



# Creating Stewardship through Discovery:

## *Visitor Participation in the Rocky Mountain National Park / National Geographic BioBlitz*

Natural Resource Report NPS/ROMO/NRR—2016/1278



**ON THE COVER**

Images of Rocky Mountain National Park BioBlitz

Photograph by: Rocky Mountain National Park Photo Gallery: <http://www.nps.gov/romo/photosmultimedia/index.htm> and by Mark Christmas / iLCP on National Geographic Survey website: <http://www.nationalgeographic.com/explorers/projects/bioblitz/>

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Data in this report were collected and analyzed using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

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## Executive Summary

- This study evaluated participants' experiences in a BioBlitz held at Rocky Mountain National Park (ROMO), which was co-sponsored by the National Park Service (NPS) and National Geographic Society (NGS) at ROMO in 2012. Information about why the program was important and benefits accrued from this event were gathered to provide management agencies with a greater understanding of their constituencies. Social outcomes related to the BioBlitz aim to enhance interest in science and stewardship within protected areas.
- Results indicated that BioBlitz participants engaged in a diverse set of activities while visiting Rocky Mountain National Park (ROMO) and came to the program with previous experiences built over an extended period of time.
- Respondents were involved in the BioBlitz for a variety of reasons. The most important factor that encouraged involvement was their attraction to and the appeal of the program. The least important facet of participants' involvement was the idea of centrality, in that most did not organize their life around nor feel that the program was central to their lives.
- The impact of the BioBlitz program manifested in different ways. The program allowed people to experience the park in different ways and provided opportunities to learn from professionals. The impact of participation on understandings of science and nature was also realized through natural resource stewardship. Survey respondents considered themselves to be stewards and felt, stewardship was nature rather than human-oriented, though only reported modest levels of willingness to be individually responsible for protecting ROMO.
- Management agencies should note that the most important source of information for the BioBlitz was "friends, relatives and/or word of mouth." The most important reason for engaging in the program was centered on individuals' contributions to society. Opportunities to learn from others with more experience also compelled participants to engage in this event and may influence future decisions to engage in stewardship activities.
- Half of the respondents at ROMO reported having favorite places within the park and the levels of attachment formed between people and places were mostly driven by affective / emotional bonds, individual identities, and opportunities made available to associate with other people. Given the relative importance of different places within ROMO, management agencies should be careful to prioritize high and low priority settings.
- To more effectively reach and engage with visitors that attended the ROMO BioBlitz, managers should note there were slightly more males than females. Most respondents were just over 45 years of age, the majority was well-educated (at least a four-year college degree), and over half reported earning more than \$75,000 per year. Also, at least half of the respondents were employed outside the home and the majority of those individuals were employed full time. The majority was not Hispanic or Latino and the vast majority was White.
- The diversity of experiences, attitudes, and behaviors reported by survey respondents at ROMO suggest that a "one size fits all" management approach may exclude important segments of the survey population. Research results that shed light on the varied elements that comprise visitor experiences can be used as a guide to most effectively respond to the preferences reported by BioBlitz participants.

## **Acknowledgments**

Data collection at Rocky Mountain National Park was made possible through collaboration with staff at the park and with the assistance of students working within the Human Dimensions of Natural Resources Laboratory at Texas A&M University. This study was approved by: Texas A&M IRB 2012-0493; OMB Approval #1024-0224, Expiration date: August 31, 2014; and Rocky Mountain National Park Research Permit #ROMO-2012-SCI-0048, Expiration date: Dec 31, 2012.



# Introduction

## Overview of Biodiversity Discovery and the National Park Service

The national park system contains some of the most biologically rich ecosystems in the United States. Although vertebrates and vascular plants are often well documented, biodiversity of national parks remains relatively unknown considering the vast number of undocumented invertebrates, non-vascular plants, fungi, and bacteria remaining to be discovered. Management and protection is hindered by few surveys for these lesser-known taxa. The result is that invasive species from these groups can go undetected, and distribution and abundance of rare, threatened and endangered species remain unknown. Greater knowledge of extant species from a full taxonomic array is crucial in order to improve a park's ability to protect its natural resources. All-taxa biodiversity inventories (ATBIs) and BioBlitzes help to assess and document the variety of species within a given area.

National parks also have a large number and rich diversity of visitors; they come to experience, learn about, discover, and explore a park's natural and cultural resources. Visitors generally are limited in their ability to learn about and discover the invertebrate and other unique lifeforms in parks due to the lack of opportunities and expertise. In addition to increasing NPS knowledge of the diversity of life found in parks, ATBIs and BioBlitzes provide safe learning environments for visitors to participate in a new non-traditional park experience. Engaging citizen scientists in supervised biological surveys increases visitor investment and can lead to greater interest in park advocacy and preserving park resources. Utilizing citizen scientists to help document the biodiversity of a park that may harbor tens of thousands of species may seem daunting, but this task is feasible using an ATBI approach that includes BioBlitzes.

The NPS and NGS have been co-sponsoring a large-scale BioBlitz in a park near a large urban area annually since 2006. These BioBlitzes are compressed 24-hour events where teams of volunteer scientists, families, students, teachers, and other community members work together to find and identify as many species of plants, animals, microbes, fungi, and other organisms as possible. There is also a public component to these BioBlitzes, with goals of getting the public interested in biodiversity, science, and park stewardship. NPS-NGS BioBlitzes will be conducted in a different national park each year during the decade leading up to the NPS centennial in 2016. The purpose of this study was to learn more about the type of people who participate in BioBlitzes and examine the social benefits of the NPS-NGS BioBlitz program.

Specifically, the following elements of the BioBlitz experience were examined:

- Participation in the BioBlitz and NPS program
- Experiences with the park that hosted the BioBlitz program
- Commitment to and involvement in BioBlitzes
- Motives for engaging in BioBlitz programs
- Impacts and implications that emerge from participation
- Feelings about the natural environment
- Attachment to places within the protected area
- Stewardship and attitudes toward resource protection
- Socio-demographic characteristics

# Methods

## Data Collection

On-site survey data were collected from volunteers attending the ROMO BioBlitz over a 28-hour period beginning at 10am on Friday, August 24<sup>th</sup> through noon Saturday, August 25<sup>th</sup>, 2012. This sampling period covered the duration of the event. Five trained researchers conducted onsite surveys; three were stationed at the Homestead pick-up and two at the visitor center shuttle drop-off. Every second visitor was approached to participate in the survey. For groups greater than one, adults ( $\geq 18$  years of age) with the most recent birthday were requested to participate. The on-site survey took approximately three minutes to complete and it collected email or postal addresses so that respondents could be asked to participate in a follow-up survey about their BioBlitz experience (see Appendix A).



**Figure 1.** Texas A&M graduate student surveys visitors at Rocky Mountain National Park BioBlitz.

On-site and mailback surveys were completed following Dillman, Smyth and Christian's (2008) protocols for the administration of mixed mode surveys. For the on-site surveys, email addresses, names and postal addresses were collected. For the web-based survey, respondents were sent an email one week after the BioBlitz inviting their participation and directing them to a website where they could complete the survey. At the end of the web-based survey, respondents were sent an automated thank you note for their participation and assistance. Over the following three weeks, non-respondents were sent additional email reminders (one each week,  $n=3$ ) encouraging their participation and feedback.

For the mail surveys, two weeks following the BioBlitz respondents were sent hard copies of the survey. The survey packet contained: (a) a cover letter thanking respondents for their participation and a brief description of the survey; (b) a survey questionnaire; and (c) a stamped, self-addressed return envelope. One week following the initial mailing, a reminder, thank you post card was sent to non-respondents. Two weeks following the initial mailing, another survey packet was sent to non-respondents. A final survey packet was sent to non-respondents one month following the initial mailing. The survey took approximately 25 minutes to complete. It was divided into five sections including questions about: 1) past BioBlitz participation; 2) experience with ROMO NPS.NGS BioBlitz; 3) experience with ROMO; 4) feelings about the natural environment; and 5) socio-demographic information.

