

Assessing Urban Parklands: Novel Use of Game Cameras to Study Park User

Behavior in the Baldwin Hills

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Abstract

The preservation and conservation of public open spaces are essential in urban settings as they promote the growth and sustainability of local communities and surrounding environments. The Baldwin Hills Conservancy manages the Baldwin Hills Park System and aims to promote recreation, restoration and protection of urban parks. This study's goal is to provide park managers a longitudinal study of the attitudes and behaviors of park visitors. The study includes the use of game cameras to examine visitation and access to the parks, which serves as a passive, novel methodology in order to study human movement patterns into and around the park. This poster will describe the methods and summarize preliminary data collected during the period October 30, 2015 through April 30, 2016. A total of 129 days of data were collected in four locations in the parks, which included 7679 images and 133 hours of time lapse video. Of the data collected, a subset of 1,001 images from one location, a park entrance, were selected and assigned into categories. Preliminary analysis of these data indicate several initial trends that are identified and discussed. Ongoing efforts include full-scale data collection. As part of the Baldwin Hills Park User Study, the methodology and findings of this study will likely be applied to the study and management of other public green spaces in Los Angeles.

Introduction

- Urban parks are vital resources that provide opportunities for recreation and the passive enjoyment of nature to densely populated neighborhoods
- A better understanding of how visitors access and use the parks can be beneficial to improve planning and management efforts
- This game camera project is a supplement to a large-scale survey of park user behavior in the Baldwin Hills parks system
- Staff of the Baldwin Hills Conservancy were interested in determining how visitors were accessing and utilizing certain entrances to the parks

Methods

- The study is divided into four phases:
 - May-Sept 2015: identified locations and developed initial research design
 - Oct 2015-April 2016: field tested for positioning; preliminary data collected
 - May-Nov 2016: preliminary data analysis; development of classification system (focus of this poster)
 - In Progress: large-scale data collection and final analysis
- High Definition Trail Cameras were installed at five locations in the Baldwin Hills Parks (Fig 1). Researchers replaced batteries and memory cards on a weekly basis.
- Data were reviewed to evaluate the performance of the cameras as well as to categorize the data from each site.
- 1,001 images from one site were used as the basis for classification

