Land Use Policy 61 (2017) 80–85

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Economic valuation of alternative land uses in a state park

Omkar Joshi[a,*], Neelam C. Poudyal[b], Donald G. Hodges[b]

[a] 008C Ag Hall, Department of Natural Resource Ecology and Management, Oklahoma State University, Stillwater, OK, USA
[b] Department of Forestry, Wildlife and Fisheries, University of Tennessee, Knoxville, TN, USA

ARTICLE INFO

Article history:
Received 21 April 2016
Received in revised form 21 October 2016
Accepted 23 October 2016
Available online 15 November 2016

Keywords:
Benefit-cost
Land use
Opportunity cost
Sensitivity analysis
Net present value

ABSTRACT

Public lands such as state parks provide numerous environmental, economic, and cultural benefits. Many of these benefits possess public goods characteristics and are not traded in market, making it difficult to incorporate them in a traditional economic analysis. Agencies responsible for managing public parks often struggle with demonstrating amenity benefits. Consequentially, many state parks in the U.S. are facing reductions in operating hours and in some cases permanent closure. Using the case of Indian Springs State park in Georgia, U.S, this study compares the economic returns of using the area as a recreation park with the alternative land use option of timber production. Lost timber sale revenues were estimated using a timber investment model. The results reveal that if only revenue and operating costs associated with the current land use (i.e., recreation) are considered, the best financial option is to utilize the area for timber production. However, the total economic benefits of using this land as a state park exceeded the operating costs of park by a factor of ten. Furthermore, the ratio ranged from 8.86 to 9.74, even when foregone opportunity costs of timber production were considered in benefit-cost analysis. These results provide further evidence of the net benefit of public recreation lands, and will help managers justify investments in operating and maintaining such resources.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Public recreation lands such as state parks are integral to North American society. State parks in the U.S. are protected areas similar to national parks, but typically contain attractions and resources of regional or sub-national significance. The economic significance of nature-based recreation can be demonstrated from the fact that U.S. state parks provided a direct economic contribution of more than $20 billion to surrounding communities in 2010 (Brandeis, 2013). The public benefits of recreational areas for maintaining quality of life have been well-documented in the outdoor recreation literature (e.g. Chiesura, 2004; Poudyal et al., 2009). In addition, a rapidly growing population, coupled with relatively constant supply of public lands in recent years, points to the need for additional public investment to meet the increasing recreational demand (Whiting et al., 2012).

Unfortunately, many state park systems, faced with increasing budget deficits, are losing staff and other resources needed to maintain the current level of visitor services (Whiting et al., 2012; Walls, 2009). Since the most recent recession, several state park systems nationwide have reduced operating hours (Poudyal et al., 2012). California, Arizona, Colorado, Georgia, and Massachusetts, for example, have eliminated a significant amount of state funding for parks. Since these parks are state owned and operated, no dedicated federal funding exists to support state parks operations (Shinkle, 2012; Siikamäki, 2011). The costs for constructing and operating state parks in the U.S. have increased dramatically in recent decades. For example, after adjusting for inflation, state park operating expenses have increased by approximately $1 billion in between 1978 and 2007 (Walls, 2009). While these costs are readily quantifiable, public benefits provided by parks are difficult to monetize. As a result, recreational programs seldom receive appropriations priority from lawmakers. Maintaining citizen support for recreation lands will require clearly demonstrating that net benefits outweigh the costs of recreational land use, as well as how the net benefits of recreational use compare with those for alternative uses. The current article attempts to characterize the economic estimates of accrued benefits from land use alternatives within a state park.

2. State park systems and recreational values

The costs and benefits of recreation and alternative uses of rural land can be evaluated by assessing the streams of social costs and

* Corresponding author.
E-mail addresses: Omkar.joshi@okstate.edu (O. Joshi), npoudyal@utk.edu (N.C. Poudyal), dhodges2@utk.edu (D.G. Hodges).

http://dx.doi.org/10.1016/j.landusepol.2016.10.034
0264-8377/© 2016 Elsevier Ltd. All rights reserved.

benefits. Stated or revealed preference methods can be used to estimate the net benefits (willingness to pay or consumer surplus (CS)) of recreational use (Freeman, 2003), which provide the total public value when aggregated to the population level. The travel cost method (TCM) is generally used to estimate the economic value of outdoor recreation sites such as a park. Bowker et al. (2007) estimated net economic value of the Virginia Creeper Rail Trail using TCM, for example, and reported that the total amenity benefits were approximately $3.9 million. Fix and Loomis (1997) used TCM to estimate the economic benefits of mountain biking in Moab, Utah, which totaled more than $8.4 million annually. Alternatively, Oh and Hammitt (2010) used a stated preference approach to estimate the economic benefits associated with park trails in South Carolina. They noted that each visitor was willing to pay $4.76 for park management and maintenance. Likewise, Betz et al. (2003) used contingent trip model—a hybrid between individual travel cost and contingent behavior approach— to estimate recreation demand for a hypothetical rail-trail facility in northeast Georgia. The authors reported total consumer surplus of $7.5 million for annual use of rail-trail. Despite its extensive use in recreation research, TCM has been less utilized as a tool to compare recreational benefits with the lost opportunity costs.

Siikamäki (2011) estimated that the annual total value of nature-based recreation in U.S. state parks was approximately $14 billion. Even though the study provided a large-scale assessment of U.S. state park systems, it did not address opportunity costs associated with alternative land uses. Consequently, it offered no insights as to how the benefits for recreational use of state park land compare to those from alternative uses.

