



## Creating Stewardship through Discovery:

### *Visitor Participation in the Saguaro National Park / National Geographic BioBlitz*

Natural Resource Report NPS/SAGU/NRR—2016/1269



**ON THE COVER**

Images of Saguaro National Park

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## Executive Summary

- This study evaluated participants' experiences in a BioBlitz held at Saguaro National Park (SAGU), which was co-sponsored by the National Park Service (NPS) and National Geographic Society (NGS) 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.
- BioBlitz participants engaged in a diverse set of activities and over half were involved with the BioBlitz program as part of an organized group. Respondents had extensive visitation history in terms of average annual visits and number of years visiting. To engage these individuals in future events, managers should note that the most important source of information for the BioBlitz was "friends, relatives and/or word of mouth."
- Respondents were involved with 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 did organize their life around nor feel that the program was central to their lives.
- The impact of the BioBlitz program manifested in different ways according to survey respondents. The most important statement characterizing the impact of participation on understandings of science and nature was, "the program has allowed me to experience the park in a new way." The program also provided opportunities to learn from professionals.
- Respondents considered themselves to be natural resource stewards and most felt their stewardship was nature rather than human-oriented. Along similar lines, respondents' inclinations for park protection indicated the majority was modestly willing but did not feel responsible to engage in protectionist behavior.
- 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.
- Respondents felt connected to places in the park and approximately one third reported having favorite places within the protected area. 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 places within SAGU, management agencies should be careful to prioritize high and low priority settings within the park.
- Overall, there were slightly more males than females that attended this event. Most respondents were between 45 and 50 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 SAGU 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 Saguaro 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 IRB2011-0741; OMB Approval #1024-0224, Expiration date: August 31, 2014; Saguaro National Park Research Permit #SAGU-2011-SCI-0007, Expiration date: Dec 31, 2012.

## Introduction

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 park
- Stewardship and attitudes toward resource protection
- Socio-demographic characteristics

## Methods

### Data Collection

Data were collected from volunteers attending the SAGU BioBlitz over a 28-hour period beginning 10am Friday October 21<sup>st</sup> through noon Saturday October 22<sup>nd</sup>. This sampling period covered the duration of the event. Five trained researchers conducted onsite surveys; three were stationed at the car parking lot and two at the visitor center exhibition area. 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 asked to participate. The survey took approximately three minutes to complete.



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

At the conclusion of the on-site survey, respondents were requested to provide their email or postal address to participate in a follow-up survey about their SAGU BioBlitz experience following Dillman, Smyth and Christian's (2008) protocols for the administration of mixed mode surveys. For the web-based survey, respondents were sent an email one week after the BioBlitz inviting their participation and directing them to a website to complete the survey. At the end of the survey, respondents were sent an automated thank you note for the 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 event, respondents were sent hard copies of the survey. The survey packet contained: (a) a cover letter thanking them 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. Both the web-based and mailback surveys took 25 minutes to complete.

### 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

The survey protocols adopted for the on-site survey elicited 300 completed questionnaires with 22 refusals (93.2% response rate). Two hundred and fifty five respondents provided additional contact details; 213 email addresses and 42 names/postal addresses. Nineteen emails and eight postal addresses were returned owing to bad addresses. For the follow-up surveys, 159 completed surveys were collected (69.7% response rate).

## SECTION B: Involvement in BioBlitz and Park Programs

Table 1 presents results illustrating survey respondents' involvement in the SAGU BioBlitz and other programs provided by the NPS. The majority (96.2%) had not previously participated in a BioBlitz program and reported engaging in less than one ( $M=1.7$ ) program during the previous year. Approximately one third (34%) participated in other NPS programs while visiting the park and dedicated several hours ( $M=5.4$ ) to these activities on a monthly basis.

**Table 1a.** Number and percent of respondents that have participated in BioBlitz and park activities.

| Participation Question  | Response                       | N (%)          |
|---|--------------------------------|----------------|
| Previous participation in a BioBlitz?                                   | No                             | 153<br>(96.2%) |
|   | Yes                            | 6 (3.8%)       |
| Other BioBlitz/ATBI programs participated in over the past three years? | Acadia NP                      | 1(25.0%)       |
|   | Indiana Dunes                  | 1(25.0%)       |
|   | Santa Monica Mountains         | 1(25.0%)       |
|   | Sierra San Antonio, Sonora, MX | 1(25.0%)       |
| Participation in other NPS Programs at Saguaro National Park?           | No                             | 105<br>(66.0%) |
|   | Yes <sup>1</sup>               | 54 (34.0%)     |

<sup>1</sup>List of other National Park Service Programs at Saguaro NP: Bird Walks, Cultural Heritage Fairs, Desert Night, Environmental Education, Exotic Species Removal Field Trip, Fiesta de Saguaro, History of Saguaro Research, Junior Park Ranger Program, Native American Festival, Sunset/Moonlight Walk, Ranger Talks, Saguaro Fruit Harves, Weed Free Trails, Archaeology Site Steward, Guided Cactus Walk, Ramada Dedication

