Public use management in protected areas: Laying the way for a new research trail in post pandemic Costa Rica

by

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B.S., University of Costa Rica, 1998
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AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Horticulture and Natural Resources
College of Agriculture

KANSAS STATE UNIVERSITY
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2022

Abstract

Costa Rica protects almost 30% of its territory and holds nearly 6% of the world's biodiversity in just 0.03% of the Earth's surface. Considered for decades a "green republic," its long tradition of conservation, political stability, democracy, anti-militarism, and strategic location between two oceans and proximity to the North American market, helped the country to position itself as a worldwide model for ecotourism in the 1990s.

Since then, tourism has been the most important engine of economic development for Costa Rica (even during the pandemic), and visitation has steadily increased, especially to protected areas. Park managers, then, uphold a triple mandate to preserve heritage, support surrounding communities in their enjoyment of benefits that derive from ecotourism, and at the same time guarantee that visitors achieve satisfying experiences.

A principal pathway to the fulfillment of this mandate, particularly for visitor satisfaction and heritage protection, is effective tourism management, known as public use or visitor management. To monitor the effectiveness of such management, make improvements, or try new models, research is required. Unlike in the United States which enjoys a long tradition of public use and recreation research professionals and institutions, Costa Rica has no strategy or even recognizes the little public use management research which has taken place within its borders.

The first part of this dissertation identifies existing publications and research gaps about public use management in Costa Rica's national protected areas system. Also, it highlighted the most urgent public use management research needs and interests reported by park managers and other protected area stakeholders in Costa Rica. Based on these findings, a research agenda was designed to guide future public use management research in the country, and in particular for the

Paraíso and Turrialba region, the area of influence of the University of Costa Rica-Paraiso Branch, where the author works with the Ecological Tourism Program.

Additionally, both to illustrate the use of this new research agenda and to begin to fill in one of the identified gaps, a case study was developed to identify underlying factors that influence the visitor's perception of the authenticity of Guayabo National Monument, an archeological site located within a forest and one of Costa Rica's most important cultural heritage sites.

This research employed mixed methods and tools: a literature review and synthesis, personal interviews, and template analysis were applied to identify existing publications and gaps in public use management research, and for the development of the research agenda. An online survey identified social science research needs in protected areas, and for the perception of authenticity, an on-site survey and Exploratory Factor Analysis (EFA) were applied.

The results produced, for the first time in Costa Rica, an updated database of existing publications and a research agenda to guide future public use management research. The EFA generated a set of factors that related to a framework by Wang (1999) in which he presented the concepts of objective, constructive, and existential authenticity. There are no other studies that have done this, and thus it will serve to develop a scale of visitor perception of authenticity in Guayabo National Monument which can later be tested and adapted to other protected areas. The implications for managers and researchers are important because once pandemic restrictions are lifted, visitation will surely surge. This post-pandemic era presents a unique opportunity to introduce new management actions along with more concerted research efforts that should strengthen the planning, monitoring, and improvement of public use management, hopefully, at the same time that visitor satisfaction and conservation also increase in Costa Rica.

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Acknowledgements

The pandemic caused by SARS-CoV-2 reshaped the world in 2020. Costa Rica's main industry —ecotourism— was completely paralyzed and disrupted for months. So were the lives of many of us who work in this area, in my case, as a professor of the Ecological Tourism major at the University of Costa Rica.

Not only my work, but this dissertation had to be reformulated and repurposed. I cannot thank enough to all of those who accompanied and supported me to this point, despite their own challenges and setbacks during these hard times.

My gratitude to my major professors, Dr. Ted Cable and Dr. Ryan Sharp for their constant attention, support, and friendship, and for allowing me to see the importance and application of interpretation and public use in new ways that led me to this research. Also, to my committee members, Dr. Rich Scheidt, who has this amazing way of teaching about research, and whose outsider perspective made my studies and work much more meaningful, and to Dr. Jessica Fefer who came to my committee's rescue, visited us in Costa Rica, and offered her ideas and support.

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And to my family, who has walked with me along this journey always giving me support and motivation to persist —particularly Jon, with his double duty as husband and colleague.

For all of those who cared and will continue caring, **thank you**.

Dedication

To our park managers and students, for whom I wish that they, like me, will have the opportunity to experience the importance and joy of doing research for the betterment of the ecotourism profession, of our protected areas, and of our world.

Chapter 1 - Introduction

Costa Rica's tourism is considered a mature industry, based on various indicators of sustainability and competitiveness, including the conservation of attractions and heritage, excellent availability of infrastructure and tourist services, and the participation of communities which profit from the activity.

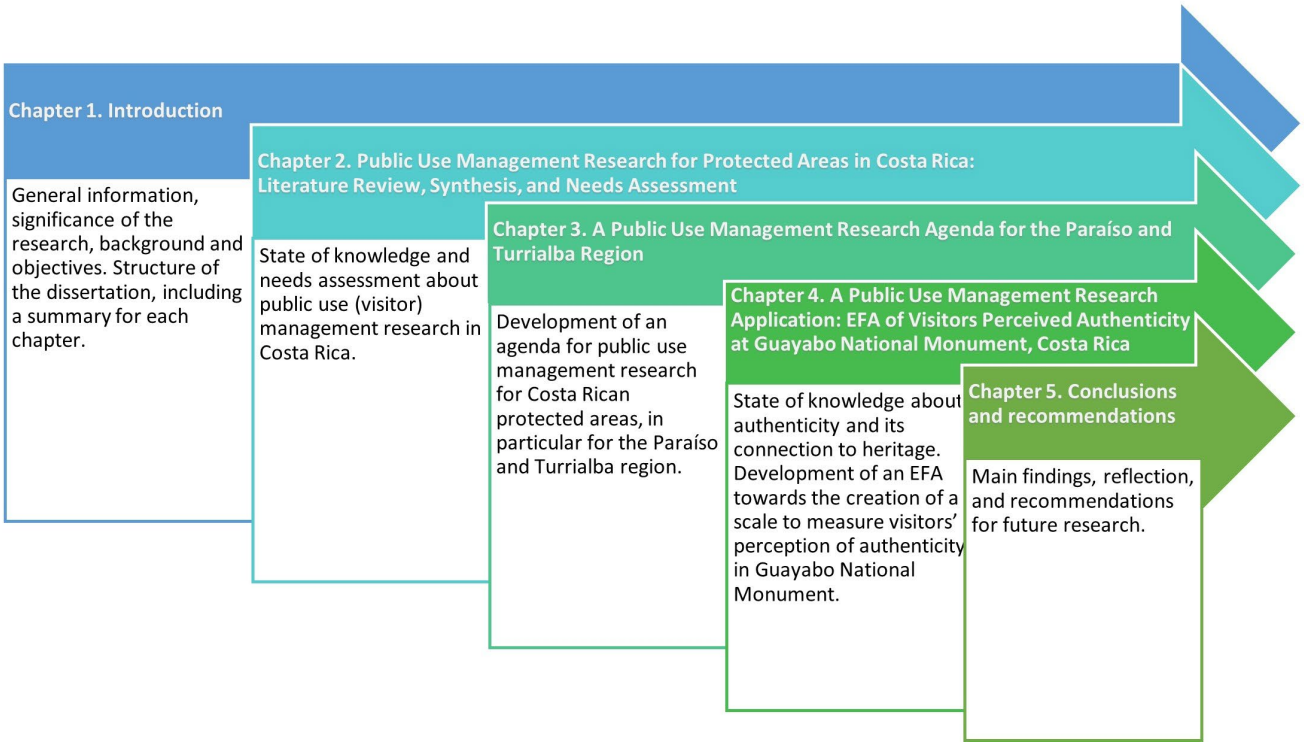
The country has maintained a sustained influx of tourists since the early 1980s. The arrival of international tourists in 1984 was 273,900 and 3,139,008 in 2019 (Instituto Costarricense de Turismo, 2017). In 2020 there was a dramatic decline due to the global health crisis, with a rock-bottom period of zero tourism, and during the entire year the country received only 1,011,912 visits (Instituto Costarricense de Turismo, 2021a). Considering tourism represents the main source of foreign income in the country, the impact was very evident. Despite this setback, Costa Rica still figures among the world's top 25 travel destinations according to National Geographic (2021), although according to projections offered by the Costa Rican Tourism Institute (ICT), it will take 2.5–4 years to recover 2019 visitation levels (Instituto Costarricense de Turismo, 2021c).

One way to accelerate recovery is by improving tourism services and offerings. Among the most important offerings include nature-based destinations such as public and private protected areas, which cover more than 28% of the country. More than two million visitors (local and foreign) visited protected areas each year between 2013 and 2019 (Instituto Costarricense de Turismo, n.d.). Despite this, the National System of Conservation Areas (SINAC) recognizes many weaknesses in the development of sustainable tourism (Sistema Nacional de Áreas de Conservación, n.d.), some of which relate to its public use management (also known as visitor management).

In order to better understand these issues and contribute to solutions, data is necessary. The initial problem identified was the lack of information, as public use management research has also been a neglected task in Costa Rica. For this reason, the purpose of this dissertation is to clarify the status of public use management research for protected areas in Costa Rica and offer a way forward to collect, analyze, and share existing information, as well as launch new research efforts, as it will be documented through the chapters of this dissertation (Figure 1.1).

Figure 1.1.

Structure of the Dissertation



As shown in Figure 1.1 Chapters 2, 3, and 4 form the base of this dissertation. Chapter 2 offers an overview of public use management published research and gaps for Costa Rica's national protected areas and identified the most urgent research needs and interests reported by

park managers and other relevant stakeholders for public protected areas in Costa Rica. It also explores a framework based on Integral Theory to organize and analyze the existing research and needs.

Based on these findings, Chapter 3 presents a public use management research agenda, whose meaning and relevance are explained. Even though this research agenda could be applied elsewhere, specific possible applications were proposed for the Paraíso and Turrialba region, which lies within the area of influence of the University of Costa Rica-Paraíso Branch, where the author currently works.

To exemplify the feasibility and possibilities for the immediate application of this agenda, Chapter 4 presents a case study in Guayabo National Monument, a cultural and natural mixed heritage protected area in Costa Rica. The study identifies underlying variables for the construct of authenticity perceived by visitors in that protected area.

Chapter 5 concludes the dissertation with a summary of what was learned and implications for future research.

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Chapter 2 - Public Use Management Research for Protected Areas in Costa Rica: Literature Review, Synthesis, and Needs Assessment

Introduction

Costa Rica protects almost 30% of its territory. Its 19,700 square miles (about ¼ the size of Kansas), contain 152 protected areas, including a national monument, two absolute conservation reserves, four marine management areas, twelve wetlands, thirty national parks, fifty-one wildlife refuges, nine biological reserves, nine national forests, and thirty-three protected zones. Additionally, the private protected areas association has 215 affiliated reserves as well as many that remain unaffiliated, and there are several other outdoor recreation areas and facilities, including botanical gardens, zoos, and recreational parks managed by the National Institute for Sports and Recreation (ICODER), municipalities, and private owners.

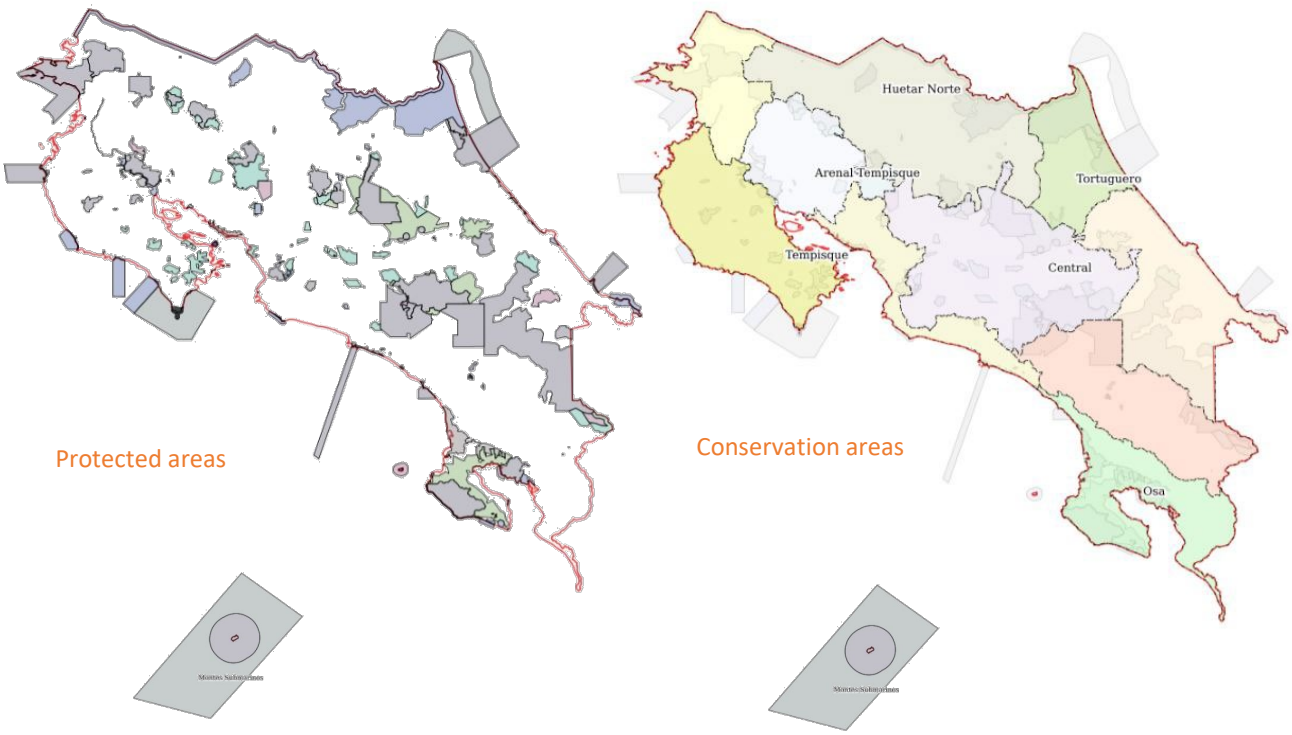
All these sites form part of a network of 11 formally declared conservation areas that cover the entire country. To understand the Costa Rican concept of "conservation area", it is necessary to briefly explain their establishment. In 1994, the Forestry Agency, the Park Service Agency and the Wildlife Agency in Costa Rica merged into one entity called the National Conservation Areas System (SINAC). This agency, itself today under the Ministry of Environment and Energy, implemented an entirely new conservation approach based upon the ideas of democratization and decentralization in which the government redirected its focus from natural resource management to sustainable regional biodiversity management (Courrau, 2002).

The new conservation model then proposed that the protected areas would not be considered independent units, but components of Costa Rica´s Conservation Areas System consisting of eleven large biogeographic terrestrial and marine areas in which management

focuses on biodiversity conservation and sustainable development. These regions are called conservation areas (Figure 2.1).

Figure 2.1.

Costa Rica´s protected areas and conservation areas



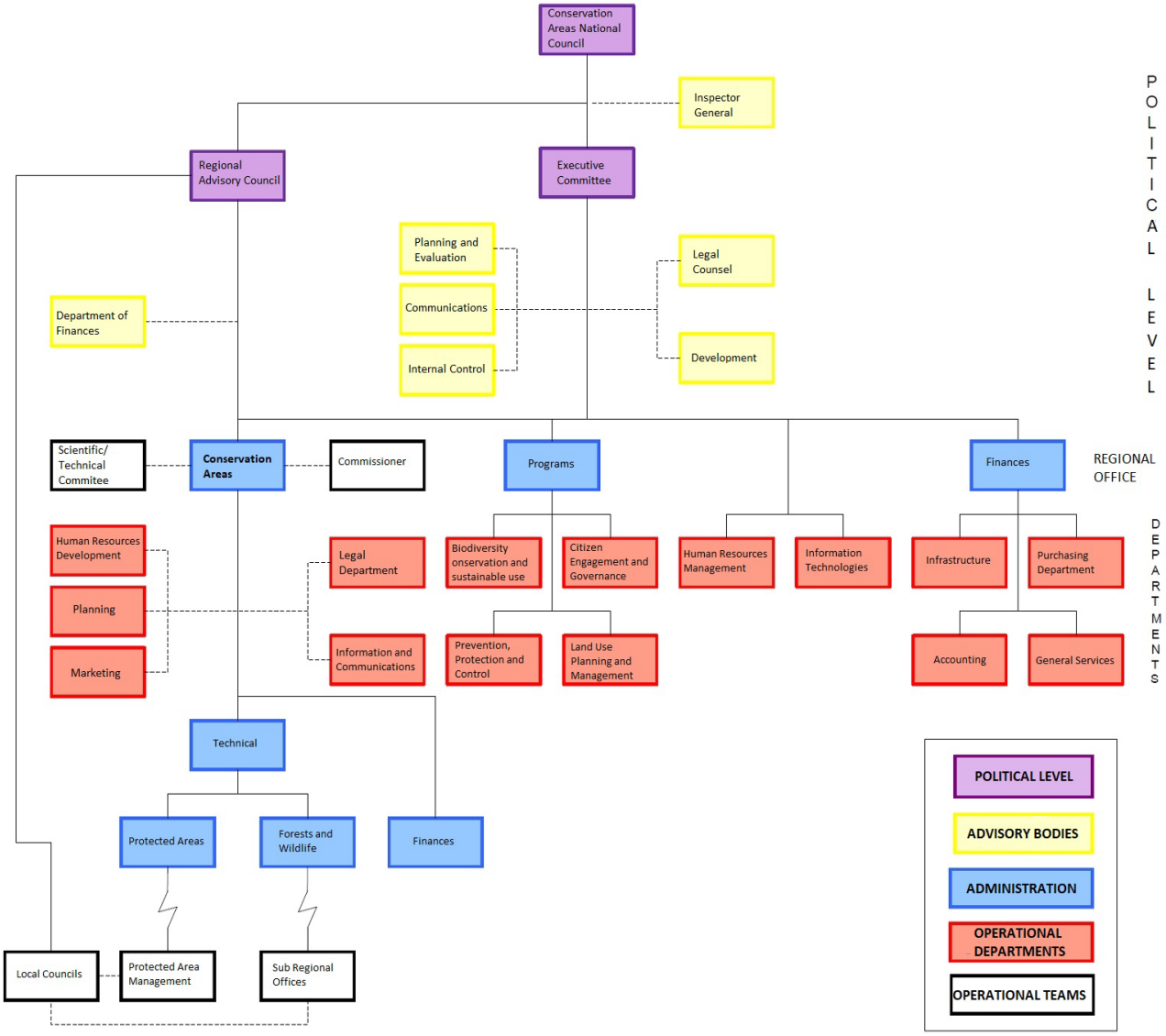
Source: Instituto Geográfico Nacional (Instituto Geográfico Nacional, 2022)

The national government, therefore, does not manage protected areas as independent units, but instead as components of the larger landscape system (Figure 2.2) that responsibly manages resources with the participation of government, communities, and private sector, based on the constitutional right of every citizen to a healthy and ecologically balanced environment, at

the same time the system strengthens the value of cultural and natural heritage and contributes to community development.

Figure 2.2.

Costa Rica´s Conservation Areas System organizational chart



Tourism and public use management in Costa Rica's protected areas

Although it is not possible to determine exact numbers of visitors to private and local parks, according to the Costa Rican Tourism Institute (ICT), in 2019 more than two million people (foreign and residents) visited public protected areas (Instituto Costarricense de Turismo, n.d.). This is a noteworthy number considering the country has a population of only 5.1 million.

In the document, "Protected Areas Policies for the National Conservation Areas System of Costa Rica" (Sistema Nacional de Áreas de Conservación, 2010), there is one policy specifically related to sustainable tourism: "POLICY 3 - Sustainable tourism: Protected area tourism management should be sustainable and consider its surrounding area, as well as all national conservations and tourism policies, plans and programs" (p.21).

SINAC, however, states in its Sustainable Tourism Strategy (Sistema Nacional de Áreas de Conservación, n.d.) that protected areas still have many weaknesses related to the development of sustainable tourism. For example, lack of coordination with ICT, poor development of services and tourism promotion, high concentrations of visitors in few areas and for a few months of the year, rigid rates and difficulty for online bookings, lack of initiatives to promote environmental education for visitors, and lack of knowledge of impacts generated by tourism. Some of these weaknesses closely relate to public use management which is defined as all tourist, educational, interpretive, recreational, and research activities carried out by visitors in these places, which do not involve the introduction or extraction of resources (except for certain sports and research activities) at a site (PUP Global Heritage Consortium, 2017). In Latin America public use is synonymous with the concept of visitor management.

Proper public use management promotes visitor satisfaction loyalty and intentions to use more services and repeat their visitation (Custódio Santos et al., 2014) and in the case of

protected areas, such management is also crucial to conserve a site´s heritage. In these sites, visitors join a complex system of wildlife, plants, and site management. Also, they are part of a social system with cultural aspects and very complex ways of thinking and behaving. They have expectations and needs when using the facilities and services and when interacting with staff.

Costa Rica requires that its protected areas develop a series of plans and strategies based on management models addressing social, natural, and managerial aspects, as stated in the Effectiveness Management Tool (Sistema Nacional de Áreas de Conservación, 2016a). One such document is the Sustainable Tourism Plan Development Guide which shows indicators for context assessment, product development, and tourism impact monitoring and management (Sistema Nacional de Áreas de Conservación, 2016b) (Table 2.1).

Table 2.1.

Effectiveness management indicators for the Sustainable Tourism Plan and their connection to SINAC´s management and evaluation cycle.

Element of Assessment	Area		
	Social	**Managerial**	**Natural and Cultural Resources**
Context	Resource use patterns and intensity	—	—
Planning	• Volunteer Plan • Communications Plan • Environmental Education Plan • Sustainable Tourism Plan	• Facilities and Equipment Maintenance Plan • Solid Waste Management Plan • Staff Development Plan	• Protection Plan • Research Plan • Climate Change Mitigation and Adaptation Plan • Resource Management Plan
Inputs	—	• Needed staff • Adequate equipment • Facilities	—
Processes	Participation Strategy	—	—
Outputs	—	Information Systems	Ecological Integrity

Source: Sistema Nacional de Áreas de Conservación (2016a, p. 16, 2016b)

Another public use tool is the Visitor Flow Management Tool based on models like the Recreation Opportunity Spectrum and the Visitor Experience and Resource Protection (Sistema Nacional de Áreas de Conservación, 2015a). The application of this tool, however, is not required, and the same document confirms it is a general guide, as visitor management "…es un campo del conocimiento nuevo para Costa Rica que debe madurar y evolucionar" (is a new area

of study for Costa Rica which needs to mature and evolve (Sistema Nacional de Áreas de Conservación, 2015a, p. 7).

It is worth noting, that the effectiveness assessment only collects parks´ estimated percentage of plan or activity implementation in their respective areas. Thus, independent of plan contents and objectives, parks only report, based on a 5-point scale, the percentage of implementation, but not their actual results. In other words, they only report the degree of conformance (the degree which activities fulfillment align or conform with predetermined objectives) rather than actual performance, which measures the degree to which conditions actually improve. Conformance as a measure of plan implementation has been criticized in the planning literature since the 1960s principally because conditions change quickly and thus outdate the original objectives (Kohl & McCool, 2016).

In 2018 only 44% of the parks applied this tool, and more than half of the general management effectiveness results scored low: not acceptable (35%), fairly acceptable (22%), moderately acceptable (34%), acceptable (6%) and highly acceptable (3%) (Sistema Nacional de Áreas de Conservación, 2020a). Particularly for the implementation of the Sustainable Tourism Plan, the report states that most of areas have such plans but on average they have implemented only 50%, although the results and implications of this implementation are not completely clear.

Public Use Management Research

Public use management research allows us to understand how people use and experience sites, their possible impacts, and mitigation, as well as how to design strategies and infrastructure that better serve visitors to be more comfortable, safe, and satisfied, while protecting heritage, facilities, ecological conditions, and surrounding communities. Public use management in

heritage sites is increasingly complex and demands new approaches to maintain heritage values for the enjoyment and education of present and future generations. Examples of the variety of issues that affect heritage management include the type of use and visitors, cultural context, diversity of values, meanings and relevance to daily life, existing scientific data, ownership, influence of globalization, related institutions, resource constraints, politics, development issues, disasters caused by natural phenomena, climate change, human conflicts, and sustainability (Wijesuriya et al., 2013).

In the United States, for example, there is a long tradition of outdoor management and visitor research performed by professionals in a variety of disciplines, such as anthropology, architecture, biology, business administration, conservation, ecology, economics, ecotourism, environmental sciences, geography, heritage interpretation, humanities, sustainability, tourism, and urban development, just to name a few (Manning, 2011; Plummer, 2009).

Such studies cover many different subjects. For instance, some research by the U.S. National Park Service (2019) and the Kansas State University´s Applied Park Science Lab (2021) is related to planning and site management, including visitor impacts on the site and on other visitors; management actions (zoning, regulations, setting conditions); surveys to evaluate site conditions, quality, and management actions; and effectiveness of educational and interpretive interventions. Also, studies include visitor profiles and management, their assessment of their visit and experience on site, reported benefits, perceptions, attitudes, behaviors, motivations, expectation, satisfaction, willingness to pay, and visitation data (visitors per month or year, number of vehicles, etc.). This list is not exhaustive but shows current research efforts and many possible study topics.