## Data Analysis

Completed and usable survey data were coded and entered into a database for analysis using Statistical Package for the Social Sciences (SPSS) Version 20.0. For various response categories, frequency distributions and valid percentages (i.e., percentages excluding missing values) were estimated. Descriptive statistics were also calculated to illustrate mean values (i.e., averages) and standard deviations. Figures were created for selected variables to guide interpretation of the study findings.

# Results

## SECTION A: Response Rate

During the on-site survey, a total of 395 respondents provided their contact details; 382 email addresses and 13 names and postal addresses were collected. Thirty nine emails and three postal addresses were returned owing to faulty information. For the web-based survey, 129 completed surveys were returned and a response rate of 36.4% was obtained. For the mail surveys, the procedures adopted for this investigation yielded a 40.0% response rate.

## SECTION B: Past Involvement

As displayed in Table 1, most respondents (95.3%) were first-time participants in the BioBlitz program. Those that had previously participated in a BioBlitz including the ROMO event reported, on average, that they had taken part in the program less than one time (0.8) within the previous year and had spent 0.8 hours committed to BioBlitz activities per month. About 31.5% of respondents indicated that they participated in other NPS programs at ROMO.

**Table 1.** Respondents' history of participation in BioBlitz and National Park Service programs.

Participation Question	Response	N (%)
First participation in a BioBlitz?	No	6 (4.7%)
	Yes	121 (95.3%)
Participation in other BioBlitz programs over the past three years?	Key Biscayne National Park	1 (25.0%)
	Saguaro	1 (25.0%)
	Soapstone Natural Area	1 (25.0%)
	Indiana Dunes National Lakeshore	1 (25.0%)
Participation in other National Park Service Programs at ROMO?	No	87 (68.5%)
Participation in other National Park Service Programs at ROMO?	Yes <sup>1</sup>	40 (31.5%)

<sup>1</sup> List of other National Park Service Programs at ROMO: Camp Ground Presentations, Ecological Research, Educational Presentations, Evening Programs, Historical Interpretive Talks, Junior Ranger, National Geographic, Ranger-lead Programs, Snowshoeing, Summer Campfires, Bird Walk, Service Learning, Visitor Center Presentations/Programs

## SECTION C: Experience with Rocky Mountain National Park BioBlitz

Table 2 below provides a summary of information sources from which respondents first learned about the NPS/NGS BioBlitz at ROMO. The most cited information source was friends/relatives/word of mouth (36.7%), followed by newspaper/magazine articles (24.0%), other organization(s) they belong to (17.1%), Internet – ROMO (16.8%), Internet – others (8.5%), previous visits to ROMO (2.3%), videos/television/radio (2.3%), previous BioBlitz program participation (1.6%), and convention/visitors' bureau (0.8%).

**Table 2.** Sources of information on the NPS/NGS BioBlitz at Rocky Mountain National Park.<sup>1</sup>

Source	N (%)
Friends/relatives/word of mouth	47 (36.7%)
Newspaper/Magazine article	31 (24.0%)
Other organization(s) I belong to <sup>2</sup>	22 (17.1%)
Internet – Rocky Mountain National Park	21 (16.8%)
Internet – other sites <sup>3</sup>	11 (8.5%)
Previous visit to Rocky Mountain National Park	3 (2.3%)
TVideos/Television/Radio	3 (2.3%)
Local business	3 (2.3%)
Previous BioBlitz participation	2 (1.6%)
Convention/Visitors' Bureau	1 (0.8%)
Chamber of Commerce	0

<sup>1</sup> Respondents could check all that applied so column totals may not equal 100%.

<sup>2</sup> List of other organizations provided by respondents: Colorado Mycological Society, Colorado Native Plant Society, Colorado NICHE Homeschooling Group, CSU Fort Collins, Estes Park Schools, Metropolitan State College of Denver, National Geographic, National Park Service employee/contractor email announcements, National Science Teachers Association, Park School District, Poudre Learning Center, Rocky Mountain Nature Association, University of Colorado – Boulder, YMCA of the Rockies

<sup>3</sup> List of other Internet sites: Facebook, Google, National Geographic, National Park Service

As shown in Table 3, 22.8% of respondents indicated that they had participated in the ROMO BioBlitz as a part of an organization. Most participants (61.4%) reported that they attended with friends, family, or colleagues.

**Table 3.** Organizational affiliation among BioBlitz participants.

Affiliation Question	Response	N (%)
Participated in the Rocky Mountain BioBlitz as a part of an organization?	No	98 (77.2%)
	Yes <sup>1</sup>	29 (22.8%)
Participated in the Rocky Mountain BioBlitz with friends, family or colleagues?	No	46 (38.6%)
	Yes	77 (61.4%)

<sup>1</sup> List of organization: Boy Scout Troop, Colorado Mycological Society, Estes Park Elementary School, Estes Park Middle School, Estes Park High School, Great Old Broads for Wilderness, Metro State University, Metropolitan State University of Denver, National Geographic, NPS, Poudre Learning Center, Poudre School District, U.S. EPA, University of Colorado – Boulder, University of Northern Colorado, USS Silversides Museum, Wild Wonders of Europe

Table 4 presents the degree to which respondents were committed to the NPS/NGS BioBlitz program. Respondents considered the following to be most important (mean  $\geq 3.6$ ):

- Participating in the NPS/NGS BioBlitz at ROMO was exciting ( $M=3.9$ )
- My involvement in the NPS/NGS BioBlitz at ROMO was important to me ( $M=3.8$ )
- I enjoy discussing the NPS/NGS BioBlitz at ROMO with my friends ( $M=3.6$ )
- My involvement with the NPS/NGS BioBlitz at ROMO allowed me to be myself ( $M=3.6$ )

**Table 4.** Reported involvement among participants in the Rocky Mountain National Park BioBlitz.

Involvement <sup>1</sup>	Mean	SD
Participating in the NPS/NGS BioBlitz at ROMO was one of the most enjoyable activities I've participated this year	3.5	1.0
My involvement in the NPS/NGS BioBlitz at ROMO was important to me	3.8	0.9
Participating in the NPS/NGS BioBlitz at ROMO was exciting	3.9	0.8
I organized my leisure time around attending the NPS/NGS BioBlitz at ROMO	3.4	1.3
The NPS/NGS BioBlitzes at ROMO occupied a central role in my life	2.3	1.0
I consider myself to be somewhat of a BioBlitz expert	2.1	1.0
I coordinate my schedule around BioBlitz activities	2.9	1.2
I enjoy discussing the NPS/NGS BioBlitz at ROMO with my friends	3.6	1.0
Most of my friends were in some way connected with the NPS/NGS BioBlitz at ROMO	2.1	1.0
Participating in the NPS/NGS BioBlitz at ROMO allowed me to be myself	3.1	1.1
My involvement with the NPS/NGS BioBlitz at ROMO allowed me to be myself	3.6	0.9
I identify with the people associated with the NPS/NGS BioBlitz at ROMO	3.6	1.0
I identify with other participants who were involved with the BioBlitz at ROMO	3.5	1.0
Participating in the ROMO BioBlitz allowed me to be myself	2.7	1.0

<sup>1</sup> Measured along a Likert-type scale where 1= "Strongly Disagree" through 5= "Strongly Agree"

Table 5 below presents data on respondents' motives for participation in the ROMO BioBlitz. Respondents considered the following as most important to their participation:

