highest rated positive sub-category of the trail with the results equaling seventeen percent of positive responses and ten percent of the total responses. Examples of Scenic attributes of the trail are background landscape, surrounding flowers and vegetation, uncompromised natural settings and even old bones from deceased wildlife.

The third sub-category under positive aspects is Trail Signage. Positive Trail Signage aspects were indicated as being properly signed trails with markers that allow individuals to guide themselves along the trail without much complication. Fourteen percent of positive responses were for proper trail markings and signage. This equates to nine percent of the total responses. However, under negative impacts respondents also revealed signage as an attribute to consider. This combined amount of responses to signage both positive and negative is fifteen percent of the total responses. Figure 4 illustrates the dispersion of aspects under the category positive results.

Negative impacts to the trail were also grouped into three distinct sub-categories (Figure 8). The first and most occurring attributes to be grouped fell into the sub-category Trail Conditions. These are negative impacts to the actual trail condition usually incurred by the users themselves. Users include bikers, hikers, and horseback riders. Participants defined negative Trail Conditions as horse hooves depressions in the trail, scarred natural settings due to unnecessary webbing or braiding to the trail, parallel trails, riding around obstacles, illegal trails and garbage. This is accounted for in results from the V.E.P. survey and can be seen in Figure 6. The picture was described as being a negative aspect of the trail and was not appreciated by others who would not do this to the area. This picture is riddled with bike tracks off of the main path as well as hoof

depressions from when a horse rode the trail when the trail was wet. Trammeled

vegetation and scarred desert floor were considered to have the most negative impacts by

this group to the trail. Trail widening and braiding were also mentioned by participants

in this study as having negative physical and visual impacts to the singletrack. This

aspect of Trail Conditions makes up twenty percent of the total responses, which is fifty

eight percent of the negative aspects category.

Figure 6.

The second sub-category under negative impacts is titled Closed Trails. The trail

that the participants followed was purposely designed so that the person would come

across trail signs; one in particular was a closed trail sign. This sign received four

responses. Responses to trail closures contained aspects dealing with the need for more

trails not less. It was also apparent that users of the area felt that BLM was only there to

close trails and this promoted the unsustainable use among this user group.

The third most recognized aspect to be grouped was based upon lack of trail

signage. The No Signage sub-category was identified by users as not having any

indicators as to where they are or where they are going due to lack of signs (Figure 7).

Figure 7.
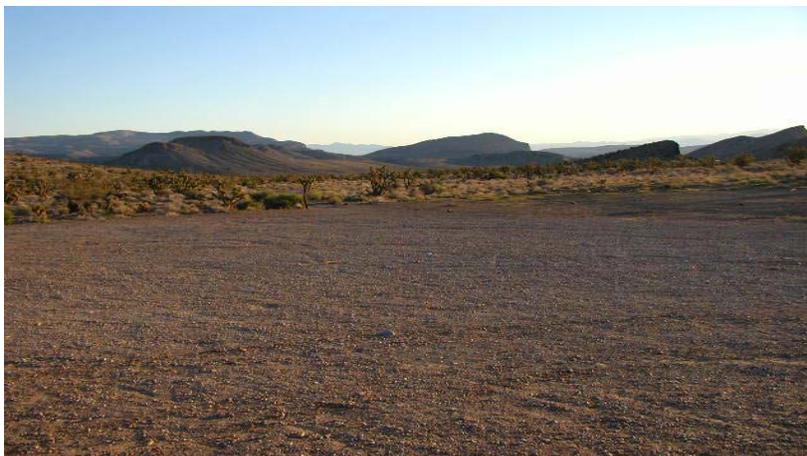
A participant took the above picture and it is of one of the main parking lots that is used for staging before accessing the trails. It was described as not having any information for the public describing where the trails were, what the appropriate etiquette was or who could use these trails. This aspect has been accounted for under positive and negative categories in this study. This is a re-occurring theme throughout this study and will be addressed in the discussion. Eighteen percent of negative impacts were devoted to this category. Results with aspects of negative impacts to the area can be seen distributed in the pie chart below.