**Table 1b.** Mean and standard deviation of respondents that have participated in BioBlitz and park activities.

| <b>Participation Question</b>   | <b>Response</b>                     |
|---|-------------------------------------|
| Average hours of participation / month in other National Park Service programs at Saguaro NP?     | <i>Mean</i> =5.4<br><i>SD</i> =9.0  |
| Number of BioBlitz programs attended over previous 12 months?                                     | <i>Mean</i> =1.7<br><i>SD</i> =1.2  |
| Average hours of participation in BioBlitz activities per a month?                                | <i>Mean</i> =2.8<br><i>SD</i> =2.2  |
| Average hours of participation in other National Park Service programs at Saguaro NP per a month? | <i>Mean</i> =5.4,<br><i>SD</i> =9.0 |

Survey respondents heard about the BioBlitz program through a variety of outlets (Table 2). The most cited source of information was friends, relatives and/or word of mouth (22.5%). There were also other organizations to which respondents belonged (22.3%) and newspaper and/or magazine articles (16.2%) that brought the BioBlitz program to participants' attention.

**Table 2.** Information sources about the BioBlitz program at Saguaro National Park.

| <b>Information Source</b>                      | <b>N (%)</b> |
|--|--------------|
| Friends/relatives/word of mouth                | 60 (33.5%)   |
| Other organization(s) I belong to <sup>1</sup> | 40 (22.3%)   |
| Newspaper/Magazine article                     | 29 (16.2%)   |
| Previous visit to Saguaro National Park        | 13 (7.3%)    |
| Internet for Saguaro National Park             | 12 (6.7%)    |
| Internet (other) <sup>2</sup>                  | 11 (6.1%)    |
| Videos/Television/Radio                        | 6 (3.4%)     |
| Previous BioBlitz/ATBI program participation   | 5 (2.8%)     |
| Convention/Visitors' Bureau                    | 3 (1.7%)     |
| Chamber of Commerce                            | 0            |

<sup>1</sup>List of other organization provided by respondents: Arizona Game & Fish Dept, Arizona Science Teachers Association, Arizona Sonora Desert Museum, ASU CACSCB, Cactus Ranger, Central Arizona Chapter of the Society for Conservation Biology, Coromado National Memorial, Desert Museum-earth camp, MFA University of Arizona, NPCA, Paulo Freire Freedom School, Project Noah, Sabino Canyon Volunteer Naturalists, Saguaro Desert Museum, SCVN, Sierra Club, Sky Island Alliance, Student Conservation Association, TEP, Tucson Electric Power Community Action Team, Tucson Girls Chorus, University of Arizona-College of Public Health/EOL, Manzo Elementary School

<sup>2</sup>List of other Internet sources: Facebook, Desert Museum, Google, National Geographic

Table 3 illustrates respondents’ organizational affiliations. Just over half (57.9%) of SAGU participants were part of an organization and three quarters (74.8%) knew friends, family, or colleagues participating in the event.

**Table 3.** Organizational affiliations among respondents at Saguaro National Park.

| Affiliation Question   | Response | N (%)      |
|--|----------|------------|
| Participated in the BioBlitz as a part of an organization?       | No       | 92 (57.9%) |
|  | Yes      | 67 (42.1%) |
| Participated in the BioBlitz with friends, family or colleagues? | No       |            |
|  | Yes      | 40 (25.2%) |

<sup>1</sup>List of organizations: Altar Valley Middle School, Arizona Native Plant Society, Arizona Sonora Desert Museum, Cactus Ranger, Castle Hill country day school, Central Arizona Chapter of the Society for Conservation Biology, Chicago Academy of Sciences, Citizens for Picture Rocks and Friends of the Jaguar, Encyclopedia of Life, Friends of Ironwood Forest, Junior Ranger, Khalsa Motessori School, Lisa Haynes\_UA, Manzo Elementary School, Marana High School Earth Club, Paolo Frieri School, Poetry Reading, Project Noah, Robles Elementary School, Sierra club, Sky Island Alliance, Summit Hut, The Student Conservation Association, Tucson Electric Power, Tucson Girls Chorus, Tucson Trails Tribute, University of Arizona: College of Public Health, Valencia Middle school, Tucson Unified School District

Respondents were compelled to participate in the SAGU BioBlitz for a variety of reasons (Table 4). The most important reported motives were:

- Feel I can play a role in the conservation of nature ( $M=4.1$ )
- I like to support the park ( $M=4.1$ )
- Involve myself in something meaningful ( $M=4.0$ )
- Make life better for the coming generation ( $M=3.9$ )
- Feel I am doing something useful ( $M=3.9$ )