In Costa Rica´s protected areas, conversely, although there is a long tradition of conservation and biological research, there is a lack of public use research. SINAC´s National Research Strategy 2014–2024 aims to "support decision-making for the conservation and sustainable use of biodiversity and the ecosystem services it provides" (Sistema Nacional de Áreas de Conservación, 2014, p. 2) and established a research agenda that prioritized three themes, mainly focusing on biodiversity (but not public use):

- State of functional biodiversity and its relationship to ecosystem services: focus on functional biodiversity, invasive, threatened, opportunistic, and commercial species.
- Ecosystem management in the face of global change: rehabilitation, connectivity, and population recovery; approach to ecosystem and migratory species resilience.
- Interaction of human activities and ecosystems (marine-coastal, terrestrial, and inland waters) and the services the latter provides with a focus on pressures and threats to ecosystems and ecosystem service valuation (Sistema Nacional de Áreas de Conservación, 2014, pp. 10–11).

The lack of consistent public use evaluation, research, and publications has been confirmed through other venues. For instance, the director of the Department of Conservation and Sustainable Use of Biodiversity and Ecosystem Services at SINAC (H. Molina personal communication, 19 February 2021), clarified that SINAC does perform assessments when developing park management plans or other relevant planning tools and issues annual reports about protected areas management effectiveness and visitation (as mentioned in the previous section). He also confirmed that SINAC also encourages the development of research about topics of interest, like visitor-wildlife interactions, among others. He indicated that this

information, however, is not obtained “bajo una lógica y metodología convencional de proceso de investigación formal” (under a conventional logic and methodology of a formal research process).

Additionally, unlike in the United States, where the literature about social science research in outdoor recreation and visitor management has been thoroughly reviewed and periodically updated (Cerveny et al., 2020; Manning, 2011), there are no consistent reviews for Costa Rica. According to the director for SINAC´s Department of Citizen Engagement and Governance (J. J. Jimenez, personal communication, 19 February 2021), SINAC does not have an official database of social research publications in parks and does not have a strategy and protocols for conducting social research with visitors. For instance, although any formal research performed in protected areas requires to submit a project proposal and complete a form, this form was originally designed to request permission for biological specimens collection, not for the purpose of social science research, so for the last it only collects personal information and affiliation of the researcher(s).

These insights increase the urgent need for a more thorough and deeper review of the scientific literature on public use management in Costa Rican protected areas. A literature review would thus allow us to understand what it is already known, so new and different contributions can be made (Baker, 2000). Cooper (2017) also defends the importance of research synthesis because the incredible amount of information available makes it nearly impossible for researchers to keep up and assimilate the research. Even though it is not the same when little research has been developed or published —as it is in this case — it is still necessary to develop a system to organize and integrate what has been and will be done in the future.

A research needs assessment can help researchers, technical assistance providers, and training program designers to focus attention and resources on those topics considered relevant or high priority (Harris & Lorenzo, 2000). A literature review and synthesis could also lay the groundwork for a research agenda, enriched further by stakeholder input (especially that of park administrators) of their research needs and preferences.

An Integral Framework Approach

A framework to organize and analyze research topics can be very helpful. As Bosak (2019) emphasizes, when thinking of tourism as a complex system, there are different methods of addressing its complexity which requires new approaches to produce and analyze data in a more holistic way that might enhance ecological and social sustainability.

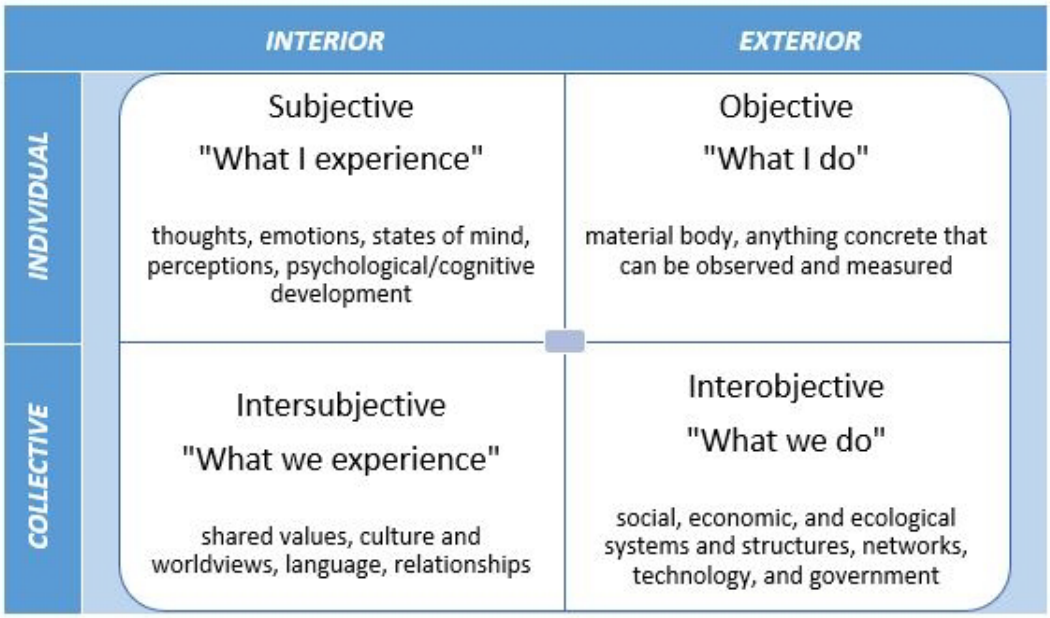
To organize the research process, for instance, the book *A Research Agenda for Sustainable Tourism* (McCool & Bosak, 2019) propose a variety of topics, including those related to visitor management like social-ecological interactions and visitor experiences and benefits, among others. Pearce (2008) proposed a list of future research requirements for Australia's Wet Tropic Rainforests, including research into resources, patterns, tourists, management, impacts, and economic issues. Another way of structuring public use management research could be with the Integral Theory, which provides a framework that could help organize different contributions for public use management research in protected areas from a holistic perspective.

According to Esbjörn-Hargens (2009), in order to fully understand any issue or aspect of reality, four irreducible perspectives or dimensions must be considered. These perspectives derive from the interaction of interior (psychological), exterior (behavioral), individual, and

collective (community, society) perspectives (Figure 2.3). Esbjörn-Hargens and Zimmerman (2009) applied this theory to integrate many approaches to the field of ecology. Kohl and McCool (2016) used it to evaluate planning implementation. Duffy (2020) also proposed its application to mental health care. Similarly, Mayorga and Kohl (2021) applied it to heritage interpretation.

Figure 2.3.

Perspectives or dimensions of reality, according to Integral Theory



Adapted from Brown (2006) and Wilber (2014)

An advantage of this model is that it expands perspectives beyond some commonly studied topics, which, even though important, can obscure factors from other quadrants that directly affect outcomes, in this case, public use management. As Duffy (2020) points out, the

Integral framework also encourages interdisciplinary efforts and learning, recognizing cultural diversity, but also individual needs for experiences, self-cultivation, and self-assessment.

An analogous approach is proposed here for public use management research where research emerges from one or more of the four perspectives:

i. Subjective perspective: Psychological and Spiritual Experiences. The upper-left quadrant includes studies about phenomena that occur in the minds of individuals: values, beliefs, attitudes, motivations, perceptions, awareness, preferences, satisfaction, or intentions to act. Also, studies related to an individual´s mental health and wellbeing, self-esteem, and particular experiences, as well as attention, memory, and learning. Although research on individuals might lead researchers to think about site visitors, such research can also be conducted with park staff and officials, as well as other stakeholders, to identify potential conflicts and opportunities.

ii. Objective perspective: Physical and Behavioral. The upper-right quadrant relates to individuals' physical health and concrete actions and behaviors: health indicators such as heart rate, skills and abilities, participation in park activities or programs, and any kind of behavior and impacts (positive and negative) towards other visitors, communities, and heritage. Individual behaviors are important because they indicate conformance with group and societal norms. For example, an individual that properly disposes of trash while visiting a park, might exert pressure for others to act accordingly. The opposite is also true: depreciative behaviors can influence others to follow suit, as is often the case with graffiti or stone stacking.

iii. Intersubjective perspective: Collective Experience and Culture. Studies for the lower-left quadrant focus on paradigms, worldviews, shared views, collective norms, cultural imaginaries, communication, culture of participation and contribution, and partnerships. They also include interactions with and within communities, institutions, and groups of visitors or stakeholders in connection to public use. Current times —where individual and collective values clash with increasing frequency and intensity — might demand new assessments of these topics.

iv. Interobjective perspective: Natural and Social Systems. The lower-right includes studies about planning, management, and assessment of public use tools, for example, related to recreation ecology (managing impacts for the natural environment and ecological systems), infrastructure quality and design, patterns of usage, frequency of visits, risk assessment and management, community and park development models, park policies, management frameworks and strategies (i.e. carrying capacity, ROVAP), zoning, protocols, education and communication tools and strategies (interpretation, environmental education), training, and technologies.

Historically, much of this research has focused efforts on what is objectively measurable, so by integrating all perspectives, researchers can illuminate some unseen relationships, forces, and interactions between intangible and tangible dimensions, as well as reveal previous biases in research paradigms and preferences toward one quadrant over another.

Considering Costa Rica´s current context, this study´s purpose is twofold: 1) to provide researchers and park managers with an overview of published public use research and gaps in Costa Rica´s national protected areas through a literature review and research synthesis, and 2) to identify the most urgent research needs and interests reported by park managers and other relevant stakeholders for public protected areas in Costa Rica through a survey.

Methodology

Literature Review and Research Synthesis for Public Use Management Research

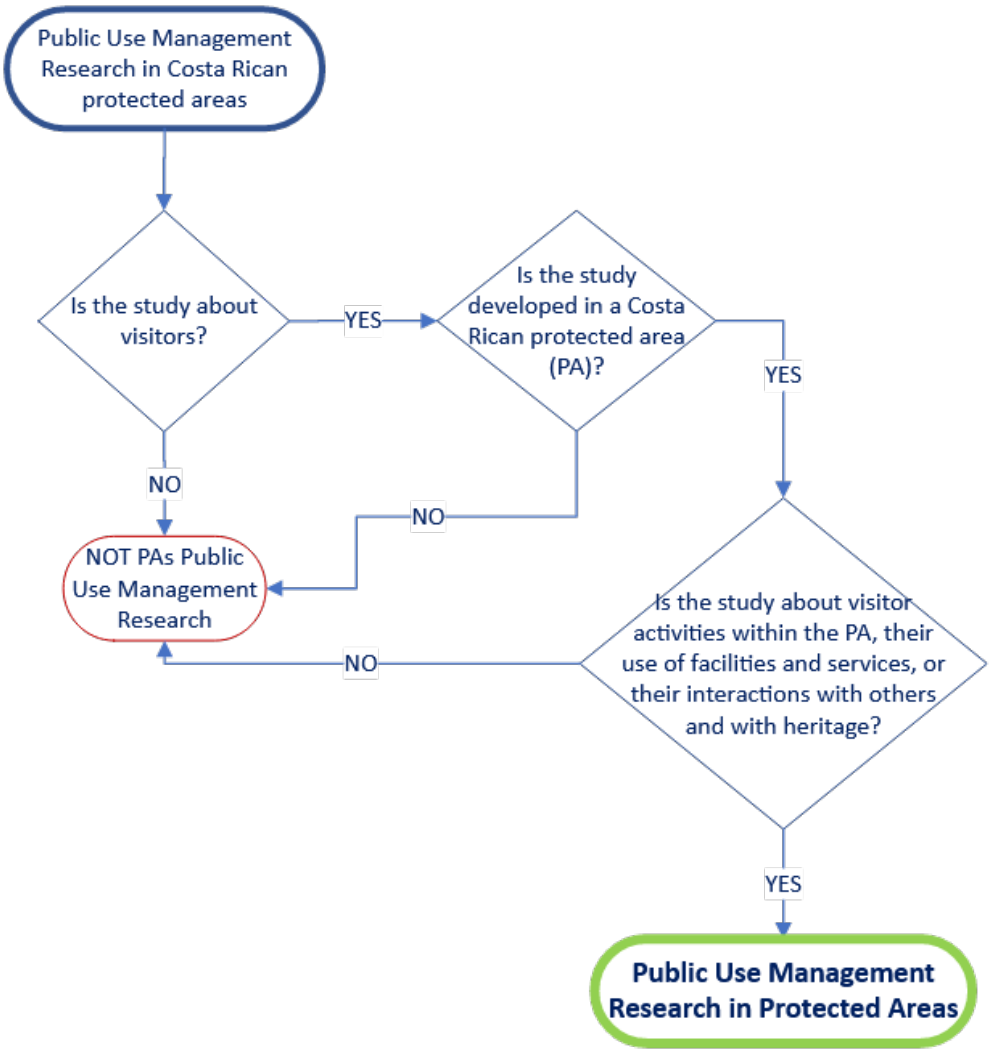
This study conducted a literature review and research synthesis (Cabral & Dhar, 2019; Le et al., 2019; Pickering & Byrne, 2014; Randolph, 2009; Sharp et al., 2017) following four basic steps: problem formulation; identification of keywords, databases, and literature selection criteria; search in databases and refined criteria; and summary, synthesis, and presentation of findings. The first three steps will explain the study design, while the last one will be addressed in the results section:

Problem formulation

It is important to differentiate public use management research from other types of research developed in Costa Rican protected areas, or alternatively, of visitor studies conducted in Costa Rica but not directly related to protected areas. Public use management research refers to studies about users and activities that they carry out within the place they visit, their use of facilities and services provided, and interactions with others and with different aspects of heritage (Figure 2.4).

Figure 2.4.

Selection process for public use management research studies



One example of research that qualifies as public use management research would be the impact of visitors on monkey behaviors (and the reverse). Conversely, research related to monkey behavior within their natural habitat, even though it might inform manager decisions, would not be considered public use management research. Other visitor studies not conducted in

parks but elsewhere, for example at the airport, does not qualify as protected areas public use management research for this study.

A type of publication that does not constitute research, but is relevant for this study, are public use or tourism plans developed for protected areas. They include diagnostic information about sites, and since they identify audiences, intended experiences, and activities with concomitant impacts, they often prove fruitful sources for studies, if implemented. Thus, the current review attempts to answer the following question: What kind of public use management research on national protected areas has been conducted in Costa Rica and subsequently published?

Databases, keywords, and literature selection criteria

The literature review was conducted primarily from December 2020 to December 2021 through the Kansas State University (KSU) library, associated to EBSCO and Google Scholar. Also, through the University of Costa Rica library (SIBDI), associated to SCOPUS, as well as local databases and repositories: the national repository of Costa Rica (KÍMUK) which includes references from all five Costa Rican public universities (University of Costa Rica, National University, National Distance University, Technological Institute, and National Technical University), and also an intergovernmental natural resource postgraduate university (CATIE), and a private university (LEAD). Additionally, the thesis database from the University for International Cooperation was consulted. A repository in Google Drive from the School of Field Studies was also reviewed, as they have done public use consultant projects. Additional findings based on references from previous publications were also included. The earliest publication found in 1988, was the starting point and from there, the search extended until 2021.

Search keywords in English and Spanish in different combinations were: Costa Rica, parks (parques), protected areas (áreas protegidas), tourist/tourists management (turista/manejo de turistas), visitor management (manejo de visitantes), public use management (gestion de uso público), visitor use planning (planificación de uso de visitantes), recreation planning (planificación recreativa), recreation (recreación), carrying capacity (capacidad de carga), limits of acceptable change (límites de cambio acceptable), visitor impacts (impacto de visitantes). Some searches included "Costa Rica" + park + "public use"; "Costa Rica" + "visitor management"; "Costa Rica" + "protected area" + "visitor impact"; or "Costa Rica" + park + "carrying capacity", just to give a few examples.

Search results were imported to the reference manager RefWorks where duplicate references were eliminated, as well as articles that clearly would not fit established criteria (i.e., an article about pollinator visitation patterns to certain plant species in a park). The refined list was imported into Excel for further analysis. Those publications that could not be imported into RefWorks because they were not in compatible databases were included manually in the Excel file. The publications obtained were primarily peer-reviewed academic journals in English and Spanish, and student theses or dissertations related to public use management in protected areas in Costa Rica. Institutional reports related to public use were also included.

Refined criteria

A total of 416 documents were initially selected through database searches using different keyword combinations as described. Four types of documents were considered: peer reviewed journal articles, thesis/dissertation, books, and reports. After a more thorough screening (first read the title, then the abstract, and when appropriate, the full article), many of these publications

that did not relate directly with public use management in Costa Rican protected areas were eliminated. Also, because most documents were about applied public use management, very few documents focusing only on conceptual and theoretical discussions or opinion pieces (for instance about the importance of park interpretation or carrying capacity) were excluded, resulting in 119 documents, including 47 peer reviewed articles (30 in English and 17 in Spanish), 33 thesis or dissertations (3 in English), 12 undergraduate research projects, 23 reports (including 10 sustainable tourism plans for parks; 1 in English), 1 book in Spanish, and 3 book chapters (2 in English and 1 in Spanish). A list of all these annotated sources is in Appendix A.

All publications were reviewed and analyzed using template analysis to identify major research categories and subcategories about public use in protected areas. Template analysis often starts with a priori codes (University of Huddersfield, 2021). In this case, the categories and subcategories were associated with the four perspectives of the Integral framework. The template analysis greatly helped to quickly identify the emphasis different researchers put on their studies, as well as some important gaps and opportunities for future public use research.

Social Research Needs Assessment

To identify the level of importance of certain research needs and interests reported by park managers and other stakeholders, a research needs assessment survey was designed based on relevant literature (Cerveny et al., 2020; Clayton & Myers, 2015; Harris & Lorenzo, 2000; Leung et al., 2018; Manning, 2011; Spenceley et al., 2015; Weiler & Black, 2015), and the Integral framework and categories identified during the literature review (Appendix B). The survey was reviewed by two park managers and two tourism professors for clarity of content. After reviewing recommendations and adjusting the survey format, it was shared with site

managers and other stakeholders related directly or indirectly to public use research in protected areas in Costa Rica.

The survey was sent to all national protected areas with a reported visitation of at least 5,000 visitors in 2019 (Sistema Nacional de Áreas de Conservación, 2021), for a total of 27 sites (Table 2). The areas were contacted initially by phone where they received an explanation about the survey, the request for one person (the manager or research coordinator) to complete it, and a preferred way to receive it, for which the answer was by email or WhatsApp.

Table 2.2.

List of national protected areas with more than 5,000 visitors reported in 2019

Protected Area	**Number of visitors in 2019**
1. Monumento Nacional Guayabo	6,107
2. Parque Nacional Barra Honda	5,621
3. Parque Nacional Braulio Carrillo	33,919
4. Parque Nacional Cahuita	136,430
5. Parque Nacional Carara	54,273
6. Parque Nacional Chirripó	18,901
7. Parque Nacional Corcovado	70,114
8. Parque Nacional Los Quetzales	6,973*
9. Parque Nacional Manuel Antonio	513,050
10. Parque Nacional Marino Ballena	171,562
11. Parque Nacional Marino Isla del Coco	12,975
12. Parque Nacional Palo Verde	6,741
13. Parque Nacional Rincón de la Vieja	103,462
14. Parque Nacional Santa Rosa	46,146
15. Parque Nacional Tapantí Macizo de la Muerte	20,888
16. Parque Nacional Tortuguero	147,466
17. Parque Nacional Volcán Arenal	119,801
18. Parque Nacional Volcán Irazú	352,034
19. Parque Nacional Volcán Poás	147,230
20. Parque Nacional Volcán Tenorio	148,062

21. Refugio Nacional de Vida Silvestre Bahía Junquillal	8,087
22. Refugio Nacional de Vida Silvestre Cipancí	18,762
23. Refugio Nacional de Vida Silvestre Gandoca Manzanillo	46,138
24. Refugio Nacional de Vida Silvestre Ostional	13,252
25. Reserva Biológica Isla del Caño	19,233
26. Reserva Forestal Grecia	15,302
27. Reserva Natural Absoluta Cabo Blanco	5,823

Note. * Report for 2020

Source: Sistema Nacional de Áreas de Conservación (2021)

A follow up phone call, email, or WhatsApp message was sent to remind recipients to complete the survey if they had not done so, and if desired, share it with stakeholders that have experience working with visitors in protected areas. Additionally, the survey was shared through email and WhatsApp with staff from SINAC´s headquarters, as well as other professionals who have a relationship and a direct interest in research in protected areas, such as academics or consultants.

The survey asked participants to rate their current need or interest for research and evaluation on 23 topics related to public use (i.e., visitor impacts, interpretive planning, visitor flow patterns, etc.), as well as need or interest for technical assistance and training on 11 subjects (i.e., public use management strategies, trail management and risk assessment, customer service, etc.). The rating scale indicated the urgency of the need and varied from *Very Important* (3) to *Important* (2), *Not important* (1), and *Don't know/No opinion* (0). Related to assistance and training, preferences for media and materials were consulted, giving four options: face to face activities, printed materials (i.e., books, field guides, flyers, posters), digital materials (i.e., podcasts, videos, blogs), webpages and social media, and virtual events (i.e., webinars, virtual workshops). Once received, the data was transferred to an *Excel* worksheet and analyzed.

Expecting that all the topics would have some level of importance for the respondents, only topics deemed as *very important* by more than 50% of the respondents were considered as research priorities.

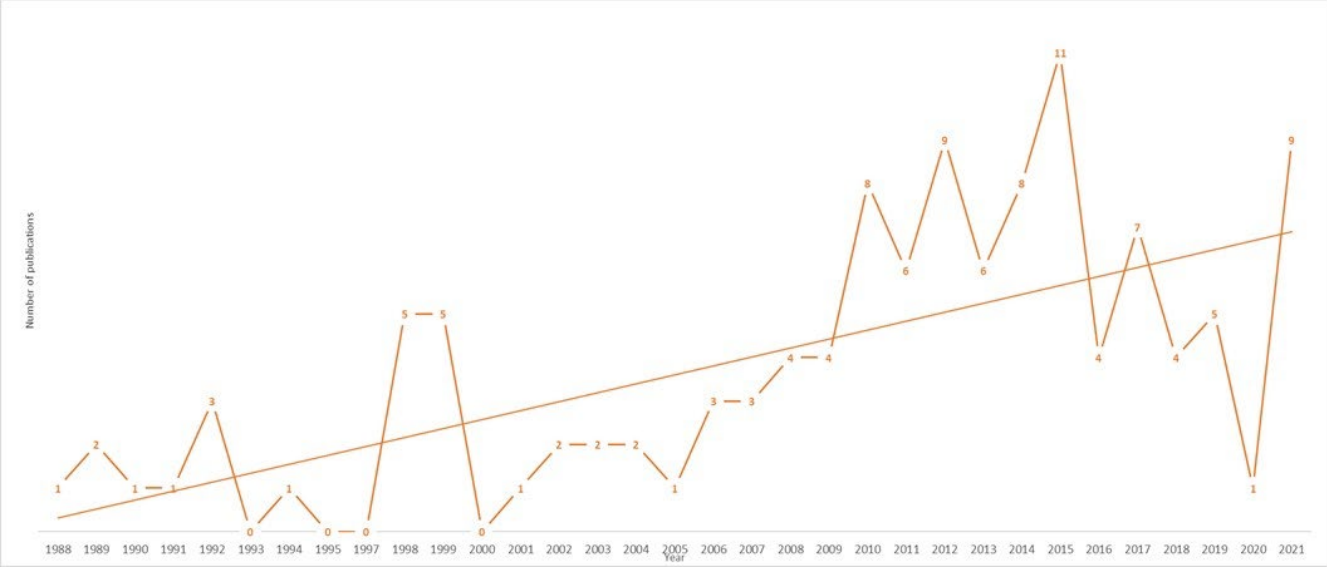
Results

Summary, Synthesis, and Presentation of Findings for Literature Review

The earliest publications were three theses from 1988 and 1989. Since then, the total number of publications has slowly increased, particularly in the last 12 years (Figure 2.5).

Figure 2.5.

Number of publications related to public use management in Costa Rica, 1988–2021

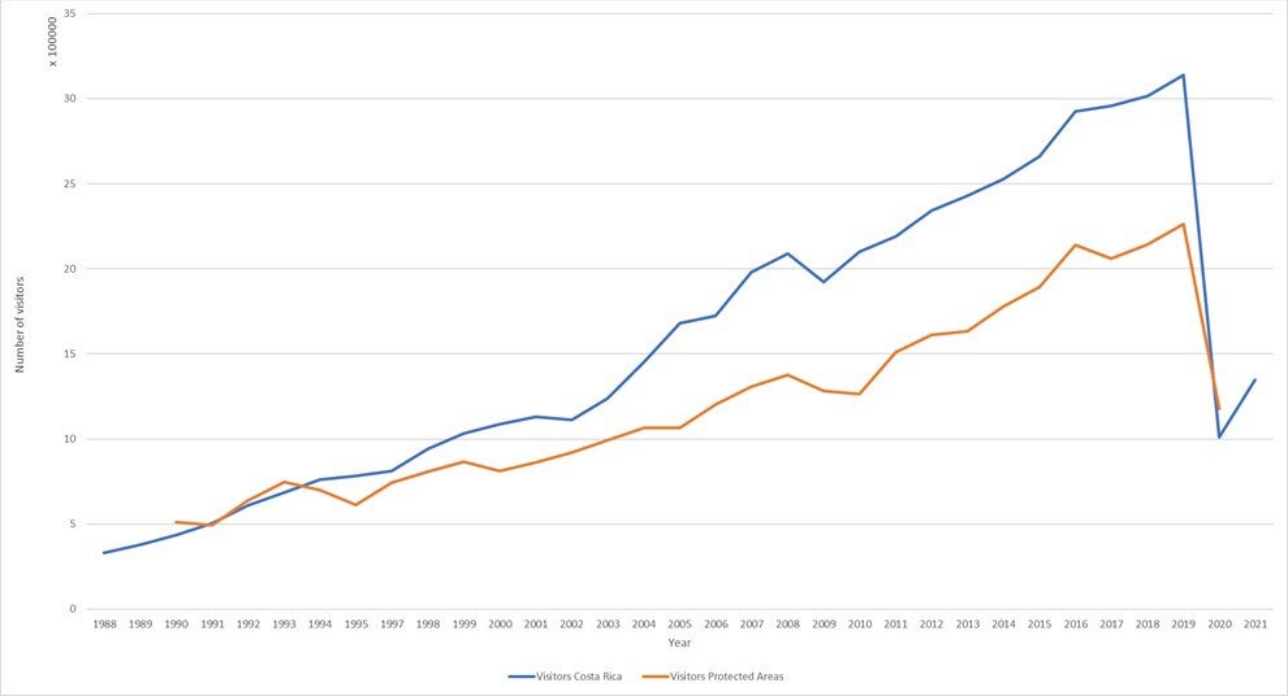


One reason for the increase of public use research and publications might be tourism growth in Costa Rica (in 1988 Costa Rica received 329,386 visitors and in 2019 the visitation

was 3,139,008) as well as protected area visitation, which has increased at a similar pace (Figure 2.6) (Instituto Costarricense de Turismo, 2021).