Figure 8. This graph shows dispersion of results under negative aspects

DISTIBUTION OF NEGATIVE ASPECTS TO TRAIL

- 18%
- 24%
- 58%

- TRAIL CONDITION
- CLOSED TRAIL
- NO SIGNAGE
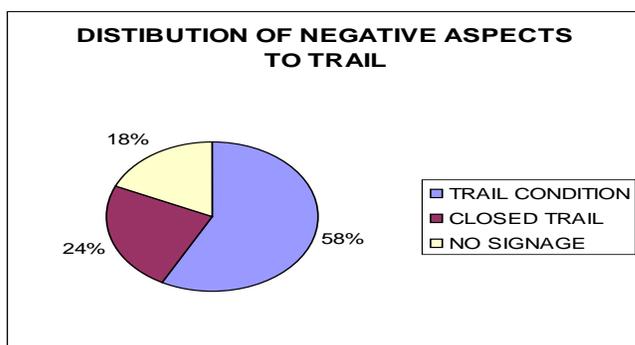
All participants revealed that they were aware that the BLM owned and managed the area and that this particular trail was designated as National Conservation Area.

Neutral responses were categorized as being boring, straight trails by participant # 1.

The survey results were collected and used to show data averages. The average respondents lived in Las Vegas 6.7 years. This shows that the sample of participants were locals and on average have been part of the new growth to the valley in the last ten years. Respondents were also asked to reveal how much time they spent per week on the trail system. They claimed on average of riding 5.7 hours a week in Cottonwood Valley. The participants were also asked to disclose their approximate age within a five year window. One person fell within the age range of 21-25 years old, two people between 26-30 years old, the majority, four people, were between the ages of 31-35, only one person between the ages of 36-40 and one person fell between the ages of 56-60. The average age group was 31-35 years old.

The survey asked participants what specific attributes of the area drew them to Cottonwood Valley. The most predominant remark was that the scenery could not be replicated anywhere else and that the views were of the most important attribute. The amount of trails and the multiple ways of linking the trails for long distance rides were the second highest rated attribute. Location was the third main attribute that was revealed by this user group.

Discussion

My first hypothesis was not supported by the data that was received from the VEP survey. Participants did recognize trail impacts, even those associate that they were derived from unsustainable use of their own user group. This result may be partially due to the awareness of how this type of land is managed. My second hypothesis was

supported by the results because preferred aspects of the area were defined as diverse trail

conditions with scenic areas that offered lots of challenges. This was similar to previous

studies done on this type of user group (Goeft and Alder, 2002).

The VEP survey that was used to conduct this study has proved to be helpful in

deciphering data that has been collected. It allowed me to gather data with photos and

correlating written descriptions that added to the detail and understanding of the subject.

The pictures made ordinarily ambiguous descriptions very precise and supported the

message that the participant was trying to convey.

The data collected had sometimes-different views of the same aspects of the trails

in Cottonwood Valley. Though the participants all knew the designation of this land,

some did not correlate this designation with certain etiquettes and rules. This became

evident when a re-occurring photo of a subject was labeled as both positive and negative.

The subject is of a trail that splits off and then reconnects approximately fifty feet ahead

(Figure 9).   The offshoot of the trail was due to users that were not respecting etiquette

and rounded off this section of trail making a more direct and straight section. Most

participants realized the negative impact associated with this impact, but it was also

logged as a positive aspect to the trail because of the ability to use this trail for passing

other users. This positive result shows that even though users are aware of land

designations, they may not know the actual rules and guidelines when using the trails.

Figure 9. This is a picture of a parallel trail (i.e. webbing) that is not necessary.

This example of user's views is a great reason for education on trail etiquette and interpretation of resource values, which was also one of the most important attribute that were derived from the survey.