**Table 4.** Motivations for involvement in the BioBlitz program at Saguaro National Park.

| Motivation                                 | Mean <sup>1</sup> | SD  |
|--|-------------------|-----|
| Be in a quiet peaceful spot                | 2.1               | 1.5 |
| Be alone with my thoughts                  | 1.7               | 1.4 |
| Apply my scientific skills                 | 2.4               | 2.1 |
| Refine my understanding of science         | 3.2               | 1.3 |
| Make life better for the coming generation | 3.9               | 1.1 |
| Feel I am doing something useful           | 3.9               | 1.2 |
| Be of benefit to society or the community  | 3.8               | 1.1 |

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

**Table 4 (continued).** Motivations for involvement in the BioBlitz program at Saguaro National Park.

| Motivation   | Mean <sup>1</sup> | SD  |
|--|-------------------|-----|
| Feel I can play a role in the conservation of nature | 4.1               | 1.1 |
| Work with different age groups                       | 3.0               | 1.4 |
| Meet friendly and interesting people                 | 3.6               | 1.1 |
| Opportunity to try new things                        | 3.8               | 1.0 |
| Involve myself in something meaningful               | 4.0               | 1.5 |
| I like to support the park                           | 4.1               | 1.4 |
| Help build my self-confidence                        | 2.1               | 1.2 |
| Help me with my personal growth                      | 2.7               | 1.3 |
| Help me to stay healthy                              | 2.7               | 1.4 |
| Help me to be optimistic about nature's future       | 3.5               | 1.3 |
| Learn how nature works                               | 3.7               | 1.2 |
| Learn about different species of flora and fauna     | 3.8               | 1.5 |
| Seek out and enjoying the wonders of nature          | 3.9               | 1.5 |
| Learn about the practice of science                  | 3.5               | 1.6 |

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

Table 5 presents results suggesting the degree to which respondents were committed to the NPS (including SAGU) BioBlitz program. Respondents considered the following most important:

- My involvement in the Saguaro BioBlitz program is important to me ( $M=3.9$ )
- Participating in the Saguaro BioBlitz program is exciting ( $M=3.8$ )
- I identify with the people associated with Saguaro BioBlitz programs ( $M=3.7$ )
- I enjoyed discussing the Saguaro BioBlitz with my friends ( $M=3.6$ )

**Table 5.** Involvement in the BioBlitz program at Saguaro National Park.

| Involvement  | Mean <sup>1</sup> | SD  |
|--|-------------------|-----|
| Participating in the Saguaro BioBlitz program is one of the most satisfying things I've done | 3.4               | 1.3 |
| My involvement in the Saguaro BioBlitz program is important to me                            | 3.9               | 0.6 |
| Participating in the Saguaro BioBlitz program is exciting                                    | 3.8               | 0.8 |
| A lot of my life was organized around the Saguaro BioBlitz                                   | 2.3               | 1.3 |

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

**Table 5 (continued).** Involvement in the BioBlitz program at Saguaro National Park.

| <b>Involvement</b>   | <b>Mean<sup>1</sup></b> | <b>SD</b> |
|--|-------------------------|-----------|
| The Saguaro BioBlitz occupied a central role in my life                          | 2.2                     | 1.0       |
| I consider myself to be somewhat of a BioBlitz expert                            | 2.1                     | 1.0       |
| I coordinate my schedule around BioBlitz activities                              | 1.6                     | 0.6       |
| I enjoyed discussing the Saguaro BioBlitz with my friends                        | 3.6                     | 1.3       |
| Most of my friends were in some way connected with the Saguaro BioBlitz          | 2.3                     | 1.0       |
| Participating in the Saguaro BioBlitz allowed me to be myself                    | 2.7                     | 1.7       |
| My involvement with the Saguaro BioBlitz program allows me to be myself          | 3.3                     | 1.4       |
| I identify with the people associated with Saguaro BioBlitz programs             | 3.7                     | 1.3       |
| I could tell a lot about a person by their involvement with the Saguaro BioBlitz | 3.1                     | 1.3       |
| Participating in the BioBlitz/ATBI program says a lot about who I am             | 3.2                     | 0.8       |

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

Participation in the BioBlitz program positively influenced surveys respondents’ understandings of science and nature, overall knowledge, and it carried implications for the NPS (Table 6).

Respondents were in agreement with four statements that reflected the extent to which the BioBlitz program impacted understandings of science and nature (all means were  $\geq 3.7$ ). There were other beneficial outcomes from involvement in the BioBlitz program, in that participation increased knowledge of SAGU’s ecosystems and lifeforms ( $M=4.0$ ) and improved understandings of biodiversity ( $M=4.0$ ). Respondents also felt that the BioBlitz program contributed to the park’s ability to manage natural resources ( $M=4.0$ ), inform the public about park resources ( $M=4.2$ ), understand biodiversity within the park ( $M=4.3$ ), and acquire science-based knowledge ( $M=4.3$ ).