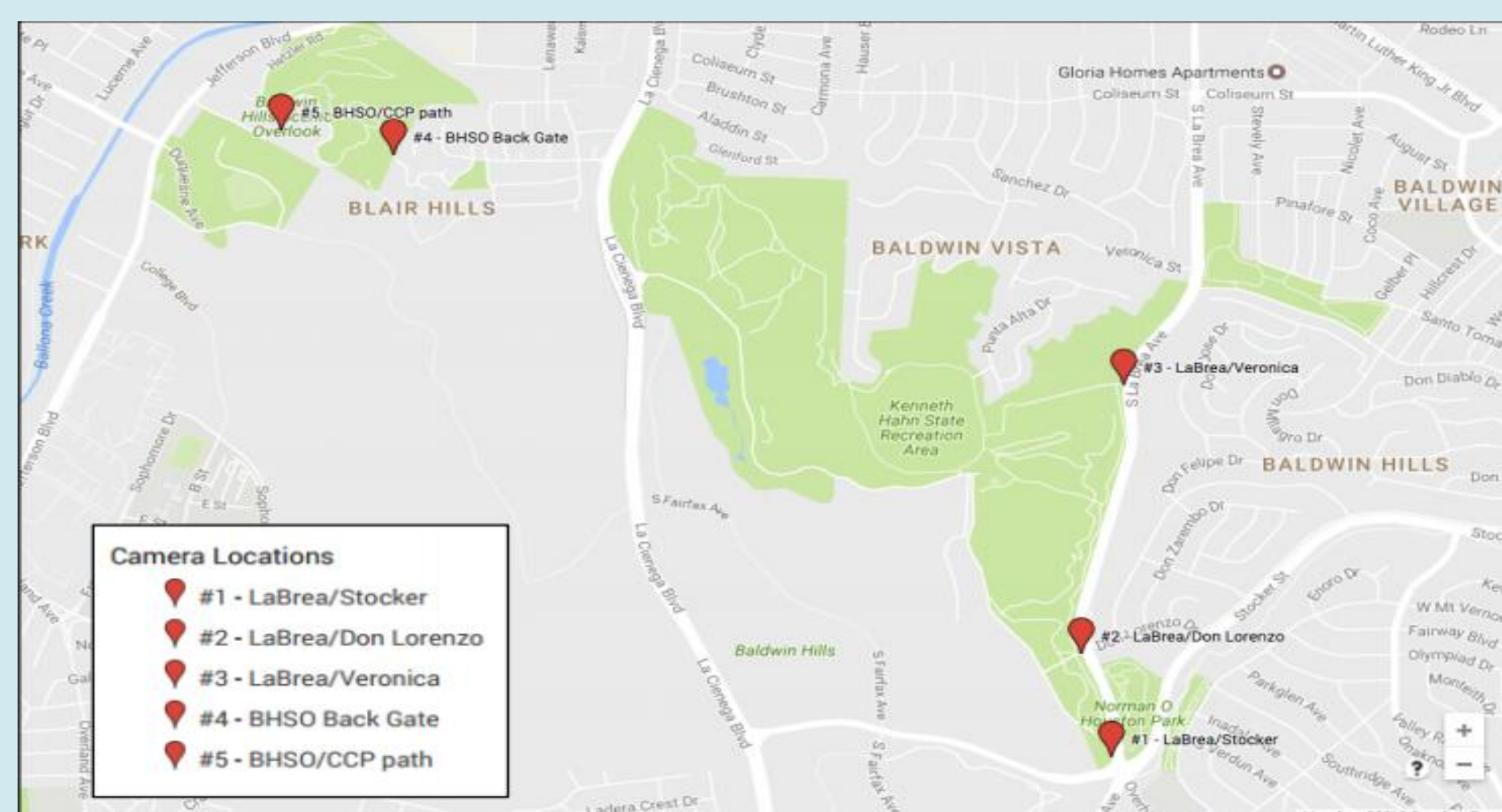


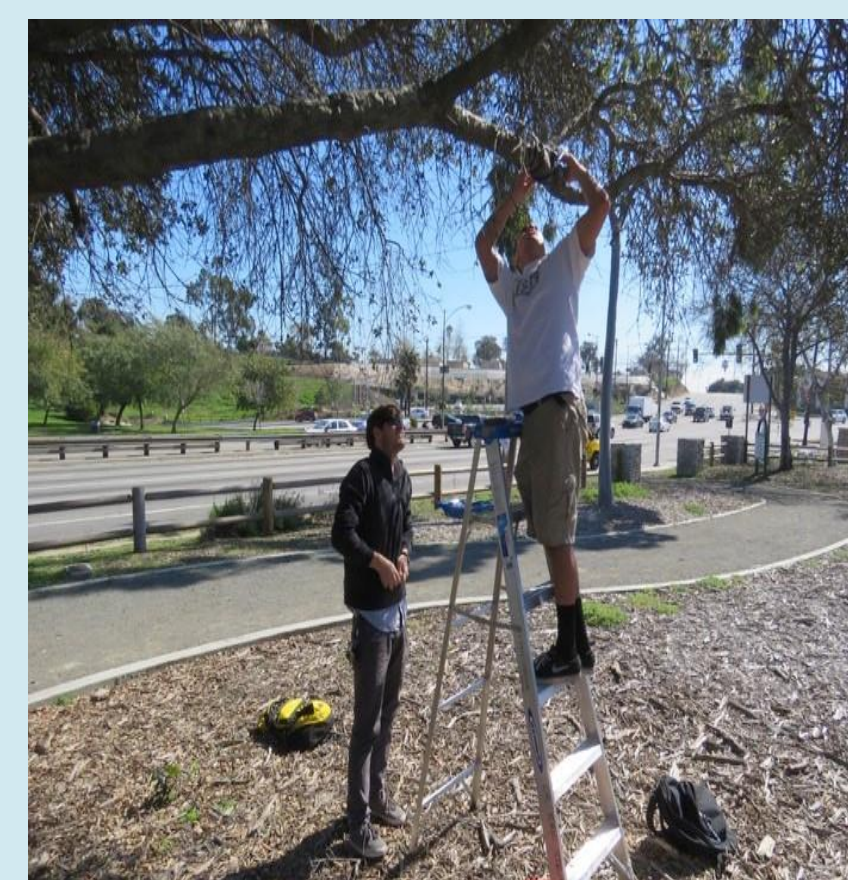
Figure 1. Game camera locations for the Baldwin Hills Park User Study.

Data

Table 1. Game camera data collected for the Baldwin Hills Park User Study from October 2015-April 2016.

