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Social Values and Knowledge Predict Attitudes within an Urban Protected Area in El Salvador

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ABSTRACT

Urban protected areas are faced with numerous pressures from intensified land uses that jeopardize their sustainability, particularly in Central America where there is an abundance of areas managed for conservation yet limited financing. An understanding of the factors that influence public support for fee programs is of paramount importance but difficult to anticipate without empirical evidence of the social phenomena that influence attitudes. Here, we used on-site survey data to understand the relationships among the perceived benefits of nature (i.e., social values), knowledge and attitudes toward a proposed increase in fees to enter an urban protected area in El Salvador, the El Espino forest reserve. Our results revealed an array of reasons why visitors valued places, particularly aesthetics, opportunities for recreation, life sustaining qualities, biodiversity, and the intrinsic qualities of nature. As these social values increased, so too did support for user fees. Knowledge about environmental, social, and management conditions of the protected area was also instrumental in explaining why a range of social values and attitudes were expressed by respondents. These results provide insights on how to increase support for a fee program that could enhance management of the El Espino reserve with broader implications for other urban protected areas in the region and beyond.

Introduction

Human impacts on the environment are causing widespread changes to ecosystems across the globe (IPBES 2019). Many scientists argue society has moved into the Anthropocene (Kotchen and Young 2007; Waters et al. 2016) – a possible new geologic epoch whereby humans are causing rapid loss of biodiversity, increased atmospheric carbon dioxide concentrations, and built infrastructure that covers most of the earth's land surface (Beninde, Veith, and Hochkirch 2015; McPhearson et al. 2016). Although urbanization is a major driver of these changes (Dye 2008), previous research on areas managed for conservation has tended to focus on settings with relatively low degrees of

human activity, particularly wetlands and forests (Gómez-Baggethun and Barton, 2013). Moreover, this body of work has been predominantly guided by knowledge of biophysical and economic indicators of human use, while the role of social phenomena in shaping people's decisions about the environment has received far less attention (Chan et al. 2012; Muhar et al. 2018; Plieninger, Schaich, and Kizos 2011). These gaps in previous research underscore the need for a better understanding of how people value and react to management of natural areas in efforts to move toward a more sustainable Anthropocene, particularly within the context of urbanizing environments (McPhearson et al. 2021).

Previous research has sought to understand the co-benefits of nature through the study of "social values" that we define as the perceived benefits of goods, services and activities provided by places (Brown, Reed, and Raymond 2020; Fagerholm et al. 2012). Social values reflect preferences for the allocation of resources that are available to sustain human communities and can be aggregated at the group level (Kenter et al. 2015; Raymond et al. 2014; Sherrouse, Clement, and Semmens 2011). Social values have also been referred to as "assigned values" that can be ranked by stakeholders to indicate the relative importance of environments (van Riper and Kyle 2014) and sit in contrast to "held values" that are predictors of both attitudes and behavior (Brown 1984). This line of research has yielded numerous benefits including broader representation of interests in natural resource management decision-making through participatory research (Booth, Gaston, and Armsworth 2009; Ives and Kendal 2013; Kenter et al. 2019). This body of work has sought to advance conservation efforts by encouraging compliance with regulations, ensuring that policy change is transparent, and increasing trust in scientific expertise through the development of negotiated and consensus-based outcomes (Ban et al. 2013; Shipley et al. 2019).

This article responds to a call for research focused on the process of valuing nature and forming attitudes toward policy change, particularly through initiatives that have highlighted the relevance of knowledge including the Millennium Ecosystem Assessment (MEA 2005), Economics of Ecosystems and Biodiversity (TEEB) (Ring et al. 2010), and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES 2019). We examined how visitors valued an urban protected area in El Salvador – Bicentennial Park – faced with a variety of pressures from land use change, as well as their responses to hypothetical visitor fees that would extend an existing program for vehicles only. This case study provides insights not only for researchers and decision-makers in El Salvador, but also builds on previous research to demonstrate how other low-income countries can manage challenging tradeoffs between economic development and natural heritage conservation (Bragagnolo et al. 2016). In particular, we aimed to provide empirical evidence of how the perceived benefits of nature and knowledge levels influenced attitudes toward a hypothetical fee program for enhancing the effectiveness of resource management in an urban protected area.