**Table 6.** Impact of participation in the Saguaro BioBlitz on understanding of science and nature.

| <b>Impact Categories</b>                       | <b>Impact Response</b>  | <b>Mean<sup>1</sup></b> | <b>SD</b> |
|--|---|-------------------------|-----------|
| Impact on Understandings of Science and Nature | The Saguaro program has taught me a lot about a variety of species of plants and animals living in the park | 3.7                     | 0.9       |
|  | The Saguaro program has provided me with a unique opportunity to learn from professionals                   | 3.8                     | 0.9       |
|  | The Saguaro program has allowed me to experience the park in a new way                                      | 3.9                     | 0.8       |
|  | The Saguaro program has provided me with an opportunity to learn about science                              | 3.9                     | 0.9       |
| Overall Outcomes                               | Increased my knowledge of Saguaro National Park’s ecosystems and lifeforms                                  | 4.0                     | 0.7       |

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



**Table 6 (continued).** Impact of participation in the Saguaro BioBlitz on understanding of science and nature.

| Impact Categories                                 | Impact Response   | Mean <sup>1</sup> | SD  |
|---|---|-------------------|-----|
| <b>Overall Outcomes (continued)</b>               | Improved my understanding of the work undertaken by scientists        | 3.9               | 0.8 |
|   | Improved my understanding of biodiversity at Saguaro National Park    | 4.0               | 0.7 |
|   | Improved my understanding of scientific methods                       | 3.6               | 0.7 |
|   | Contributed to the scientific knowledge base of Saguaro National Park | 3.7               | 1.3 |
|   | Increased my interest in natural resource stewardship                 | 3.7               | 0.8 |
|   | Increased my desire to spend time in natural areas                    | 3.7               | 0.9 |
|   | Increase my desire to be involved in natural areas stewardship        | 3.7               | 0.8 |
| <b>Implications for the National Park Service</b> |   |                   |     |
| <b>Implications for the National Park Service</b> | Manage the park’s natural resources                                   | 4.0               | 0.7 |
|   | Acquire science-based knowledge about resources in the parks          | 4.2               | 0.6 |
|   | Understand biodiversity within the parks                              | 4.3               | 0.6 |
|   | Inform the public about park resources                                | 4.3               | 0.7 |

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

### SECTION C: Experience with Saguaro National Park

Respondents had different levels of experience history with SAGU (Table 7). SAGU BioBlitz participants had been visiting the park for a range of years and, on average, visited nearly seven times in the previous 12 months. Approximately one third (32.4%) reported having a favorite place within the park.

**Table 7.** Respondents reported experiences with Saguaro National Park.

| Experience Question  | Response         | N (%)       |
|----------------------|------------------|-------------|
| Favorite place?      | No               | 109 (68.6%) |
|                      | Yes <sup>1</sup> | 50 (31.4%)  |
| Year of First Visit? | Before 1980      | 30 (18.9%)  |
|                      | 1980 – 1985      | 10 (6.3%)   |
|                      | 1986 – 1990      | 14 (8.8%)   |
|                      | 1991 – 1995      | 10 (6.3%)   |

<sup>1</sup>Hill on the bike loop, Bee Rocks, Bridal Veil Falls, Camino Del Cerro Trail, Desert Museum, Signal Hill, Gates Pass, East loop, King's Canyon (4), Madrona Canyon(5), Signal Hill, Tanque Verde Ridge Trail, Top of Wasson Peak, West Unit of the park, Wild Horse Canyon

**Table 7 (continued).** Respondents reported experiences with Saguaro National Park.

| Experience Question                 | Response    | N (%)      |
|-------------------------------------|-------------|------------|
| Year of First Visit<br>(continued)? | 1996 – 2000 | 27 (17.0%) |
|                                     | 2001 – 2005 | 18 (11.3%) |
|                                     | 2006 – 2010 | 25 (15.7%) |
|                                     | 2011        | 25 (15.7%) |

<sup>1</sup>Hill on the bike loop, Bee Rocks, Bridal Veil Falls, Camino Del Cerro Trail, Desert Museum, Signal Hill, Gates Pass, East loop, King's Canyon (4), Madrona Canyon(5), Signal Hill, Tanque Verde Ridge Trail, Top of Wasson Peak, West Unit of the park, Wild Horse Canyon

Results presented in Table 8 show respondents' levels of attachment to places within SAGU. Overall, respondents were moderately attached to the park with most means for the individual items ranging from 2.5 to 3.8. The following statements were rated highest by BioBlitz participants:

- I really enjoy Saguaro National Park ( $M=3.8$ )
- I have a lot of fond memories of past experiences with family and friends in Saguaro National Park ( $M=3.7$ )
- Saguaro National Park means a lot to me ( $M=3.5$ )
- I have a strong emotional bond to Saguaro National Park ( $M=3.5$ )