Site Number	Site Name	Type of Data	Number of Images	Time Represented
1	Stocker	Video		32 hours 20 min
2	Don Lorenzo	Image	722	
3	Veronica	Video		90 hours 42 min
4	BHSO- Back	Image	6957	
5	BHSO- CCP	Image	0	
			Total Images: 7679	Total Video: 133h 2m

Note: Camera #5 went missing before any data could be retrieved.



Researchers Jorge and Erich setting up Game Camera 1 at the La Brea-Stocker entrance



Game Camera 2 set up at the La Brea-Don Lorenzo Entrance



Researchers Jorge and Erich setting up Game Camera 3 at the Baldwin Hills Culver City Path

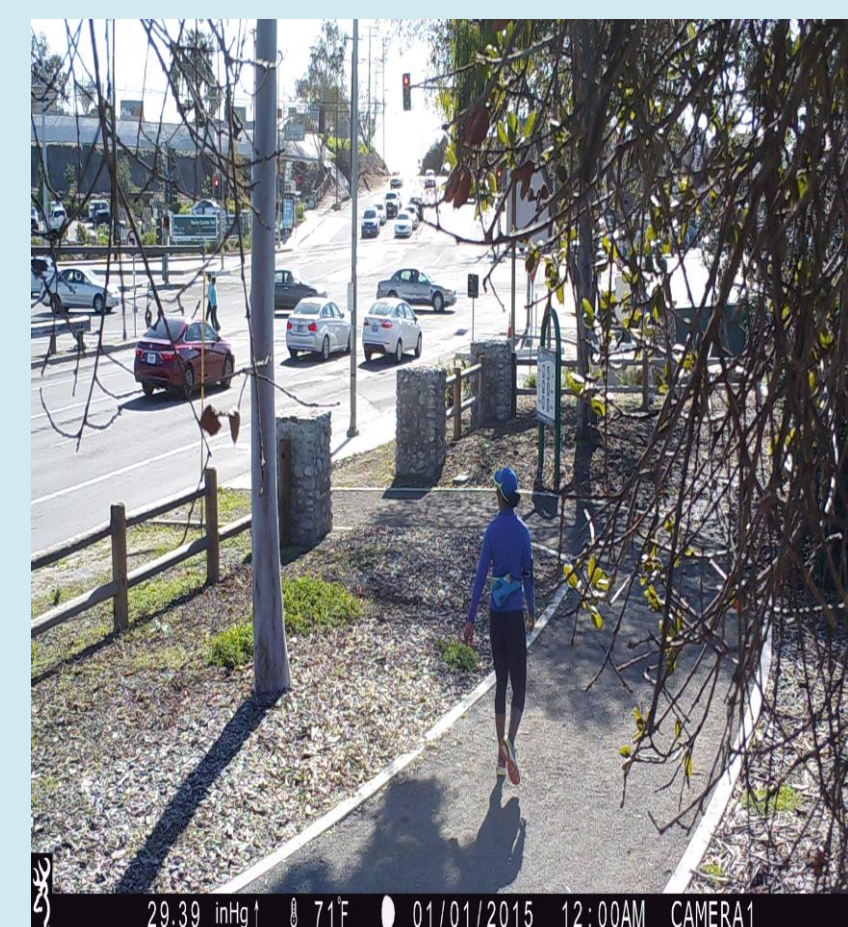


Image collected from Camera 1 depicting an individual exiting the park



Image collected from Camera 4 depicting two individuals walking towards the park's exit