- Seek out and enjoy the wonders of nature ( $M =4.2$ )
- Feel like I am supporting the park ( $M =4.1$ )
- Involve myself in something meaningful ( $M =4.2$ )
- Feel I can play a role in the conservation of nature ( $M=4.0$ )
- Make life better for the coming generation ( $M=4.0$ )
- Have an opportunity to try new things ( $M=4.0$ )
- Learn about different species of flora and fauna ( $M=4.0$ )

**Table 5.** Reported motivation among participants in the Rocky Mountain National Park BioBlitz.<sup>1</sup>

<b>Motivation</b>	<b>Mean</b>	<b>SD</b>
Be in a quite peaceful spot	3.2	2.0
Be alone with my thoughts	2.7	2.2
Apply my scientific skills	3.5	1.9
Refine my understanding of science	3.7	1.6
Make life better for the coming generations	4.0	1.1
Feel I am doing something useful	3.7	1.7
Be of benefit to society or the community	3.8	1.6
Feel I can play a role in the conservation of nature	4.0	1.6
Work with different age groups	3.0	1.7
Meet friendly and interesting people	3.7	1.3
Have an opportunity to try new things	4.0	1.0
Involve myself in something meaningful	4.2	1.0
Feel like I am supporting the park	4.1	1.0
Build my self-confidence and personal growth	2.6	1.7
Help with my personal growth	3.4	1.5
Stay healthy	3.4	1.5
Be optimistic about nature's future	3.9	1.2
Learn how nature works	3.8	1.2
Learn about different species of flora and fauna	4.0	1.0
Seek out and enjoying the wonders of nature	4.2	1.1
Learn about the practice of science	3.8	1.1
Other <sup>2</sup>	5.2	1.3

<sup>1</sup> Measured along a Likert-type scale where 1= "Not important" through 5= "Extremely important"

<sup>2</sup> Other motivations: curiosity, education for my kids, for fun, to get ideas for a BioBlitz for my organization

As illustrated in Table 6, respondents indicated that their participation in the ROMO BioBlitz influenced their thoughts about science and nature (all means were 3.8 or higher).

**Table 6.** Impact of participation on thoughts about science and nature.

<b>Impact on perceptions of science and nature<sup>1</sup></b>	<b>Mean</b>	<b>SD</b>
Taught me a lot about a variety of species of plants and animals living in the park	3.8	1.0
Provided me with an opportunity to learn about science	4.1	0.7
Allowed me to experience the park in a new way	4.0	0.9
Provided me with a unique opportunity to learn from professionals	4.3	0.7

<sup>1</sup> Measured along a Likert-type scale where 1= “Strongly Disagree” through 5= “Strongly Agree”

As presented in Table 7, respondents thought that there were potential outcomes of participation in the NPS/NGS BioBlitz at ROMO. Respondents considered the following to be the most important outcomes (with a mean greater than 3.8):

- Improved understanding of biodiversity at Rocky Mountain National Park ( $M=4.0$ )
- Increased knowledge of Rocky Mountain National Park’s ecosystems and lifeforms ( $M=3.9$ )
- Improved understanding of the work undertaken by scientists ( $M=3.9$ )

**Table 7.** Potential outcomes of participation in the BioBlitz at Rocky Mountain National Park.

<b>Outcomes of participation<sup>1</sup></b>	<b>Mean</b>	<b>SD</b>
Increased my knowledge of Rocky Mountain National Park’s ecosystems and lifeforms	4.0	0.9
Improved my understanding of the work undertaken by scientists	3.9	0.9
Improved my understanding of biodiversity at Rocky Mountain National Park	4.0	0.8
Improved my understanding of scientific methods	3.7	1.0
Contributed to the scientific knowledge base of Rocky Mountain National Park	3.6	1.0
Increased my interest in natural resource stewardship	3.8	0.9
Increased my desire to spend time in natural areas	3.8	0.9
Increase my desire to be involved in natural areas stewardship	3.6	0.8

<sup>1</sup> Measured along a Likert-type scale where 1= “Strongly Disagree” through 5= “Strongly Agree”

Table 8 presents potential implications of the BioBlitz program for the national park system. Respondents considered the most important implication of the program to be informing the public about park resources (with a mean of 4.4).

**Table 8.** Potential Implications of the BioBlitz program for the national park system.

<b>Implications for the national parks<sup>1</sup></b>	<b>Mean</b>	<b>SD</b>
Manage the park's natural resources	4.0	0.9
Acquire science-based knowledge about resources in the parks	4.1	0.9
Understand biodiversity within the parks	4.2	0.8
Inform the public about park resources	4.4	0.7

<sup>1</sup> Measured along a Likert-type scale where 1= "Strongly Disagree" through 5= "Strongly Agree"

Table 9 illustrates participants' levels of satisfaction with various activities they observed while attending the NPS/NGS BioBlitz. Respondents were generally satisfied with these elements of their visit (with a mean of 4.1).

**Table 9.** Satisfaction with activities at the Rocky Mountain National Park BioBlitz.

<b>Satisfaction with Activities<sup>1</sup></b>	<b>Response N (%)</b>	<b>Satisfaction Mean (SD)</b>
Opening and/or closing ceremonies	40 (31.0%)	3.9 (1.0)
Entertainment	78 (60.5%)	4.0 (0.6)
Youth ambassador presentations and interactions	48 (37.2%)	4.0 (0.7)
Scientist presentations/talks	94 (72.9%)	4.3 (0.6)
Interactive booth activities	109 (84.5%)	4.3 (0.6)
Information provided at booths	120 (93.0%)	4.3 (0.6)
Science Tent: Opportunities to interact with scientists at work (e.g., identification of specimens, data entry)	104 (80.6%)	4.3 (0.6)
Earning Biodiversity University degrees	48 (37.2%)	3.9 (1.0)
Social media; e.g., blogging, Facebook	30 (23.3%)	3.6 (0.9)
Arts and cultural activities (e.g., drawing, photography, cooking demonstrations, poetry, writing)	71 (55.0%)	4.1 (0.7)

<sup>1</sup> Satisfaction was measured along a Likert-type scale where 1= "Extremely Dissatisfied" through 5= "Extremely Satisfied"



Table 10 shows how various attributes impacted respondents' experiences at the NPS/NGS BioBlitz at ROMO. The attributes that were most satisfactory included "expertise of scientists, naturalists, and technical staff" ( $M=4.4$ ), "assistance provided by NPS staff" ( $M=4.3$ ), "assistance provided by volunteers" ( $M=4.3$ ), and "transportation within ROMO" ( $M=4.3$ ).

**Table 10.** Impact of attributes on experiences at the Rocky Mountain National Park BioBlitz.

<b>Impact of Attributes<sup>1</sup></b>	<b>Response N (%)</b>	<b>Satisfaction Mean (SD)</b>
Availability of food	92 (71.3)	3.5 (1.0)
Availability of drinking water	104 (80.6%)	4.1 (.8)
Scheduling of events	113 (87.6%)	4.0 (.7)
Availability of clean bathrooms	108 (83.7%)	4.0 (.8)
Overall provisions for visitor safety	104 (80.6%)	4.2 (.6)
<i>Dehydration</i>	37 (28.7%)	3.7 (.8)
<i>Sunburn</i>	35 (27.1%)	3.6 (.8)
<i>Heat stress</i>	33 (25.6%)	3.7 (.8)
<i>Elevation sickness</i>	28 (21.7%)	3.7 (.9)
<i>Stinging plants and insects</i>	98 (76.0%)	3.7 (.7)
<i>Minor first aid</i>	26 (20.2%)	3.5 (1.1)
Instructions on when and where to meet	101 (78.3%)	4.0 (.9)
Transportation within ROMO	75 (58.1%)	4.3 (.7)
Assistance provided by NPS staff	112 (86.8%)	4.3 (.7)
Assistance provided by volunteers	114 (88.4%)	4.3 (.6)
Accessibility of scheduled events	113 (87.6%)	4.0 (.7)
Expertise of scientists, naturalists, and technical staff	122 (94.6%)	4.4 (.7)
NPS staff effort to follow- up following the BioBlitz to seek your evaluation	94 (72.9%)	4.1 (.6)

<sup>1</sup> Satisfaction was measured along a Likert-type scale where 1= "Extremely Dissatisfied" through 5= "Extremely Satisfied"

Table 11 describes the influence of respondents' involvement in the BioBlitz at ROMO. The most positive part of the visitor experience that influenced involvement was “promotional material from Rocky Mountain National Park and/or the National Geographic Society” ( $M= 3.8$ ).