**Table 8.** Reported levels of attachment to places in Saguaro National Park.

| Place Attachment   | Mean <sup>1</sup> | SD  |
|--|-------------------|-----|
| Saguaro NP is the best place for the recreation activities that I enjoy                            | 3.3               | 1.9 |
| Compared to Saguaro National Park, there are few satisfactory alternatives                         | 2.5               | 2.5 |
| I have a lot of fond memories of past experiences with family and friends in Saguaro National Park | 3.7               | 2.6 |
| I have a strong emotional bond to Saguaro National Park  | 3.5               | 2.6 |
| I can't imagine a better place for what I like to do than Saguaro National Park                    | 2.8               | 2.5 |
| I feel Saguaro National Park is a part of me   | 3.2               | 2.6 |
| I feel a strong sense of belonging to Saguaro National Park  | 3.3               | 2.6 |
| I identify with Saguaro National Park  | 3.0               | 3.0 |
| I really enjoy Saguaro National Park   | 3.8               | 2.6 |
| Saguaro National Park means a lot to me  | 3.5               | 3.1 |
| Visiting Saguaro National Park says a lot about who I am   | 3.0               | 2.5 |

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

**Table 8 (continued).** Reported levels of attachment to places in Saguaro National Park.

| Place Attachment   | Mean <sup>1</sup> | SD  |
|--|-------------------|-----|
| I am happiest when I get to visit Saguaro National Park                              | 2.8               | 2.5 |
| I associate special people in my life with Saguaro National Park                     | 3.1               | 2.6 |
| The time spent at Saguaro National Park allows me to bond with my family and friends | 3.3               | 2.6 |

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

#### **SECTION D: Feelings about the Natural Environment**

Survey respondents’ generally agreed with a series of statements that measured “natural resource stewardship” in relation to SAGU (Table 9). Respondents considered the following as most close to their meaning of stewardship:

- Protecting the environment of Saguaro National Park for future generations ( $M=4.4$ )
- Preserving Saguaro National Park’s environment in its natural state ( $M=4.3$ )
- An ethical responsibility to care for the environment of Saguaro National Park ( $M=4.3$ )

**Table 9.** Natural resource stewardship in relation to Saguaro National Park.

| Stewardship  | Mean <sup>1</sup> | SD  |
|--|-------------------|-----|
| Managing our natural resources wisely to provide for human needs                               | 3.7               | 1.7 |
| Sustainably and responsibly using our natural resources  | 4.1               | 1.6 |
| Protecting all species because we may find a use for them later (for example, curing diseases) | 3.7               | 1.7 |
| Trying to reduce my negative impact on the environment   | 4.2               | 1.6 |
| All animals’ and plants’ right to exist  | 4.1               | 1.7 |
| Considering how others in society are affected when we use natural resources                   | 4.1               | 1.6 |
| Preserving the environment in its natural state  | 4.3               | 1.6 |
| A religious obligation to protect the environment  | 2.5               | 1.8 |
| An ethical responsibility to care for the environment  | 4.3               | 1.6 |
| Protecting the environment for future generations  | 4.4               | 1.6 |
| Nothing at all; the term “natural resource stewardship” has no meaning for me                  | 1.3               | 1.4 |

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

Table 10 presents results illustrating respondents’ attitudes toward protection of SAGU. Overall, respondents felt they could make personal contributions to reduce environmental problems at the park. Respondents most strongly agreed with the statement “It is important for me to reduce my

negative personal impacts on the environment of Saguaro National Park.” When asked the extent to which they considered themselves to be stewards, participants reported an average value of 5.3 ( $SD=1.2$ ) on a scale that ranged from 1= “Not at all” through 7= “very much.”

**Table 10.** Attitudes toward resource protection of Saguaro National Park.

| <b>Attitudes</b>  | <b>Mean<sup>1</sup></b> | <b>SD</b> |
|---|-------------------------|-----------|
| I am willing to volunteer my time to help the environment of Saguaro National Park  | 3.3                     | 1.9       |
| I do not feel responsible for causing environmental problems in the park today  | 1.8                     | 1.4       |
| I am willing to pay more for the products I buy or services I use if it improves the environment of Saguaro NP  | 3.5                     | 1.6       |
| It is important for me to reduce my negative personal impacts on the environment of Saguaro NP  | 3.9                     | 1.6       |
| The efforts of one person to conserve the resources of Saguaro NP are insignificant as long as other people refuse to conserve  | 2.0                     | 1.5       |
| It is primarily the responsibility of individuals, not the government, to protect the environment of Saguaro NP   | 2.7                     | 1.8       |
| Because my contribution to environmental problems at Saguaro NP is very small, I do not feel I have any control over whether or not my daily activities harm Saguaro NP | 2.1                     | 1.5       |

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

Respondents engaged in a variety of activities at SAGU (Table 11). The most popular activities were hiking (76.9%), visiting the visitor and/or nature center (71.2%), and wildlife and/or birdwatching (54.7%).