Figure 2.6.

Number of visitors to Costa Rica and its protected areas*, 1988–2021



Note. * Available data: 1990–2020
Sources: ICT (n.d., 2021), SINAC (2021).

Peer reviewed articles, in English and Spanish, account for 39% of the publications. The other major category consisting of 38% includes undergraduate research, thesis, and dissertations developed in public and private universities in Costa Rica, and a few from outside of the country. Reports follow (19%), and then books and book chapters (4%). Even though there are noteworthy differences between graduate research themes and methodologies, length, and quality, it does indicate a growing interest in public use management research by local researchers and students, as opposed to publications developed in many cases by foreign

researchers with no direct links to in-country institutions as happened with some peer reviewed articles. Based on the analysis and Integral Theory, the perspectives shown in Table 2.3 were identified.

Table 2.3.

Perspectives of Integral Theory and areas of inquiry for each perspective identified in publications

Perspective	Areas of inquiry
Subjective perspective: Psychological and Spiritual Experiences	• Visitor values • Visitor attitudes • Visitor motivations • Visitor satisfaction • Visitor intentions to act • Visitor perceptions • Visitor preferences • Visitor reported experience
Objective perspective: Physical and Behavioral	• Visitor impacts on heritage (principally, wildlife) • Visitor donations
Intersubjective perspective: Collective Experience and Culture	• Community-park partnerships • Community perceptions about tourism and public use • Public use impacts on community
Interobjective perspective: Natural and Social Systems	• Inventory and development of public use services (i.e., interpretation/environmental ed. programs, tours, guide training) • Infrastructure • Interpretive planning • Visitor profiles, flow, and patterns • Visitor fees • Economic impacts of public use • Public use strategic planning • Management frameworks (Carrying Capacity, Limits of acceptable change, VIM) and zoning

Figure 2.7 shows the proportion of publications for each perspective. More than half of the research has been developed from an interobjective perspective. The publications in this area

are mostly thesis and undergrad research (n=36) followed by journal articles (n=20) and reports (n=16).

Figure 2.7.

Percentage of publications identified for each of the four research perspectives

These publications, however, have been more about assessments and application of interpretive strategies, creation of interpretive trails, exhibits, programs, visitor centers, interpretive inventories, guide training, and education. Many are proposals that do not get implemented (particularly undergraduate research), and none evaluate the quality or effectiveness of the proposed product, nor the application of theoretical or empirical models.

By contrast, for the 26% from the subjective perspective, it is worth noting that most publications are peer reviewed articles (n=16) and only three theses were found. There is also a variety of research topics related to visitor values, attitudes, motivations, perceptions, preferences, satisfaction, experiences, and intentions to act, and have been performed from different fields of study (geography, economics, tourism, leisure, environmental management, conservation, cultural heritage, sustainability) for this category.

Next, 12% of publications account for the objective perspective related to people´s observable behaviors and physical or physiological reactions. From these, all but one study (about visitor donations), are related to visitor impacts on heritage, especially visitor-wildlife interactions with monkeys, racoons, and sea turtles.

Last, the intersubjective perspective that sees the interconnection between public use and communities, culture, or society as a whole, constitutes 8% of publications, which covered community-park partnerships related to public use, impact of public use activities and services on the community, as well as community perception of these activities. Beyond what has been studied, it is also crucial to better understand what managers and other interested stakeholders consider the most pressing research topics, discussed in the following section.

Social Research Needs Assessment Results

A total of forty-seven surveys were received: 25 from the parks that were contacted and 22 from stakeholders related to these parks (for instance, SINAC staff, guides, academics, staff from other parks). The response rate to this survey was 92% (25 of 27 parks responded). For the purpose of this inquiry, those topics selected as very important with a rating higher than 50% were considered of high interest and proposed as further research priorities (Table 2.4). In this case, *Visitor safety and risk management* was considered a very important topic for 76% of respondents. *Visitor impacts (positive or negative) on heritage, facilities, and other visitors* was also considered very important (74%). Sixty-one percent thought that *Quality of programs and activities, services, and facilities* and *Evaluation of education and interpretive programs* were very important; and 59% considered the study of *Impact of management decisions* a very important topic as well. Last, *Visitor distribution and use patterns* were deemed very important for 51% of the respondents.

Table 2.4.

Importance of public use research topics, rated by protected area managers and stakeholders

Importance for the site → Topic of research	Very important	Important	Not important	Don't know/ No opinion
Visitor safety and risk management	**76.60%**	23.40%	0.00%	0.00%
Visitor impacts on heritage, facilities, and other visitors	**74.47%**	23.40%	0.00%	2.13%
Evaluation of education and interpretive programs	**61.70%**	31.91%	0.00%	6.38%

Quality of programs and activities, services, and facilities	**61.70%**	34.04%	2.13%	2.13%
Impacts of management decisions over the site and other people	**59.57%**	38.30%	2.13%	0.00%
Visitor's distribution and use patterns	**51.06%**	44.68%	4.26%	0.00%
Visitation forecasting and economic impact	48.94%	42.55%	6.38%	2.13%
Communication effectiveness with visitors and communities	46.81%	46.81%	4.26%	2.13%
Partnerships with communities for public use management	44.68%	48.94%	4.26%	2.13%
Community participation in sites interpretation	42.55%	48.94%	2.13%	6.38%
Conflicts between different audiences	42.55%	42.55%	10.64%	4.26%
Nature's influence on visitor's well-being	40.43%	51.06%	8.51%	0.00%
Willingness to pay entrance and services	38.30%	53.19%	8.51%	0.00%
Values and attitudes from surrounding communities	38.30%	53.19%	6.38%	2.13%
Public use management models and best practices	38.30%	51.06%	8.51%	2.13%
Factors that influence visitor experience	36.17%	59.57%	2.13%	2.13%
Perceptions, expectations, motivations, attitudes	36.17%	53.19%	8.51%	2.13%
Visitor interaction with exhibits and facilities	36.17%	51.06%	6.38%	6.38%
Tour operators' needs regarding the site	31.91%	51.06%	10.64%	6.38%
Special needs audiences, minorities	27.66%	59.57%	8.51%	4.26%
Current audiences use of the site	23.40%	70.21%	6.38%	0.00%
Visitor's preferred activities and schedules	21.28%	65.96%	12.77%	0.00%
Potential visitors	19.15%	57.45%	19.15%	4.26%

The same rating system was applied to identify priority topics for training and technical assistance (Table 2.5) where 74% of respondents considered the subject of *Trail management and risk assessment to be very important*; 63% considered *Planning and development of programs, projects, and activities* and *Customer relations best practices* to be very important; and 51% showed interest in the *Implementation and comparison of different public use models and strategies* and *Software management*.

Table 2.5.

Importance of technical assistance and training topics, rated by protected area managers and stakeholders

Importance for the site → Topic of research	Very important	Important	Not important	Don't know/ No opinion
Trail management and risk assessment	**74.47%**	23.40%	2.13%	0.00%
Planning and development of programs, projects, and activities	**63.83%**	25.53%	8.51%	2.13%
Customer relations best practices	**63.83%**	36.17%	0.00%	0.00%
Implementation and comparison of different public use models and strategies	**51.06%**	46.81%	0.00%	2.13%
Software management	**51.06%**	38.30%	10.64%	0.00%
Conflict resolution	48.94%	40.43%	8.51%	2.13%
Methods and instruments for visitor data collection and analysis	42.55%	51.06%	0.00%	6.38%
Social media management, impact analysis	42.55%	48.94%	8.51%	0.00%
Cultural sensitivity workshops	40.43%	46.81%	12.77%	0.00%
Virtual program techniques and tools	29.79%	51.06%	17.02%	2.13%
Recreation and leisure practices and therapies	25.53%	51.06%	17.02%	6.38%

When considering training materials and techniques, some materials or strategies are preferred by managers to be used in their sites. It is always advisable, however, to have a variety to address different learning preferences (Dunn et al., 2010) and favor multiple intelligences (Wilson, 2018) for staff, visitors, or other stakeholders. This was reflected in the responses (Table 2.6), where only *Face to face activities (workshops, talks, guided tours, theatrical presentations, interpretive exhibits)* showed a clear preference as the number one strategy for 47% of respondents, but the other options were not as clear.

Table 2.6.

Priorities for the use of different types of training materials or techniques, according to protected area managers and stakeholders

Priority → Type of training materials and strategies	**Priority # 1**	**Priority # 2**	**Priority # 3**	**Priority # 4**	**Priority # 5**
Face to face activities (workshops, talks, guided tours, theatrical presentations, interpretive exhibits)	**47.37%**	18.42%	5.26%	7.89%	21.05%
Printed publications (handbooks, field guides, books, flyers, brochures, posters, infographics)	17.95%	25.64%	28.21%	15.38%	12.82%
Digital publications (audio guides, podcasts, videos, blogs, articles)	16.28%	18.60%	37.21%	23.26%	4.65%
Virtual events (virtual workshops, webinars)	11.63%	32.56%	13.95%	16.28%	25.58%
Webpages, social media	11.63%	6.98%	16.28%	32.56%	32.56%

Discussion

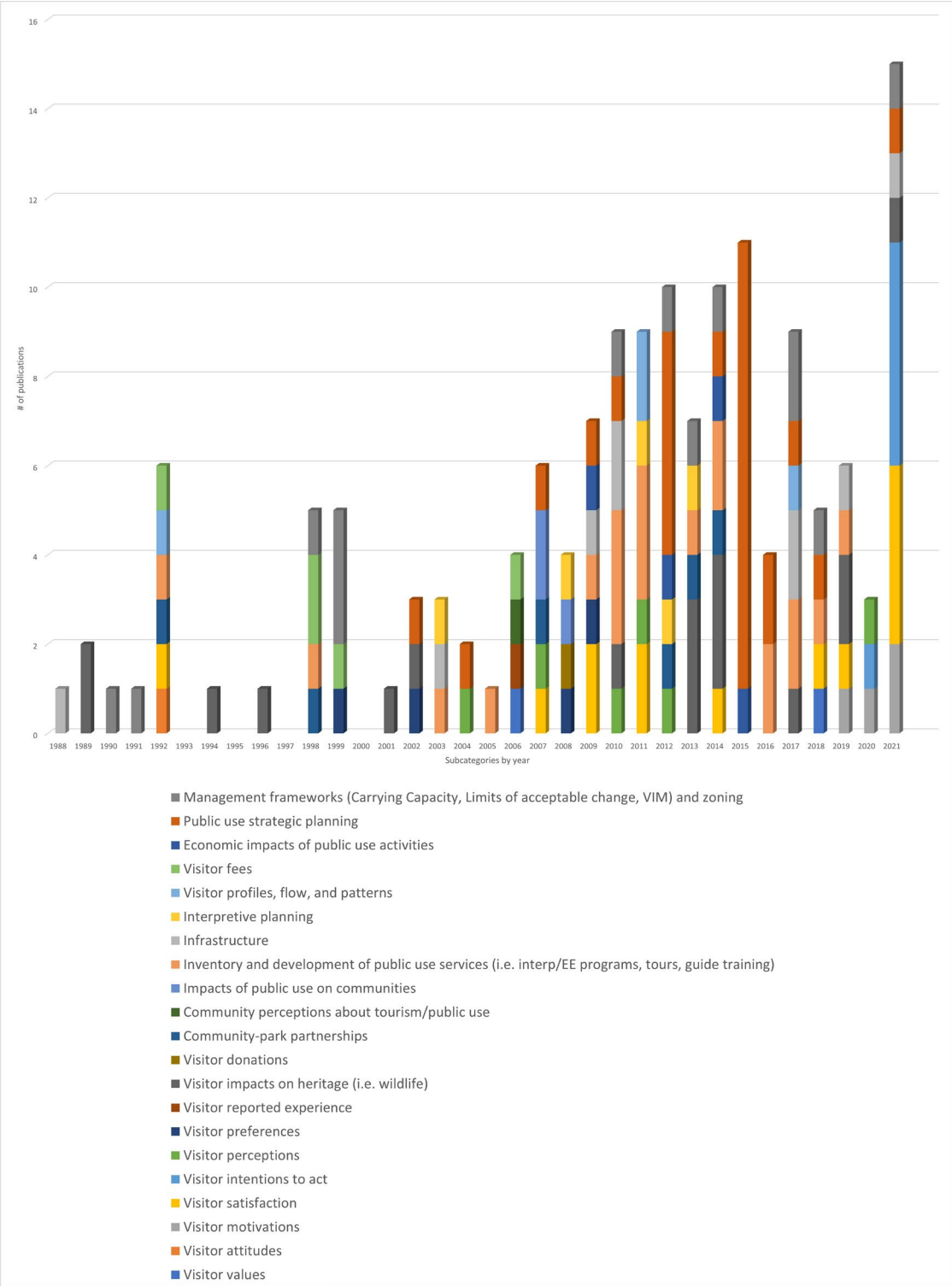
Protected areas in Costa Rica have consistently increased their visitation in recent decades. As visitation increases, so do challenges for sites. Although some researchers propose proactive and not reactive thinking regarding public use planning, it is hard to ignore the multiple ongoing problems these areas confront. From ecological disruptions to facilities' design and maintenance. From conflict between visitors, to conflicts with communities. From environmental to anthropogenic risks for visitors and species they are ought to protect. Site managers need information and management tools to effectively deal with these issues, at the same time they try to plan proactively to avoid future ones.

To obtain this information and use the right tools in a timely manner and appropriately, research is key. The literature review revealed different efforts to understand visitors in our protected areas, and the increasing interest in the topic, alas not big enough. Integral Theory helped to organize and visualize these contributions and shows that, even though more scientific public use management studies in Costa Rica have emerged in recent years, the publications do not seem to follow any patterns or permanent research agenda on a particular perspective, area of inquiry, or in a defined time or space (Figure 2.8).

This has important implications for managers and researchers, because if not planned, research can become —at least in its initial stages — a collection of random studies that might not advance a field as complex as this. The more strategic the research efforts could become, the more opportunities to take advantage of limited resources.

Figure 2.8.

Number of publications identified for each of the areas of inquiry, by year, 1988-2021



Filling the gaps

Based on the current results, the next chapter will develop and explain a research agenda, addressing different areas of inquiry for each of the perspectives proposed through Integral Theory. For instance, as Table 2.3 and Figure 2.7 show, there has been a clear tendency to study topics related to natural and social systems, much interest in program development and planning, but, not many studies related to interactions with the community or about visitor behaviors. Additionally, it is important to understand and highlight key research areas moving forward, related to the most pressing needs expressed by managers:

i. **Visitor safety and risk assessment**. This topic has clearly become a large gap and the most important priority for the respondents of the needs assessment survey. Only one recent article (Alvarado et al., 2021), reports changes to infrastructure design and some other restrictions in case of an eruption within volcanic national parks, but it was not possible to find other publications. Situations related to visitor safety and heritage (accidents, encounters with wild animals, etc.) and management alternatives and strategies, have been discussed but not published.

ii. **Visitor impacts on heritage, facilities, and other visitors.** Only 18 published studies were found about these topics, 15 of which were related to visitor interactions with wild animals and potential impacts. The other 3 were related to trail deterioration, ecosystem impacts, and donations. There are needs and opportunities to develop studies about visitor impact on cultural and historical resources, trails and infrastructure, as well as interactions with other visitors.

iii. **Evaluation and quality of programs and activities, services, and facilities, and impacts of management decisions over the site and other people.** When making management decisions, park administrators have impacts (positive and negative) on heritage, visitors, and communities, although these impacts are not always accounted for. For instance, the design of buildings and trails could have an impact on visitors perception of authenticity, or affect wildlife behaviors or safety. The schedule of programs and activities could affect the visitors flow and community businesses. The design of interpretive and educational interventions can change visitors attitudes and behaviors.

Planning and product design and evaluation such as interpretive and educational programs are of high concern for park managers. SINAC recently developed an action plan with strategic objectives and indicators for the Environmental Education Program for 2020–2030 (Sistema Nacional de Áreas de Conservación, 2020b). Among the evaluation indicators, however, the plan only focuses on outputs such as numbers of people or institutions reached, but not on outcomes such as short-term learning, medium-term actions, and long-term conditions (Jacobson et al., 2006). Additionally, SINAC does not have a department or program related to interpretation. Each protected area oversees its own development and implementation and, if possible, evaluation of its own interpretive products. There is no national program or strategy as there is with Environmental Education. This presents a challenge, but also an opportunity for academics and other relevant stakeholders to develop research regarding program development, effectiveness, and improvement.

iv. **Visitor's distribution and use patterns.** Another topic of interest, such as visitor distribution, flow, and impacts has not been sufficiently studied. Only 6 studies have been developed and even though there is the Visitor Flow Management Tool developed by SINAC (Sistema Nacional de Áreas de Conservación, 2015a), it is not required to apply it in protected areas and there are still many aspects to explore and improve, according to specific needs of each protected area.

A future for public use management research in Costa Rica

One specific challenge particularly for Costa Rica´s protected areas is the lack of experience and investment in public use research, as shown throughout this chapter. For instance, when analyzing the literature on public use research in Costa Rica it was found that many peer reviewed published articles since 1990 have been developed by foreign researchers that have come as tourists, students, or scholars. And even though 80% of publications have at least one Costa Rican researcher involved, for most of these Costa Rican authors this has been a one-time event with no follow up publications about public use research. Also, 36 (almost 1/3) of these publications are in English, which in some ways limits access to non-English speaking audiences, although they show possible topics that can be researched and published. In the case of theses and dissertations, even though trends show interest in some public use topics, there is no clear way to ensure research rigor, particularly for undergraduate projects. And for postgraduates, only four have produced peer reviewed publications based on their research or follow up research.

With so many angles and approaches to inquiry, a researcher or institution could quickly lose track of what has been done, and more importantly, of what still needs to be done. This chapter gives a comprehensive overview of existing efforts in Costa Rica. It is proposed, in addition to a follow-up article with study results, to create a specialized database for public use management resources easily accessible to park managers, researchers, and relevant stakeholders.

In addition to research, to share information and develop capacities to fill up these gaps, training is fundamental. It is not surprising the preferences for training topics are very related to those expressed as "very important" needs. Regarding types of training materials and techniques, the preferred method by far, was face to face or in person activities. This might not come as a surprise after a long time of pandemic social distancing. Also, this may be because park staff prefer "hands-on" and to be in the field. An important consideration for the future, however, will be to offer multiple training options to accommodate other learning preferences and schedules.

Looking forward, the possibilities for public use management research are immense. Chapter 3 will present a proposed research agenda that creates a path forward to organize future contributions and help to build a strong body of research applied to Costa Rica. This could improve chances of constructing a more comprehensive understanding of public use management that better supports heritage conservation, site management, and improved visitor relations and experiences with heritage and with each other in Costa Rica.

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Chapter 3 - A Public Use Management Research Agenda for the Paraíso and Turrialba Region of Costa Rica

The previous chapter presented a literature review and synthesis of published research related to public use management in protected areas in Costa Rica. The Integral Framework was introduced to organize the existing research according to different fundamental perspectives. A needs assessment was also conducted with park managers and stakeholders to identify possible areas of interest or need for public use management research.

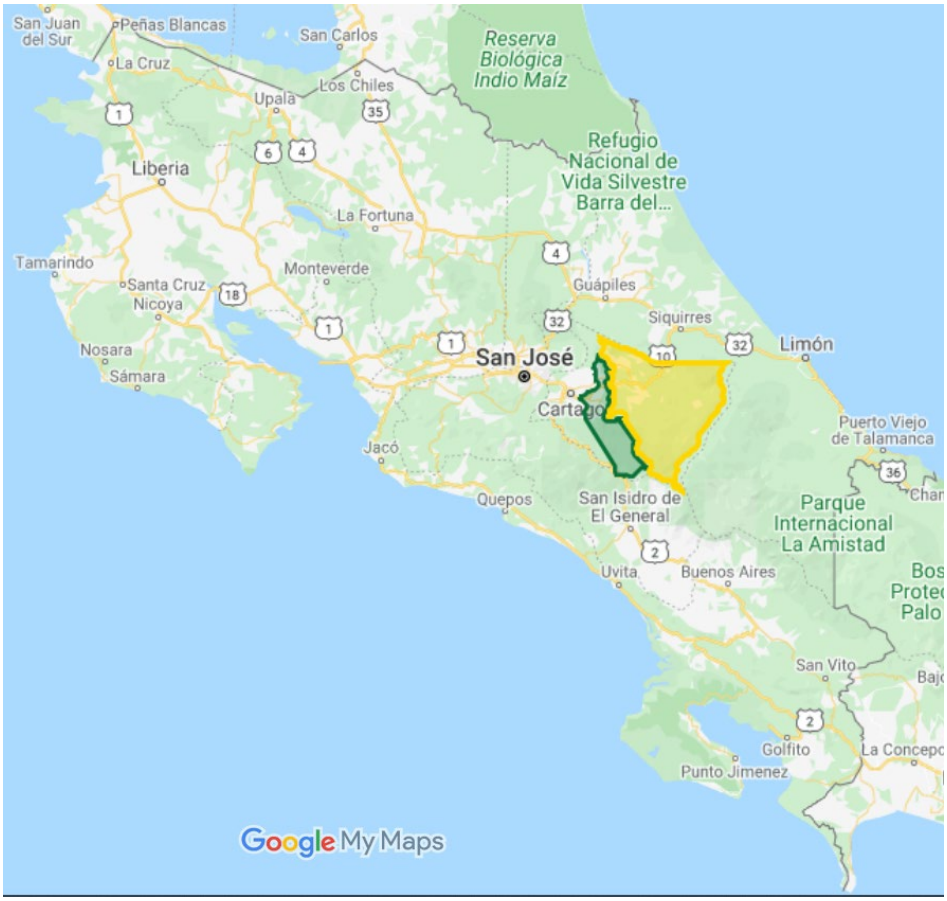
Based on these results —what has been done and what needs to be done — this chapter presents and discusses a research agenda for public use management. It also offers examples and guidelines for conducting public use management research in Costa Rica, particularly in Paraíso and Turrialba Counties, both of which lie within the area of influence of the University of Costa Rica-Paraíso Branch, where the author currently works. It also introduces a series of concepts important to consider when developing social science research, as well as different methodologies that could apply in this process. Last, it shares a series of recommendations to carry out the research process. The current chapter will be translated into Spanish to produce a handbook for park administrators and researchers.

Paraíso and Turrialba Region

Paraíso and Turrialba are a region of Costa Rica that enjoys a diversity of unique cultural landscapes such as indigenous sites and the oldest colonial settlements in the country, all of which are embedded in a variety of tropical ecosystems, which cover approximately 67% of Cartago Province (Figure 3.1).

Figure 3.1.

Paraíso and Turrialba Counties, located in Cartago Province and within the area of influence of the University of Costa Rica-Paraíso Branch



Note. Paraíso (green) and Turrialba (yellow)

In Paraíso, the temperature ranges from 61°F to 78°F over the year. The topography has an average elevation above sea level of 4,310 feet (Cedar Lake Ventures, 2021a). The valley of Turrialba is warm, humid, and the temperature varies from 66°F to 83°F during the year (Cedar Lake Ventures, 2021b). Its average elevation is 2,051 feet closer to populated areas, but farther away shows extreme variations (up to 12,490 feet) because of nearby mountains and volcanos.

In both areas grasslands and cultivated lands cover around 60% and forests a 40% close to populated areas. Farther away (10–50 miles), the proportions reverse, and forests increase to about the same percentage (60%). The region produces 11% of national agricultural exports and 38% of its hydroelectric production and provides 50% of the water for the Central Valley of Costa Rica, where the country´s major metropolitan area lies (Instituto Nacional de Desarrollo Rural, 2015, 2016). It also boasts important ecotourism destinations:

- Tapantí-Macizo Cerro de la Muerte National Park (part of a natural World Heritage Site)
- Turrialba Volcano National Park
- Guayabo National Monument
- Barbilla National Park
- Central Volcanic Mountain Range Forest Reserve (a biosphere reserve)
- Rio Macho Forest Reserve
- Cerros Rio Tuis Protected Zone
- La Marta Wildlife Refuge
- El Copal Wildlife Refuge
- Orosí Overlook
- Ujarrás Overlook
- Ujarrás Ruins
- Charrara Recreation Area (currently closed to the public)
- La Expresión Laguna de Doña Ana Cleto Park
- Dominica Park
- CATIE Botanical Garden and campus

- Lankester Botanical Garden, University of Costa Rica
- Agroecological Models Interdisciplinary Experimental Farm, University of Costa Rica

The management of these destinations varies depending on the objectives and ownership of each. Smaller sites might have fewer management demands and a simpler structure, while most public protected areas of Costa Rica's National Conservation Areas System have greater management requirements because of size and complexity.