Attitudes Are Influenced by Social Values and Knowledge

Environmental attitudes are internal, prescriptive forces that have received widespread research attention in the environmental social sciences (Wallen and Landon 2020). We

define attitudes as positive or negative evaluations of an external object such as a person, place, or thing to which an individual responds and forms judgment (Heberlein 2012; Oskamp and Schultz 2005). Because attitudinal constructs cannot be directly observed, self-reported methods and implicit measurement techniques are often employed in research (DeVellis 2016). Attitudes are influenced by a range of explanatory variables and vary across socio-cultural contexts; however, few studies have examined the relationship between attitudes and social values. Instead, most scholars have focused on understanding how attitudes are influenced by held values, which are considered guiding principles in life (Ives and Kendal 2013; Schwartz 2012; Stern et al., 1999; Vaske and Donnelly 1999). One exception is research conducted by Sherrouse, Clement, and Semmens (2011) that examined how attitudes toward resource use influenced a range of social values in the Pike and San Isabel National Forests, CO, US. The authors found that social values varied across survey subgroups that were defined by their attitudes toward public uses such as motorized recreation, logging, and oil and gas drilling. These results indicate that social values can be positioned as preferences for landscape change that influence attitudinal concepts (Howley 2011; Kaltenborn and Bjerke 2002).

Environmental attitudes research encompasses a wide range of topics (Oskamp and Schultz 2005), including evaluations of social rules and policies that incentivize behavior and shape how people experience places like protected areas. Fee programs, in particular, are attitude objects governed by policies that warrant research attention, because these programs can support or hinder visitation to public lands (Kyle, Absher, and Graefe 2003; Lindberg 2007). The literature surrounding attitudes toward fee programs indicates this is a contested topic. On one hand, previous research has argued that space in the public domain should be subsidized and supported as a service that is accessible to all segments of society (More, 1999). On the other hand, research has emphasized the need for fees programs to maintain high quality experiences (Bowker et al., 1999). Further complicating this divide are socio-political and historical considerations, the financial sustainability of specific programs, and individual abilities to pay fees for experiencing nature (Buckley 2003). A better understanding of public attitudes toward fee programs can provide management agencies with valuable insights on public viewpoints to make more informed decisions, particularly in contexts where government funding for conservation is low.

Knowledge is a key factor that explains environmental attitudes. We define knowledge as an individual's understanding of factual information (Cebrián-Piqueras et al. 2020; D'Antonio et al. 2012). There are different streams of research surrounding the concept of knowledge, which spans factual and subjectively defined information. This body of work distinguishes among beliefs concerning the awareness of consequences that emerge from inaction (Stern et al., 1999; De Groot and Steg 2009), local knowledge generated through practice and observation (Olsson and Folke 2001), Traditional Ecological Knowledge passed down from generation to generation (Berkes, Colding, and Folke 2000; Olsson and Folke 2001), and understanding of facts and figures (D'Antonio et al. 2012). Previous research has recognized that local and scientific knowledge should be integrated (Cebrián-Piqueras et al. 2020), problem focused (Raymond et al. 2010), and related to familiarity with different landscape conditions (van Riper et al. 2020). In

the context of protected area scholarship in particular, the classification of knowledge systems has spanned visitors and governance, ecosystem structures and functions, and management tactics adopted by agencies to protect the environment (D'Antonio et al. 2012). This research approach shows promise for understanding how knowledge influences attitudes (Stern et al., 1999) and provides insight on variation in social values such as esthetic beauty, perceived biodiversity, and recreation conditions in protected areas (Lamarque et al. 2011).

Protected Areas Are Valuable Conservation Tools

Protected areas are fundamentally important for the conservation of nature and provision of ecosystem services valued by a range of stakeholder groups (Miller and Nakamura 2018; Trzyna 2014; Watson et al. 2014). As one of the most widespread conservation tools in the world (UNEP-WCMC 2020), protected areas serve as refuges for biological diversity and cultural heritage (Thomas and Gillingham 2015), as well as economic engines driven by tourism and recreation (Balmford et al. 2015; Eagles and McCool 2002). Protected areas in Latin America warrant special research attention because of their abundance in this region and a high risk of their downgrading, downsizing, and degazettement due to local land pressures and industrial scale activities (Leisher et al. 2013; Mascia et al. 2014).