**Table 11.** Activity engagement among BioBlitz participants at Saguaro National Park.

| <b>Activities</b>                         | <b>N (%)<sup>1</sup></b> |
|---|--------------------------|
| Hiking                                    | 120 (76.9%)              |
| Visiting the Visitor Center/Nature Center | 109 (71.2%)              |
| Nature/landscape photography              | 83 (55.3%)               |
| Wildlife watching or birdwatching         | 82 (54.7%)               |
| Running/Walking for exercise              | 60 (29.5%)               |
| Picnicking                                | 47 (31.5%)               |
| Research                                  | 39 (26.9%)               |
| Camping                                   | 33 (22.6%)               |
| Biking                                    | 23 (15.4%)               |

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

**Table 11 (continued).** Activity engagement among BioBlitz participants at Saguaro National Park.

| Activities       | N (%) <sup>1</sup> |
|------------------|--------------------|
| Motorboating     | 12 (7.6%)          |
| Horseback riding | 4 (2.8%)           |

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

### SECTION E: Information about Respondents

As shown in Table 12, over one-half of respondents (68.0%) were male. The average age was 49 years old. Respondents were well-educated, with three quarters (73.9%) reported having at least a four-year college degree. Just over half (56.9%) reported earning \$50,000 or more on an annual basis. Over half (52.9%) were employed outside the home. The majority was White (94.0%) of non-Hispanic origin (92.1%).

**Table 12.** Socio-demographic characteristics of BioBlitz participants at Saguaro National Park.

| Socio-Demographic Characteristic | Response Category                   | N (%)       |
|----------------------------------|-------------------------------------|-------------|
| Gender                           | Male                                | 104 (68.0%) |
|                                  | Female                              | 49 (32.0%)  |
| Education                        | Less than high school               | 0           |
|                                  | Some high school                    | 1 (0.7%)    |
|                                  | High school graduate                | 4 (2.6%)    |
|                                  | Vocational/trade school certificate | 0           |
|                                  | Some college                        | 28 (18.3%)  |
|                                  | Two-year college degree             | 8 (4.6%)    |
|                                  | Four-year college degree            | 48 (31.4%)  |
|                                  | Masters degree                      | 42 (27.5%)  |
|                                  | Ph.D. M.D. J.D. or equivalent       | 23 (15.0%)  |
| Income                           | Less than \$24,999                  | 20 (13.1%)  |
|                                  | \$25,000 to \$34,999                | 14 (19.2%)  |
|                                  | \$35,000 to \$49,999                | 16 (10.5%)  |
|                                  | \$50,000 to \$74,999                | 29 (18.3 %) |
|                                  | \$75,000 to \$99,999                | 22 (14.4%)  |
|                                  | \$100,000 to \$149,999              | 23 (15.0%)  |
|                                  | \$150,000 to \$199,999              | 7 (4.6%)    |
|                                  | \$200,000 or more                   | 7 (4.6%)    |

**Table 12 (continued).** Socio-demographic characteristics of BioBlitz participants at Saguaro National Park.

| <b>Socio-Demographic Characteristic</b> | <b>Response Category</b>                  | <b>N (%)</b> |
|---|---|--------------|
| Occupation                              | Employed outside the home                 | 81 (52.9%)   |
|   | Unemployed                                | 2 (1.3%)     |
|   | Retired                                   | 33 (21.6%)   |
|   | Student                                   | 19 (12.4%)   |
|   | Full-time homemaker                       | 15 (9.8%)    |
| Ethnicity                               | Hispanic or Latino                        | 12 (7.9%)    |
|   | Not Hispanic or Latino                    | 139 (92.1)   |
| Race                                    | American Indian or Alaska Native          | 0            |
|   | Asian                                     | 8 (5.3%)     |
|   | Black or African American                 | 0            |
|   | Native Hawaiian or other Pacific Islander | 1 (0.7%)     |
|   | White                                     | 141 (94.0%)  |

## Discussion

The purpose of this investigation was to better understand visitors / participants that engaged in the National Park Service's (NPS) all taxa biodiversity inventory (ATBI)/BioBlitz program at Saguaro National Park (SAGU) in 2011. This study provides insight on: (a) visitor participation in BioBlitzes and NPS programs; (b) experiences with the protected area (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 protected area; (g) stewardship and attitudes toward resource protection; and (h) socio-demographics

Respondents did not report extensive previous experiences with BioBlitz activities at SAGU, in that most were first-time participants that had limited previous exposure to the program. Over half of the respondents from SAGU were affiliated with an organization. Many individuals engaged in program activities with friends, families, and colleagues and 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. Experiences were diverse, in that most had previous visitation experience. The most popular on-site activities were hiking and going to the visitor and/or nature center.

Respondents' levels of commitment to the BioBlitz were based on a variety of factors. At SAGU, participants felt that engagement in the program was exciting and important to one's self. However, involvement in the BioBlitz was not central to participants' lives but it was supported by the appealing and attractive nature of the program. The most important motives that compelled people to become involved in the SAGU program related to contributing to society and learning.