In these sites, there is great potential (and need) to develop all kinds of public use management research, both for individual sites and also the region. For that reason, these destinations will be considered for the implementation of the proposed public use management research agenda, as they can benefit from integrated management of sites, visitors, and heritage, the basis for their existence.

Public Use Management Research: An Agenda

Research on public use management is multidisciplinary by nature, and therefore dynamic and evolving. Determining what and how to investigate not only presents a series of challenges and limitations from a theoretical and academic point of view, but also from a managerial one. At the same time, it opens up many possibilities and opportunities. The following sections offer an overview of Integral Theory and its application to develop a research agenda that organizes areas of inquiry around four fundamental perspectives. It also explains different areas of inquiry as well as examples of past and future research for each perspective.

Integral Theory and the Research Agenda

Integral Theory is a philosophy and framework that integrates several backgrounds and methodologies to acquire knowledge about an area of inquiry. As Esbjörn-Hargens and Zimmerman (2009) express "integral approaches are 'meta-paradigms,' or ways to draw together an already existing number of separate paradigms into an interrelated network of approaches that are mutually enriching" (p.5). This allows researchers and practitioners who recognize this approach to understand issues studied with a broader perspective and intentionally add different voices to the discussion.

Integral Theory is part of a rigorous philosophy that involves the study of five different aspects related to evolution, theories, and perspectives of any given subject. In this case, one aspect has been considered to develop the research agenda, which are the four perspectives or quadrants about public use management (Chapter 2). Each perspective suggests several areas of inquiry based on previous findings from the literature and surveys, and professions that carry out that research in Costa Rica (Table 3.1).

Table 3.1.

A Research Agenda for Public Use Management in Costa Rica: research perspectives with corresponding areas of inquiry and professions that can better support them.

Research Perspective according to Integral Theory	**Areas of Inquiry**	**Supporting Professions**
Subjective Individual Perspective: Psychological and Spiritual Experiences Research about subjective individual experiences of visitors, locals, managers, or staff. This could be related to the heritage, social, or managerial aspects.	• Values, beliefs, attitudes, perceptions, motivations, and intentions to act • Awareness and appreciation • Attention and memory • Mental health, self-esteem, spiritual connections	Arts Communication Ecological Tourism Education/Counseling Psychology

Objective Individual Perspective: Physical and Behavioral
 	
Research related to concrete, observable reactions, activities, skills, or behaviors of visitors, locals, managers, or staff. This could be related to the heritage, social, or managerial aspects.
	• Physical health and wellbeing
	• Behaviors
	  ○ Impacts* (positive and negative) and opportunities for responsible behaviors in the outdoors (i.e., participation in programs and activities, donations, etc.)
	  ○ Skills displayed
		Conservation
		Ecological Tourism
		Medicine
		Physical Education and Recreation
		Psychology
		Vocational training
		Environmental Education and Interpretation

Intersubjective Perspective: Collective Experience and Culture Research related to social groups, cultural perspectives.	• Mental models and worldviews • Cultural imaginaries • Partnerships related to public use and interactions with and within communities, institutions, or groups, culture of participation and contributions for conseration	Anthropology Archaeology Communication Ecological Tourism Geography History Social Process Facilitation

Interobjective Perspective: Natural and Social Systems
 	
Research related to the management of natural, social, and cultural/human systems.
	• Management and operations
	  ○ Laws, policies, protocols, and regulations
	  ○ Management frameworks and strategies (zoning, carrying capacity, LAC, ROVAP, etc.)*
	  ○ Direct and indirect management practices (limit use, increase supply, reduce use impact, increase durability of the space)
	  ○ Education, interpretation, and volunteer programs*
	  ○ Design, use, and maintenance of infrastructure and facilities*
	  ○ Risk assessment*
	  ○ Communication and technologies
	  ○ Economic analysis
	• Social aspects
	  ○ Crowding
	  ○ Conflicts
	  ○ Recreation activity
	  ○ Use patterns, distribution, and dynamics
	  ○ Visitor programs and services
	• Heritage management and conservation
	  ○ Recreation ecology*
	• Inventories and conservation status
		Administration
		Architecture
		Biology
		Communication
		Computer Systems
		Education
		Ecological Tourism
		Engineering
		Geology
		Geography
		Law
		Resource management

Note. * Areas of research deemed “very important” by protected area managers (Chapter 2)

The following sections will explain in more detail each area of inquiry and how they relate to public use management. They will also provide examples of existing research developed in or about Costa Rica for each area of inquiry. Additionally, some ideas collected during interviews with park managers, researchers, and students, and based on experience and observations collected during this investigation about studies that could be performed in the Turrialba and Paraíso region, will be presented.

Subjective Perspective: Psychological and Spiritual Experiences

Because tourism in Costa Rica is of such vital importance to the economy, one would expect that its study and the enhancement of the visitor experience would be a priority subject for tourism providers and the government. Not only the visitor experience is important, however, but also the experience of managers and tourism providers. Experiences, according to cognitive psychology, define how people reflect upon past events or situations and how they will remember current interactions with a place, an object, and other people, to use in the future (Norman, 2013; Sousa, 2011). From these experiences, people can make sense of things, integrate the experience, and act upon it (Reisinger, 2013).

Schmitt (1999) defines experiences as "a result of encountering, undergoing, or living through situations… [that] provide sensory, emotional, cognitive, behavioral, and relational values..." (p. 25). This is consistent with the views of Gentile et al. (2007) who proposes in the business realm that the customer experience is the result of the interaction between a customer and a product or company which provokes a personal reaction that entails "the customer's involvement at different levels (rational, emotional, sensorial, physical, and spiritual)" (p. 397).

It also aligns with a simpler definition by Pine and Gilmore (1998) who present the experience as an event that causes a reaction that will leave an impression or memory in our brain.

Moscardo (2009), based on her review of several definitions of tourist experiences, concludes that experiences are a subjective mental state during which tourists construct meaning. She also says that a theory of tourist experience would need to recognize "the importance of features of the physical setting, social interactions, expectations, and information provision in determining the nature of the tourist experience" (p. 101).

Following are some key concepts for research related to subjective experiences that arise from individuals (and their background, prior experiences, attitudes, and knowledge) interacting with facilities, communities, heritage, and other people, under certain management conditions.

Values, beliefs, attitudes, perceptions, motivations, and intentions to act

Cognitive theories, as explained by Vaske (2008), deal with concepts related to human ways of thinking and motivations that lead to certain behaviors, for example, pro-environmental actions or the way people use parks and public places. Rossi et al. (2015) present a values-behavior hierarchical framework which very clearly explains the concepts and how these are useful to study park visitation, park use, and human impacts. Values are defined as deep and enduring guiding principles, the broadest motivations that inform and influence attitudes people hold and how they behave (Holmes et al., 2011; Rossi et al., 2015). Values can be classified in different ways. For instance:

i. Self-enhancement values are based on the pursuit of personal status and success (power, hedonism, achievement, stimulation), while openness-to-change values

center on independence and readiness for change (Holmes et al., 2011). Some call these egoistic values as they predispose people to protect aspects of the environment that affect them personally, or to oppose protection of the environment if the personal costs are perceived as too high (Stern & Dietz, 1994). Although some consider egoistic values would dissuade individuals from engaging in conservation, egoists who believe environmental changes threaten them personally would adopt a pro-environmental, but egocentric, position.

ii. Conservative values are those that relate to self-restriction, preservation of the past, and resistance to change (security, conformity, and tradition). These, in addition to benevolence values according to Stern & Dietz (1994), can also be called social-altruistic values that describe individuals who experience a sense of moral obligation and act on it when they believe adverse consequences are likely to occur to others. People who hold such values judge phenomena based on costs or benefits for humans, such as community, ethnic group, nation-state, or all humanity.

iii. Self-transcendence values (benevolence, universalism) are generally concerned with the wellbeing of other humans or non-humans (Holmes et al., 2011). These are also called biospheric, ecocentric, or worldcentric values, prominent in the thinking of many ecologists and environmentalists. Stern & Dietz (1994) and Vaske (2008) point out how this might be a new value orientation emerging on the basis of costs or benefits to ecosystems or the biosphere.

From the research perspective, Vaske (2008) clarifies that, because values are widely shared, they are unlikely to account for much of the variability in specific attitudes, norms, and

behaviors. Instead, values influence and filter beliefs —ideas considered to be true— and reflect thoughts and perceptions about specific objects or issues (Rossi et al., 2015; Vaske, 2008).

Beliefs, then, mediate and shape attitudes, defined as learned predispositions towards an object or situation, and can affect and alter motivations and perceptions. The construct of perception refers to the way an individual, based on his or her history and context, "observes, understands, interprets, and evaluates a referent object, action, experience, individual, policy, or outcome. Observations are based on sensory experiences, including sight, hearing, smell, touch, and taste" (Bennett, 2016, p. 585). In social psychology, social perception refers to opinions or inferences about others regarding their motives, attitudes, or values (American Psychological Association, 2020). These perceptions can be positive or negative, can change over time, and are subject to persuasion. Because perceptions are influenced by previous experiences and knowledge, they can be very different for each individual, and highly subject to bias (Clayton & Myers, 2015).

Motivations and perceptions are important because they moderate, guide, and drive behaviors, in this case, those performed in protected areas.

Awareness and appreciation

Awareness has been defined in different ways. One definition is associated with the subjective experience of "noticing," in other words, the awareness of a stimulus, but also can be associated with a conscious access to mental states, memories, self-awareness, etc. (Colmenero Jiménez, 2004). Reinhardt et al. (2012) distinguish six types of awareness:

i. Activity awareness: deals with the past, present, and future of an object.

ii. Cultural awareness: is crucial when interacting with people from other cultures. It refers to a person's knowledge and perceptions about their cultures, values, beliefs, and perceptions.

iii. Social awareness: describes the things people become conscious of in a social context, like information about the attentiveness of others, gestures and facial expressions, or clues about a person's interest in a topic.

iv. Workplace awareness: refers to knowledge about the workplace design and job characteristics of co-workers and is strongly related to other forms and aspects of awareness.

v. Location awareness: refers to knowing the physical location of an object. It can be related to one's own location or the locations of others.

vi. Knowledge awareness: refers to the ability of a person to judge another person's knowledge about a given object or that person´s competencies and skills, and method of operation. (pp. 18-20)

The concept of awareness is related to the concept of appreciation, a disposition to acknowledge the value and meaning of something—an event, person, behavior, idea, or other object—and feeling a positive emotional connection to it (Adler & Fagley, 2005). In tourism, cultural and social awareness, for example, will be very important for a guide to be able to appropriately attend a visitor and for the visitor to respect local people and customs.

Attention and memory

The topic of attention is relevant for protected areas because it plays an important role in experience memorability. Since visitors usually go to places for short periods of time and lack local knowledge, it is important to manage their attention so their memory can be improved (Skavronskaya et al., 2017). Memory is also important for visitors because managers invest a lot of resources in signage, exhibits, videos, and other informational media, and people´s attention and memory are common ways that success is evaluated. Also, visitors make future travel decisions —which can be positively or negatively influenced by these memories— according to prior experiences.

Although not often discussed with relation to protected areas, the concept of attention has been discussed by many authors in museum settings, where it is defined as follows:

> Visitor attention is a group of psychological processes: 1. that involve a three-stage continuum (capture, focus, and engagement); 2. in which each stage is sensitive to a unique combination of variables; 3. in which actions from these processes are motivated by the interaction of personal factors (value, interest, past experiences; perceptual, cognitive, affective, decision-making processes) and setting factors (social influence, architectural, and exhibit design); 4. that are measured by multiple indicators or dependent variables (approaching an object, stopping, viewing time, reading, talking with others about, thinking about, tests of learning and memory, rating scales, etc.) with different outcome responses (indicators) at each stage (Bitgood, 2013).

There are many possibilities in protected areas to assess and improve visitor attention and memory, such as during guided visits or after visiting a trail or exhibit.

Mental health, self-esteem, spiritual connections

Positive emotions have been associated with performance of sustainable behaviors (Corral-Verdugo et al., 2011). Also, many authors have determined that the connection to nature provides many benefits, which in this case would be a very important aspect to study with people who both visit and work in protected areas.

For instance, Kellert (2002) explains how "children´s emotional, intellectual, and values-related development, especially during middle childhood and early adolescence, is greatly enhanced by varied, recurrent, and ongoing contact with relatively familiar natural settings and processes" (p. 146), and relates this to the concept of biophilia, defined as the "innately emotional affiliation of human beings to other living organisms" (Wilson, 1993, p. 31).

Other mental health outcomes have been reported over the years for both adults and children who live near natural spaces or in some cases those that are temporarily exposed to nature. This includes improved attention and cognition, changed attitudes, reduced levels and improved recovery from stress, anxiety, and depression, coping with illness or disorder, improved life satisfaction, family and friend relationships, emotional wellbeing, happiness, fulfillment, and even transformative effects (Buckley, 2020; Buckley & Brough, 2017; Kellert, 2002; Thomsen et al., 2018).

Examples of existing research on areas related to the subjective perspective relevant for Costa Rica

As mentioned in Chapter 2, research related to the subjective perspective has more peer reviewed publications than other perspectives. Table 3.2 shows investigations from different research traditions that have been conducted for each research subject described above.

Table 3.2.

Examples of peer reviewed articles and theses related to public use research in areas from the subjective perspective conducted in Costa Rica.

Reference	Research Area	Research Summary
Gray, N. J., & Campbell, L. M. (2007). A decommodified experience? Exploring aesthetic, economic and ethical values for volunteer ecotourism in Costa Rica. *Journal of Sustainable Tourism*, 15(5), 463–482.	Values	Perceptions of volunteer ecotourism were explored through in-depth interviews to analyze stakeholder´s views of volunteer ecotourism in terms of aesthetic, economic, and ethical values, and situated the results in existing theories about the moralization and decommodification of ecotourism.
Shultz, S., Pinazzo, J., & Cifuentes, M. (1998). Opportunities and limitations of contingent valuation surveys to determine national park entrance fees: Evidence from Costa Rica. *Environment and Development Economics*, 3(1), 131–149. 10.1017/S1355770X98000072	Attitudes, motivations, and intentions to act	A contingent valuation method survey to determine foreign and resident willingness to pay for return visits to two different Costa Rican national parks was administered.
Hearne, R. R., & Salinas, Z. M. (2002). The use of choice experiments in the analysis of tourist preferences for ecotourism development in Costa Rica. *Journal of Environmental Management*, 65(2), 153–163. 10.1006/jema.2001.0541	Attitudes and preferences	A survey was conducted to understand and incorporate tourist preferences for nature appreciation, infrastructure, use restrictions, and fees in a national park.
Stem, C. J., Lassoie, J. P., Lee, D. R., & Deshler, D. J. (2003). How 'Eco' is Ecotourism? A Comparative Case	Awareness	This paper, based on a comparative survey study in Costa Rica, explores how respondents see ecotourism and its contribution to

Study of Ecotourism in Costa Rica. *Journal of Sustainable Tourism, 11*(4), 322-347. 10.1080/09669580308667210		conservation and community development, and environmental awareness, and provides recommendations to improve ecotourism´s potential as part of a broader conservation strategy.
Aguirre González, J. A. (2012). Climate change and tourism: Comparing female Costa Rican and American perceptions. *Worldwide Hospitality and Tourism Themes*, 4(4), 356-377. 10.1108/17554211211255693	Perceptions, emotions	A survey was used to understand women's perceptions about the threat from climate change, and the likely importance of the problem in 50 years.
Sander, B. (2012). The importance of education in ecotourism ventures: Lessons from Rara Avis ecolodge, Costa Rica. *International Journal of Sustainable Society, 4*(4), 389-404. 10.1504/IJSSOC.2012.049408	Memory and learning, motivations, and intentions to act	A pre-post visit survey was applied to measure conservation ethics, environmental commitment and involvement, and learning related to an environmental education and interpretation program in a private reserve in Costa Rica.
Schönberg, F. (2021). *Ecotourism and Residents' Well-being A Case Study from Monteverde, Costa Rica, during the COVID-19 Pandemic* [Mater´s Thesis]. Lund University.	Mental well-being, self esteem	In this master's thesis, a qualitative in-field case study was conducted using in-depth semi-structured interviews with residents in Monteverde, Costa Rica, to understand how ecotourism and well-being relate, the impacts of the pandemic, and suggestions for improvement.

In addition to these examples, Chapter 4 presents a study about people's perception of authenticity of a heritage site in Costa Rica.

Recommendations for future research on areas related to the subjective perspective relevant to the Paraíso and Turrialba region

The following are specific research suggestions related to the subjective perspective discussed with staff from Guayabo National Monument (R. Tenorio, personal communication, 27 January 2021), Turrialba Volcano National Park (R. Sánchez, personal communication, 12 February 2021), students from University of Costa Rica (Workshop 1 course, class discussion, 20 November 2020), and the author's own observations and experience:

i. Satisfaction surveys for Guayabo National Monument visitors
ii. Phenomenological study about the beliefs of illegal tourists and guides in Tapantí National Park and the Turrialba Volcano National Park (project recently initiated by undergraduate students)
iii. In-depth studies of park manager perspectives in the region about public use management
iv. Relationship between nature exposure and mindfulness in students of Paraíso
v. Visitor perceptions of authenticity of colonial historical destinations in Ujarrás, Orosi and Cachí
vi. Perception by visitors and managers about illegal activities that affect or interfere with the user experience (hunting, trespassing) in Tapantí-Macizo de la Muerte National Park, and possible solutions

Objective Perspective: Physical and Behavioral

Observable aspects of a person´s physical condition and reactions when interacting with the outdoors or with other people in an outdoor context, such as a protected area, are covered in this component of the research agenda. Also, the reactions to management decisions as well as the interaction with facilities and heritage are explained below.

Physical health and wellbeing

Costa Rica´s National Strategy for Physical Activity and Health (Ministerio de Salud & Ministerio de Deporte y Recreación, 2011) points out that noncommunicable diseases like obesity, hypertension, and diabetes represent important health issues for Costa Ricans of all ages. Since the 1970s, the leading cause of death nationally has been coronary disease. The strategy proposes objectives for the promotion of healthy lifestyles and physical activity, as well as to create more spaces and infrastructure for sports and recreation; although it never mentions the role that protected areas and other outdoor recreation sites could have or the possibility of including them as part of the strategy.

It is well known, however, that contact with the outdoors can provide health benefits. Clayton and Myers (2015) point out studies where people who live closer to green spaces reported fewer health problems, and that a higher diversity of species contributes to positive effects. Multiple studies have also found that physical activities like hiking, camping, fishing, biking, etc. also contribute to cardiovascular and respiratory health, reduction or prevention of hypertension, reduction of cholesterol, control and prevention of diabetes, better muscle strength, reduction of spinal problems, improved bladder control, management of arthritis and menstrual cycles, increased bone mass, better balance, reflexes, flexibility, quality of sleep, reduced

obesity, and reduced consumption of alcohol, tobacco, medications, among other physical benefits (Manning, 2011; Thomsen, 2018). An increased connection with the outdoors, therefore, can help promote a culture of selfcare and of collective responsibility for Costa Rican physical health and wellbeing.

Behaviors

The concept of behavior is defined differently by educators, psychologists, and conservationists (Jacobson et al., 2006). In the case of conservation behaviors, they represent positive or negative impacts on surroundings and other people. Therefore, it is necessary to provide people with background information and skills, plus the motivation and commitment to make appropriate, responsible choices.

Impacts (positive and negative) and opportunities for responsible behaviors in the outdoors.

Park managers have the challenge of minimizing environmental and social visitor impacts while providing fulfilling recreational opportunities. Some recurring issues with park visitors relate to impacts in three different spheres: ecological, managerial, and social. According to Leung and Marion (2000), the most common type of ecological impacts are those that occur to soil, vegetation, water, and wildlife. Related to the managerial sphere (i.e., deterioration or vandalism of buildings, exhibits, or trails), and social impacts for visitor experiences (crowding, depreciative behaviors —particularly littering and certain conflicts) (Manning, 2011; Manning & Anderson, 2012). Social scientists understand, however, that behavior change is neither simple nor immediate. People go through different processes at different rates and will be influenced by different factors to achieve specific behaviors.

There are external factors (i.e., immediate environment, social norms, incentives), and internal factors (knowledge, attitudes, values, emotions, efficacy, responsibility, level of consciousness) that can influence behavior performance (Clayton & Myers, 2015). The same authors also point out that behaviors are always susceptible to change in response to intended or unintended influence, and understanding such influences creates the opportunity to design positive interventions that promote sustainable behaviors.

Many models have been developed to explain how people change behaviors. Jacobson et al. (2006) and Kassirer et al. (2016) present a non-exhaustive sample of theories that may help promote short-term conservation actions and long-term behaviors. These theories are:

i. The Stages of Change provides a framework for segmenting target audiences by their readiness for change (precontemplation, contemplation, preparation, action, maintenance, and termination) and for selecting strategies and tactics that work best for each stage.
ii. Diffusion of Innovations Theory notes that new ideas are adopted in a predictable way in a social system, where people who apply them can be divided into five groups (innovators, early adopters, early majority, late majority, and laggards).
iii. The theories of Reasoned Action and Planned Behavior consider a person's intentions to act and perceived behavioral control as direct predictors of behaviors. Intentions are predicted by attitudes, personal and social norms, and perceived behavioral control.
iv. The Theory of Normative Social Behavior also holds that norms influence social behavior, and they can be descriptive norms (beliefs about the prevalence of a

behavior, or what is commonly done) or injunctive norms (beliefs about what should be done and what others influential figures expect).

Skills development

The development of outdoor skills is directly related to the physical wellbeing of individuals, improved confidence and self-esteem, improved interpersonal and social skills (O'Brien et al., 2011), enhanced sense of self-efficacy (the perception of being able to complete an action) (Clayton & Myers, 2015), and contributes to behavior modeling to make responsible choices. When people feel comfortable and confident outdoors, they are more likely to get involved in outdoor activities. Teaching and learning to use equipment like binoculars or a compass, the right protocol for ziplining, the proper way of recycling, or seven principles of Leave No Trace (Leave No Trace, 2021) might make the visit to an outdoor site like a protected area more enjoyable and potentially lead to more favorable conservation behaviors. Practicing interpersonal skills, team building, and problem solving can also provide much needed tools for visitors and communities to apply in other settings.

Examples of existing research on areas related to the objective perspective relevant for Costa Rica

For each area of research described above, Table 3.3 shows examples of research that has been conducted in Costa Rica.

Table 3.3.

Examples of peer reviewed publications related to public use research from the objective perspective conducted in Costa Rica.

Reference	**Research Area**	**Research Summary**
Leandro-Rojas, M. (2014). Potencial del espacio público como facilitador de bienestar y salud mental. *Revista Costarricense de Psicología*, *33*(1), 31–45. http://www.rcps-cr.org/openjournal/index.php/RCPs/article/view/31	Physical health and wellbeing	The paper emphasizes active mobility as triggering healthy behaviors within the framework of a vibrant and diverse public space. It concludes that public spaces stimulate flexibility, empathy, curiosity, focused attention, openness to novel experiences, skills for delaying gratification, and a safe framework for expressing personal energy and individual potential.
Farrell, T. A. & Marion, J. L. (2001). Identifying and assessing ecotourism visitor impacts at eight protected areas in Costa Rica and Belize. *Environmental Conservation*, *28*(3), 215–225. https://doi.org/10.1017/S0376892901000224	Visitor impacts on parks	This study targeted visitor impacts through manager interviews and evaluations of alternative impact assessment procedures at eight protected areas in Belize and Costa Rica. The resulting data characterize manager perceptions of impact problems, document trail and recreation site impacts, and provide examples of inexpensive, efficient, and effective rapid impact assessment procedures.
Webb, S. E., & McCoy, M. B. (2014). Ecotourism and primate habituation: Behavioral variation in two groups of white-faced capuchins (*Cebus capucinus*) from	Visitor impacts on wildlife	The study observed white-faced monkeys in order to assess the impact of human presence and development on monkey behavior, with a focus on aggressive, affiliative, and foraging behaviors in Curú Wildlife Refuge, located in Puntarenas,

Costa Rica. *Revista de Biología Tropical*, *62*(3), 909–918. https://www.scielo.sa.cr/pdf/rbt/v62n3/a07v62n3.pdf		Costa Rica, and to ascertain the degree of over-habituation of capuchin populations there. While habituated monkeys may not be overhabituated, they could become so as development, especially ecotourism, increases.
Rodríguez García, M. J., & Mayorga Castro, M. (2012). Interpretación Ambiental de un sendero marino en Palito, Isla de Chira, Puntarenas, Costa Rica. *Biocenosis*, *26*(1–2), 70–74. https://revistas.uned.ac.cr/index.php/biocenosis/article/view/585	Skills development	This article presents the implementation and lessons learned from an interpretive planning process with the Fishermen's Association of Palito, a group that participates in the Management of a Responsible Fishing Marine Area (AMPR) on the island of Chira, Puntarenas, Costa Rica. The project included the design of a marine interpretive trail and the training of fishermen as local guides. This was done based on life stories of the fishermen, as well as resources and needs of the group and the AMPR.
Hunt, C. A., & Harbor, L. C. (2019). Pro-environmental tourism: Lessons from adventure, wellness and eco-tourism (AWE) in Costa Rica. *Journal of Outdoor Recreation and Tourism*, *28*. https://doi.org/10.1016/J.JORT.2018.11.007	Pro-environmental behaviors	This exploratory case study provides an empirical complement into the precursors of pro-environmental behavior as a result of adventure tourism, wellness tourism, and ecotourism. The research found three principal mechanisms motivating travelers to take up healthy new actions, lifestyle changes, and environmental stewardship pledges: immersive experiences, identity reinforcement, and meaningful reflection opportunities during and after the trip.