Protected areas provide a range of benefits for stakeholders, particularly visitor populations (Manning et al. 2016; Rice et al. 2020). Every year, approximately 8 billion people visit terrestrial public lands around the world, generating $600 billion in direct expenditures (e.g., travel, accommodations, fees) and $250 billion in consumer surplus (i.e., the difference between what visitors would pay and the amount actually spent) (Balmford et al. 2015). Although economically valuable, the benefits of protected areas are far greater than the financial support returned for their sustainability (Johnson et al. 2019; Waldron et al. 2020), creating an urgent need for fee programs and other efforts to support management efficacy (Watson et al. 2014). A more complete understanding of why protected areas are valued and how people are responding to management approaches involving fee programs is needed to shape policies in ways that align with visitor interests and advance environmental planning to sustain these places in perpetuity.

Urban Protected Areas Warrant Research Attention

Urban protected areas provide a range of ecosystem services that span social, ecological, economic, and technological domains (De Leon and Kim 2017; Grimm and Redman 2004; Kremer et al. 2016). Although resource management in urban contexts is replete with challenges, these settings are often managed using criteria and techniques developed for large, nature-based protected areas like the ones originally set aside in the United States (Nash 2014). This is problematic, because urban protected areas are not located in remote settings with low population densities, as is assumed by the traditional model (De Leon and Kim 2017). Further, the provision of ecosystem services in these settings is influenced by multifunctional infrastructure and competing demands for

limited resources (Folke et al. 1997; Andersson et al. 2015). Urban protected areas, as compared to their more rural counterparts, may present greater opportunities for spurring interest in environmentalism due to their proximtiy to large population centers with engaged constituencies (Taylor 2016; Trzyna 2014). This public support is instrumental in advancing conservation initiatives in the global south across high- and low-income countries given financial challenges faced by management agencies (Coad et al. 2019).

Previous research has generated evidence of the restorative qualities of urban environments (MEA, 2005; Kaplan and Kaplan 1989; IPBES 2019), showing the range of benefits that greenery provides to city residents (Andersson-Sköld et al. 2018), and demonstrating that even small areas of green space can enhance quality of life on a daily basis (Bolund and Hunhammar 1999; Gómez-Baggethun and Barton 2013). Restoring, optimizing, and creating new urban green spaces facilitates the flow of ecosystem services such as reduced storm water runoff flood mitigation, higher property values, and recreational opportunities for residents (Andersson et al. 2015; McPhearson et al. 2016; Stewart et al. 2019). For example, previous research has provided evidence of fewer effects from urban heat islands and lower electrical demand from air conditioning and smog levels (Foley et al. 2005), as well as surface temperatures that heat up with less energy than forested environments (Comarazamy et al. 2015). These settings also serve as biological repositories due to high levels of species richness among plants and other organisms (Beninde, Veith, and Hochkirch 2015), places for scientific research (Manning et al. 2016), and hydrological ecosystem services that support well-being through the provision of drinking water for human consumption (Watson et al. 2014). That is, protected areas in the built environment generate a host of opportunities for augmenting environmental stewardship and therefore supporting transformations toward sustainability (Andersson et al. 2015; Abson et al. 2017).

Study Purpose

This research was guided by the following question: How do social values and knowledge influence visitor attitudes toward a hypothetical fee program? In response, we examined the relationships among these phenomena within an El Salvadoran urban protected area located in a densely populated city. First, we evaluated the multiple reasons why the protected area was considered important given its status as a park, uniqueness in El Salvador, and proximity to a large and densely populated urban area. Specifically, we drew on previous research (van Riper and Kyle 2014) to hypothesize that as social values increased, so would attitudes (H1). Second, we determined how social values were influenced by the knowledge of park visitors. We hypothesized that greater knowledge of environmental, social, and management conditions within a protected area would result in a higher social values of the setting (H2). This assertion was guided by evidence from previous studies showing that as experiences in a particular geographic area increase, people become more sensitized to different types of resource conditions (D'Antonio et al. 2012). Finally, we examined how attitudes toward a fee program were influenced by knowledge. We expected to find that as knowledge increased, so too would the expressed support (i.e., attitudes) for a hypothetical fee program implemented
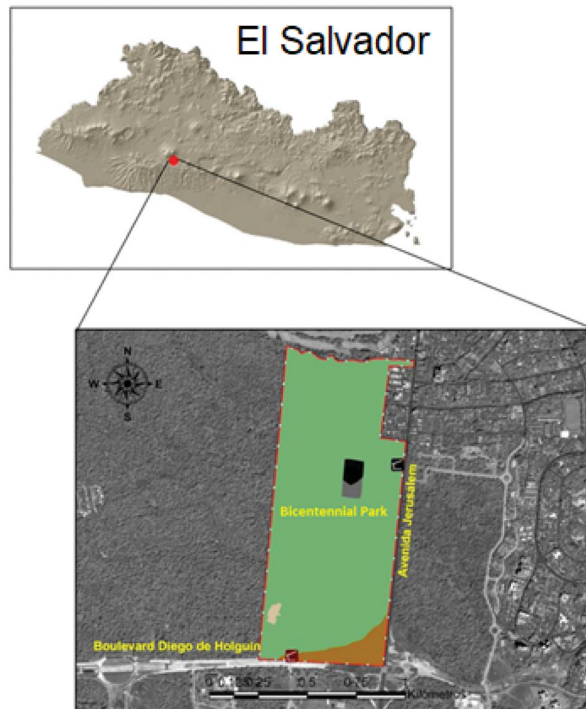
Figure 1. Bicentennial Park in San Salvador, El Salvador. Source: (SalvaNATURA 2011).