**Table 11.** Influences on involvement in Rocky Mountain National Park BioBlitz.

Influences on involvement <sup>1</sup>	Mean	SD
Promotional material from ROMO and/or the National Geographic Society	3.9	0.9
Required waivers; e.g., for photos, permission slips, survey permissions, etc.	3.1	0.5
Information for planning and scheduling	3.7	0.9
Information concerning safety risks	3.3	0.6
NPS/NGS sponsorships to help defray the costs of participation	3.7	1.0

<sup>1</sup> Measured along a Likert-type scale where 1= “Major deterrent” through 5= “Major positive influence”

#### **SECTION D: Experience with Rocky Mountain National Park**

Presented in Table 12 are data on the history of respondents' previous visitation to ROMO. The majority (91.8%) indicated that they had previously visited the park. In general, respondents that reported previously visiting ROMO had extensive use histories. The average BioBlitz participant had been visiting for nearly 30 years ( $M=28.0$ ) and had been to ROMO on ten occasions over the previous month. The sample was comprised of individuals with a broad range of visit histories (ranging from 1940 to 2012). Also, about half (50.8%) of the respondents indicated that they had a favorite location within ROMO (Table 13).

**Table 12.** Rocky Mountain National Park visitation history.

Visitation Question	Response	N (%)
Previous Visitation?	No	112 (91.8%)
	Yes	11 (8.9%)
Year of first visit	Before 1980	45 (40.2%)
	1980 – 1985	10 (8.9%)
	1986 – 1990	15 (13.4%)
	1991 – 1995	7 (6.2%)
	1996 – 2000	8 (7.1%)
	2001 – 2005	7 (6.2%)
	2006 – 2010	17 (15.2%)
	2011	3 (2.7%)

**Table 13.** Favorite place within Rocky Mountain National Park.

<b>Favorite Place</b>	<b>N (%)</b>
No	60 (49.2%)
Yes <sup>1,2</sup>	62 (50.8%)

<sup>1</sup> Where?: Alberta Falls and Mills Lake, Alluvial Fan, Bear Lake, Chapin Pass, Cub Lake, Dream Lake, Emerald Lake, Fall River Road/Valley, Fern and Odessa, Flattop Mountain, Lawn Lake, Lily Lake, Long's Peak, Moraine Park, Sky Pond, The Alpine Tundra, The North Fork Area, Nymph Lake, Trail Ridge Road

<sup>2</sup> Why?: Beauty of nature, solitude, bird watching, hiking/climbing, fly fishing, plants, interesting geography, quiet and peaceful, good trails, early memories, less crowded

Table 14 illustrates the extent of respondents' attachments to their favorite location within ROMO. Overall, respondents were moderately or strongly attached to the park with the average levels of attachment ranging from 3.2 and 4.6. Respondents agreed most with the following statements (with a mean of 4.4 or higher):

- I really enjoy ROMO ( $M=4.6$ )
- ROMO means a lot to me ( $M=4.5$ )
- I have a lot of fond memories of past experiences with family and friends in ROMO ( $M=4.4$ )

**Table 14.** Reported level of attachment formed between people and places within Rocky Mountain National Park.

<b>Place Attachment<sup>1</sup></b>	<b>Mean</b>	<b>SD</b>
ROMO is the best place for the recreation activities that I enjoy	3.5	1.8
Compared to ROMO, there are few satisfactory alternatives	3.0	1.8
I have a lot of fond memories of past experiences with family and friends in ROMO	4.4	1.9
I have a strong emotional bond to ROMO	4.2	1.8
I can't imagine a better place for what I like to do than ROMO	3.6	1.9
I feel ROMO is a part of me	3.8	1.8
I feel a strong sense of belonging to ROMO	3.9	1.8
I identify with ROMO	4.0	1.8
I really enjoy ROMO	4.5	1.8
ROMO means a lot to me	4.2	2.4
Visiting ROMO says a lot about who I am	3.5	1.9
I am happiest when I get to visit ROMO	3.7	0.9
I associate special people in my life with Ro ROMO	3.8	1.0
Visiting ROMO allows me to spend time with my family and friends	4.2	0.8

<sup>1</sup> Measured along a Likert-type scale where 1= "Strongly Disagree" through 5= "Strongly Agree"

## SECTION E: Feelings about the Natural Environment

Presented below in Table 15 are data illustrating how respondents defined “natural resource stewardship” in relation to ROMO. Respondents were also asked “To what extent do you consider yourself a natural resource steward?” on a scale from 1 (“Not at all”) to 7 (“Very much”).

Respondents generally considered themselves to be natural stewards, reporting an average of 5.6 (SD=0.9) on a scale that ranged from 1= “Not at all” through 7= “very much.” Respondents considered the following to be closest to their understanding of stewardship (with a mean of 4.4 or higher):

- Protecting the environment for future generations ( $M=4.5$ )
- Sustainably and responsibly using our natural resources ( $M=4.4$ )
- An ethical responsibility to care for the environment ( $M=4.5$ )
- Trying to reduce my negative impact on the environment ( $M=4.4$ )

**Table 15.** Definitions of natural resource stewardship according to BioBlitz participants

Stewardship <sup>1</sup>	Mean	SD
Managing our natural resources wisely to provide for human needs	4.0	1.0
Sustainably and responsibly using our natural resources	4.4	0.7
Protecting all species because we may find a use for them later (for example, curing diseases)	3.7	1.2
Trying to reduce my negative impact on the environment	4.4	0.7
All animals' and plants' right to exist	4.1	1.0
Considering how others in society are affected when we use natural resources	3.9	0.9
Preserving the environment in its natural state	4.0	0.9
A religious obligation to protect the environment	2.6	1.3
An ethical responsibility to care for the environment	4.5	0.7
Protecting the environment for future generations	4.5	0.6
Nothing at all; the term “natural resource stewardship” has no meaning for me	1.5	0.8

<sup>1</sup> Measured along a Likert-type scale where 1= “Strongly Disagree” through 5= “Strongly Agree”

Table 16 presents respondents' attitudes toward the protection of ROMO. Overall, respondents felt that they could make a personal contribution to reduce environmental problems at the park. Two statements that characterized respondents' environmental attitudes were "It is important for me to reduce my negative personal impacts on the environment of ROMO" ( $M=4.4$ ) and "It is primarily the responsibility of individuals, not the government, to protect the environment of ROMO" ( $M=3.3$ ).

**Table 16.** Attitudes toward protection of Rocky Mountain National Park.

Attitudes <sup>1</sup>	Mean	SD
I am willing to volunteer my time to help the environment of ROMO	3.7	0.9
I do not feel I have any control over whether or not my daily activities harm ROMO	2.0	0.9
It is important for me to reduce my negative personal impacts on the environment of ROMO	4.3	0.8
The efforts of one person to conserve the resources of ROMO are insignificant as long as other people refuse to conserve	1.9	0.9
It is primarily the responsibility of individuals, not the government, to protect the environment of ROMO	3.3	1.1
Because my contribution to environmental problems at ROMO is very small, I do not feel responsible for causing environmental problems in the park today	2.4	1.0

<sup>1</sup> Measured along a scale where 1= "Not at all" through 7= "Very much"

As presented in Table 17, respondents participated in diverse activities at ROMO. The most frequent activities were hiking, wildlife watching or birdwatching, visiting the visitor center/nature center, and nature/landscape photography.