Recommendations for future research on areas related to the objective perspective relevant to the Paraíso and Turrialba region

As offered in the previous section, specific suggestions by people at Guayabo National Monument (R. Tenorio, personal communication, 27 January 2021) and University of Costa Rica (students from Taller 1 course, class discussion, 9 September 2021, and F. Camacho, personal communication, 23 Julio 2021) follow as well as the author's own observations and experience:

i. Inventory of visitor behaviors in public use areas of Tapantí National Park
ii. Visitor impact on the ecosystems of Tapantí National Park and the Turrialba Volcano National Park
iii. Visitor impact on wildlife species and archeological objects in Guayabo National Monument
iv. Impact of management practices at private properties inside the Guayabo National Monument on the tourist experience
v. Relationship between participation in outdoor activities at Lankester Botanical Garden and physical health of university students and staff in UCR´s Paraíso Branch.
vi. Evaluation of visitors acquired outdoor skills during interpretive tours in the Laguna de doña Ana Cleto Park.

Intersubjective Perspective: Collective Experience and Culture

When thinking about protected area visitors, there is a tendency to talk about and study "the visitor." The truth is that visitors rarely come alone, but rather as part of a group. Even when

they come alone, they still interact with other people and are influenced by others in the past in the way they think and act (Mayorga & Kohl, 2021). In other words, all humans are influenced and defined by their culture. Culture, as stated by the Universal Declaration of Cultural Diversity (United Nations Educational Scientific and Cultural Organization, 2001), is "the set of distinctive spiritual, material, intellectual and emotional features of society or a social group, and that it encompasses, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs" (p. 1). Several aspects of the culture of visitors, managers, communities, and researchers can be explained and investigated through the study of mental models and cultural imaginaries.

Mental models and worldviews

The way we see the world will influence the values we hold, even though, we might not realize it. For a long time, people were born, grew up, and died within one local culture with its corresponding values. It was not necessary or even possible to know, let alone understand other perspectives or worldviews, since most people around had similar mindsets. Parents expected their kids in such contexts to think and behave as they do (Wilber, 2011). Wilber mentions, however, that after the Cold War and with the influence of the industrial revolution a very rapid development of technology and telecommunications, globalization, and the integration of economic and cultural exchanges (for instance, through tourism), the combinations of perspectives (values) have changed substantially but unevenly, which causes a lot of conflicts and misunderstandings that we can see today related to contentious social subjects, including protected areas conservation and ecotourism.

There are four main worldviews that can be easily identified in current society (de Witt et al., 2016; McIntosh, 2007; Worldview Journeys, 2021), and those views influence their values and perspectives regarding every subject, including heritage, parks, and outdoor recreation, as explained below:

i. Traditional worldview. Those who hold this worldview see the universe as God-created and find truth and knowledge in traditions, conventions, and scripture. It emphasizes the importance of family and community and the need for social roles and rules, law, and order. The strengths of this worldview are loyalty to its own group, discipline and order, and social values. People with this worldview see nature as God's creation, and its conservation as a responsibility of its human stewards. They can call for restauration or conservation based on egoistic or social-altruistic values to ensure the survival of their family or their community.

ii. Modern worldview. Modernists seek liberation from the oppressive, faith-based religious traditional worldview. They emphasize individual faculties and have a clear bias towards scientific understanding, rationality, logic, critical thinking, and technological solutions. The strengths are the pursuit of independence and achievement, rationality, human equality, and objectivity which have produced the many conveniences we enjoy today. Modernism emphasizes individualistic and hedonistic values, and nature as a resource to be deciphered and used for human progress. Most environmental destruction in the past two centuries has been caused by modernist values, and some early solutions, like biological education and nature guiding were based on similar scientific-based values.

iii. Postmodern worldview. Postmodernism sees the universe as relativistic, pluralistic, and with an interior and spiritual dimension. It acknowledges and values multiple and subjective perspectives on reality, especially those suppressed by modernism. It is generally critical of science that claims to provide objective knowledge. Postmodernists like diversity, authenticity, imagination, inclusion, multiculturalism, community, equality, environmentalism, and social justice. Many current approaches to conservation, like conservation biology and sustainability are based on postmodern values. Ironically, postmodernists are very intolerant of other worldviews, particularly modernism, despite claims to openness, tolerance, and inclusion. The new visitor use management framework from the Interagency Visitor Use Management Council (2016) reflects some postmodern values.

iv. Integral worldview. Integralism sees the universe as an evolving, spiritually meaningful whole, and truth and knowledge are acquired through an integration of methods and paradigms, science, religion, and spirituality. Opposing perspectives are always considered, resulting in "both-and" rather than "either-or" thinking. It is the first worldview to recognize the existence of other worldviews and their contributions to the human legacy. An Integral Approach to the conservation of protected areas should hold a perspective that integrates all perspectives. The paradigm for the world's protected areas proposed in Harmon & Putney (2003) displays an integral perspective by presenting "a more inclusive, holistic form of protected area management that respects the full range of values society ascribes to and that are inherent in extraordinary places" (p. 324).

Cultural imaginaries

Cultural imaginaries are a social construction, both individual and collective. They portray people's ideas, visions, or narratives of a society (or an activity, person, or space) and how they relate to others (Vandevoordt et al., 2018). For tourism, imaginaries are very important because they "come to occupy a central position in a complex set of connections among very diverse societies, very dissimilar locales, and very different kinds of relations of production and consumption" (Salazar, 2012, p. 876). These narratives created around a place subtly influence how people (visitors and locals) engage with each other and renegotiate these political and social realities.

In public use management, it is necessary to understand the tourism imaginaries that visitors hold, because they relate to the expectations about the country and the site they visit. Just as important are the imaginaries of hosts, as they shape the way they offer public use activities and services. For instance, a study developed by Moreno (2011) shows a negative perception of high school students towards the influence of touristic activity over youth values and behaviors in a community in Guanacaste, Costa Rica. It would be of value to analyze the context ten years later to see if this perceived negative influence or the interaction between visitors and youth has changed in any way.

Partnerships related to public use and interactions with and within the community, institutions, or groups, culture of participation and contributions for conservation

Community processes and citizen participation are becoming increasingly complex. Not only are there more people, but as discussed before, their diverse worldviews, expectations, and

behaviors have increasingly come into conflict, and can cause unexpected impacts in communities.

In this regard, Wijesuriya et al. (2013) point out the need for a more inclusive approach and increasing participation from different stakeholders during the decision-making, planning, implementation, and evaluation processes. At the same time, multiple platforms call for the building of alliances and partnerships with communities, minority groups, public and private sector, etc. As Berkes (2007) discusses, however, "improving the integration of conservation and development requires rethinking conservation by using a complexity perspective and the ability to deal with multiple objectives, use of partnerships and deliberative processes, and learning from commons research to develop diagnostic tools" (p. 15188). Berkes also calls for multiple levels of organization and to consider an institutional diversity so that both the voices of experts and of communities are heard.

Some models that could help to better understand groups, working with them, and promoting conservation actions and behaviors are the following:

i. Social learning theory is used in sustainable natural resource management; it is based on the idea that we learn from our interactions with others through a collective process, products, and shared identity (Clayton & Myers, 2015; Jacobson et al., 2006). By observing behaviors of others, people develop similar ones.
ii. A community-based social marketing model emphasizes direct contact among community members and the removal of structural barriers to perform conservation behaviors (Kassirer et al., 2016).

iii. The application of citizen science involves non-expert citizen who partnering with scientists to answer real-world questions and can provide a platform for both volunteers and experts to have a much better understanding of the other's perspectives and interests (Chandler et al., 2012).

Parks and other outdoor recreation areas need to identify their current and potential partners and allies, as well as those who are opposed to their objectives in an effort to address the complexities of heritage and visitor management.

Examples of existing research in areas related to the intersubjective perspective relevant for Costa Rica

Most ecotourism initiatives in Costa Rica are community-based, low-scale projects. Even though SINAC has made significant efforts to work with communities around protected areas, and there are many published articles related to community development and relations, still public use management research based on the intersubjective perspective is scarce. There are, however, a few good examples relevant for Costa Rica in Table 3.4.

Table 3.4.

Examples of peer reviewed articles and theses related to public use research from the intersubjective perspective conducted in or relevant to Costa Rica.

Reference	Research Area	Research Summary
Gale, T., Ednie, A., & Beeftink, K. (2019). Worldviews, Levels of Consciousness, and the Evolution of Planning Paradigms in Protected Areas. *Journal of Sustainable Tourism*, *27*(11), 1609–1633. https://doi.org/10.1080/09669582.2019.1639720	Worldviews	Directed content analysis was used to examine two visitor use plans developed in Chile. Research questions focused on how modernist, postmodernist, and integral worldviews were expressed within the two plans. Worldviews were explored in both manifest and latent manners, considering plan text, models, and overall context revealing patterns and links between the plans and planning frameworks that guided their development. Rich context and a thorough discussion of methods assist with the incorporation of worldview evaluation within PA management theory, informing the continuing development of knowledge and capacities that can better prepare PAs for future challenges.
Martin, G. R. (2003). *Contested Space in Cahuita, Costa Rica: Conservation, Community and Tourism on the Caribbean Coast* [University of California, Davis]. https://www.proquest.com/docview/30534	Cultural/ tourism imaginaries	This is a case study of contrasting visions of conservation and development in the village of Cahuita, Limón Province, Costa Rica, a once isolated, agrarian, Afro-Caribbean community whose people and landscape have been shaped by an exogenous conservation agenda, in this case manifested by the presence of

4837?pq-origsite=gscholar&fromopenview=true		a national park, which, in turn, functioned as a tourist destination. By articulating how various stakeholders view themselves and others operating in the contested space, the research develops a reflexive triangulation of perspective, key to understanding either potential for common ground or ongoing conflict.
Nixon, L., Popova, A., & Önder, I. (2017). How Instagram Influences Visual Destination Image — a Case Study of Jordan and Costa Rica. *E-Review of Tourism Research (ERTR)*, *8*. http://agrilife.org/ertr/files/2016/12/RN28.pdf	Destination image	The study shows how the selection of images from a social media site (Instagram) for Jordan and Costa Rica to promote a destination can be used to influence destination image. Through focus groups and a Likert-scale survey, researchers draw first conclusions on which types of photos are most effective to positively promote a destination and how the consumers' previous image of a destination could affect this.
Meletis, Z. A., & Campbell, L. M. (2009). Benevolent and Benign? Using Environmental Justice to Investigate Waste-related Impacts of Ecotourism in Destination Communities. *Antipode*, *41*(4), 741–780. https://doi.org/10.1111/J.1467-8330.2009.00696.X	Tourism impacts on communities	The study contributes to the diversification of environmental justice (EJ) by using it to frame ecotourism-related solid waste management problems. It shows that service industries such as tourism and hospitality can create environmental injustices that disproportionately impact certain types of communities.

Aguirre González, J. A. (2006). Estado de las relaciones del Parque Nacional Monumento Arqueológico Guayabo con las comunidades de Santa Cruz de Turrialba y Guayabo, Costa Rica. *PASOS Revista de Turismo y Patrimonio Cultural*, *4*(1), 69–83. https://doi.org/10.25145/J.PASOS.2006.04.005	Community development	The purpose of the study was to analyze the state of the relations between the Guayabo Archeological Monument National Park and its gateway communities of Santa Cruz and Guayabo. It concluded that: 1) the relationship was weak but not confrontational at the time, 2) the limited participation and limited economic benefits were key elements affecting the perception of the communities, 3) it was urgent for the park administration to inform, educate, and facilitate community members participation in park affairs and 4) the park administrators should point out to government authorities the importance of community involvement in park affairs to guarantee the socioeconomic and ecological sustainability of the park.
Carbajo Perez, A., Downing, M. R., Curtis, A. E., & MacRina, A. J. (2021). *Building Conservation Partnerships in Costa Rica* [Worcester Polytechnic Institute]. https://digital.wpi.edu/concern/student_works/k3569715r?locale=en	Partnerships	The goal of the project was to identify innovative organizations that could help the Tropical Science Center in Cost Rica to fulfill its mission of finding suitable corporate partners to support their conservation initiatives.

Recommendations for future research on areas related to the intersubjective perspective relevant to the Paraíso and Turrialba region

Some suggestions for research in the intersubjective perspective discussed with staff from Guayabo National Monument (R. Tenorio, personal communication, 27 January 2021), PUP Global Heritage Consortium (J. Kohl, 10 October 2021), and University of Costa Rica (W. Du, 27 September 2021), and the author's own experience are:

i. Impact of community-based tourism services (like local guides) on public use management in Guayabo National Monument, Tapantí National Park, and Turrialba Volcano National Park
ii. Relationship between public and private sectors and their role and influence on public use management
iii. Role of academic research on public use management of ecotourism destinations of Paraíso and Turrialba
iv. Analysis of SINAC's goals and values for interpretation and education programs in Paraíso and Turrialba protected areas

Interobjective Perspective: Natural and Social Systems

McKercher and du Cros (2012) mention that one of the most important things for the successful management of a heritage site is to recognize that the site is, in part, an attraction for tourism, a fact not always easy to accept by some protected area managers and conservationists who would rather prefer that their site receive no visitors at all.

Given visitation, then, site administrators face the triple mandate of working to preserve heritage, promote their natural, historic, and cultural values, at the same time provide for visitor satisfaction while generating income both for the site and surrounding communities that also need to perceive benefits from visitation.

Heritage management can be seen as a philosophy, process, or product. Institutions plan and operate differently, but there is an understanding that public use management for protected areas in general must involve objectives related to management and operations, social ends, and heritage management and conservation (Manning, 2011; Plummer, 2009; Wallace et al., n.d.). In Costa Rica, because of their size and complexity, most national protected areas include the following areas or departments in their management plans (Sistema Nacional de Áreas de Conservación, 2014a, 2014b):

i. Administration: defines the administrative structure and needs for staff, facilities, equipment, etc.
i. Ecotourism and recreation: this department identifies and develops recreational activities and facilities, which require special management measures.
ii. Environmental education, interpretation, and community development: describes programs and activities for visitors and surrounding communities.
iii. Protection: involves resource conservation and values that justify the existence of the PA, particularly related to external threats. It also involves visitor safety and accident prevention and attention in case of public use and research activities.
iv. Research: identifies and prioritize research strategies, particularly related to biodiversity (Sistema Nacional de Áreas de Conservación, 2014a), as well as facilities and services to support them.

v. Resource management: defines and coordinates sustainable, non-public use activities (extraction, production, etc.).

Research related to this perspective of natural and social systems has been, by far, the most prolific in Costa Rica. Most research, however, has been diagnostic, exploratory, or applied where investigators (particularly students working on their theses) develop products and proposals, although very few have been implemented or tested. The relevance and urgency of evaluating and improving management practices and products is evident. Following are some areas where public use management research is highly needed.

Management and operations

Research in this area relates to the application and effectiveness of legislation and policies, regulations, or protocols. For instance, laws exist to protect people with disabilities or to control depreciative behaviors; regulations exist for drone use in protected areas, or the application of COVID-19 protocols, including limits for schedule and capacity and use of masks.

Management frameworks and strategies are also important for research. Even though a version of the carrying capacity model has been applied in different areas in Costa Rica since the 1990s (Cifuentes, 1992), there are no known scientific studies or publications about the extent of their application or effectiveness. The same goes for other frameworks like LAC and ROVAP that have been applied in public and private protected areas around the country. More recent models of zoning (Kohl & Herrera-Fernández, 2021) need to consider this and demonstrate their use and effectiveness. Another relevant area of research has to do with management practices. Manning (2011) explains different types of management actions to minimize depreciative visitor

behaviors or to model and promote an ethic of conservation and respect towards heritage and others. Some are direct, such as closing trails to avoid trampling, and some are indirect, for example, educational and interpretive activities and programs that make people reflect on and act against illegal wildlife trade, or visitor volunteer involvement in management actions, such as picking up trash, so they can experience the issue firsthand. Alternative strategies to address specific behaviors also can be considered by managers, such as limiting use (modify fees and times of use, prohibit camping, require a guide), increasing supply (extend times, new trails and visiting areas), reducing impact of use (modify, disperse, or concentrate use), or increasing space durability (build facilities, harden surfaces) (Manning, 2011).

Research about the design, use, and maintenance of infrastructure and facilities (trails, visitor centers, rest areas, exhibits) is also crucial. Related to this are risk assessment and management and those related to communication and technologies as visitors will increasingly expect access to places and connections to internet and require comfort, safety, and information to improve their experience. Managers can also use new technologies for management, for example, geographic information systems for mapping or tracking visitors.

As part of operations, research about supply and demand, economic impacts of outdoor recreation for sites and communities, and other economic analyses can offer important insights into the value of ecotourism and outdoor recreation.

Social aspects

Working with people, whether visitors, staff, surrounding communities, or stakeholders involves the management of issues and provision of experience opportunities and partnerships. Some topics of interest for research include crowding, conflicts between user types or with the

management, tracking outdoor recreation activity, use patterns, distribution, and dynamics. Equally important is the research about visitor programs and services, such as interpretive program effectiveness, guide quality, and food services.

Heritage management and conservation

Manning and Anderson (2012) explain how problematic visitor behaviors can be classified in five types, including those deliberately illegal (e.g., cutting trees), careless actions (e.g., littering), unskilled actions (e.g., selecting an inappropriate campsite), uninformed actions (e.g., using dead trees for firewood), or those that are unavoidable (e.g., production of human waste). Monitoring these impacts are necessary to understand the extent of the problem and also the intervention. The field of recreation ecology deals directly with impacts on the natural environment from recreation and tourism, particularly those related to impacts on soil, water, vegetation, and wildlife. Last, inventories and conservation status of different elements of heritage will establish a baseline which allow continuous monitoring and follow up.

Examples of existing research on areas from the interobjective perspective relevant for Costa Rica

As mentioned before, the interobjective perspective is the one that has produced more publications. Although not all are peer-reviewed, they offer a good glimpse of the many topics of interest related to management of natural and human systems research. Table 3.5 shows some examples of these publications.

Table 3.5.

Examples of peer reviewed articles and theses related to public use research from the interobjective perspective conducted in Costa Rica.

Reference	Research Area	Research Summary
Morera Beita, C., & Nel-lo Andreu, M. (2017). Local Level Policies for Tourism Management in Protected Areas: Experiences from Costa Rica. In S. A. Mukul & A. Z. Manzoor Rashid (Eds.), *Protected Areas. Policies, Management, and Future Directions* (pp. 139–156). Nova Science Publishers, Inc.	Legislation and policies	Local tourism management policies and involving local people in protected area management are two important approaches to identify future challenges for protected area conservation. This chapter analyzes Costa Rica as a case study for tropical experiences, taking into consideration events of the last 40 years that have established an important number of protected areas and the policies that have been implemented for their protection.
Castro-Barrantes, L. (2020). Capacidad de carga turística y zonificación del CEANA, con miras al manejo de visitantes y protección del recurso hídrico en Cartago, Costa Rica. *Revista Forestal Mesoamericana Kurú*, *17*(41), 47–57. https://doi.org/10.18845/RFMK.V17I41.5283	Management frameworks: Carrying capacity	The objective of this thesis research was to determine the tourism carrying capacity of three visitor trails and establish the environmental zoning of the Complejo Educativo Ambiental Naciente Arriaz (CEANA), a project aimed to become a model of sustainable practices and environmental education for water conservation.
Kohl, J., & Herrera-Fernández, B. (2021). Condition-based protected area zoning tied to conservation planning and targets. *Parks*, *27*(1), 43–56. DOI: 10.2305/IUCN.CH.2021.PARKS-27-1JK.en	Management frameworks: Zoning	The paper proposes a condition-based zoning approach using pre-defined conservation targets as the principal criterion to define zones as opposed to the human use zoning model. It links conservation planning (such as the Open Standards for the Practice of Conservation) and management zoning. The article proposes technology and methodology

		that are more appropriate for the technical capacity of developing countries and presents a pilot application in Costa Rica's Monteverde Cloud Forest Reserve.
Chase, L. C., Lee, D. R., Schulze, W. D., & Anderson, D. J. (1998). Ecotourism demand and differential pricing of national park access in Costa Rica. *Land Economics*, *74*(4), 466–482. https://doi.org/10.2307/3146879	Management strategies: Entrance fees	This paper presents a conceptual framework and empirical analysis of the impacts of introducing a differential entrance fee policy at three national parks in Costa Rica. Data were collected using a contingent behavior methodology designed to elicit information on foreign tourists' hypothetical park visitation behaviors at alternative entrance fee levels. Park visitation demand functions and price and income elasticities are estimated. Revenue-maximizing fees were calculated and applications of differential pricing principles to park management are discussed.
Aguirre González, J. A. (2009). Manejo Sostenible de Senderos en Parques Nacionales de Costa Rica: El uso de la fotografía para tomar decisiones de superficie de senderos bajo condiciones de selva tropical. *PASOS Revista de Turismo y Patrimonio Cultural*, *7*(1), 29–42. https://doi.org/10.25145/J.PASOS.2009.07.003	Trail design, use, and maintenance	This study explored the feasibility of using photos in combination with a regular survey to identify the sociodemographic characteristics and other trail related variables that affect trail surface selection, to guide management decisions and resource allocation related to trail design, construction, and maintenance at Poás Volcano National Park.
Aguirre González, J. A., & Ahearn, M. (2007). Tourism, volcanic eruptions, and information: lessons for crisis management in National Parks, Costa Rica, 2006. *PASOS Revista de Turismo y Patrimonio Cultural*, *5*(2), 175–191.	Risk assessment and management	This study examines the economic impact on surrounding communities related to the closure of Poás Volcano National Park in Costa Rica for three weeks due to volcanic eruptions. It offers recommendations for improving disaster management and planning both within and outside the park, to improve communication, capacity-building and multi-

http://www.pasosonline.org/Publicados/5207/PASOS11.pdf#page=47		stakeholder participation in park-community affairs, and to decrease vulnerability to physical disasters by diversifying tourism products.
Amici, A. A., Nadkarni, N. M., Lackey, N. Q., & Bricker, K. S. (2021). Conservation, education, and adventure tourism: a case study of adventure parks as potential venues for communication in Monteverde, Costa Rica. *Journal of Ecotourism* https://doi.org/10.1080/14724049.2021.1933503	Communication	In Costa Rica, over half of international visitors cite nature and adventure as the main reasons for their visit. However, adventure-oriented facilities are underused for disseminating information about environmental conservation. With visitor surveys and manager interviews, the study assessed demographics, visitor knowledge, interest and behaviors towards conservation and education of tropical forests in Monteverde, Costa Rica. Visitors surveyed both before and after their visit to Selvatura Adventure Park agreed that they were interested in tropical forest conservation, and owners and managers of adventure parks in the region sought to improve their conservation and visitor education efforts.
Chaves Agüero, C. (2015). *Uso de los recursos educativos abiertos (REA) y la realidad aumentada (RA) como herramientas didácticas de apoyo en el curso de Plantas de Costa Rica con fines turísticos del Programa de Guía Naturalista del Núcleo de Turismo del Instituto Nacional de Aprendizaje* [Tesis de Maestría]. Universidad Nacional. https://repositorio.una.ac.cr/handle/11056/10553	Technology	This thesis introduces a strategy and a guide for the application of open educational sources and augmented reality as supporting tools for the course “Plants of Costa Rica” for naturalist guides, which promotes the use of mobile devices to access and search for information that complements the course contents and encourages cooperative and collaborative learning.

Moreno-Díaz, M. L. Actividades socioeconómicas en el Parque Nacional Isla del Coco, Costa Rica y posibles efectos de la variabilidad climática. *Revista de Biología Tropical*, *60*, 113–129. https://doi.org/10.15517/RBT.V60I3.28350	Socioeconomic analysis	A methodology that combines cluster analysis with a dynamic value chain was developed to identify the most important socioeconomic activities and quantify the gross income derived by the existence of Isla del Coco National Park. The possible effects of climate variability on these activities were also analyzed.
Calvopiña Oñate, L. (1992). *Estudio de los patrones de visitación y las oportunidades recreativas en un área protegida de Costa Rica* [CATIE]. http://repositorio.bibliotecaorton.catie.ac.cr/bitstream/11554/4993/1/Estudio_de_los_patrones_de_visitacion.pdfhttp://hdl.handle.net/11554/4993	Use patterns and distribution	The study describes visitation patterns in Carara Biological Reserve, Costa Rica. The characteristics of touristic use and visitor attitudes are analyzed. A system for distribution of visitor groups was developed to facilitate management.
Boucher, D. H., Aviles, J., Chepote, R., Domínguez Gil, O. E., & Vilchez, B. (1991). Recovery of trailside vegetation from trampling in a tropical rain forest. *Environmental Management*, *15*(2), 257–262. https://doi.org/10.1007/BF02393857	Recreation ecology	The researchers studied three trails with varying periods of use and recovery in a tropical rainforest in Costa Rica. Human impact on trailside plants was curvilinearly related to use, as found by other workers in temperate zone vegetation. Recovery in a period of two years and eight months had been rapid, and herbs and seedlings were more abundant along the recovering trail than in undisturbed forest. The results imply that a shifting mosaic of trails, analogous to the mosaic created by light gaps, may be the best management technique to minimize the impact of human visitors in tropical rainforests.