by management agencies (H3). The conceptual basis for our final objective was guided by Kyle, Absher, and Graefe (2003) who observed that as connections to places increased, knowledge of those places also increased, which in turn influenced support for increased user fees.

Data and Methods

Study Area

This research was conducted in Parque del Bicentenario El Espino - Bosque Los Pericos, also referred to as Bicentennial Park, which is part of the El Espino forest reserve in the San Salvador metropolitan region (see Figure 1). The park covers 91 hectares and was established by executive decree in 2009 as the first protected natural area in an urban context in El Salvador (SalvaNATURA 2011). The Salvadoran Ministry of the Environment and Natural Resources has authority over Bicentennial Park, but it is managed through a shared management agreement with the two municipalities (i.e., San Salvador and Antiguo Cuscatlán) by SalvaNATURA, which is a Salvadoran non-governmental organization. The park currently charges $1 per automobile for parking and maintenance (SalvaNATURA 2011). People who visit engage in bird watching, hiking, biking, and attending events supported by local offices and restaurants. Bicentennial Park is open all year to visitors who circulate freely within the park

boundaries on trails, some of which are paved. Non-motorized vehicles such as bicycles and skateboards are permitted (SalvaNATURA 2011).

Bicentennial Park is nested within a densely populated and growing urban center in El Salvador (UNICEF 2015). Because most of El Salvador's protected areas are small with high perimeter/interior-area ratios, they are susceptible to degradation and development (Leisher et al. 2013), as well as downgrading of their protected status (Mascia et al. 2014; Golden Kroner et al. 2019). Land use changes have occurred since Bicentennial Park was established, driven by urban expansion, and include the construction of a major highway bisecting the southern sector, as well as residential and commercial development along the eastern edges of the forest reserve that were previously considered buffer zones. Biodiversity within El Salvador has also decreased over time; 2% of the land includes primary forest vegetation that supports a diversity of plants, birds, and vertebrate species – located mostly within the country's 202 protected areas, only 15 of which have management effectiveness evaluations and five were designated to be managed resources (World Bank 2005, WDPA, 2020). Plant species within Bicentennial Park on the IUCN Red List of Threatened Species include a Myrtle plant species (*Eugenia salamensis var. rensoniana (Standl.)*), Walnut trees (*Juglans olanchana Standl and L.O. Williams*), and Chinaberrry trees (*Cedrela odorata L*). Important wildlife species in the area include the Black eyed leaf frog (*Agalychnis moreletii*) that is in danger of extinction, Yellow naped parrot (*Amazona auropalliata*) classified as vulnerable, and the threatened White fronted parrot (*Amazona albifrons*), Pacific parakeet (*Aratinga strenua*), and Collared alacari (*Pteroglossus torquatus*) (SalvaNATURA 2011).

Data Collection

On-site survey data were collected from April - May 2017 through a self-administered intercept survey in Bicentennial Park. Questionnaires were distributed across a north-south gradient of the park including both interior and exterior trails at fixed positions. The survey schedule was stratified by time of day and day of the week to cover even portions of time when visitors may be accessing the protected area. The questionnaire was available in both English and Spanish and took respondents approximately 15 minutes to complete. Six individuals including five women and one man passed out the self-administered survey questionnaires. Each administrator used daily contact logs to estimate a response rate and determine non-response bias (Dillman, Smyth, and Christian 2014). The project under which the survey was carried out was approved by the University of Illinois at Urbana-Champaign Institutional Review Board (protocol #17691), with all survey administrators having been certified for research involving human subjects.