**Table 17.** Activity engagement at Rocky Mountain National Park.

Activities <sup>1</sup>	N (%)
Hiking	113 (87.6)
Wildlife watching or bird watching	95 (73.6)
Visiting the Visitor Center/Nature Center	87 (67.4)
Nature/landscape photography	81 (62.8)
Picnicking	66 (51.2)
Running/Walking for exercise	55 (42.6)
Camping	50 (38.8)
Research	23 (17.8)
Horseback riding	19 (14.7)
Biking	10 (7.8)
Motor boating	2 (1.6)

<sup>1</sup> Respondents checked all activities that apply

## SECTION F: Information about Respondents

Over half of respondents (57.5%) were male (Table 18). The average age was just over 47 years. Respondents were well-educated and had obtained a college degree. More than half (53.6%) indicated being employed outside the home and just under half (48.2%) of the sample reported earning \$75,000 or more. The majority was white (94.4%) and of non-Hispanic origin (93.6%).

**Table 18.** Socio-demographic profile of BioBlitz participants.

Socio-demographic Characteristic	Response Category	N (%)
Gender	Male	73 (57.5%)
	Female	54 (42.5%)
Education	Less than high school	0
	Some high school	0
	High school graduate	3 (2.4%)
	Vocational/trade school certificate	3 (2.4%)
	Some college	12 (9.4%)
	Two-year college degree	10 (7.9%)
	Four-year college degree	48 (37.8%)
	Masters degree	35 (27.6%)
Income	Ph.D., M.D., J.D., or equivalent	16 (12.6%)
	Less than \$24,999	12 (9.9%)
	\$25,000 to \$34,999	6 (5.0%)
	\$35,000 to \$49,999	14 (11.6%)
	\$50,000 to \$74,999	30 (24.8%)
	\$75,000 to \$99,999	20 (16.5%)
	\$100,000 to \$149,999	28 (23.1%)
	\$150,000 to \$199,999	9 (7.4%)
Occupation	\$200,000 or more	2 (1.7%)
	Employed outside the home	73 (58.4%)
	Unemployed	7 (5.6%)
	Retired	23 (18.4%)
	Full-time homemaker	12 (9.6%)
	Student	10 (8.0%)

**Table 18 (continued).** Socio-demographic profile of BioBlitz participants.

<b>Socio-demographic Characteristic</b>	<b>Response Category</b>	<b>N (%)</b>
Ethnicity	Hispanic or Latino	2 (1.6%)
	Not Hispanic or Latino	121 (98.4%)
Race	American Indian or Alaska Native	2 (1.6%)
	Asian	0
	Black or African American	2 (1.6%)
	Native Hawaiian or other Pacific Islander	0
	White	122 (94.4%)

## Discussion

The purpose of this investigation was to better understand visitors / participants that engaged in the NPS-NGS BioBlitz at Rocky Mountain National Park (ROMO). Findings from this BioBlitz provide insight on: (a) visitor participation in BioBlitzes and NPS programs; (b) experiences with the park (c) commitment to and involvement in the BioBlitz program; (d) motives for becoming involved with the BioBlitz program; (e) impacts from participation including understandings of science and nature, park protection behavior, and associated implications for the national park system; (f) attachment to places within the park; (g) stewardship and attitudes toward resource protection; and (h) socio-demographics

Visitor participation in the ROMO BioBlitz and NPS program was examined. Respondents that engaged with this event reported previous experiences with BioBlitz activities, in that most had visited the park previously. The majority of participants were affiliated with an organization and many engaged in program activities with friends, families, and colleagues. Respondents became familiar with the BioBlitz through various outlets including others' recommendations and newspapers and/or magazine articles. While visiting, approximately one third was involved with NPS programs outside of this NPS / National Geographic Society (NGS) sponsored event.

The most popular on-site activities were going to the visitor and/or nature center, wildlife and/or birdwatching, and nature and/or landscape photography. Visitor satisfaction with activities and opportunities to learn about the park were generally high. Informational tents and booths, scientific presentations, and arts / cultural activities were rated particularly high. Other attributes of the visitor experience such as the expertise of organizers, assistance provided by staff and volunteers, and provisions for visitor safety were well-regarded. The availability of food and the electronic fieldtrip were rated relatively low.

Respondents' levels of commitment to the BioBlitz were based on a variety of factors. At ROMO, participants felt that engagement in the program was exciting and important to one's self. Although involvement in the BioBlitz was not central to participants' lives, it was supported by the appealing and attractive nature of the program. The most important influences on involvement were promotional material from the park and/or NGS, information for planning and scheduling, and NPS / NGS sponsorship to help defray costs of participation. Required waivers (e.g., photographs, permission slips) carried relatively less weight in influencing involvement in the ROMO program. The most important motives for becoming involved related to discovering nature and engaging in a meaningful activity. Contributing to society and opportunities to learn from others compelled participants to engage in this event; however, there were mixed results regarding the solitude dimension of motivation, which were noteworthy.

Impacts from participation in the BioBlitz program were widespread. Survey respondents were in agreement with statements indicating that the program provided opportunities to learn from professionals, better understand science, and experience the park in a new way. Various feelings about the natural environment were also influential. Participants reported moderate willingness to engage in park protection behavior such as volunteering time and reducing environmental impacts.



However, responsibility was not ascribed at the individual level to conserve the park's resources and avert negative consequences from environmental impacts. A series of related questions were asked about potential implications of the BioBlitz program for the national park system, and on average, respondents agreed that this kind of event would help manage the park's natural resources, acquire science-based knowledge, understand biodiversity, and inform the public about park resources.

Survey respondents formed connections with places at ROMO. BioBlitz participants reported high levels of place attachment, which likely corresponded to their extensive visitation histories. Over time, respondents have developed connections with places based on emotional ties (e.g., feelings of belongingness and happiness), individual identity (e.g., believing the park is part of one's self), and opportunities to socialize (e.g., spending time with family and friends). Additionally, affect / emotion, social, and individual factors underpinned human-place bonds. These dimensions of place attachment may be supported by relatively high levels of self-expression and social bonding that comprised respondents' involvement in the BioBlitz program. The least important factor that contributed to participants' reported levels of attachment was the notion that places provided unique opportunities that could not be attained elsewhere. This latter finding aligns with past research.

Reported levels of stewardship were examined and respondents at ROMO considered themselves to be natural resource stewards and, in general, the idea of stewardship was more nature-based than human-based. For example, respondents more strongly agreed with statements defining stewardship such as, "all animals and plants have a right to exist" compared to statements such as "managing our natural resources wisely to provide for human need." At ROMO, an analysis of survey items examining attitudes toward protection suggested it was important to reduce negative personal impacts on the environment and that it was up to individuals and not the government to protect the park.

Socio-demographic characteristics indicated that more males than females completed the survey, most were in their mid-40s, were well-educated, and employed outside the home. Between half to three quarters of respondents reported having earned more than \$50,000 on an annual basis. The majority was white and of non-Hispanic origin.