Recommendations for future research on areas from the interobjective perspective relevant to the Paraíso and Turrialba region

Specific suggestions for research from the interobjective perspective come from discussions with staff from Guayabo National Monument (R. Tenorio, personal communication, 27 January 2021), Turrialba Volcano National Park (R. Sánchez, personal communication, 12 February 2021), and University of Costa Rica (W. Du, personal communication, 27 September 2021), as well as personal observations:

i. Development and monitoring of the Sustainable Tourism Plan for Tapantí National Park (recently initiated)
ii. Visitor distribution and patterns in Tapantí National Park
iii. Biological inventories of species of touristic interest (amphibians, bats, birds, fungi, mammals, plants, and snakes) at Guayabo National Monument
iv. Biological inventory and interpretation of local wetlands in local parks and protected lands of Paraíso
v. Development and application of indicators for the design and quality of interpretive services in Guayabo National Monument, Tapantí National Park, and Turrialba Volcano National Park
vi. Development and application of indicators for visitor safety and risk management in Guayabo National Monument, Tapantí National Park, and Turrialba Volcano National Park

vii. Development and application of indicators and thresholds for ecological conditions in Guayabo National Monument, Tapantí National Park, and Turrialba Volcano National Park

It is important for protected area managers to keep in mind and in practice these different approaches. Not only because together they will yield a more complete picture to base their management decisions, but also because these approaches will reinforce the importance and need to involve professions that do not explicitly or often become directly involved with conservation. This could generate many possibilities for professionals to explore new intersections with conservation. For instance, there is much room to develop research related to conservation psychology, environmental anthropology, or ecological theology studies. Also, to develop new models and theories or methodologies based on findings. A research agenda based on the Integral framework does not impose or favor a specific area of research. It rather keeps the door open for any profession and any researcher that can offer a contribution. And eventually, with more understanding of the Integral Model, they may move the field beyond a mere collection of perspectives, but forge deep connections between them. For this, it is also important to understand research-related philosophical and methodological possibilities, which will be briefly discussed in the following section.

Social Science Research for Public Use Management

All public use research is connected to people; thus, it is social science research. Social science research is a systematic, rational form of inquiry performed across fields (such as psychology, education, conservation, interpretation, or anthropology) about a topic (in this case,

public use), based on different paradigms and assumptions about understanding life, conducting research, and creating knowledge (Babbie, 2016).

Social Science research in protected areas in Latin America, should be concerned with three main aspects: heritage, management, and communities. Public use management is always intertwined with these areas. As mentioned in the previous section, however, there are different ways of approaching research on this subject, and it is of vital importance for park managers and young researchers to understand these perspectives, so they will be able to identify and produce desired results. A brief explanation of some concepts and an example of how this can affect and guide research in a protected area follows:

Where does knowledge reside and how is knowledge acquired? Research paradigms.

In a society, knowledge —the understanding about something— resides in existing agreements about that information (Babbie, 2016). For example, we witness Turrialba Volcano eruptions and know about vulcanism, we hear about Orosi fault lines, and how the Talamanca Mountain Range emerged due to interaction of tectonic plates, and we accept such explanations, even though we have never seen a tectonic plate directly or experienced up close a volcanic eruption. To accept such an explanation that we cannot verify personally, that explanation must be reasonable and must also have empirical basis, using verifiable facts, which allows us to confidently accept such explanation (Babbie, 2016). This is because there have been previous agreements of how this information or data is acquired, analyzed, and presented, which make us confident of the results, even though these results could change when new information and better tools are brought to bear.

The philosophy of science offers a research perspective based on theoretical thinking for both the natural and social sciences. It presents different perspectives that explain what is in the world to know about and how we acquire knowledge about it.

One important concept is that which scientists know as a paradigm. A paradigm represents a set of basic beliefs that defines the nature of the world, the individual's place in it, and the possible relationships to that world (Guba & Lincoln, 1994). In very general terms, it is possible to talk about two main paradigms, which Crotty (1998) alludes as "the great divide." On one hand, the objectivistic (positivist) paradigm, and on the other, the constructionist/subjectivist paradigm.

An objectivist researcher considers that a meaningful reality exists even if we are not aware of its existence. With the right tools and procedures (scientific method), we can discover an objective truth, and we can find patterns to predict future actions or behaviors. Conversely, for a constructionist it is the subject who creates a particular reality or meaning about the world when the subject interacts with the object (context always matters) and therefore there are different truths. Subjectivism also rejects the idea of only one truth and goes further to sustain each person perceives and understands reality in a different way and holds its own truth "imposed" by the subject onto the object.

Through these paradigms we can understand how people (visitors, managers, or researchers) have diverse ways of seeing the world, and how researchers learn about it. The following example will help to illustrate these paradigms and how researchers from different traditions apply their tools to obtain data and then interpret the truth.

An example: defining authenticity through different research paradigms

As it will be explained with more detail in Chapter 4, one concept that it is important in tourism but it is hard to define is the concept of authenticity. Researchers from different traditions or paradigms have applied different tools to define it:

- From a positivistic (objectivist) approach, Kovács, Carroll & Lehman (2014), indicate that "attributions of authenticity are made when a person verbalizes something that invokes the concept of authenticity; this might entail the use of the word "authentic" or any of a host of words closely associated with the concept" (p. 461). In their study they developed a list of ninety words and asked participants of the study to choose the word that would best describe a restaurant as authentic in a series of two-word pairs. The words that obtained a score of 80 or more in a scale of 100 were selected: authentic, genuine, real, skilled, faithful, legitimate, and original.
- From a constructivist/subjectivist perspective, several authors (Wang, 1999; Liu et al, 2015; Marine-Roig, 2015) argue that a constructed perception of the concept of authenticity relates to the own definition, experience, and interpretation of each visitor. In a study about authenticity perceptions in the Chinese marketplace, Liu et al (2015) used 45 in-depth interviews and later analyzed them through the interpretive thematic analysis technique, where they used patter recognition to construct and interpret a representation of meanings. From here, they extracted two central themes "consistent and noticeably different from those of Western consumers" (p.29), namely "domesticated authenticity" and "mimicked authenticity".

It is important for a researcher to understand his or her role and objectives because this will define how the study will be developed, what tools will be used, and what results to be expected. For protected area staff, it is also important to understand, so they can coordinate, according to their research agenda, the integration of different paradigms and research perspectives to obtain a better view of the studied topic.

Why and how do we perform research?

Based on the research paradigms (positivistic, constructivist, or subjectivist), there are fundamental differences and expectations about why to carry out research:

- From an objectivist perspective, research has three main purposes: exploration (to familiarize the researcher with a topic and develop methods that could be used in later studies), description, and explanation (Babbie, 2016).
- From a constructivist/subjectivist perspective, the purpose of research is rather to understand (collect all relevant information surrounding someone's experience and explore it in-depth), interrogate (in order to highlight issues of inequities and marginalization, and identify solutions), and deconstruct (to expose a problem, break apart assumptions, stereotypes, and social conditioning, and let people come up with their own possibilities of new structures) (Bhattacharya, 2015).

Once the why is clear, then it is necessary to define how to design, develop, and present social science research. Babbie (2016) explains these differences, as the "dialectics" of social research, for instance:

- In visitor studies, one could use a survey to identify factors that explain illegal visitor behaviors in all Costa Rican parks (called nomothetic research) or instead, conduct interviews to understand the behavior of one person or a group of people, and the reasons that lead to such behavior in different volcanic parks like Turrialba, Irazú, Poás, and Rincón de la Vieja (idiographic research).
- Research can also be deductive or inductive. In the process of deduction, the conclusion derives from a theoretical model. For instance, Bryce et al. developed a model to test the relationship between authenticity, engagement, and visitor loyalty and created a model based on theory to test it. Conversely, Bahadur Gurung (2008) used data from specific observations and through inductive inquiry reached a general conclusion and developed a grounded theory of participatory governance in Nepal.
- Another way research can be structured is based on how individual actions are influenced. For instance, in public use, a deterministic view could establish that some people are more likely to guide illegal tours into a park, or litter, because of social patterns and contextual factors, like the financial situation of the family and communities, or level of education, and the research would be set to identify such factors. Another perspective would argue for the agency or free will of individuals and their power to choose not to engage in such practices independently of context, so the research would be related to the "capacity of individuals to perceive their situation, reason about it, consciously monitor their action, form motives, act independently, make choices, and so on" (Schwandt, 2015, p. 4).
- One more decision is if the study should be qualitative or quantitative. These terms describe different ways of designing and performing research. As Babbie (2016) and

Schwandt (2015) indicate, one clear use of these adjectives is to make the distinction between qualitative nonnumeric data —data in the form of words— and quantitative or numeric data. For instance, from a quantitative perspective, certain visitor behaviors in a park could be accurately described through concrete observations and statistics, but qualitative inquiry might offer insights of why they behave that way and propose possible alternatives and solutions that otherwise could be missed by only collecting quantitative data.

Qualitative research is useful for studying social processes over time and to study subtle distinctions in attitudes and behaviors. It is also flexible, can adapt to new circumstances, and can be inexpensive. It cannot however, describe (or predict) aspects of large populations, although it can give ideas about possible causes (Babbie, 2016). The study by Martin (2003) about community reactions and perceptions in Limón, Costa Rica, after the creation of a protected area and subsequent tourism development cannot be generalized but gives an idea of the sentiments that could be present in other communities going through similar changes in Costa Rica or the world. It provides a point of reference to conduct further research in other places with other populations.

Even though qualitative inquiry emerged as an alternative to the positivist tradition (Ravitch & Mittenfelner Carl, 2016), it is important to note that currently qualitative and quantitative methods may be used appropriately with any research paradigm. The positivist (objectivist) tradition has adopted (and in certain ways, adapted) many qualitative methodologies. Ultimately, Trochim (2021) argues the debate takes place at the level of paradigms, not at the level of data. Qualitative data

can be converted into numbers, and quantitative data is based on judgment. Both kinds of data are complementary and can be used to address almost any kind of research question, yet qualitative research tends to be more exploratory in nature (e.g., starting to learn about or explore a topic), while quantitative tends to generalize across populations and relies on existing models.

Quality and veracity of research

A very important concept both for quantitative and qualitative research is the quality and veracity of research. Some common attributes that determine the quality of the research in general include:

i. That the research is based on the work of others (incremental) —hence the reference "standing on the shoulders of giants" (Hawking, 2003)—,
ii. It is doable and can be replicated
iii. It is based on logic and tied to theory, generates new questions, and is apolitical and performed for the betterment of society (Salkind, 2009).

Each approach, however, has some characteristics or criteria (Table 3.6) that are very specific and rigorous because, as mentioned before, people need to trust and be confident about explanations offered.

Table 3.6

Criteria used to define the quality and veracity of quantitative and qualitative research

Quantitative	**Qualitative**
Validity (the test used is measuring what it is supposed to measure)	In qualitative research, validity is known as **trustworthiness**, based on the following standards: o Confirmability (similar to the concept of objectivity) o Dependability (similar to the concept of **reliability**) o Credibility (similar to the concept of internal validity) o Transferability (similar to the concept of **generalizability**)
Reliability (the test produces consistent measures)	
Generalizability (results can be applied to broader contexts)	

Sources: Babbie (2016) and Ravitch & Mittenfelner Carl (2016).

These criteria can be directly linked to the four quadrants, because professionals who relate to one or more of these quadrants will bring their validity claims with them. But also, for the Integral model, each quadrant has its own version of validating their evidence, presented as truthfulness to oneself (subjective perspective), empirical truths (objective perspective), cultural fit and mutual recognition (intersubjective perspective), and systems functional fit (interobjective perspective) (Wilber, 2011b). An integral vision recognizes the validity claims of each quadrant, because this allows to broaden perspectives, and eventually open opportunities to do research and understand the world in more meaningful ways.

Theoretical perspectives and methodologies

Public use management, like ecotourism, interpretation, and heritage conservation use many different methodological approaches and strategies of inquiry. Some of the most

commonly used are explained below, accompanied by examples of public use management research.

Experimental Studies

The experimental researcher manipulates one or more variables, and controls and measures any change in other variables. Park et al. (Park et al., 2008) conducted an experimental study in the United States to test five management practices to keep visitors on maintained trails. In another study about voluntary contributions to Poás Volcano National Park in Costa Rica, Alpizar et al. (2008) used an experimental design to examine the role of anonymity for individual contributions, explore the effect of giving a small gift before asking for a contribution, and study the effect of providing a changing social reference point on individual contributions to the park. A future experimental study could apply different interpretive interventions in a protected area and analyze the effectiveness of each to achieve a specific public use goal.

Survey research

Survey research uses questionnaires or statistical surveys to collect information about how people think and act. To create a survey, it is necessary to specify and define variables that will be included, how they will be measured, select a survey method, sample, and finally, analyze data collected with the help of statistical tests (Vaske, 2008).

One example of survey research in Costa Rica is a comparison of female Costa Rican and American perceptions about climate change in a national park, where significant differences were found between the two groups regarding perceptions about the threat from climatic change, and the likely importance of the problem in 50 years. Costa Rican women appeared to exhibit a

more complex problem-reaction-action behavioral continuum than American women in the study (Aguirre Gonzalez, 2012). The current research about authenticity, shown in Chapter 4 of this dissertation, is another example of survey research.

Phenomenological inquiry

This approach identifies a phenomenon and works with a group of people who have shared the same encounter or interaction with it and described their subjective experiences of it. It also requires identifying which kind of phenomenology is used for the purpose of data collection and data analysis: transcendental, existential, or hermeneutic, the last of which the more commonly applied (Schwandt, 2015). If hermeneutic phenomenology is used, Bhattacharya (2015) explains, "language, conversations, one's historical context, understanding and interacting with cultural elements are where the researcher focuses […] Through symbolic apparatus of culture such as religion, art, literature, language, and history, meaning is mediated" (p. 85).

Knapp and Yang (2002) developed a phenomenological study to analyze long-term recollections of an interpretive program on bats in the United States. In Costa Rica, Arrieta Sánchez et al. (2020) conducted for their thesis a phenomenological study to compare and contrast the experience and evolution of the intergenerational perspective about hunting with members (grandfather, father, and son) of two families of hunters in a rural area of Turrialba and their current views about hunting and tourism. Future studies using this methodology could be related to visitor perception of authenticity of tourism destinations in the area, and the experience of a "women-only" birding group that operates in the region and how that have impacted their experience as birders.

Case studies

In tourism and visitor management literature, case studies are a very commonly used research method in qualitative and quantitative studies (Jiménez Chaves & Comet Weller, 2016) for descriptive, exploratory, and in some cases, for explanatory purposes (de Urioste-Stone et al., 2018).

De Urioste-Stone et al. (2018) explain different reasons to develop a case study, for example: to make more data accessible for critical or theoretical discussion, to compare different situations, or because it is an unusual or extreme case. Beeton (2005) presents the benefits of using this approach in an applied and complex discipline like tourism. The use of case studies has been criticized because of its limitations to generalize results, sometimes due to its lack of rigor (i.e., in cases used for instructional purposes), or even the conflict between ontological views of researchers. Regarding this, Xiao and Smith (2006) caution about arguments against the use of case studies in tourism research, and based on the results of their research, they conclude that "case study is not only a frequently used but also a highly useful and much needed approach in tourism research" (p.747).

There are several methodological considerations to carry out case study research. In qualitative research, case studies answer focused questions with in-depth inquiries. Its use should be considered when the focus of the study is to answer "how" and "why" questions and the context is very relevant to the phenomenon under study. For this, it is necessary to determine the unit of analysis, bind the case, determine the type of case study, decide if it will be single or multiple, develop theoretical propositions, and identify data sources and how data will be analyzed (for instance, through template analysis). This needs to be constantly reviewed and

adjusted. Such dynamic process is called by Ravitch & Mittenfelner Carl (2016) a "methodological ecosystem."

From the quantitative perspective, Xiao & Smith (2006) described methodological aspects of a case study as a research strategy for tourism. They analyzed the content of 76 articles between 2000 and 2004 and found the following trends: Most cases were case/place-specific and related mainly to development, planning, and community perceptions to tourism. The geographical scale tended to be local, with a one-time or cross-sectional approach. There was also a high proportion of single-case research studies, as opposed to comparative or multiple cases. For data collection, the main sources were secondary data as well as surveys. And about half of the studies were quantitative which analyzed data using descriptive statistics, factor analysis, regressions, spatial analysis, and econometrics, among others.

There are plenty of examples of case studies in Costa Rica, both from a qualitative and a quantitative perspective, such as a study by Gray and Campbell (2007) that explored the aesthetic, economic, and ethical values for participants of a volunteer ecotourism program. Rodríguez García and Mayorga Castro (2012) described the process of development, training, implementation, and initial assessment of an interpretive tour guided by local fishermen and women to promote the culture of handline fishing and the sustainable development of their rural community. A more recent example is the study by Littlejohn (2018) which studied the role of personal norms in predicting visitor behavior in Manuel Antonio National Park.

Potential studies for the region could be a study of volunteer contributions to public use management in a protected area, or the impact of massive events (like an annual kayak competition in Peralta, Turrialba) over the ecosystems and the community.

Critical theory

Critical theory examines and critiques society and culture and its contradictions. Critical ethnographic studies in particular "aim to criticize the taken-for-granted social, economic, cultural and political assumptions and concepts (e.g., family, work, self, agency, power, conflict, race, class, gender) of Western, liberal, middle-class, industrialist, capitalist societies" (Schwandt, 2015, p. 47). The aim of critical theories research is to explain the circumstances of people living under criticized conditions. A good example of this is the article by Barboza Núñez (2016) where the author portrays stereotypes of the female figure in the Western androcentric imaginary and analyses the representation of the feminine body as a touristic attraction on Costa Rican beaches, through the lenses of colonialism and patriarchy.

An important study that should be developed in Turrialba because of its indigenous population would be an analysis of participation barriers for indigenous communities in offering public use services.

In summary, social science research uses multiple methodological approaches with different purposes and informed by research paradigms. These can complement each other, and when correctly used, may bring many benefits to better understand and explain social phenomena and behavior to help in the management of public use.

Additional Recommendations for the Implementation of Public Use Management Research in Paraíso and Turrialba Region

There are critical information and knowledge gaps for the subject of public use management in Costa Rica, as discussed in Chapter 2. The current chapter offers a proposal for

an agenda to organize and move forward research on this subject. To encourage implementation of this agenda, the following recommendations are offered:

i. Because public use management has not been considered part of a national research strategy for protected areas (Sistema Nacional de Áreas de Conservación, 2014a), it is proposed that implementation of this agenda be initially done by academics and young professionals (for instance, students working on their graduate research in ecotourism and related areas like administration, anthropology, biology, psychology, resource management, etc.) who can work with managers and research coordinators in protected areas and other ecotourism destinations in the region.

ii. For each perspective and area of inquiry, research could be based on its scope and design: 1) as baseline research, 2) as a pilot or small-scale research, 3) as large-scale research, or 4) as monitoring or research assessment.

    - The availability of baseline data can strengthen monitoring, assessment, evaluation, and recommendations for management decisions as it allows comparison of initial data with observed changes during the process of research (Ballesteros-Cánovas et al., 2019; Bamberger, 2009; Edgar et al., 2004). Baseline data for public use management should be collected and organized through literature reviews and field research, and in the case of protected areas and other

ecotourism destinations in the Paraíso and Turrialba region, it must be published through peer reviewed publications, gray literature (i.e., thesis, technical reports, conference proceedings), or in some cases, popular publications, and made widely available to managers and researchers.

- Pilot tests and small-scale projects allow feasibility assessments, formative evaluation, and refinement of projects or products to assert internal validity during shorter periods of time (one year or less) and under more controlled settings. It is recommended for universities, colleges, and institutes in the region to develop and document undergraduate or graduate research projects.

- Large-scale research, conversely, should be performed for longer periods in a variety of settings and focus on external validity. In this case, professors from these institutions can partner with protected areas, local government, and private sector to develop long-term studies.

- Monitoring, assessment, and evaluations should be continuously implemented to adjust, iterate, and ensure appropriate results. Long-term monitoring processes should be designed to explore, track, and understand local and global, social and natural phenomena, that

directly affect heritage, visitors, and public use management, such as pandemics, climate change, or any other specific situations in the region of Paraíso and Turrialba.

iii. Data management and availability will be crucial. For this, the proposal is to create a specialized local database managed by the University of Costa Rica's Ecological Tourism Program with technical support from the UCR-Sede del Atlántico library (http://sibdi.ucr.ac.cr/pruebabases.php).

iv. Most importantly, it is imperative to strengthen collaborative mechanisms and platforms for the generation and exchange of knowledge between academics, managers, and communities. The development of international collaborations, and the participation of public and private institutions — as long as they respect academic autonomy — would also be welcomed, as well as development of citizen science research projects to encourage visitors and communities to get involved and support the mission and improve the quality of protected areas and other ecotourism destinations in the area of influence of UCR-Paraíso Branch.

Even though the proposed agenda is not exhaustive, it gives a foundation to initiate and develop more comprehensive research strategies in the short term, along with some theoretical and practical foundations and key points for moving forward the application of this research agenda. This will allow the initiation of discussions and development of partnerships with other researchers and institutions, and channel resources to specific topics of interest for the sites and region.

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Chapter 4 - A Public Use Management Research Application: Exploratory Factor Analysis of Visitors Perceived Authenticity at Guayabo National Monument, Costa Rica

Previous chapters in this dissertation discussed the current status and need to improve public use management research in Costa Rica (Chapter 2) and offered a research agenda to do so (Chapter 3). This agenda organizes research topics from four different perspectives, based on the Integral framework: a subjective (psychological and spiritual) perspective, an objective (physical and behavioral) perspective, an intersubjective (collective experiences and culture) perspective, and an interobjective (natural and social systems) perspective.

It was established that publications related to public use management research in protected areas in Costa Rica have been heavily biased towards this last perspective (management of natural, social, and cultural/human systems). The proposed research agenda's goal is to encourage and broaden public use management research so that decision makers could benefit from a more complete picture forged of different areas or perspectives of research that could lead them to make more informed decisions. As studied in Chapters 2 and 3, there are many needs and opportunities to develop public use management research in protected areas in Costa Rica. One of those needs and interests have to do with the development of programs and activities. Depending on how it is framed, the perception of authenticity in the tourism experience could be part of the subjective perspective or even the intersubjective perspective of this research agenda, and also understanding this perception can help developing new options for visitor programs and it is presented here as an example of other relevant areas of research that

have not been, but could be, more developed to support public use and heritage management in Costa Rica.

This chapter presents an Exploratory Factor Analysis to identify underlying variables for the construct of authenticity—developed as a case study in Guayabo National Monument, a cultural and natural heritage protected area in Costa Rica. This chapter will be translated and published into Spanish, considering this language's lack of literature on the topic, and because it is a case relevant for this region.

Introduction

Heritage tourism is currently defined as "traveling to experience the places, artifacts, and activities that authentically represent the stories and people of the past and present. It includes visitation to cultural, historic, and natural resources" (Gibson, 2015, para. 1). According to Timothy (2018), up to 80% of global travel involves interaction with heritage, which makes it a subject of great importance, particularly for those sites for which their very existence relies on their protection and management.

Although tourism was not a factor considered particularly relevant for the preservation of heritage a few decades ago, unsustainable tourism has now become a direct threat to protected areas by degrading sites and impeding their conservation (Mathur et al., 2015). For the UNESCO World Heritage Centre's Sustainable Tourism Programme, for instance, "sustainable planning and management of tourism is one of the most pressing challenges concerning the future of the World Heritage Convention today…" (UNESCO, 2021, para. 1), and if this challenge afflicts World Heritage Sites, which are supposed to be models for all other protected heritage sites, then

this problem surely extends to nearly all heritage sites in general, including national parks and other protected areas.

In Costa Rica, before visitation stopped due to the pandemic, a mere few parks received more than 80% of the total visitation to the nation's protected areas (Sistema Nacional de Áreas de Conservación, n.d.). This, combined with inadequate facilities and management, impacted not only other visitors, but more importantly, heritage (species, ecosystems, buildings, artifacts).

Among the recommendations to mitigate or eliminate such impacts, figures a series of management best practices to improve the possibility that visitors have a meaningful experience at the same time that heritage remains protected (Leung et al., 2018). One concept that has increased the level of effectiveness and engagement of tourist experiences is that of authenticity (Moscardo, 2009).

Authenticity, however, is not equally important for all visitors or all destinations. The way visitors experience heritage and perceive that authenticity has been analyzed in many different forms and finding a consistent way of identifying what visitors perceive as authentic, as well as its implications, has proven a challenge. For that reason, understanding its meaning and the way visitors perceive it, is of fundamental importance for heritage sites despite both the complexity and operationalization of authenticity as a management construct. Sedmak and Mihalič (2008) concur that it has been impossible to find common criteria for authenticity assessment for a wide variety of academic areas. Also, despite the many heritage sites, most current scales and models that have been developed or adapted, have not been designed in nature-based sites (Jiang et al., 2016) or do not include items that reflect perceptions about certain aspects of heritage sites like natural protected areas or natural landscapes (Andriotis, 2011).

