

ASTRONOMICAL TOURISM: AN OFTEN OVERLOOKED SUSTAINABLE TOURISM SEGMENT¹

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Statement of Purpose

Astronomical tourism is a potential attraction for visitors to destination areas where dark skies free from artificial light pollution can be enjoyed. This situation presents an opportunity for locations with specific product offerings such as astronomical observatories, (Robson, 2005; Weaver, 2011), auroral displays (Weaver, 2011), national/state/local parks, amateur astronomy organizations that offer public programs, and miscellaneous other providers. The focus here is on parks that have both dark skies and an organized astronomy program. The purpose of this research is two-fold: 1) to provide background research on necessary elements for astronomical tourism and 2) to examine the potential for this sustainable tourism segment to enhance the offerings to visitors at various types of natural parks, as exemplified by the astronomy program at Bryce Canyon National Park (BCNP). Where successful, these programs can enhance the overall visitor experience as well as the experience for visitors specifically interested in astronomy and improve the habitat for wildlife in the area.

Literature Review

Astronomical Tourism

Astronomical tourism goes back many centuries at sites as widely dispersed as Nabta Playa, Stonehenge, Chichen Itza, and in the United States, Cahokia, the Bighorn Medicine Wheel, Mesa Verde, and Chaco Canyon. (Malville, 2008; Williamson, 1984) Many of the above locations had specific purposes related to agriculture and other traditional practices. (Malville, 2008; McCoy, 1992; Richman, 2004; Shattuck and Cornucopia, 2001) Astronomical tourism in recent times includes traveling to a park to enjoy the beauty of the night sky.

For people living under light pollution, the night sky has only a few bright stars and planets, and a ubiquitous sky glow from artificial illumination. (Longcore and Rich, 2004; National Park Service, n.d. a, n.d. b; Nordgren, 2010) A survey questionnaire of United States National Park Service (NPS) units found that 94% of parks with overnight visitation considered dark night

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skies an important resource, 62% of these offered some form of night sky interpretation, and 80% of these undertook efforts to reduce artificial light pollution. (Simon and Babcock, 1999)

Artificial Night Sky Brightness and Seeing Quality

Over the past century increasing uses of artificial illumination for outside uses at night (e.g., streetlights, advertising signs) occurred. Recently some have come to question the appropriateness of outdoor lighting at night in terms of negative impacts on humans and all living animals and plants. (Alvarez del Castillo, Crawford, and Kreuger, 2004; Chepesiuk, 2009; Longcore and Rich, 2004; López and Suárez, 2007; Luginbuhl, Walker, and Wainscoat, 2009; National Park Service, n.d. b; Navara and Nelson, 2007) Artificial night sky brightness as impacted by outdoor lighting is important to measure since it affects the ability of people to see faint objects in the night sky.

Artificial night sky brightness has been mapped from space via satellite measurements. (Cinzano, et al., 2000; Cinzano, et al., 2001) Areas least affected by artificial night sky brightness included much of Canada, and portions of the southwestern and western U.S. (Cinzano, et al., 2001) and this is projected to worsen by 2025. (Walker, 2011) Artificial night sky brightness impacts are of interest to parks and organizations that rely on darkness as another attribute of individual park offerings to visitors.

Key Organizations in the Dark Night Sky Effort

The International Dark Sky Association (IDA) serves as a significant resource for the maintenance and restoration of sky darkness. (Sovick, 2001) IDA has designations for parks that meet criteria for dark sky quality and artificial light pollution minimization, with the Gold level most stringent. (International Dark-Sky Association, 2006) Four parks in the US have received Gold certification: Natural Bridges National Monument in Utah, Cherry Springs State Park in Pennsylvania, Clayton Lake State Park in New Mexico, and Big Bend National Park in Texas. (International Dark-Sky Association, 2012) Other organizations in the fight to save dark night skies include the NPS, Globe at Night, and the Starlight Initiative. (National Park Service, n.d. b; Globe at Night – Home, 2012; StarLight Initiative, 2007)

Methodology

Because this research is exploratory, much of the data used is necessarily secondary, with the exception of observational data gathered at BCNP. The main elements from BCNP examined include astronomy program and overall visitation and visitor participation in astronomy activities. Determining total visitors for the Astronomy and Dark Sky Program (ADSP) is somewhat difficult to do as one visitor might represent more than one program contact. In order to overcome this problem, a conservative approach counted only visitors at multimedia presentations, moon hikes, and moon scopes at BCNP, and off-site attendance at multimedia presentations, as these activities were mutually exclusive since a visitor could not attend more than one of these at the same time.

Results

The ADSP consists of four primary components for visitors: solar observing, multimedia presentations in the evening, night sky viewing, and full moon hikes into the BCNP amphitheater. (Bryce Canyon National Park – Astronomy & night sky programs, n.d.). Visitors may take part in one or more of these activities. The night sky viewing and multimedia sessions are also used as a time to further educate viewers about the need to reduce artificial lighting at night.

For the 2010 fiscal year (01 October 2009 through 30 September 2010), monthly ADSP visitors by specific activity were available, yielding a total of 17,002 verifiable individual visitors. Monthly ADSP visitors were the largest in the period May through September. ADSP visitors relative to recreational park visitors were typically largest for the peak visitor months of June through September. Relative monthly numbers average 1.12 percent of park visitors, with all but one of these less than one percent for the peak and shoulder seasons.

Astronomy-related visitors relative to overnight park visitors averaged 9.91%. During the peak and shoulder seasons, monthly ASDP visitors comprised 8.1 to 11.8 percent of overnight park visitors. Visitor participation in the ADSP may not seem large in comparison to park recreational visitors. This was due to the large number of visitor arrivals by tour bus (14 % on average) and some visitors by automobile, whose travel often did not include an overnight stay at Bryce Canyon. (National Park Service Public Use Statistics Office, 2011), thus making it impossible to participate in the ADSP offerings other than the mid day solar observing.

In a recent visitor survey of BCNP visitors (2009), 67 percent of respondents indicated that they learned about one or more park topics, with the percentage of those for “night skies/astronomy” at 56%; 21% percent of the latter respondents indicated that their learning improved a lot, while 38% indicated that their learning improved somewhat. For learning topics of interest during future visits, 56% indicated “night skies/astronomy”. Respondents were asked to rate the importance of protecting park attributes and resources and 47% indicated “Dark, starry night sky”. Ten percent of respondents reported participating in “stargazing activities/astronomy”. This number is higher than that found for the ASDP compared to either overall visitors (1%) or overnight visitors (9.9%) found in the above paragraphs. (Holmes, Schuett, and Hollenhorst, 2010) Further studies may be able to discern reasons for this disparity.

The above results indicate that a dark sky can be an important resource for a natural park that possesses such an attribute, which may sometimes be overlooked. Having an interpretation program that goes along with the dark skies can add substantially to that resource. These components can have a positive impact on sustainable tourism demand since potential visitors may seek out dark sky parks more so than they have done previously. (Moore, Hoffman, Fields, and Mastroguiseppe, n.d.)

Future research may take a number of directions at BCNP and other similar parks with astronomical tourism (actual or potential). In addition to determining why the discrepancies in the number of ADSP visitors existed (as noted previously), other research elements to examine could include: visitors’ demographics, characteristics, motivations, and how these might be segmented; ADSP visitor economic impacts; determining marketing strategies and implementation for the ADSP. Expansion of this research to other parks that offer astronomy and dark sky programs could also be developed.

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