Measurement and Analysis

We first drew on previous research (Brown and Reed 2000; Sherrouse, Clement, and Semmens 2011; van Riper and Kyle 2014), to identify ten relevant social values, including aesthetic, biodiversity, cultural, economic, future, intrinsic, historical, life sustaining,

recreation, and spiritual (see Table 1). All social value survey items were tailored to the study context and evaluated using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with the middle option being 3 (Neutral). Second, respondents' attitudes toward park fees were evaluated using six survey items that reflected perceptions of what was considered a fair user fee (Kyle, Absher, and Graefe 2003). These survey items were measured on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Finally, five questions were asked to evaluate

Table 1. Mean values, standard deviations (SD), and standardized factor loadings for survey items measuring attitudes toward a fee program in Bicentennial Park (BP), social values, and knowledge.

	λ	Mean (SD)
Attitudes[a] ($\alpha = .632$)		
A1. I support paying increased fees to better operate and conserve BP	.413	3.33 (1.38)
A2. I understand the reasons behind the parking fee program	.846	3.75 (1.13)
A3. Overall, I approve of the fees that are charged to visitors at BP	.438	3.74 (2.01)
A4. The fee program will not limit my access to this site	.747	3.86 (1.16)
I should not have to pay to visit recreational sites, because I already pay enough taxes to support such areas[b]	–	3.25 (1.39)
Fees are inappropriate because they exclude some visitors from experiencing the park[b]	–	2.89 (1.34)
Social values[a] ($\alpha = .835$)		
SV1. Aesthetic: I enjoy the scenery, sights, sounds, and smells at BP	.527	4.35 (0.82)
SV2. Biodiversity: BP supports a variety of wildlife and plant life	.610	4.20 (0.90)
SV3. Economic: BP provides useful resources such as sales and tourism	.488	3.60 (1.08)
SV4. Future: BP allows future generations to know and experience this place as it is now	.629	4.03 (0.93)
SV5. Intrinsic: I value BP in and of itself, whether people are present or not	.766	4.20 (0.94)
SV6. Life Sustaining: BP helps produce, preserve, clean, and renew air, soil and water	.714	4.24 (0.96)
SV7. Spiritual: BP is a religious or spiritually special place to me or because I feel respect for nature there	.698	4.00 (2.06)
Cultural: BP allows me to pass down the wisdom, traditions, and way of life of my ancestors[b]	–	3.27 (2.16)
Historical: BP has historical significance to me and others[b]	–	3.46 (1.12)
Recreation: BP provides opportunities for outdoor recreation[b]	–	4.51 (3.07)
Knowledge score[c]	–	6.12 (2.06)
Survey items with Yes / No response options (% correct)		
Correct designation of water as a natural resource		53.4%
Correct designation of soil as a natural resource		42.0%
Correct designation of wildlife as a natural resource		42.0%
Correct designation of vegetation as a natural resource		60.6%
Entity with authority over management of the park (% correct)		43.0%
Classification as a protected area (% correct)		64.5%
Year that Bicentennial Park was created (% correct)		89.7%
Monthly visitation for Bicentennial Park (% correct)		11.9%

[a]Measured along a Likert scale where 1 = "Strongly Disagree" and 5 = "Strongly Agree."
[b]Survey items excluded from the final model.
[c]Summative score for knowledge reflected by questions about the correct designation of four natural resources, the management agency, classification of the protected area, its history, and visitation rates.
Note: α = Cronbach's alpha; λ = Factor loading score.

respondents' knowledge levels across three dimensions of resource management: natural resources within the protected area, visitation rates, and managerial issues such as the protected area's designation and governing bodies, following D'Antonio et al. (2012). The survey items measuring knowledge had different formats such as true/false and multiple choice. Therefore, the number of correct answers was summed into a composite score ranging from 0 to 10.

Structural equation modeling (SEM) was used to evaluate the psychometric properties of our attitude and social value scales. In our attitude scale, we observed that two factor loading scores were below the .40 threshold established by Hair et al. (2006), including the statements, "I should not have to pay to visit recreational sites, because I already pay enough taxes to support such areas" and "Fees are inappropriate because they exclude some visitors from experiencing the park." Both items were reverse coded and omitted from further analysis, which resulted in a final four-item scale that was deemed reliable ($\alpha = .632$). Our final social values scale included seven survey items that had acceptable internal consistency ($\alpha = .835$) and factor loadings above .40. The three survey items dropped from the social values scale evaluated the cultural, historical, and recreation qualities of Bicentennial Park.