This leads to the question about which criteria could managers consistently use to understand visitor perception of authenticity. The question is particularly relevant because no quantitative research and only one qualitative study (Nost, 2013) have been found about the topic in Costa Rica. This study addresses this gap and presents an Exploratory Factor Analysis (EFA) that prove relevant to study the perception of authenticity at heritage sites (specifically, protected areas) in Costa Rica. The objective then is to identify the underlying variables as a first step in the development of an authenticity scale applied in Guayabo National Monument.

Authenticity Research

Since the first appearance of the concept of authenticity in tourism, hundreds of peer reviewed articles have discussed its definitions and operationalization. More than 1,000 articles, particularly in the last five years, have been published in 136 different journals in tourism, social studies (i.e. anthropology, sociology, geography, history, cultural studies), business and management, and communication and marketing. Through these articles one may appreciate a trend of increasing published research with a particular interest in quantitative inquiry.

Growing interest in the operationalization of authenticity, however, still remains elusive because this latent variable is not directly observable (DeVellis, 2017), and the operationalization has not been consistent across studies. Kolar and Zabkar (2010) indicate the lack of consensus on operational definitions as one limitation for their study, and they assert that more indicators of authenticity need future consideration.

Authenticity has been used as an independent variable that affect emotions, consumer behavior, place value, and the tourist experience (Castéran & Roederer, 2013; Jang et al., 2011; Kovács et al., 2014; Lu et al., 2015; Milman, 2013; van Riper & White, 2007), also as a mediator

related to visitor experiences, place attachment, loyalty, and intentions to purchase (Bryce et al., 2015; Jiang et al., 2016; Kolar & Zabkar, 2010; Yu & Littrell, 2003). In addition, a in a few cases authenticity was proposed as the dependent variable where the effect of visitors characteristics, perceptions, and experiences influenced their perception of authenticity (Budruk et al., 2008; Day et al., 2015), and one study where the significant moderator effect of place attachment over the perceived authenticity of four heritage attractions was analyzed (Ram et al., 2016).

Studies have shown perceived authenticity to be linked to purchase intentions (Wong, 2014), support for tourism development (Zhou et al., 2015), economic benefits for local communities (Chhabra, 2001), increased perceived value of heritage (Kim, Hyounggon et al., 2018), design of places and customer satisfaction (Engeset & Elvekrok, 2015; Kikuchi & Ryan, 2007), aesthetic judgment of a place (Kirillova et al., 2014), destination loyalty (Yi et al., 2018), subjective wellbeing (Kifer et al., 2013), and discussions of authenticity in cultural restaurant experiences (Mkono, 2013). Other practitioners have presented authenticity to connect with the past and create meaning through interaction with landscapes (Andriotis, 2011), artifacts (DeLyser, 1999), and embodied practices and memories (Zhu, 2012).

Not all results have been consistent throughout the studies. In some studies demographics like age, education level, gender, income, and occupation affect the perception of authenticity of a place or an object (Brida et al., 2014; Maruyama et al., 2008) but have not been statistically significant in other cases (Chang et al., 2012). Cultural motivation was found to be a predictor of existential authenticity in some studies (Bryce et al., 2015; Kolar & Zabkar, 2010) although Zhou et al. (2013) did not find a connection between those two variables in their research. Other studies have determined that objective authenticity has a significant effect on existential

authenticity (Domínguez-Quintero et al., 2019; Kolar & Zabkar, 2010), while others have found just the opposite (Park et al., 2019). These contradictory results reflect the dynamic nature of the construct and suggest the need for continued study to identify consistent variables within a variety of contexts and audiences. This is certainly the case of authenticity in heritage sites as well, which will be discussed in the next section.

Defining Authenticity in Heritage Sites

The word "authentic" has its etymological roots in the 13th Century Greek word authentikos and can be defined as "original, genuine, principal" (Harper, 2021). "Authenticity", however, is a more complex construct and not so easy to define. Its use in tourism has been the object of constant discussion and debate since the introduction of the concept to this field in the 1960s (Brown, 2013). It started in relation to museums where the concept was linked to the legitimacy of objects (for instance, if a painting is an authentic original or a fake) (Brida et al., 2014). Later, MacCannell (1973) applied the term from a sociological perspective. Since then, other disciplines and views that inform the tourism field have contributed to the discussion. Thus, the concept of authenticity and its applications in tourism have been argued from the grounds of sociology (Cohen, 1984; Cohen & Cohen, 2012; MacCannell, 2013; N. Wang, 1999), anthropology (DeLyser, 1999; Theodossopoulos, 2013a, 2013b), business, management, and marketing perspectives (Bryce et al., 2015; Carroll, 2014; Gentile et al., 2007; Gilmore & Pine, 2007; Kovács et al., 2014) just to name a few. This has led to the creation of multiple definitions and frameworks about authenticity, originating from different ontological and epistemological traditions and applications. To illustrate the extent of the discussion, Table 4.1 shows several theoretical frameworks to explain authenticity used in arts, business, marketing, and tourism.

Table 4.1.

Frameworks for authenticity

Framework	**Author(s)**
Nominal authenticity refers to the empirical facts concerning the origins of an art object — what is usually referred to as provenance. Is the correct identification of the origins, authorship, or provenance of an object ensuring, as the term implies, that an object of aesthetic experience is properly named. *Expressive authenticity* referes to an object's character as a true expression of an individual's or a society's values and beliefs.	(Dutton, 1994, 2003)
Authentic by verisimilitude means credible and convincing, to produce a historic site believable to the public, to achieve mimetic credibility. *Authentic by genuineness.* In this case, something authentic not only resembles the original but is a complete and immaculate simulation, one that is historically accurate and true to the epoch. *Authentic by originality* refers to something original, as opposed to a copy. *Authentic by authority* means is duly authorized, certified, or legally valid.	(Bruner, 1994)
Cool authenticity refers to an authenticity that is formal and based on scientific knowledge, expertise, and proof. *Hot authenticity* refers to a more subjective perspective, related to tourist imaginaries and myths.	(Selwyn, 1996)
Objective authenticity refers to the authenticity of originals.	(N. Wang, 1999)

Constructive or *symbolic authenticity* refers to the authenticity projected onto toured objects by tourists or tourism producers in terms of their imagery, expectations, preferences, beliefs, powers, etc. There are various versions of authenticities regarding the same objects. *Existential authenticity* refers to a potential existential state of Being that is to be activated by tourist activities. Existential authenticity can have nothing to do with the authenticity of toured objects.	
Indexical authenticity. To view something as an index, the perceiver must believe that it actually has the factual and spatio-temporal link that is claimed. *Iconic authenticity* is used to describe something whose physical manifestation resembles something that is indexically authentic or considered an "authentic reproduction."	(Grayson & Martinec, 2004)
Natural authenticity. People tend to perceive as authentic that which exists in its natural state in or of the earth, remaining untouched by human hands, not artificial or synthetic. *Original authenticity.* People tend to perceive as authentic that which possesses originality in design, being the first of its kind, never before seen by human eyes, not a copy or imitation. *Exceptional authenticity.* People tend to perceive as authentic that which is done exceptionally well, executed individually and extraordinarily by someone demonstrating human care, not unfeelingly or disingenuously performed. *Referential authenticity.* People tend to perceive as authentic that which refers to some other context, drawing inspiration from human history, and tapping into our shared memories and longings, not derivative or trivial. *Influential authenticity.* People tend to perceive as authentic that which exerts influence on other entities, calling human beings to a higher goal and providing a foretaste of a better way, not inconsequential or without meaning.	(Gilmore & Pine, 2007)
Object-related authenticity refers to the authenticity of artifacts and buildings. *Factual authenticity* refers to consumer perceptions of the historical accuracy of the provided narrative.	(Chronis & Hampton, 2008)

Personage authenticity refers to the belief that actual people have lived and acted in historical events. *Locational authenticity* refers to consumer perceptions of the actual place or exact location where a particular historical event took place. *Contextual authenticity* refers to consumer perceptions of an unchanged, unmediated, and faithful environmental context where the events of the past took place.	
Pure (Literal) authenticity is to provide consumers with an *in situ* guarantee of the genuine article. *Approximate authenticity* is to provide consumers with a feeling that this brand will help achieve self-authentication through connecting with place and time. *Moral authenticity* is to provide consumers with a feeling that this brand will help achieve self-authentication through connecting with personal moral values.	(Beverland et al., 2008)
Type authenticity is concerned with whether an object fits appropriately into a classification for which it has been assigned or someone has claimed for it. *Moral authenticity* is concerned with whether something carries moral meaning about the values and choices embedded in an object. *Craft authenticity* is concerned with whether something is made using the appropriate techniques and ingredients by a skilled staff. *Idiosincratic authenticity* is the symbolic or expressive interpretation of aspects of an entity's idiosyncrasies.	(Carroll, 2014)
Authentic by continuity refers to the brand's history and stability over time and the likelihood that it will persist into the future.	(Morhart et al., 2015)

Authentic by integrity involves a sense of integrity based on virtue reflected in the brand's intentions and in the values it communicates. *Authentic by credibility* has commonalities with brand quality, which reflects the extent to which a brand performs according to consumer expectations, and the sincerity dimension of brand personality, which subsumes traits such as being honest and sincere. *Authentic by symbolism* is brand's potential to serve as a resource for identity construction by providing self-referential cues representing values, roles, and relationships.	
Historical authenticity relates to the assessment of spatiotemporal history. *Value authenticity* relates to the assessment of values. *Categorical authenticity* relates to the assessment of category membership. Judgments are dictated by observer's own expectations. *Self authenticity* relates to the assessment with respect to the self.	(Newman & Smith, 2016)
Indexical authenticity occurs when the perceiver believes that an object has a factual or real connection with the past and with the heritage site. *Iconic authenticity* occurs when the object is non-original but still meets the expectations of the viewer. *Symbolic authenticity* calls for an analytical distinction and different symbolisms between viewers.	(R. C. Thomsen & Vester, 2016)

Due to this conceptual diversity, there is growing consensus that instead of one type, multiple types of authenticity should be considered, as it is in this study. Ram et al. (2016) recommend the consideration of other types of authenticity in different settings. Yi et al. (2018) suggests that "decision makers in public, private, and nonprofit sectors should also recognize the different types of authenticity since tourists may perceive authenticity differently and seek different experiences that enhance their loyalty" (p.421). Some studies suggest the use of the term authenticity orientation to refer to people's attitudes toward different kinds of authenticity (Stepchenkova & Belyaeva, 2020; Stepchenkova & Park, 2021), and others propose the term authenticities instead of the single noun to describe them (Newman & Smith, 2016; Thomsen & Vester, 2016).

Exploratory Factor Analysis

Despite this struggle, not many authors have explored the frameworks explained above or tried to identify underlying variables that could explain the construct and operationalize it altogether. Factor analysis determines amount and type of latent variables that underlie a set of items (DeVellis, 2017). An Exploratory Factor Analysis (EFA) explains correlations and most of the variance within a group of variables and refines or reduces these variables to a smaller, more manageable number to measure the construct. For this, DeVellis (2017) explains, "…thinking clearly about the content of a scale requires thinking clearly about the construct being measured" (p. 105). Even though coincidences can be found among existing frameworks, trying to unify them would be very difficult, as some focus on the object or its representation (artifacts, events, or products) and others focus on the perception or attitude toward the object.

The current study focused on the tourist perception of authenticity and applied an EFA to discover the relationship between the variables and determine dimensions of authenticity that could emerge. Because an experience results from people encountering a series of sensory, emotional, cognitive, behavioral, and relational stimuli (Schmitt, 1999) —as explained in more detail in Chapter 3 — it was important to consider items that reflected this user perception of authenticity related to a wide range of aspects of the protected area tourist experience.

In this respect, the work by Nguyen (2020) is relevant, as it developed a scale to measure the tourist perceived authenticity in heritage sites. Many others have used the concept of authenticity in the construction of scales and structural models (Kolar & Zabkar, 2010; Ramkissoon, 2016; Tao Zhang et al., 2019; Zhou et al., 2015), but as Nguyen (2020) states the different forms of authenticity have been tested separately, and therefore do not show a complete picture of the overall perception from different perspectives of authenticity.

Nguyen then proposes a scale to measure perceived authenticity of heritage experiences based on Wang's framework (1999), which identifies three types of authenticity: objective, constructive, and existential. Even though that study is an improvement because it includes three conceptualizations of authenticity, it is still focused on cultural and historical aspects, and never considers the possibility of applying this scale in a natural setting. Also, even though Wang's framework has been extensively used, the definition and operationalization of authenticity is not yet clear; it is thus still necessary to consider alternative propositions. One such alternative is the framework proposed by Gilmore and Pine (2007) which also focuses on the visitor experience and suggests five types or genres of authenticity based on the customer experience. Again, there are commonalities, as they focus on experience, but there are also differences worthy of

exploration. A brief explanation of both frameworks and some applications to the current context where they were applied follows.

Objective, Constructive, and Existential Authenticity

Wang's seminal work (1999) argues that even though the concept of authenticity in the tourist experience might not be relevant for certain kinds of contemporary tourism (like sea and sun), authenticity is still relevant to other kinds of tourism like ethnic, historical, and cultural tourism — and as this paper argues, ecotourism as well.

Wang proposed three approaches to authenticity, which relate to current research paradigms: "objectivism, as a consequence of Cartesian demands on science; constructivism, as a response to the increasing need for authentication of experiences […]; and postmodernism, as a response to the increasing hold of the positivistic scientization of technology, society, and hence the individual" (N. Wang & Gnoth, 2016, p. 70).

Based on these approaches, Wang suggests these three types of authenticity. They are described as follows, as well as with possible connections to their application in protected areas, particularly in Guayabo National Monument:

Objective authenticity

It refers to the authenticity of originals, and the tourist experience is considered authentic when there is access to these original objects. In the case of protected area settings, objective authenticity could be measured by the presence of original artifacts, archeological pieces, constructions, or the presence of wildlife.

Constructive authenticity

It refers to that "projected onto toured objects by tourists or tourism producers in terms of their imagery, expectations, preferences, beliefs, powers, etc." (N. Wang, 1999, p. 352). In this case, the tourist experience is symbolic and negotiated, as it is experienced not because of the original or real objects, but because of the way they are perceived. For instance, certain places that look authentic today, like ghost towns and archeologic ruins (like Guayabo), were full of life and well-maintained back when they were inhabited. But to experience it as authentic now, those places need to look worn out (DeLyser, 1999). It also happens in connection with certain rituals and dances from indigenous communities (Theodossopoulos, 2013a). In these cases, Cohen (1988) explains authenticity as socially constructed, negotiable, because the visitor agrees to ignore the fact that it does not represent the real object or setting, but looks rather convincing, credible, and believable to the public (Bruner, 1994). Additionally, Nguyen (2020) indicates that constructive authenticity not only implies the projection onto the object, but also reflects the activity within heritage sites and of the visitor, which certainly involves public use activities.

Existential authenticity

It refers to "a potential existential state of Being that is to be activated by tourist activities" (N. Wang, 1999, p. 352). The authenticity of the tourist experience often is not concerned with object originality. Wang proposes two sub-dimensions of that state of Being: intrapersonal authenticity related to bodily feelings (i.e. energy, relaxation), and self-identity (self-realization, feeling of freedom) and interpersonal authenticity related to developing or strengthening emotional bonds with family, community, and other visitors. There are certainly many opportunities for this to occur in Guayabo.

Thomsen and Vester (2016) explain that Wang's typology has a strong theoretical foundation, as opposed to other frameworks that have been based on empirical observations and, for the authors, represent a problem when tested in the field. Another framework also based on theoretical analysis and empirical observations that describes the experience economy and the customer (visitor) experience (Pine & Gilmore, 1998) is that of Gilmore and Pine (2007).

Five Genres of Authenticity

Gilmore and Pine's framework explains how economies tend to follow an evolution from **commodities** (materials extracted from the earth and then exchanged in the marketplace, such as coffee), toward **goods** (tangible things manufactured from commodities, such as a bag of dark roasted coffee), and **services** (intangible activities delivered on behalf of individual customers, such as a cup of freshly brewed coffee). In addition to these offerings, the authors proposed two more: **experiences** (memorable events that engage individuals in an inherently personal way. For instance, coming into a coffee shop where the customer can smell the freshly brewed coffee and have a conversation, or attending a coffee tour). And more recently, **transformations** (outcomes where customers change some dimension of their selves, like learning new skills to appreciate coffee, customizing the way to prepare and drink it, and even add a dimension that seeks higher personal objectives, like buying free trade, organic coffee). Later, the authors suggest that when these offerings correspond to one's self-image, they are perceived as authentic and increase the value of the experience. Thus, in response to each offering they proposed five corresponding types or genres of authenticity: natural, original, exceptional, referential, and influential (Gilmore & Pine, 2007; Pine & Gilmore, 2013).

Because in heritage sites authenticity is based on tangible and intangible attributes or values of the heritage, Gilmore and Pine (2007) suggest that this framework can be applied in such context:

> In an offering appealing to authenticity you encounter one or more of these five genres —and occasionally all five. Consider an entity explicitly chartered with preserving the past— […] UNESCO. In determining which venues it places on its World Heritage List of protected sites, UNESCO issued "Operational Guidelines for the Implementation of the World Heritage Convention"—a set of rules for meeting "the test of authenticity" based on "design, material, setting, workmanship" as well as "use, tradition, and spirit/feeling." The rules follow the five genres of authenticity: "materials" (natural), "design" (original), "workmanship" (exceptional), "setting" (referential), and "spirit/feeling" (influential). (p.50)

This proposition is not exclusive to World Heritage Sites, however, and can be applied to non-World Heritage sites. Andriotis (2011) used a qualitative perspective to analyze elements of a pilgrim landscape experience based on these five genres of authenticity. An explanation of each genre follows and how this framework could apply to heritage sites, in particular, protected areas:

Natural authenticity

"People tend to perceive as authentic that which exists in its natural state in or of the earth, remaining untouched by human hands, not artificial or synthetic" (Gilmore & Pine, 2007, p. 49). Criteria to determine natural authenticity include the presence or close observation of wildlife in their natural setting (Curtin, 2005) or built environments that remind one of, and bring

people close to, nature with a biophilic design (Kellert et al., 2008). The use of raw materials, rusticity, or that which contributes to conservation will also appeal to natural authenticity (Gilmore & Pine, 2007).

Original authenticity

"People tend to perceive as authentic that which possesses originality in design, being the first of its kind, never before seen by human eyes, not a copy or imitation" (Gilmore & Pine, 2007, p. 49). When discussing the originality of a heritage tourism offering, this brand of authenticity might refer to objects or artifacts, constructions, or events. There are formal ways to authenticate those objects (for example, paintings, wines, archeological pieces, or festivals) by expert interventions, actions of local people, or visitor knowledge itself. For instance, Littrell et al. (1993) identified several characteristics to determine the authenticity of a craft, such as basket making, while Robinson and Clifford (2012) identified six dimensions to assess food authenticity. Some visitors will look for cues or marks like printed dates or certain materials that confirm the originality of the artifact or buliding. Other criteria proposed by Gilmore and Pine (2007) to appeal to original authenticity are: be the first, revive the past, look old, or conversely, show innovation. Guayabo National Monument in Costa Rica, for instance, gives a great sense of original authenticity because it looks old and revives the past.

Exceptional authenticity

"People tend to perceive as authentic that which is done exceptionally well, executed individually and extraordinarily by someone demonstrating human care, not unfeelingly or disingenuously performed" (Gilmore & Pine, 2007, p. 49). When a tourism product exceeds

expectations, showing human interaction and care, as well as quality, visitors will have a much better experience. Some ways to appeal to exceptional authenticity, according to the authors, would be being transparent with the visitors, allowing people to see something unique, to "slow down," offering temporary products, and somehow relate to the foreign or exotic.

In protected areas in Costa Rica, for visitors to perceive exceptional authenticity could be through good quality services: facilities, exhibits, trails, and knowledgeable staff. It also could be reflected in their intention to return or a word-of-mouth recommendation for others to visit the place.

Referential authenticity

"People tend to perceive as authentic that which refers to some other context, drawing inspiration from human history, and tapping into our shared memories and longings, not derivative or trivial" (Gilmore & Pine, 2007, p. 50). Transcending specific artifacts, buildings, or events, the decision about tourism product originality is not based solely on objective verification of one element but constructed or negotiated based on the particular characteristics and experiences that product offers (Brida et al., 2014). Gilmore and Pine suggest giving tribute to particular people, evoking an important time in history, and, if simulating an experience, being realistic. So, being completely historically accurate and true to the epoch it tries to simulate, would lend a sense of referential authenticity.

Influential authenticity

"People tend to perceive as authentic that which exerts influence on other entities, calling human beings to a higher goal and providing a foretaste of a better way, not inconsequential or without meaning" (Gilmore & Pine, 2007, p. 50). Influential authenticity connects people with

the self and the collective, and stems from the question, “How will this change or otherwise influence me, or others, for the better?” To enhance influential authenticity, the authors suggest appealing to personal and collective aspirations, embracing art, promoting a cause, and giving meaning. Considering the raison d´être of protected areas in Costa Rica and the world is to preserve heritage for future generations. It should not be hard to instill a sense of influential authenticity with visitors, although it should be a conscious effort for sites to remind visitors why they visit this place and how this place can inspire and change them and others for the better.

Measurement Items for Authenticity

Although there are no exact correlations, it could be possible to find common ground between the frameworks of Wang and of Gilmore and Pine. Through a literature review some themes were identified that could be developed or existing items that could be adapted for the current study, as shown in Table 4.2.

Table 4.2.

Themes for measurement items of authenticity

Themes for potential items	**Source**
Presence of animals unique to this place	(Backhaus, 2003; Curtin, 2005)
Presence of plants unique to this place	(Backhaus, 2003; Curtin, 2005)
Variety of landscapes	(Andriotis, 2011)
Real and natural ecosystem	(Sedmak & Mihalič, 2008)
Be part of nature	(Gilmore & Pine, 2007)
Interactions plants/animals	(Backhaus, 2003; Curtin, 2005)
Blend of place with natural landscape	(Kolar & Zabkar, 2010; Lin & Liu, 2018)
Place not polluted	(Gilmore & Pine, 2007)
Unique natural elements	(Fritz et al., 2017; Gilmore & Pine, 2007)
Bulidings/facilities corresponding with the context	(Chronis & Hampton, 2008; Fu et al., 2015; Robinson & Clifford, 2012)
Bulidings/facilities reflect history of local population	(Chronis & Hampton, 2008; Zhang & Yin, 2020)
Cannot tell if objects are original or replicas	(Nguyen, 2020; N. Wang, 1999)
Real historic artifacts	(Castéran & Roederer, 2013; H. Kim et al., 2018; J. Kim, 2014)
Design and decorations of bulidings/ facilities design according to local customs	(Nguyen, 2020; Y. Wang et al., 2015; Zhou et al., 2015)

Unique cultural elements	(Fritz et al., 2017; Yi et al., 2018)
Inspired by original design of facilities	(Kolar & Zabkar, 2010; Lin & Liu, 2018)
Objects reflect history of the place	(H. Kim et al., 2018; Yi et al., 2018)
Objects and infrastructure abandoned	(Stovel, 2007)
Location exceeded expectations	(Morhart et al., 2015)
Will visit place again	(Kolar & Zabkar, 2010)
Exceptional design of trails	(Molleda, 2009)
Staff had many experts	(Gilmore & Pine, 2007)
Quality of tour and exhibits	(Hede et al., 2014; Molleda, 2009; Morhart et al., 2015)
Learned about the place	(Hede et al., 2014; Lee & Jan, 2018)
Recommended this site to others	(Kolar & Zabkar, 2010; Morhart et al., 2015; Yi et al., 2018)
Service was exceptional	(Hede et al., 2014)
Bring friends and family	(Nguyen, 2020; N. Wang, 1999)
Have experience somewhere else	(Gilmore & Pine, 2007)
Learned about the culture	(Hede et al., 2014; Lee & Jan, 2018)
Connection to history and civilization	(Kolar & Zabkar, 2010)
Connection to natural and cultural history	(Ram et al., 2016)

Connection to history, legends, and historical personalities	(Kolar & Zabkar, 2010)
Local cultural history well represented	(Hede et al., 2014; Lu et al., 2015)
Connection to people from other times	(Gilmore & Pine, 2007)
History in the place reflects importance for society	(Gilmore & Pine, 2007)
Stories completely related to the park significance	(Fritz et al., 2017)
Spiritual experience	(Kolar & Zabkar, 2010; Lin & Liu, 2018)
Visiting place tells who I am	(Fritz et al., 2017; Ram et al., 2016)
Higher appreciation for local traditions	(Zhou et al., 2013)
Immersion in place because of local culture and pride	(N. Wang, 1999; Zhou et al., 2013)
Contribute to conservation	(Gilmore & Pine, 2007)
Feelings of satisfaction and high energy	(Lin & Liu, 2018; N. Wang, 1999)
Learning more about oneself	(Jiang et al., 2016; Zhang & Yin, 2020)
Inner feelings and emotions	(Jiang et al., 2016)
Value of time share with family and friends	(N. Wang, 1999; Zhang et al., 2019)
Personal sense of freedom	(H. Kim & Bonn, 2016; Lin & Liu, 2018)

Methodology

The purpose of this study is to identify the underlying variables that could explain the construct of an authenticity perceived by visitors in Guayabo National Monument.

Study site

Guayabo National Monument (Monumento Nacional Guayabo, MNG) is an archaeological site in Costa Rica (Figure 4.1), which consists of pre-Columbian architectural structures with river rocks built between 1000 BC and 1400 AD.