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. At SAGU, a series of related questions were asked about potential implications of the BioBlitz program for the national park system. 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 SAGU. Over time, these connections have developed 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. These findings align with past research.

Reported levels of stewardship were examined and respondents considered themselves to be natural resource stewards, though their stewardship was more nature-based than oriented toward people. 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." An analysis of survey items examining attitudes toward protectionist behavior 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. Analyses of socio-demographic characteristics indicated 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 earning more than \$50,000 on an annual basis. The majority was white and of non-Hispanic origin.



## Implications and Management Options

- Given the limited previous experiences with BioBlitz activities at SAGU, participants should be provided with sufficient background on the purpose of the program, its workings, and how to stay involved into the future. Providing sufficient 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 protected areas. At SAGU, individuals that engaged with BioBlitz programs were “regular” visitors but were new to the BioBlitz program.
- The most important factor underlying involvement was centered on the attractive nature of a 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 SAGU, opportunities for experiencing solitude were relatively less important for survey respondents to maintain satisfactory experiences and help ensure continued participation.
- Survey data suggest BioBlitz participants would be willing to engage in park protection behavior but do not feel responsible at the individual level. 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 SAGU given the strong environmental attitudes toward park protection reported by survey respondents.
- Levels of place attachment were measured by four dimensions and indicated that affective / emotional bonds were key components of the connections formed between people and places, which can be maintained through experiential opportunities. The BioBlitz program may 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 SAGU 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 SAGU 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: Saguaro 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?

\_\_\_\_\_ 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 Saguaro BioBlitz?

\_\_\_\_\_ 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. Saguaro National Park

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

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

5. Do you participate in other National Park Service presentations or programs at Saguaro 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 Saguaro National Park?

\_\_\_\_\_ Hours

**Section B: Your Experience with Saguaro National Park NPS/NGS BioBlitz**

6. How did you first learn about the Saguaro BioBlitz? (*check all that apply*)

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

7. Did you come to the NPS/NGS BioBlitz at Saguaro 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 Saguaro BioBlitz?

\_\_\_\_\_ No  
 \_\_\_\_\_ Yes

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

|   | Not important | Somewhat important | Moderately important | Very important | Extremely important |
|---|---------------|--------------------|----------------------|----------------|---------------------|
| Participating in the BioBlitz at Saguaro National Park allowed me to: |               |                    |                      |                |                     |
| 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 Saguaro 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 Saguaro 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 Saguaro National Park was important to me  | 1                 | 2        | 3                          | 4     | 5              |
| c. Participating in the NPS/NGS BioBlitz at Saguaro National Park was exciting  | 1                 | 2        | 3                          | 4     | 5              |
| d. I organized my leisure time around attending the NPS/NGS BioBlitz at Saguaro National Park   | 1                 | 2        | 3                          | 4     | 5              |
| e. The NPS/NGS BioBlitz at Saguaro 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 Saguaro 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 Saguaro National Park   | 1                 | 2        | 3                          | 4     | 5              |
| j. Participating in the NPS/NGS BioBlitz at Saguaro 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 Saguaro 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 Saguaro National Park   | 1                 | 2        | 3                          | 4     | 5              |
| m. I identify with other participants who were involved with the NPS/NGS BioBlitz at Saguaro National Park  | 1                 | 2        | 3                          | 4     | 5              |
| n. Participating in the NPS/NGS BioBlitz at Saguaro 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 Saguaro 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 Saguaro 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 Saguaro National Park. Please circle the number that best represents your level of agreement with each statement.

| Participation in the NPS/NGS BioBlitz at Saguaro National Park has...             | Strongly Disagree | Disagree | Neither Disagree nor Agree | Agree | Strongly Agree |
|---|-------------------|----------|----------------------------|-------|----------------|
| a. ... increased my knowledge of Saguaro National Park's 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 Saguaro 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                            | 1                 | 2        | 3                          | 4     | 5              |

Saguaro National Park

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 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.

|   | Strongly Disagree | Disagree | Neither Disagree nor Agree | Agree | Strongly Agree |
|---|-------------------|----------|----------------------------|-------|----------------|
| 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              |

**Section C: Your Experience with Saguaro National Park**

14. What year did you first visit the Saguaro National Park? \_\_\_\_\_ Year
15. In the last 12 months, how many times have you visited Saguaro National Park? \_\_\_\_\_
16. Do you have a favorite or special place within Saguaro National Park?
- \_\_\_ NO → Skip to question Section D below
- \_\_\_ YES (If YES, please answer 16a and 16b below)
- ↳ 16a. What is the name of this place? \_\_\_\_\_