## Implications and Management Options

- Participants should be provided with sufficient background on the purpose of the program, its workings, and how to stay involved into the future. Information to be shared with others will be particularly important to maintain future interest in the program considering the proportion of visitors that becomes aware of BioBlitzes via friends/relatives/word of mouth and involved through organizational affiliations.
- Varied levels of visitation histories should be considered in the provision of information to potential stewards of the parks. At ROMO, individuals that engaged with BioBlitz programs were “regular” visitors and will likely continue to visit the park outside of BioBlitz events.
- Attributes that positively influenced participants (i.e., expertise of scientists, naturalists, and technical staff; assistance provided by NPS staff and volunteers; transportation within ROMO) should be maintained. Other satisfactory on-site experiences (i.e., pre- and post-trip interactions with ROMO staff; schoolyard BioBlitz information from the NGS) should also be encouraged. Aspects of the on-site experience that received relatively lower satisfaction ratings (e.g., availability of food) warrant future attention.
- The most important factor underlying involvement is centered on the attractive nature of the BioBlitz, suggesting that importance and pleasure are associated with engagement and can serve as a source of satisfaction. Managers should note that the program is not central to participants’ lives.
- Motivations reported by survey respondents can be targeted by managers in different ways. The contributions to society that emerge from BioBlitz data collection and opportunities to learn from others are the most important factors that push or pull respondents into BioBlitz activities. At ROMO opportunities to discover nature should be provided to maintain satisfactory experiences that may help ensure continued participation.
- Survey data suggest BioBlitz participants would be willing to engage in park protection behavior and that the individuals are only moderately likely to maintain responsibilities for minimizing impacts. To encourage environmentally-friendly behavior, managers might consider framing interpretation / outreach messages in a way that suggests individual actions can substantially reduce environmental impacts and should be pursued despite reluctance from other people. More pronounced degrees of environmental protection will likely ensue if survey respondents take more ownership over their individual contributions to supporting the national parks, especially at ROMO given the strong environmental attitudes toward park protection reported by survey respondents.
- Levels of place attachment measured by four dimensions were high among ROMO respondents. Affective / emotional bonds were key components of the connections formed between people and places, which can be maintained through experiential opportunities. The BioBlitz program will help to foster attachment to settings given its potential to allow participants to interact with the park in new and exciting ways.

- The majority of survey respondents were not dependent on ROMO for specific activities, which will require more complex approaches to satisfy visitors' needs and communicate management plans. Moving beyond activity and setting-based management will be necessary to consider the experiences, beliefs, and attitudes of survey respondents that comprise the emotional connections formed between people and settings.
- The diversity of experiences, attitudes, and behaviors reported by survey respondents at ROMO suggest that a "one size fits all" management approach may exclude important segments of the survey population. Research results that shed light on the varied elements that comprise visitor experiences can be used as a guide to most effectively respond to the preferences reported by BioBlitz participants.

## **Literature Cited**

Dillman, D. A., L. M. Christian, and J. D. Smyth. 2008. Internet, mail and mixed-mode surveys: The tailored design method. John Wiley and Sons, Hoboken, New Jersey.

# Appendix A: Rocky Mountain National Park BioBlitz Survey Questionnaire

<b>Section A: Past Bioblitz Involvement</b>
---

1. Have you participated in other Bioblitzes prior to your participation in the National Park Service (NPS)/National Geographic Society (NGS) Bioblitz at Rocky Mountain National Park?

\_\_\_\_\_ Yes → Continue to Question 2

\_\_\_\_\_ No → Go to Question 5

2. How many Bioblitzes have you participated in within the last 12 months, including the NPS/NGS Bioblitz at Rocky Mountain National Park?

\_\_\_\_\_ Time(s)

3. On average, how many hours each month do you commit to Bioblitz activities?

\_\_\_\_\_ Hours

4. Which Bioblitzes have you participated in over the past three years? (*Please list*)

a. Rocky Mountain National Park

b. \_\_\_\_\_

c. \_\_\_\_\_

5. Do you participate in other National Park Service presentations or programs at Rocky Mountain National Park? (*check one*)

\_\_\_\_\_ No → Go to question 6

\_\_\_\_\_ Yes → Go to question 5a.

5a. If “yes”, what are these? (List)

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

5b. On average, how many hours each month do you spend on NPS activities at Rocky Mountain National Park?

\_\_\_\_\_ Hours

**Section B: Your Experience with Rocky Mountain National Park NPS/NGS Bioblitz**

6. How did you first learn about the NPS/NGS Bioblitz at [Park Name]? (*check all that apply*)

- |   |  |
|---|--|
| <input type="checkbox"/> Previous Bioblitz participation                  | <input type="checkbox"/> Internet – Other sites (List: _____)            |
| <input type="checkbox"/> Previous visit to Rocky Mountain National Park   | <input type="checkbox"/> Chamber of Commerce                             |
| <input type="checkbox"/> Friends/relatives/word of mouth                  | <input type="checkbox"/> Convention/Visitors’ Bureau                     |
| <input type="checkbox"/> Videos/Television/Radio                          | <input type="checkbox"/> Local businesses                                |
| <input type="checkbox"/> Newspaper/Magazine article                       | <input type="checkbox"/> Other organization(s) I belong to (List: _____) |
| <input type="checkbox"/> Internet – Rocky Mountain National Park homepage | <input type="checkbox"/> Other: _____                                    |

7. Did you come to the NPS/NGS Bioblitz at Rocky Mountain National Park as part of an organization?

\_\_\_\_\_ No    If “No”, please proceed to question 8

\_\_\_\_\_ Yes    If “Yes,” which organization: \_\_\_\_\_

8. Do you have friends, family or colleagues that are also participating in the NPS/NGS Bioblitz at Rocky Mountain National Park?

\_\_\_\_\_ No

\_\_\_\_\_ Yes

9. Below is a list of possible reasons for participating in the NPS/NGS Bioblitz at Rocky Mountain National Park. For each item, please indicate how important the reason is to you for your participation.

Participating in the Bioblitz at Rocky Mountain National Park allowed me to:

	Not important	Somewhat important	Moderately important	Very important	Extremely important
a. Be in a quiet peaceful spot	1	2	3	4	5
b. Be alone with my thoughts	1	2	3	4	5

c. Apply my scientific skills	1	2	3	4	5
d. Refine my understanding of science	1	2	3	4	5
e. Make life better for the coming generation	1	2	3	4	5
f. Feel I am doing something useful	1	2	3	4	5
g. Be of benefit to society or the community	1	2	3	4	5
h. Feel I can play a role in the conservation of nature	1	2	3	4	5
i. Work with different age groups	1	2	3	4	5
j. Meet friendly and interesting people	1	2	3	4	5
k. Have an opportunity to try new things	1	2	3	4	5
l. Involve myself in something meaningful	1	2	3	4	5
m. Feel like I am supporting the park	1	2	3	4	5
n. Build my self-confidence and personal growth	1	2	3	4	5
o. Help me with my personal growth	1	2	3	4	5
p. Stay healthy	1	2	3	4	5
q. Be optimistic about nature's future	1	2	3	4	5
r. Learn how nature works	1	2	3	4	5
s. Learn about different species of flora and fauna	1	2	3	4	5
t. Seek out and enjoy the wonders of nature	1	2	3	4	5
u. Learn about the practice of science	1	2	3	4	5
v. Other	1	2	3	4	5

Describe:

---

10. We'd like to know how strongly you consider yourself to be involved with the NPS/NGS Bioblitz at Rocky Mountain National Park. Please indicate your level of agreement or disagreement with each of the following statements. Please circle only one response for each item.	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. Participating in the NPS/NGS Bioblitz at Rocky Mountain National Park has been one of the most enjoyable activities in which I've participated this year	1	2	3	4	5
b. My involvement with the NPS/NGS Bioblitz at Rocky Mountain National Park was important to me	1	2	3	4	5
c. Participating in the NPS/NGS Bioblitz at Rocky Mountain National Park was exciting	1	2	3	4	5
d. I organized my leisure time around attending the NPS/NGS Bioblitz at Rocky Mountain National Park	1	2	3	4	5
e. The NPS/NGS Bioblitz at Rocky Mountain National Park occupied a central role in my life	1	2	3	4	5
f. I consider myself to be somewhat of a Bioblitz expert	1	2	3	4	5
g. I coordinate my schedule around Bioblitz activities	1	2	3	4	5
h. I enjoy discussing the NPS/NGS Bioblitz at Rocky Mountain National Park with my friends	1	2	3	4	5
i. Most of my friends were in some way connected with the NPS/NGS Bioblitz at Rocky Mountain National Park	1	2	3	4	5
j. Participating in the NPS/NGS Bioblitz at Rocky Mountain National Park provided me with an opportunity to be with friends	1	2	3	4	5
k. My involvement with the NPS/NGS Bioblitz at Rocky Mountain National Park allowed me to be myself	1	2	3	4	5
l. I identify with the people associated with the NPS/NGS Bioblitz at Rocky Mountain National Park	1	2	3	4	5
m. I identify with other participants who were involved with the NPS/NGS Bioblitz at Rocky Mountain National Park	1	2	3	4	5
n. Participating in the NPS/NGS Bioblitz at Rocky Mountain National Park is an important part of my own identity	1	2	3	4	5



11. We would like to know what, if any, impact your participation in the NPS/NGS Bioblitz at Rocky Mountain National Park has had on your thoughts about science and nature. Please circle a number that captures your feelings about each statement.