Trail Signage was in positive and negative attributes but may be most important when looking for answers. The first question on the exit survey asked; if you could change anything about the trails in the Cottonwood Valley, what would you change? Participant number six replied, "I would like to see directional markers at all trail junctions." Trail markers provide directions on the trail, which is necessary so user groups such as this one can explore far from the safety of roads and help. A great example of this is in the situation of an emergency. If an accident occurs out on the trail it is important that the user can identify where he or she is on the trail and have emergency crews aware of trail locations and access routes. Trail markers also allow users to enjoy the natural settings without having to constantly be looking at a map for directions. Uninterrupted flowing singletrack is an attribute that this user group is looking for. This category though having the least responses under positive aspects (Positive Trail Signage 14%) was the most focused of all the sub-categories and may be

of the most interest for this study. Trail signs are not only helpful, but indicated by this user group they are also much needed.

It is important that trails are designed with the intent to work proactively and more user friendly with the environment, because it is far easier to properly design trails than to rehabilitate them.

Only two pictures were taken of trash that littered the trails. This indicates that there is not much worry for physical trash; the trails condition is of more importance.

Trail closures (Figure 10) were among the data collected that can was considered a negative aspect to the trails.

Figure 10. This is a photo taken by a participant that was affected in a negative way due to the closing of this trail.

Because this is a conservation area, trails sometimes need to be closed for rehabilitation. Having the permission to actually ride trails in an area such as this is a special experience and cannot be replicated. This opportunity should not be taken for granted. This is a direct correlation to the request by users for more trails. Because of the designation of the area, more trails may not be a suitable remedy for the area. Introducing other options around the Valley may be an option for managers to consider. Responses to trail closures

are directly linked to the request for more trails. This user group seems to value quantity of trails.

Recommendations

Educating this user group so that they are aware of the appropriate ways of using the trails is an important aspect to consider. Following the etiquette and rules of the trails are important in order for the priority of the conservation area to stay in compliance. I would recommend that steps to prevent these negative impacts to the land be taken in the future for managers of the land. Steps may include monitoring of trails by BLM officials who can enforce rules and inform the public. This would cost the BLM, so it there may need to be a cost associated with using the trails. These passes would guarantee that the person using this area has paid and that they have had some contact with a BLM official and A regulations manual was received. Having new trails in different areas built so that impacts can be relieved from Red Rock might be a way to ease unsustainable use. Further studies would need to be done to take other user groups into consideration. This will allow a deeper understanding of what users want and how to build, manage and maintain trails so that preservation can be an attainable goal.

Acknowledgements

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Appendix B

FOR MOUNTAIN BIKE USER'S ONLY

Cottonwood Valley Trails Survey

Participant #: _____Date: _____Page _____of_____
Interviewer: _____Time Start: _____Time Finish: _____
Site Conditions:
Approximate Temperature: _____
Other Environmental Conditions: (Windy, Cold, etc.) _____
Other conditions that might affect participant response: (crowded, camera problems, etc.)
_____
Other Observer Comments: _____

Exit Interview:

1. If you could change anything about the trails in the Cottonwood Valley, what would you change?

2. Is your age under 20__21-25__26-30__31-35__36-40__41-45__46-50__51-60__over?

3. Gender: Female   Male

4. Approximately how much time do you spend on the trails per week?
_____

5. What specific attributes of the area draws you to the Cottonwood Valley trails?
_____

6. If you live in the Las Vegas valley/ area how long have you lived here?
_____

7. Do you know the (Congressional) designation that this area falls under?
_____

8. Do you know who manages the trails and enforces the rules?   Yes   No

9. If you have ridden mountain bikes on trails in other places, what appealed to you about most about those places?

Appendix C

*** FOR MOUNTAIN BIKE USER'S ONLY***

PHOTO LOG: Participant #: _____   Page ____ of ____

PHOTO #: _____

SUBJECT (What is the picture of?):

_____

LOCATION (Approximately where located on map, by zones?):

_____

On a scale ranging from one to five, one being very negative and five being very positive, indicate how the SUBJECT affects your experience on the trail:

       1   2   3   4   5

Explain how the SUBJECT had a positive or negative effect on your enjoyment of the trails:

*** FOR MOUNTAIN BIKE USER'S ONLY***

Appendix D
Human subject approval.