Our use of SEM allowed us to test how the latent variables of attitudes and social values were predicted by the mean value score used to measure knowledge. We also tested the effects of social values on attitudes. To test these hypothesized relationships, we used a maximum likelihood estimation procedure and accounted for missing data using the full-information maximum likelihood (FIML) method. A chi-square test of significance assessed model fit, though given this statistic's sensitivity to sample size, other fit statistics were referenced (Kline 2015). Root Mean Square Error of Approximation (RMSEA) values less than .08 (Steiger 2007), Comparative Fit Index values over .90 (Bentler 1990), and Standardized Root Mean Square Residual (SRMR) values less than .08 were considered acceptable (Hu & Bentler, 1999). All analyses were performed in Mplus version 8.

Results

Socio-Demographics and Trip Characteristics

We collected a total of 304 surveys with nine respondents declining to participate, resulting in a response rate of 96%. The median age was 32 and 42% of the sample was female. The median age in El Salvador as a whole was 26.60. Nearly half of the respondents (48%) made less than $500 per month, with 85% making less than $2,000 per month, compared to a Salvadorian average of $660. A total of 92% had graduated from high school, compared to 60% of the Salvadorian population that attended high school in 2015 (UNICEF 2015). More than one third (38%) of respondents reported having a bachelor's degree or higher and 90% reported that they had studied subjects related to the environment. Over half (58%) reported living in the two municipalities closest to Bicentennial Park including San Salvador or Santa Tecla. The average respondent had visited the park 6.5 times in the last 12 months and 11 times in total. Approximately one third of respondents (34%) visited as a part of a group including at least two people. The most common reported activity was walking (89%), followed by observing

nature (67%) and taking photographs (52%). A total of 65% of respondents reported that the park was either "taken care of" (48%) or "very well conserved" (17%).

Social Values, Attitudes, and Knowledge of Visitors to Bicentennial Park

We found that Bicentennial Park was valued for a variety of reasons. Respondents agreed with all statements that characterized the benefits provided by the protected area. Aesthetics (M = 4.35, SD = 0.82), recreation (M = 4.51, SD = 3.07), life sustaining (M = 4.24, SD = 0.96), biodiversity (M = 4.20, SD = 0.90), and intrinsic social values (M = 4.20, SD = 0.94) were most important, while cultural social values (M = 3.16, SD = 2.16) were least important. Both recreation and cultural social values were omitted from the final social value scale.

Attitudes toward a potential fee program at Bicentennial Park were assessed by adapting a survey scale established in previous research (Kyle, Absher, and Graefe 2003). Results from the CFA involving attitudes and social values showed the data fit the model well (χ^2 = 99.868, df = 42; CFI = .937; RMSEA = 0.068; SRMR = .059). Respondents agreed most with the statement "The fee program will not limit my access to this site" (M = 3.86, SD = 1.16) and least with the statement "Fees are inappropriate because they exclude some visitors from experiencing the park" (M = 2.89, SD = 1.34). However, the latter question was not included in the final four-item scale that was used to measure attitudes.

Knowledge was examined to better understand why respondents believed Bicentennial Park provided benefits to the public (see Table 2). We observed high levels of knowledge that spanned environmental, social, and managerial domains. According to a five-question quiz, average knowledge was 6.12 out of 10 (SD = 2.06). Specifically, about half of the respondents correctly identified water (53%), soil (42%), wildlife (42%), and vegetation (61%) as natural resources. Approximately four out of 10 (43%) were able to identify the three government agencies responsible for management of the park, while a majority (90%) knew that Bicentennial Park was created in 2010 and 65% knew its designation. Finally, only 12% percent of respondents knew the park had more than 15,000 visitors annually.

Modeling Results

We observed good model fit when testing the hypothesized relationships among social values, attitudes, and knowledge (χ^2 = 110.765, df = 51; CFI = .934; RMSEA = .066; SRMR = .061) (Kline 2015) (see Figure 2). Attitudes were positively correlated with social values (β = .266) (H1) at $p < .01$. In line with H2, social values were predicted by knowledge (β = .329) at $p < .01$. Finally, we observed that knowledge predicted

Table 2. Path modeling results.