The economic and social significance of state parks can vary according to geography, the nature of recreation, and local public interest (Siikamäki, 2011). Consistent with those findings, we believe that disaggregating nationwide estimates to an individual state park or a state park system can over-simplify the local situation and yield some unrealistic, and possibly unjustifiable, values for "benefit transfer" (Rosenberger and Loomis, 2001). Instead, park-specific information is needed if such benefits and costs are to be reflected accurately. To that end, this research examines Indian Springs State Park (ISSP) as a case study. The specific objectives of this study were to calculate the economic significance of ISSP using various criteria of costs and benefits associated with recreational use and compare the recreational value to the economic costs and benefits of an alternative land use.

3. Methodology

3.1. Study site

Indian Springs State Park (ISSP), a 523-acre public land located in rural Georgia, was selected as the study area for a number of reasons. First, ISSP is a medium size park that is representative of most state parks in the U.S. in terms of both land area and recreation visitation. Second, like most state parks, ISSP is located in a relatively rural setting where land values are not influenced substantially by development potential (e.g., residential, commercial). Site Index (a measure of land productivity for trees) in this locality suggests favorable conditions for commercial pine production. The park is located in Butts County between two major population centers, Atlanta, and Macon. ISSP features a range of amenities including cottages, individual and group camping areas, picnic shelters, overnight shelters, beaches, lake, and hiking and biking trails (Georgia, 2013). Visitation to Indian Springs State Park in 2010 totaled 175,442, with per capita visitor revenue of $2.34. Six full-time and six part-time personnel are employed at the park (Georgia, 2013).

3.2. Data collection

The study entailed TCM to estimate the economic benefit of the current land use (state park) and a more commodity-oriented market approach to estimate the net benefit from the alternative land use – timber production. TCM involved analyzing trip data collected from an on-site survey of park visitors.

The on-site survey was conducted during the summer of 2012 to collect data on trip frequency, mileage, and other demographic variables essential for estimating travel costs. Park visitors were intercepted by employing a multistage sampling technique which allocated available sampling hours to different recreation location within the park (e.g., beach, playground, trails, picnic shelters, camp sites). The survey effort was proportionately distributed between weekends (66%) and weekdays (33%) as recreational activities generally double over weekend (Minnesota, 2000). During holiday weekends, when high visitation was expected (e.g., Labor Day), two additional surveyors were employed. Every third person encountered at the recreation location was asked to complete the survey. The survey protocols followed a modified version of the Tailored Design Method (Dillman, 2000). The survey included 18 questions covering a variety of topics related to the total number of visits to ISSP, number of visitations to other Georgia state parks, group size, recreation activities, factors influencing their travel decisions, and socio-demographic information. The survey-based data were supplemented with secondary sources to obtain actual park revenues and costs. Specifically, the total number of visitation and the annual revenue obtained from park visitation were obtained from the park's official records (Georgia, 2013).

3.3. Econometric modelling

Benefit estimation associated with Indian Springs State Park visitation followed the theoretical underpinnings of the TCM (Englin and Shonkwiler, 1995; Ovaskainen et al., 2012; Haab and McConnell, 2002; Bowker et al., 2007). Costs incurred in visiting a park reflect demand as visitors choose recreational sites among many available alternatives (Haab and McConnell, 2002).

A generic demand model derived from allocated visitor time and income can be expressed as:

$$\Sigma_{j=1}^{n} X_{ij} C_{ij} + Z_i \leq Y_i, \tag{1}$$

Where, X_{ij} represents the number of trips by individual i to site j, C_{ij} travel cost, Z_i other costs during the trip, and Y_i total income. Since the dependent variable in a travel cost demand model is number of trips, a count data model is a natural fit. The negative binomial regression model, an appropriate specification for non-zero count data, can be expressed as (Yen and Adamowicz, 1993):

$$\mathrm{p}(\mathrm{Y_i} = \mathrm{Y_i} > 0) = \frac{\Gamma\left(\frac{1}{\alpha} + y_i\right)}{\Gamma\left(\frac{1}{\alpha}\right)\Gamma(y_i + 1)}, \frac{(\alpha\lambda_i)^{y_i}(1 + \alpha\lambda_i)^{-\left(\frac{1}{\alpha} + y\right)}}{1 - (1 + \alpha\lambda_i)^{-\left(\frac{1}{\alpha}\right)}}., \tag{2}$$

where $y_i = 1, 2\ldots n$, $\alpha > 0$.

Following travel cost estimation, the average consumer surplus (CS) per trip for the travel party can be estimated as "the negative inverse of the travel cost coefficient" (Yen and Adamowicz, 1993). The aggregate annual benefits can be computed by multiplying the estimated total number of trips by the estimated CS per trip. The basic travel model assumes perfect time flexibility, meaning that time not spent on recreational activity can be used for work (Haab and McConnell, 2002; Prayaga et al., 2009). In addition to the basic relationship between travel cost, income, and number of trips, other attributes representing socio-demographic attributes of visitors, availability of alternative recreation sites, and visitor preferences can also play important roles in trip demand (Haab and

Download English Version:

https://daneshyari.com/en/article/6461260

Download Persian Version:

https://daneshyari.com/article/6461260

Daneshyari.com