L> 16b. Why is it your favorite? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

|   | <b>Strongly disagree</b> | <b>Disagree</b> | <b>Neither agree nor disagree</b> | <b>Agree</b> | <b>Strongly agree</b> |
|---|--------------------------|-----------------|-----------------------------------|--------------|-----------------------|
| a. Saguaro National Park is the best place for the recreation activities that I enjoy                 | 1                        | 2               | 3                                 | 4            | 5                     |
| b. Compared to Saguaro 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 Saguaro National Park | 1                        | 2               | 3                                 | 4            | 5                     |
| d. I have a strong emotional bond to Saguaro National Park  | 1                        | 2               | 3                                 | 4            | 5                     |
| e. I can't imagine a better place for what I like to do than Saguaro National Park                    | 1                        | 2               | 3                                 | 4            | 5                     |
| f. I feel Saguaro National Park is a part of me   | 1                        | 2               | 3                                 | 4            | 5                     |
| g. I feel a strong sense of belonging to Saguaro National Park  | 1                        | 2               | 3                                 | 4            | 5                     |
| h. I identify with Saguaro National Park  | 1                        | 2               | 3                                 | 4            | 5                     |
| i. I really enjoy Saguaro National Park   | 1                        | 2               | 3                                 | 4            | 5                     |
| j. Saguaro National Park means a lot to me  | 1                        | 2               | 3                                 | 4            | 5                     |
| k. Visiting Saguaro National Park says a lot about who I am   | 1                        | 2               | 3                                 | 4            | 5                     |
| l. I am happiest when I get to visit Saguaro National Park  | 1                        | 2               | 3                                 | 4            | 5                     |
| m. I associate special people in my life with Saguaro National Park                                   | 1                        | 2               | 3                                 | 4            | 5                     |
| n. Visiting Saguaro National Park allows me to spend time with my family and friends                  | 1                        | 2               | 3                                 | 4            | 5                     |

## Section D: Feelings about the Natural Environment

18. When I hear the term “natural resource stewardship” in relation to Saguaro 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              |

19. We are interested in understanding how you feel about ways to protect the Saguaro 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).

|  | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|--|-------------------|----------|----------------------------|-------|----------------|
| a. I am willing to volunteer my time to help the environment of Saguaro National Park                  | 1                 | 2        | 3                          | 4     | 5              |
| b. I do not feel I have any control over whether or not my daily activities harm Saguaro National Park | 1                 | 2        | 3                          | 4     | 5              |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| c. I am willing to pay more for the products I buy or services I use if it improves the environment of Saguaro National Park  | 1 | 2 | 3 | 4 | 5 |
| d. It is important for me to reduce my negative personal impacts on the environment of Saguaro National Park  | 1 | 2 | 3 | 4 | 5 |
| e. The efforts of one person to conserve the resources of Saguaro National Park are insignificant as long as other people refuse to conserve                                | 1 | 2 | 3 | 4 | 5 |
| f. It is primarily the responsibility of individuals, not the government, to protect the environment of Saguaro National Park   | 1 | 2 | 3 | 4 | 5 |
| g. Because my contribution to environmental problems at Saguaro National Park is very small, I do not feel responsible for causing environmental problems in the park today | 1 | 2 | 3 | 4 | 5 |

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

| Not at all |   | Somewhat |   |   | Yes, very much |   |
|------------|---|----------|---|---|----------------|---|
| 1          | 2 | 3        | 4 | 5 | 6              | 7 |

21. We are interested in the types of activities you participate in at Saguaro National Park. Please mark ALL of the activities you have participated in at the park over the last 12 months.

- |  |  |
|--|--|
| <input type="checkbox"/> Camping                                   | <input type="checkbox"/> Picnicking                        |
| <input type="checkbox"/> Hiking                                    | <input type="checkbox"/> Wildlife watching or Birdwatching |
| <input type="checkbox"/> Biking                                    | <input type="checkbox"/> Horseback riding                  |
| <input type="checkbox"/> Running/Walking for exercise              | <input type="checkbox"/> Motor boating                     |
| <input type="checkbox"/> Visiting the Visitor Center/Nature Center | <input type="checkbox"/> Research                          |
| <input type="checkbox"/> Nature/landscape photography              |  |

**Section E: Information about You**

22. What is your gender? (*circle one*)    1. Female    2. Male
23. What year were you born? \_\_\_\_\_
24. What is the highest level of formal education you have completed? (*circle one of the following*)
- |  |                                  |
|--|----------------------------------|
| 1. Less than high school               | 6. Two-year college degree       |
| 2. Some high school                    | 7. Four-year college degree      |
| 3. High school graduate                | 8. Master's degree               |
| 4. Vocational/trade school certificate | 9. Ph.D. M.D. J.D. or equivalent |
| 5. Some college                        |                                  |
25. 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      |
26. 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

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

1. Hispanic or Latino

2. Not Hispanic or Latino

28. 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 Saguaro 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 Saguaro National Park. The information you provided will be protected to the extent possible by the researchers and the managers at Saguaro 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 151/133763, August 2016

**National Park Service**  
**U.S. Department of the Interior**



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