Dependent variable	Predictor variable	β	SE	t-value	R-squared
Attitudes	Social values	.266	.073	3.645*	.162
Attitudes	Knowledge	.226	.066	3.408*	–
Social values	Knowledge	.329	.060	5.474*	.108

Note. β = standardized regression coefficient between exogenous and endogenous constructs; SE = standard error.
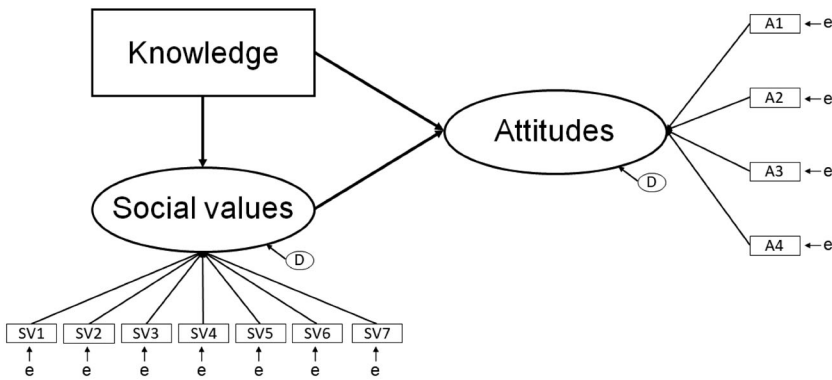*Significant at $p < .01$.

Figure 2. Graphical representation of the hypothesized path model showing relationships among knowledge, social values, and attitudes of visitors to Bicentenniel Park, El Salvador.

attitudes ($\beta = .226$) (H3) at $p < .01$. This path model explained 16.2% of the variation in attitudes and 10.8% of the variation in social values (R^2).

Discussion

This research addressed a growing need to better understand the factors that influence public support for fee programs to improve management effectiveness in urban protected areas. Using on-site survey data collected in El Espino Bosque Los Pericos Bicentennial Park in El Salvador, our findings extended previous studies that have involved management of urban landscapes undergoing rapid transformations from degradation and human occupation (Andersson et al. 2015; Dye 2008; Ives and Kendal 2013). Given the importance of recognizing a broad range of values when making land use decisions, particularly those not currently accounted for in economic markets (Chan et al. 2012; IPBES 2019; Shipley et al. 2020), we focused on building a deeper understanding of the various reasons why people value nature (Rice et al. 2020). Our results specifically showed that social values and knowledge were helpful for explaining attitudes toward fee programs among visitors to Bicentenniel Park in El Salvador.

Results from this study highlighted a wide range of social values that were associated with landscapes throughout the protected area. Respondents believed this setting was important because it provided aesthetics, recreation, life sustaining qualities, biodiversity, and intrinsic social values. These findings align with previous research that has suggested aesthetics, biodiversity, and recreation are of greatest concern in assessments of social values (Brown and Kyttä 2014; van Riper et al. 2019). Also, we observed economic values were important, but ancillary given their low rating by respondents, which complements previous studies that have argued protected areas are not primarily valued for commercial development (Larson et al. 2013). This finding reinforces the position that protected areas are viewed as a public good rather than places for profit or resource extraction (More, 1999). Additionally, few studies have found that life sustaining social values are prioritized by survey respondents in their valuations of protected areas (for exception see Bagstad et al. 2016) despite the potential for this social value to shed light

on public perceptions of regulating ecosystem services that maintain environments favorable to support life (MEA, 2005). It could be that respondents considered Bicentennial Park to be more instrumental in cultural (i.e., non-material) and sustaining services given its proximity to an urban center. Thus, this study highlighted the need to recognize that the prevailing management strategy for advancing conservation initiatives in 'natural' protected areas may not apply directly to urban protected areas because these settings are valued differently.

Attitudes toward fee programs were empirically evaluated and predicted by social values and knowledge. These findings indicated that increases in social valuation paralleled increases in support for a fee program. Internal processes such as attitudes are important to understand when making decisions about the provision of opportunities for experiencing nature-based settings because these metrics also correlate with behavior that can benefit and sustain protected areas (Stern et al., 1999; Oskamp and Schultz 2005). Given that attitudes are not directly observable, future research should continue to adopt sound measurement practices (Kline 2015) and recognize complexity in how the public responds to management tactics such as fee programs (Kyle, Absher, and Graefe 2003). Attitudinal research can also provide insight on whether fee increases may reduce visitation, which is important in light of increases in operating expenditures and environmental uncertainties for public land management agencies (Lindberg 2007; Smith, Wilkins, and Leung 2019). Although respondents in this study did not respond adversely to a hypothetical fee program, economic marginalization may ensue (Krymkowski, Manning, and Valliere 2014) and cause negative reactions that can deter resource management agencies from introducing new fee structures (Zou 2020).