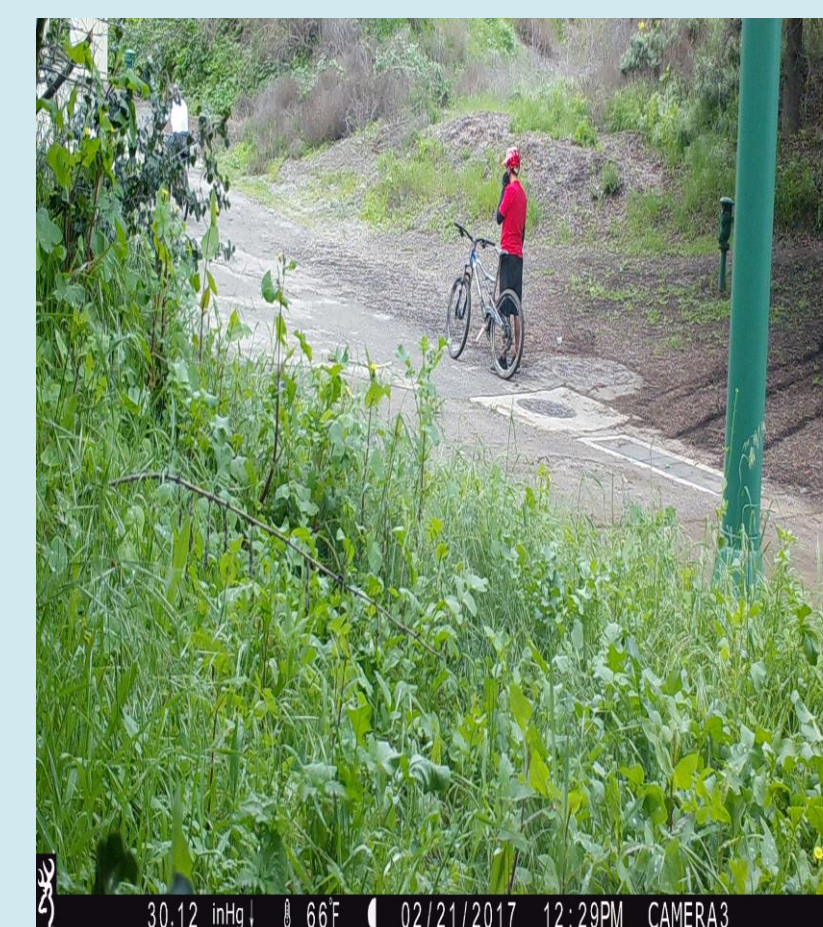


Image collected from Camera 3 depicting a cyclist entering the park

Figure 2. Representative images from Phases 2 and 3 of the Baldwin Hills Park User study.

Table 2. Behaviors captured by game cameras at Site 4, Nov 2015-March 2016. N=1,001 images.

Tags	Description	Counts
P	People	855
Type/Time of Entry		
In	People entering the park	412
Out	People exiting the park	463
Same	Same People: Already accounted for	261
N	Night	80
Number in Group		
1	1 person observed	522
2	2 people observed	269
3	3 people observed	64
4	4 people observed	24
5	5 people observed	3
Behaviors of People		
Active	People are wearing active gear/physical activity	391
B	Bicycle	21
M	Motorized Vehicles	80
S	People smoking	2
Types of People		
W	Workers (individuals wearing uniform)	101
Pregnant	Pregnant individuals	3
Ch	Children	29
False Positives		
FP	False Positive	71
A	Animals	30
Dog	Dog	9
Cat	Cat	2
Liz	Lizard	14
Coyote	Coyote	1

Results

- We spent the majority of Phase 3 inspecting the recorded data and developing tags to help define patterns in park user behavior
- This type of research is inductive, where the observations are collected first and theories are developed towards the end of the process as patterns emerge in the data. Thus, identifying appropriate categories is important to establish early on in the process.
- Table 2 shows the results of the Phase 3 data categorization process. Some preliminary trends:
 - 855 (85%) included one or more visible people
 - The remaining 146 images (15%) were made up of false positives and motor vehicles without a visible person.
 - Overall, the rate of false positives was low, at only 7%, meaning that we were successful in establishing field positions for each camera during Phase 2
 - Only 8% of the entries and exits are at night (indicated by darkness)
 - 261 images were tagged "Same," meaning that the same individual had been already observed in the dataset
 - The majority of users are individuals (61% of "People" images), with 39% traveling to or from the park in groups of two or more
 - Nearly half (46% of "People" images) are engaged in active behavior, whether observed by their fitness clothing and/or their observed actions

Discussion

- These game camera data are effective in establishing how visitors are accessing and using the Baldwin Hills parks
- One area of interest expressed by the staff and Board of the Baldwin Hills Conservancy was if this entrance was being used at night. The data shows very little night usage of the entrance, and Phase 4 analyses can provide more accurate information about the times that the night usage is occurring.
- The "Same" tag supports survey results from Season 2 that 31% of users visit the same park more than once a week
- Though we did not quantify through tags, most observed active behaviors were walking and jogging, though a small number of users were riding bicycles. This is a potential area to expand in Phase 4, as types of activities observed can support the reported results from user survey questions regarding activities in the park.
- We also tagged images with observed young children. As we complete data collection and analysis at all of the sites, this can be a supplement to the demographic data section of the survey. Due to restrictions on human subjects research, we are not able to survey anyone under 18. This game camera data can provide some information about numbers of children entering and exiting the parks.
- In Phase 4, we will focus on large-scale data collection, analysis, and interpretation for all five locations
- At the end of this study, we will have completed a rather extensive pilot study utilizing game cameras to examine user behavior at park entrances, which will help us determine if this is an effective approach for potential future research.

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