The NPS/NGS Bioblitz at Rocky Mountain National Park has...	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. ... taught me a lot about a variety of species of plants and animals living in the park	1	2	3	4	5
b. ... provided me with an opportunity to learn about science	1	2	3	4	5
c. ... allowed me to experience the park in a new way	1	2	3	4	5
d. ... provided with a unique opportunity to learn from professionals	1	2	3	4	5

12. The following statements examine potential outcomes associated with your participation in the NPS/NGS Bioblitz at Rocky Mountain National Park. Please circle the number that best represents your level of agreement with each statement.

Participation in the NPS/NGS Bioblitz at Rocky Mountain National Park has...	Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
a. ... increased my knowledge of Rocky Mountain National Park ecosystems and lifeforms	1	2	3	4	5
b. ... improved my understanding of the work undertaken by scientists	1	2	3	4	5
c. ... improved my understanding of biodiversity at Rocky Mountain National Park	1	2	3	4	5

d. ... improved my understanding of scientific methods	1	2	3	4	5
e. ... contributed to the scientific knowledge base of Rocky Mountain National Park	1	2	3	4	5
f. ... increased my interest in natural resource stewardship	1	2	3	4	5
g. ... increased my desire to spend time in natural areas	1	2	3	4	5
h. ... increased my desire to be involved in natural area stewardship	1	2	3	4	5

13. The following statements examine potential implications associated with Bioblitzes for the National Park Service. Please circle the number that best represents your level of agreement with each statement.

	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Disagree nor Agree</b>	<b>Agree</b>	<b>Strongly Agree</b>
Bioblitzes in our national parks will help the National Park Service...					
a. Manage the park's natural resources	1	2	3	4	5
b. Acquire science-based knowledge about resources in the parks	1	2	3	4	5
c. Understand biodiversity within the parks	1	2	3	4	5
d. Inform the public about park resources	1	2	3	4	5

14. We would like to know the activities that you participated or observed while attending the NPS/NGS Bioblitz and how you felt about these activities. Please first check activities that you participated or observed and then indicate how satisfied you were with the selected activity.	Check activities in this column if you participated or observed the activity	If you participated or observed the activity/element of the Bioblitz, how satisfied were you with this activity?				
		Extremely Dissatisfied	Dissatisfied	Neither Dissatisfied or Satisfied	Satisfied	Extremely Satisfied
a. Opening and/or closing ceremonies	<input type="checkbox"/>	1	2	3	4	5
b. Entertainment	<input type="checkbox"/>	1	2	3	4	5
c. Youth ambassador presentations and interactions	<input type="checkbox"/>	1	2	3	4	5
d. Scientist presentations/talks	<input type="checkbox"/>	1	2	3	4	5
e. Interactive booth activities	<input type="checkbox"/>	1	2	3	4	5
f. Information provided at booths	<input type="checkbox"/>	1	2	3	4	5
g. Science Tent: Opportunities to interact with scientists at work (e.g., identification of specimens, data entry)	<input type="checkbox"/>	1	2	3	4	5
h. Earning Biodiversity University degrees	<input type="checkbox"/>	1	2	3	4	5
i. Social media; e.g., blogging, Facebook	<input type="checkbox"/>	1	2	3	4	5
j. Electronic field trip	<input type="checkbox"/>	1	2	3	4	5
k. Arts and cultural activities (e.g., drawing, photography, cooking demonstration, poetry, writing)	<input type="checkbox"/>	1	2	3	4	5

15. We would like to know how the attributes listed below impacted your experience at the NPS/NGS Bioblitz at Rocky Mountain National Park. Please let us know how you felt about each attribute by circling a number that best reflects your experience.	Extremely Dissatisfied	Dissatisfied	Neither Dissatisfied or Satisfied	Satisfied	Extremely Satisfied	Did not experience
a. Availability of food	1	2	3	4	5	<input type="checkbox"/>
b. Availability of drinking water	1	2	3	4	5	<input type="checkbox"/>
c. Scheduling of events	1	2	3	4	5	<input type="checkbox"/>
d. Availability of clean bathrooms	1	2	3	4	5	<input type="checkbox"/>
e. Overall provisions for visitor safety	1	2	3	4	5	<input type="checkbox"/>
Dehydration	1	2	3	4	5	<input type="checkbox"/>
Sunburn	1	2	3	4	5	<input type="checkbox"/>
Heat stress	1	2	3	4	5	<input type="checkbox"/>
Elevation sickness( <i>*Note: will only be used in areas where this may be an issue</i> )	1	2	3	4	5	<input type="checkbox"/>
Stinging plants and insects	1	2	3	4	5	<input type="checkbox"/>
Minor first aid						<input type="checkbox"/>
f. Instructions on when and where to meet	1	2	3	4	5	<input type="checkbox"/>
g. Transportation within Rocky Mountain National Park	1	2	3	4	5	<input type="checkbox"/>
h. Assistance provided by NPS staff	1	2	3	4	5	<input type="checkbox"/>
i. Assistance provided by volunteers	1	2	3	4	5	<input type="checkbox"/>
j. Accessibility of scheduled events	1	2	3	4	5	<input type="checkbox"/>
k. Expertise of scientists, naturalists, and technical staff	1	2	3	4	5	<input type="checkbox"/>
l. NPS staff effort to follow-up following the Bioblitz to seek your evaluation	1	2	3	4	5	<input type="checkbox"/>

16. We would like to know how satisfied you were with the support provided by the NPS before and after the NPS/NGS Bioblitz. For each item below, please indicate your level of satisfaction.	Extremely Dissatisfied	Dissatisfied	Neither Dissatisfied or Satisfied	Satisfied	Extremely Satisfied	Did not experience
a. Pre-trip lesson plans from Rocky Mountain National Park	1	2	3	4	5	<input type="checkbox"/>
b. Pre-trip interactions with Rocky Mountain National Park staff	1	2	3	4	5	<input type="checkbox"/>
c. Post-trip lesson plans from Rocky Mountain National Park	1	2	3	4	5	<input type="checkbox"/>
d. Post-trip interactions with Rocky Mountain National Park staff	1	2	3	4	5	<input type="checkbox"/>
e. Lesson plans from the National Geographic Society	1	2	3	4	5	<input type="checkbox"/>
f. Electronic field trip	1	2	3	4	5	<input type="checkbox"/>
g. <i>Schoolyard Bioblitz</i> Information from the National Geographic Society	1	2	3	4	5	<input type="checkbox"/>

17. To what extent did the following influence your involvement in the Rocky Mountain National Park NPS/NGS Bioblitz.	Major deterrent	Minor deterrent	No influence	Minor positive influence	Major positive influence
a. Promotional material from Rocky Mountain National Park and/or the National Geographic Society	1	2	3	4	5
b. Required waivers; e.g., for photos, permission slip, survey permissions, etc.	1	2	3	4	5
c. Information for planning and scheduling	1	2	3	4	5
d. Information concerning safety risks	1	2	3	4	5
e. NPS/NGS sponsorships to help defray the cost of participation	1	2	3	4	5

**Section C: Your Experience with Rocky Mountain National Park**

18. What year did you first visit the Rocky Mountain National Park? \_\_\_\_\_ Year

Or  Check if this was your first time visiting Rocky Mountain National Park?