We developed a single item indicator of knowledge that represented the technical understandings of survey respondents, and we observed high awareness of environmental, social, and management conditions in the protected area (D'Antonio et al. 2012). In our comparison between knowledge and social values, respondents with greater knowledge were more likely to see social values in the landscape, albeit to a moderate but statistically significant degree (Cohen 2013) and in directions that align with previous research (Meinhold and Malkus 2005). This result is instructive for protected area managers because increasing knowledge will simultaneously boost the perceived importance of places, which affects environmental stewardship. With a better understanding of current knowledge, managers can (re)direct attention to content that is not well understood by visitors and then monitor changes that occur in response to interventions (Stern, Powell, and Ardoin 2008). For example, factual knowledge about visitation rates in the protected area were markedly lower than respondents' views on what constituted natural resources and management conditions. If crowding was a problem in this protected area, raising awareness of current use patterns could help to increase visitor compliance and understanding of management decisions to mitigate impacts. Managers should also keep in mind that knowledge is multi-faceted, as illustrated by three dimensions that were used a basis for conceptualizing our survey scale, and as such, can be fostered through tactics such as educational campaigns, signage, interactive displays, and other learning opportunities that teach people about the complexities of protected area management (D'Antonio

et al. 2012; Guo et al. 2017). Future researchers and practitioners should also distinguish between the type of factual knowledge evaluated in this study and local or traditional knowledge about an environment that stems from different sources and learning pathways (Raymond et al. 2010; van Riper et al., 2020).

We provided insight on two predictor variables – social values and knowledge – that can be referenced to understand how and why people support management interventions like fee programs in protected areas. Both enhance understanding of what drives decisions to protect and restore the environment. However, social values and knowledge undergo different rates of change (Eriksson et al. 2019) and should therefore be targeted using different management strategies. Attitudes are 'long-term' psychological drivers that take generations to change whereas knowledge and social values are beliefs that can be shifted through new information presented to visitors (Heberlein 2012). Managers of protected areas aiming to change behaviors should think carefully about the differences in knowledge formation, the perceived benefits of places, and how the public responds to external stimuli like fee programs. In addition to targeting deeper-seated psychological drivers such as attitudes, another pathway is for researchers to consider the place meanings that are embodied by landscape conditions (Stewart et al. 2019). Given that knowledge and attitudes are closely related to the reasons why people form connections with places (Kyle, Absher, and Graefe 2003; Guo et al. 2017), fostering meaningful bonds and preserving the character of environments that people care about could help grow positive attitudes over long time periods and re-connect people with nature-based settings (Abson et al., 2017). The relationships between concepts of place and the social phenomena examined in this study would generate useful future knowledge to guide decision-making about protected areas.

Limitations

Our research process revealed two key limitations that should be taken into consideration in the interpretation of our results. First, we asked respondents to evaluate a hypothetical fee program that had not been implemented. The fee program in Bicentennial Park at the time this research was conducted only charged people for parking their cars. Although park management agencies indicated a need to increase park revenue through fees as a motivation for the present study, detailed information about the scope of a hypothetical fee program was not provided during our survey process. Second, our sample was drawn from an on-site survey of visitors that provided insight into a particular stakeholder group. Although our sampling strategy was robust and in line with standards outlined in previous research (Dillman, Smyth, and Christian 2014), we did not engage local communities in discussions about management of the protected area. We acknowledge the value of engaging multiple interest groups in the research process, particularly residents living near protected areas (Knapp et al. 2014; Johnson and van Riper 2021), and suggest that future research focus efforts on generating knowledge within local communities to not only complement visitor use research, but also embrace more inclusive conservation research approaches that are more likely to represent stakeholder interests (Tallis and Lubchenco 2014).

Conclusions

This article provides insight on factors that influenced visitors' expressed support for a fee program within an urban protected area in Central America. Our research approach generated empirical evidence of how the public valued a protected area landscape, as illustrated by the array of social values ascribed to places. That is, we learned that Bicentennial Park was most important due to the provision of recreation opportunities, aesthetics, its life sustaining qualities, and biodiversity. We also showed that factual knowledge of the protected area was high and that visitors responded positively to a fee program. As knowledge and the perceived social value of the protected area increased, so too did reactions to the hypothetical fee program. These findings point to social values and knowledge as a basis for garnering public support for resource management actions. This study thus has relevance for agencies and policymakers aiming to incorporate a broader range of values into decision-making and therefore be better positioned to achieve sustainability goals over time.

Acknowledgements

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