19. In the last 12 months, how many times have you visited Rocky Mountain National Park? \_\_\_\_\_  
 \_\_\_\_\_

20. Do you have a favorite or special place within Rocky Mountain National Park?

\_\_\_ NO → Skip to question Section D below

\_\_\_ YES (If YES, please answer 3a and 3b below)

↳ 3a. What is the name of this place? \_\_\_\_\_

↳ 3b. Why is it your favorite? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

21. Please indicate your level of agreement or disagreement with each of the following statements. Please circle only one response for each item.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. Rocky Mountain National Park is the best place for the recreation activities that I enjoy	1	2	3	4	5
b. Compared to Rocky Mountain National Park, there are few satisfactory alternatives	1	2	3	4	5
c. I have a lot of fond memories of past experiences with family and friends in Rocky Mountain National Park	1	2	3	4	5
d. I have a strong emotional bond to Rocky Mountain National Park	1	2	3	4	5
e. I can't imagine a better place for what I like to do than Rocky Mountain National Park	1	2	3	4	5

f. I feel Rocky Mountain National Park is a part of me	1	2	3	4	5
g. I feel a strong sense of belonging to Rocky Mountain National Park	1	2	3	4	5
h. I identify with Rocky Mountain National Park	1	2	3	4	5
i. I really enjoy Rocky Mountain National Park	1	2	3	4	5
j. Rocky Mountain National Park means a lot to me	1	2	3	4	5
k. Visiting Rocky Mountain National Park says a lot about who I am	1	2	3	4	5
l. I am happiest when I get to visit Rocky Mountain National Park	1	2	3	4	5
m. I associate special people in my life with Rocky Mountain National Park	1	2	3	4	5
n. Visiting Rocky Mountain National Park allows me to spend time with my family and friends	1	2	3	4	5

### Section D: Feelings about the Natural Environment

**In this section we would like to know your thoughts and behavior about nature and the extent to which you believe that you can help protect natural resources.**

22. When I hear the term “natural resource stewardship” in relation to Rocky Mountain National Park, I think of... (circle one number for each statement that best reflects your opinion)

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
a. Managing our natural resources wisely to provide for human needs	1	2	3	4	5
b. Sustainably and responsibly using our natural resources	1	2	3	4	5
c. Protecting all species because we may find a use for them later (for example, curing diseases)	1	2	3	4	5
d. Trying to reduce my negative impact on the environment	1	2	3	4	5
e. All animals’ and plants’ right to exist	1	2	3	4	5

f. Considering how others in society are affected when we use natural resources	1	2	3	4	5
g. Preserving the environment in its natural state	1	2	3	4	5
h. A religious obligation to protect the environment	1	2	3	4	5
i. An ethical responsibility to care for the environment	1	2	3	4	5
j. Protecting the environment for future generations	1	2	3	4	5
k. Nothing at all; the term “natural resource stewardship” has no meaning for me	1	2	3	4	5

23. We are interested in understanding how you feel about ways to protect the Rocky Mountain National Park. Please indicate the extent to which you agree or disagree with the following statements. (Circle one number for each statement that best reflects your opinion).

	<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neither agree nor disagree</b>	<b>Agree</b>	<b>Strongly agree</b>
a. I am willing to volunteer my time to help the environment of Rocky Mountain National Park	1	2	3	4	5
b. I do not feel I have any control over whether or not my daily activities harm Rocky Mountain National Park	1	2	3	4	5
c. It is important for me to reduce my negative personal impacts on the environment of Rocky Mountain National Park	1	2	3	4	5
d. The efforts of one person to conserve the resources of Rocky Mountain National Park are insignificant as long as other people refuse to conserve	1	2	3	4	5
e. It is primarily the responsibility of individuals, not the government, to protect the environment of Rocky Mountain National Park	1	2	3	4	5
f. Because my contribution to environmental problems at Rocky Mountain National Park is very small, I do not feel responsible for causing environmental problems in the park today	1	2	3	4	5



24. To what extent do you consider yourself a natural resource steward? (Circle one number that best reflects your opinion).

Very untrue of me	Somewhat untrue of me	Neutral	Somewhat true of me	Very true of me
1	2	3	4	5

25. We are interested in the types of activities you participate in at Rocky Mountain National Park. Please mark ALL of the activities you have participated in at Rocky Mountain National Park over the last 12 months.

- Camping
- Hiking
- Biking
- Running/Walking for exercise
- Visiting the Visitor Center/Nature Center
- Nature/landscape photography
- Picnicking
- Wildlife watching or Birdwatching
- Horseback riding
- Motor boating
- Research

**Section E: Information about You**

26. What is your gender? (*circle one*) 1. Female 2. Male

27. What year were you born? \_\_\_\_\_

28. What is the highest level of formal education you have completed? (*circle one of the following*)

- 1. Less than high school
- 2. Some high school
- 3. High school graduate
- 4. Vocational/trade school certificate
- 6. Two-year college degree
- 7. Four-year college degree
- 8. Master's degree
- 9. Ph.D. M.D. J.D. or equivalent

28. What was your total household income (before taxes) in 2010? (*circle one of the following*)

- |                         |                           |
|-------------------------|---------------------------|
| 1. Less than \$24,999   | 5. \$75,000 to \$99,999   |
| 2. \$25,000 to \$34,999 | 6. \$100,000 to \$149,999 |
| 3. \$35,000 to \$49,999 | 7. \$150,000 to \$199,999 |
| 4. \$50,000 to \$74,999 | 8. \$200,000 or more      |

29. Are you presently:

1. Employed outside the home →

full time

part time →

Occupation: \_\_\_\_\_

2. Unemployed

3. Retired → Previous occupation: \_\_\_\_\_

4. Full-time homemaker

5. Student →

full time

part time

30. Are you Hispanic or Latino? (Circle one)

1. Hispanic or Latino      2. Not Hispanic or Latino

31. What is your race? Please circle one or more.

- |                                     |  |
|-------------------------------------|--|
| 1. American Indian or Alaska Native | 4. Native Hawaiian or other Pacific Islander |
| 2. Asian                            | 5. White                                     |
| 3. Black or African American        |  |

If you have any other comments about Rocky Mountain NP's Bioblitz, please feel to write them below.

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**THANK YOU FOR YOUR TIME AND INPUT**

**PAPERWORK REDUCTION ACT and PRIVACY ACT Statements:**

16 U.S.C. 1a-7 authorizes collection of this information. This information will be used by park managers to better understand the public's participation in the Bioblitz at Rocky Mountain National Park National Park. The information you provided will be protected to the extent possible by the researchers and the managers at Rocky Mountain National Park National Park. Your response to this request is voluntary. The data collected will remain anonymous and there will be no way to connect you to the responses you provide. No action may be taken against you for refusing to supply the information requested. According to the Paperwork Reduction Act a federal agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB number.

**BURDEN ESTIMATE STATEMENT:** The public reporting time for this survey averages 30 minutes per response. Please direct comments regarding the burden estimate or any other aspect for this collection to Sally Plumb, Biodiversity Coordinator, 1201 Oakridge Drive, Suite 200, Fort Collins, CO 80525, (970) 267-2180 or by email at: [sally\\_plumb@nps.gov](mailto:sally_plumb@nps.gov).



The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 121/133814, August 2016

National Park Service  
U.S. Department of the Interior



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