Figure 4.1.

Guayabo National Monument, Costa Rica

Sources: left: (Google Earth 9.155.0.2., 2021); right: (Arce et al., 2018)

The American Society of Civil Engineers recognized the site as an Historical Civil Engineering Landmark (American Society of Civil Engineers, 2021), one of only two such designations in Latin America along with Machu Picchu in Peru. Landmark status recognizes the enduring construction achieved by Guayabo's earliest engineers. This park protects not only the

archeological structures and the historic relevance of the indigenous peoples who lived there, but almost 600 acres of remnant evergreen rainforest (Sistema Nacional de Áreas de Conservación, 2021), which makes this an ideal place to experience different dimensions of authenticity. The site was chosen for this study because it offers both natural and cultural heritage for the visitor to experience and because during the pandemic, although highly reduced, it maintained some visitation. Also, because it is located within the area of influence of the University of Costa Rica, Paraíso Branch.

Questionnaire design

An initial pool of 50 items was created (see Table 4.2, Appendix C) based on the five genres of authenticity by Gilmore and Pine (2007). The survey was designed in Spanish. To increase face validity the items were reviewed and corrected for content and grammar by an editor in Spanish. Also, an interview with two academics from the Psychological Research Institute from the University of Costa Rica was conducted. The researchers suggested changes in wording and to carry out a cognitive interview (Smith-Castro & Molina Delgado, 2011). Such an interview consists of asking people to go through each item and comment about it, to locate inconsistencies or ambiguities. Noar (2003) also recommends including some individuals with no knowledge of the area to fill out the scale, which is useful to assess validity. The exercise was performed with the manager and two volunteer tourists, which led to some wording changes. There was also a suggestion to eliminate items that seemed redundant. Some were eliminated, although others were kept as DeVellis (2017) mentions redundancy is necessary for internal consistency and reliability, resulting in 46 items.

The format consisted of a 7-point Likert scale (Vagias, 2006), where items were written as declarative sentences followed by “strongly disagree,” “disagree,” “somewhat disagree,” “neither agree nor disagree,” “somewhat agree,” “agree,” or “strongly agree.” Additional demographic questions included sex, age, educational level, and place from where people were visiting.

Data collection

Research subjects were on-site visitors. The official survey was performed from August to November 2021 during some weekends which is when the monument receives almost all its visitors and had availability to conduct data collection without interfering with other ongoing research project in the protected area. Because of the site design included a trail circuit with one entrance and one exit (figure 4.2), it was easier to monitor visitor arrivals and thus intercept them at the end of their visit for an exit survey.

Every other person, 18 and older, who had the opportunity to walk the trail and experience different aspects of the site was asked if they were willing to dedicate 15 minutes for a quantitative survey in Spanish. Data was collected using tablets provided by the Applied Park Science Lab at Kansas State University with the Qualtrics Offline Surveys app. At the end of the survey a bookmark with images from the park was offered a small token of appreciation (not an incentive) to the participant. Appendix D shows IRB letter of approval for this protocol.

Figure 4.2.

Loop trail at Guayabo National Monument

Source: (Google Earth v. 9.156.0.0, 2021)

Results

Several considerations determined data appropriateness for the EFA:

Sample characteristics. Different studies (Ali Memon et al., 2020; Iskamto et al., 2020; Kyriazos, 2018; Lloret-Segura et al., 2014) discuss recommended sample sizes to conduct an EFA. Most agree that a sample of 200 is adequate, and that was the goal for this study because of the limitations due to the pandemic. The survey was applied only to Spanish-speaking visitors. Surveyors collected 210 surveys, nine of which were discarded because they had more than 10% missing values, resulting in 201 usable surveys. Table 4.3 shows the demographics.

Table 4.3.

Demographics (n = 201)

Variables	N	%
Sex		
Female	97	48.25
Male	98	48.75
NR	6	3
Age		
18-30	50	24.9
31-40	75	37.3
41-50	44	21.9
51 and up	29	14.4
NR	3	1.5
Education		
Primary	8	4
High School	40	19.9
Technical	13	6.5
College/University	93	46.3
Postgraduate	41	20.3
NR	6	3

Factorability of the correlation matrix. Barlett's test of sphericity estimates the probability that correlations in a matrix are 0. Because it would likely become significant for large samples, Worthington and Whittaker (2006) suggest the test only if there are fewer than 5 cases per variable. In this case, there were 46 variables and 201 cases, which made the test feasible. The test was significant < 0.05, indicating the data was appropriate to apply factor analysis. Addtionally, for the adjustment of data the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was conducted to know the adequate number of factors. A KMO higher than 0.7 is considered adequate (Meyers et al., 2012) and the KMO index for this sample was 0.937,

indicating it was possible to proceed with the reduction process, and that data could be grouped into a smaller set of underlying factors.

Extraction and rotation method. The analysis was developed in SPSS using Principal-axis Factoring, which is used to understand latent factors that account for the shared variance among items. In this case, the set of factors is assumed to be correlated (which is common in the social sciences), for this reason an oblique rotation (Promax) was used (López-Aguado & Gutiérrez-Provecho, 2019).

Criteria for item deletion and factor retention. As Worthington and Whittaker (2006) indicate, a larger number of items for a factor will likely make it a more reliable factor in future research. Even though they also recognize that item deletion should be part of the process, ultimately, item deletion should be based on their contribution to the factor solution and more importantly to a meaningful conceptual interpretation. To initiate item reduction, the first criterion was to review communalities. In this case, the same authors suggest that for a sample of 200, communalities less than .50 should be eliminated. Also, those with factor loadings less than .32 were eliminated. Later, those with cross-loadings with less than .15 difference from an item's highest factor loading were removed. Finally, two items redundant with other items from the first and second factor were removed ("I would bring my family and friends to this place", and "I learned a lot about this place from the information I received on site"). The results produced four factors that accounted for 66.4% of total variance. Cronbach's alpha of the factors ranged between 0.825 and 0.884, indicating high internal consistency in each factor, and factor loadings ranged from 0.593 to 0.860, and therefore exceeded the critical value of 0.50. The results are shown in Table 4.4.

Table 4.4.

Factorial analysis for authenticity

Item	Factors				Communalities	
	1	2	3	4	Initial	Extraction
I will recommend this site to other people.	.860				.669	.732
I am motivated to contribute to the preservation of this place.	.829				.719	.779
I deeply value the time I spent with my family or friends here.	.805				.656	.682
I am in touch with my feelings and emotions at this destination.		.776			.557	.627
I learned more about myself at this destination.		.709			.599	.670
I felt a special connection with the people who lived here in the past.		.568			.589	.628
I felt immersed in the local atmosphere because of the culture and local pride.		.556			.634	.665
I learned about the local culture by participating in activities in this setting.			.850		.453	.608
The staff had many experts about this place.			.536		.534	.580
The tour and exhibits were of high quality.			.528		.607	.644
I felt connected to the natural/cultural history of this setting.			.525		.666	.742
I saw many interactions between plants and animals.				.684	.481	.528
I am convinced of the originality of the architecture/design of the buildings/infrastructure.				.684	.679	.780
I am impressed with the variety of landscapes.				.593	.579	.635
Eigenvalues	7.551	1.016	.958	.830		
% variance	53.932	4.672	4.443	3.379		
Cronbach's α	.884	.862	.841	.825		

Discussion

The current case study attempted to identify underlying factors that explain visitor perception of authenticity at Guayabo National Monument in Costa Rica.

For this, an Exploratory Factor Analysis was developed, using 46 different variables with items related to two main frameworks of authenticity by Wang (1999) and Gilmore and Pine (2007). Study results generated important points for discussion.

Scale of visitor perception of authenticity in Guayabo National Monument

Even though there are conceptual differences between the frameworks since one is based on ontological perspectives and the other on the evolution of economic value, they both relate to visitor (customer) experiences, so they do have several aspects in common. For instance, in very general terms, variables from the genres of natural and original authenticity could relate to what Wang describes as objective authenticity, exceptional and referential relate to constructive, and influential authenticity relates to Wang's existential authenticity. The factors extracted for a scale of visitor perception of authenticity in Guayabo National Monument seem to relate conceptually to Wang's framework, as detailed in Table 4.5.

Table 4.5.

Conceptual interpretation of extracted factors for visitors perception of authenticity in Guayabo National Monument

Items	Type of authenticity according to Wang (1999)
I saw many interactions between plants and animals. I am convinced of the originality of the architecture/design of the buildings/infrastructure. I am impressed with the variety of landscapes.	**Objective Authenticity**
I learned about the local culture by participating in activities in this setting. The tour and exhibits were of high quality. I felt connected to the natural/cultural history of this setting. The staff had many experts about this place.	**Constructive Authenticity**
I will recommend this site to other people. I am motivated to contribute to the preservation of this place. I deeply value the time I spent with my family or friends here.	**Existential Authenticity (interpersonal)**
I am in touch with my feelings and emotions at this destination. I learned more about myself at this destination. I felt a special connection with the people who lived here in the past. I felt immersed in the local atmosphere because of the culture and local pride.	**Existential Authenticity (intrapersonal)**

Objective Authenticity

As identified in Table 4.2, several authors have developed items that relate to objective authenticity. Most of the items, however, are associated to cultural objects, whether artifacts, infrastructure, or events. This tendency manifests in the item "I am convinced of the originality of the architecture/design of the buildings/infrastructure" in the current scale. As Andriotis (2011) points out, however, as many studies have been developed in connection to sociocultural or historic sites, some authors have indicated that nature is irrelevant to the study of authenticity. This is true even for World Heritage Sites, for which requirements to fulfill authenticity criteria consider attributes related to nature like the use of certain materials and substances (UNESCO, 2017), the criteria of authenticity are only a requirement for the nomination of cultural sites, not for natural ones. A few studies, however, have argued that natural elements or landscapes do influence the perception of authenticity (Andriotis, 2011; Curtin, 2005; DeLyser, 1999; Nost, 2013). When considering authenticity's application to protected areas in Costa Rica, this aspect becomes relevant, as "see nature" is one of the main drivers for visitors to visit protected areas in this country (Carvache-Franco et al., 2019). The items "I saw many interactions between plants and animals" and "I am impressed with the variety of landscapes" are examples of this reality.

Constructive Authenticity

Because this type of authenticity depends on the interaction between visitors and heritage, and how this interaction is presented or represented, it has been harder to define, and as Nguyen (2020) indicates, has not been frequently used in other scales. As he also mentions though, to better understand the perception of authenticity and its role, it is necessary to consider all its aspects. To this end, Carbone (2015) explains how today the main attraction in

archaeological tourism is no longer just the object itself, but the message and experience that engage all the senses. Authenticity then arises from the emotion experienced due to this image that it creates and its historic cultural content. Carbone also studied how the quality strengthens the perception of authenticity, much like Gilmore and Pine had proposed. In this case, the group of items that could be associated with constructive authenticity reflects activity within Guayabo and that of the visitor: "I learned about the local culture by participating in activities in this setting," "The tour and exhibits were of high quality," "I felt connected to the natural/cultural history of this setting," "The staff had many experts about this place."

This evidence is particularly significant, because there are no empirical studies that link heritage interpretation with a possible increase in the perception of authenticity and subsequent connections to visitor satisfaction, or particular behavioral intentions, which would be very important for protected areas.

Existential Authenticity

Existential authenticity in tourism has been discussed by many authors with respect to human nature and as the essence of human individuality (Steiner & Reisinger, 2006). As mentioned before, Wang proposes two sub-dimensions that he calls intrapersonal (also divided in two dimensions related to bodily feelings and self-making), and interpersonal. The current study extracted two factors with items related to these sub-dimensions. On one hand, the items "I am in touch with my feelings and emotions at this destination," "I learned more about myself at this destination," "I felt a special connection with the people who lived here in the past," "I felt immersed in the local atmosphere because of the culture and local pride." All of these relate to experiences that involve "self-making" or self-identity. Steiner and Reisinger (2006) explain that

the focus on relationship between history and identity is fundamental for existential authenticity and for Wang this identity "is created and reaffirmed through visiting places associated with the past through insights into the emergence of a culture pertinent to one's own understanding of his/her place in time and space." (p.301)

On the other hand, Wang's interpersonal authenticity explains this as a characteristic of the traditional or emotional community, a type of social authenticity for which the visitor seeks to experience authentic relationships both with family and others. As he proposes, the experience is not enjoyed alone, but in sharing and communicating the pleasure with others. This could explain the items "I deeply value the time I spent with my family or friends here," and "I will recommend this site to other people." In the case of "I am motivated to contribute to the preservation of this place," even though it could be argued more connected to the possibility of maintaining places that strengthen self-identity and personal realization, it could also be explained because the place represents the opportunity to bond and connect with other people. In pandemic times, there have been many limitations to participating in such activities in other settings, and therefore open spaces like protected areas, have become a preferred way to connect with loved ones. Although there is no evidence for this claim, it is a proposition that could be explored further.

Considerations for managers

The current study should illuminate many aspects of public use management at Guayabo National Monument. For starters, the urgent need to acknowledge and explore different perspectives, worldviews, expectations, and needs that the visitors bring with them. Also, that by

understanding them, many possibilities emerge to provide more meaningful, positive experience opportunities for these visitors.

For instance, based on the results above, what could be some experience opportunities to enhance the authenticity of Guayabo National Monument? Some recommendations follow:

i. Opportunities for family activities and group interactions. As pandemic restrictions are removed and face-to-face activities increase, people will be eager to go out and interact with family, friends, and colleagues. This might imply more visitors or bigger groups, and managers should plan ahead to facilitate better experience opportunities that contain potential site impacts.

ii. Opportunities to support conservation. Some social activities mentioned before could have a conservation purpose, for instance, to facilitate volunteer opportunities for family groups, friends, or coworkers. Other opportunities include the installation donation boxes, requesting letters of support for the site, or donations of needed equipment or materials for surrounding schools or community groups.

iii. Improve signage, materials, and interpretive tours that incorporate natural and indigenous history. Work with the local guide association to create new activities and interpretive training and opportunities. By offering some kind of innovative product, like augmented reality to show a more accurate portrait of how original buildings may have looked, could appeal to a higher perception of constructive or existential authenticity.

iv. Have specialized talks once or twice a day during weekends. Take advantage to schedule them in non- peak visitation hours, so that park staff will be less occupied, and it might help to better distribute visitor flow.

v. Rehabilitate the nature trail for those who want to see more nature and stay away from crowds.

vi. Renovate the visitor center. A building that uses traditional architecture, that has spaces for people to rest and interact, and where they can attend talks and see exhibits will improve interpretation and sense of self-identity.

Considerations for researchers

The current case study was an initial exploration of the concept of authenticity for protected areas in Costa Rica, and in particular for Guayabo National Monument. Even though the results cannot be generalized to other areas in the country, it gives protected areas an idea of the research possibilities and the benefits of understanding their visitors. Regarding Guayabo National Monument, future researchers might conduct other studies to overcome limitations that this study faced, explained in the next section. As for potential future studies, it is highly recommended to explore the connection between interpretation and the perception of authenticity when applying different interpretive interventions, as well as the influence of the perception of authenticity in some specific behaviors. Last, future studies should explore further adaptations of the scale to protected areas that do not have archeological or historical heritage, and for which this scale would not apply.

Research limitations

Tight pandemic-induced visitation limits proved the most important limitation for the collection of surveys. Visitation to Guayabo was reduced by almost 60% compared to average visitation from the previous five years (R. Tenorio, personal communication September 9, 2021) and some visitor profiles (particularly senior citizens with high risk factors) were more affected than others.

The collection of data also required specific protocols enacted by the government of Costa Rica (use of masks, washing hands, and social distancing), as well as careful cleansing of equipment, which considerably slowed the process. Additionally, the park implemented some restrictions at data collection time because they sponsored another ongoing study, and both surveys could not be performed at the same time. For future studies, it is recommended to coordinate in advance (6–12 months) to leave enough time to accommodate other projects and protected area obligations.

On the positive side of the ledger, the tablets were not only an innovative tool which increased people's disposition to take the survey, but also much cleaner and efficient than paper. Two possible limitations, however, were that people with less experience using electronics or familiar with a platform little known in Costa Rica like Qualtrics, might have felt confused and that could have influence or affected responses. Despite the many advantages Qualtrics provides for the researcher, because of these limitations, and also the costs of the software, it is recommended to find other alternatives in future studies. Last, this is a single-case study with a local focus, which limits generalizability, as is the case with most studies carried on single heritage sites. It could be, however, used in the future for comparative studies with other sites or visitor profiles.

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Chapter 5 - Concluding Remarks

In post pandemic Costa Rica, a long path of recovery lies ahead for the ecotourism sector and protected areas, but also opportunities may begin to appear, just like the wildlife that took back their right of way on temporarily COVID-swept trails and roads. In the same manner, public use management research has discovered a break in the forest, one that we hope will lead to a new era.

In addition to the discussions and conclusions from previous chapters, the experience gained through this dissertation revealed aspects that must be revised and reflected upon to renew and develop public use management research opportunities and start showing meaningful results. Consider the following conclusions as trail markers to this new era.

i. It has been three decades since the first public use research article was published, and yet, we still have not gained enough knowledge, information, tools, and methodologies to organize and make sense of the data in the field. This might indicate that as a country we have not heretofore understood and appreciated the need, benefits, or responsibility of improving public use management in protected areas and beyond.
ii. Much work has been done by foreigners. Aside from their specific contributions, their skills and research experience, however, have gone back home and little have stayed in Costa Rica, and research done by locals have been in most cases opportunistic, with no clear intention to use the information or to follow up. With respect to theses, although it appears to be ongoing interest about public use

research among students, there are also concerns about such research not being taken seriously enough by the government and academia to transcend these graduation exercises and produce peer reviewed publications to advance the field.

iii. Acknowledging other perspectives and giving voice to those who traditionally do not participate can improve research and researchers in a variety of ways. With the right methods to collect and analyze data, it will not matter if that perspective belongs to other researchers in our field or to those from completely different fields. It will not matter if it does not belong to a researcher, as long as it belongs to someone with perspective and experience with the issue. A research agenda based on the Integral framework will illuminate some of these intersections with other research traditions and ways of knowing.

iv. We need to keep reminding ourselves that research is a process. Different professions and different countries have achieved different levels of advancement, and it might be frustrating to see one or another so far behind. Sometimes it is possible to accelerate advancement or locate shortcuts, but they always should be ethical and applied for the right reasons. Otherwise, it is fine to start from zero. The fact that some research is *only* exploratory does not mean it is not or will not be consequential. The Exploratory Factor Analysis developed through this research, for instance, already ignited many ideas and possibilities.

v. To keep these ideas and possibilities alive it is necessary to create alliances, look for political and technical support, and demonstrate results. Starting with a few projects, maybe in just one area, will help maintain attention and necessary support. To build on this, creating a program at the University of Costa Rica to take the lead —using,

for instance, the Applied Park Science Lab at Kansas State University as a model—could focus resources to the research agenda, ultimately laying the trail ahead.

Appendix A - Public Use Research Publications for Protected Areas in Costa Rica (1988–2021)

Table A.1.

Publications related to public use research in protected areas in Costa Rica (1988–2021)

Authors	Year	Title	Brief description of study	Category
Books, book chapters				
Kauffman, Laurie	(2014)	Interactions between tourists and white-faced monkeys (*Cebus capucinus*) at Manuel Antonio National Park, Quepos, Costa Rica	Discusses the negative effects of wildlife tourism on animals	O. Visitor-wildlife interactions/ impacts
Quirós-Arias, Lilliam; Miranda Álvarez, Pablo; Alfaro Chavarría, Consuelo	(2014)	El turismo en volcanes de Costa Rica: caso volcán Poás	Explored and described Poás visitor profiles, the (lack of) impact of the tourist activity in nearby communities, and observations about reasons and responsible institutions that could improve the situation	IO. Visitor profiles; S. Visitor perceptions IO. Tourism impacts on the community
Gutiérrez-Lince, Jimena; Dorante Palacios, Michelle; Valverde, Roldán A.	(2021)	Case Study: The Evolution of Tourism and Sea Turtle Conservation at Tortuguero National Park, Costa Rica	Description and appraisal, of the evolution of the Tortuguero Visitation Program as a conservation tool	O. Visitor-wildlife interactions/ impacts
Mayorga, Marisol; Kohl, Jon.	(2021)	Esencia de la Interpretación del Patrimonio	"How-to" textbook for the interpretation of heritage in Latin America and its connection to tourism and conservation	S.; O.; IS.; IO

Thesis/Dissertation				
Rodríguez Jenkins, Luis Fernando	(1988)	Complejo Eco-Interpretativo Barra Honda (C.E.I.BA.HO): Parque Nacional Barra Honda	Design of interpretive facilities for Barra Honda National Park	IO. Infrastructure
Carrillo Jiménez, Eduardo	(1989)	Influencia del turismo en los patrones de comportamiento del mapachín en el Parque Nacional Manuel Antonio, Costa Rica	Influence of tourist in racoon behavioral patterns	O. Visitor-wildlife interactions/ impacts
Rodríguez Villalobos, Jorge E.	(1991)	Determinación de capacidad de carga turística para el parque nacional Manuel Antonio	Calculates carrying capacity for the park, based on the formulas for physical carrying capacity, real carrying capacity, and effective carrying capacity	IO. Carrying Capacity
Calvopiña Oñate, Luis	(1992)	Estudio de los patrones de visitación y las oportunidades recreativas en un área protegida de Costa Rica	Determined the visitor profile and describes patterns of visitation in the park. Used surveys to identify visitors´ demographics, attitudes, preferences, and satisfaction	IO. Visitation flow and patterns; IO. Visitor profiles; S. Visitor attitudes and satisfaction
Bajaña Fabara, Diego F.	(1998)	Adaptación y validación de procedimientos para evaluar la capacidad de carga turística en el Parque Nacional Corcovado, Costa Rica	Calculates carrying capacity for different sectors of the park, based on the formulas for physical carrying capacity, real carrying capacity, and effective carrying capacity. Additionally, calculated the financial break-even point for different management scenarios.	IO. Carrying Capacity

Fernández Rojas, María del Rocío	(1998)	Interpretación autoguiada para rótulos, del sendero danés en la Reserva Natural Absoluta Cabo Blanco, Cóbano, Puntarenas	Analyzed the biological, geographical, and historical context of the park and designed interpretive signs. Determined the visitor profiles through statistical analysis	IO. Analysis and interpretation of heritage
Elliott Foulds, Ana Patricia	(1999)	Aplicación de las metodologías límite de cambio aceptable y manejo del impacto de visitantes Parque Nacional Carara, Pacífico Central: 1994 y 1998 (Lic.)	Application of LAC and VIM methodologies for the park	IO. Limits of Acceptable Change and visitor impact management
Salinas Vallecillo, Zenia M.	(1999)	Aplicación del método experimentos de selección para analizar preferencias de turistas por el Volcán Barva, Costa Rica	Experimental design ("choice experiments") was used to study visitor preferences for the development of a sector of the park. Dependent variable was the potential scenario and independent variables were the potential site attributes like access and other conditions (infrastructure, contamination, noise, crowds)	S. Visitor experience preferences
Sandoval Hernández, Iván	(2003)	Propuesta de exhibiciones para el centro de visitantes del Parque Nacional Carara	Design of an exhibit for the park based on a workshop with park guards and addressed to different audiences (schools, tourists, community)	IO. Analysis and interpretation of heritage
Mena Araya, Yadira	(2005)	Manual de rotulación para las áreas silvestres protegidas	Design of guidelines for the construction of signs in PAs, through lit review,	IO. Analysis and

		administradas por el Estado: Costa Rica	inventory of existing signs, and survey with 22 staff in 8 parks	interpretation of heritage
Meletis, Zoë A.	(2007)	Wasted Visits? Ecotourism in Theory vs. Practice, at Tortuguero, Costa Rica	Case study about solid waste crisis and its connection to tourism destination through the lenses of environmental justice to explore: the consumptive nature of ecotourism, tourist perceptions of the environment, ecotourism aesthetics, local resistance to ecotourism development, local perceptions of ecotourism's environmental impacts, and the future of ecotourism. Mixed methods including participant observation, semi-structured interviews, and on-site surveys were used to collect data	S. Visitor perceptions about the park; IS. Conflict within the community because of tourism impacts
Benavides Ruiz, Guillermo; Amador Brenes, Erika	(2009)	El uso de la zona pública de las Áreas Silvestres Protegidas por los operadores turísticos: la contribución financiera del sector turismo en el marco de una relación sostenible con las áreas protegidas	Economic benefits for tour operators who work in the public use zone of the park	IO. Economic impact
Arias Álvarez, Nancy; Escoto Ortiz, Priscilla;	(2010)	Manual de diseño sostenible para infraestructura en áreas silvestres protegidas de	Guidelines for sustainable design in protected areas	IO. Infrastructure

Ugarte Mora, Alejandro		Costa Rica: evaluación y aplicación del proceso de diseño en arquitectura		
Herrera Domínguez, Carlos Paul	(2010)	Propuesta de Diseño de una Torre de Avistamientos de Aves y Desoves de Cocodrilos especializada en Turismo Científico en el Refugio Nacional Vida Silvestre Playa Hermosa Punta Mala, Costa Rica	Design and management guidelines of a wildlife observation tower and an environmental education program	IO. Infrastructure; IO. Environmental Education
Rojas Rojas, María Fernanda	(2010)	Propuesta de interpretación para el Monumento Nacional El Farallón, Guanacaste, Costa Rica	Analysis of an archeological site with rock paintings. Design of a brochure with information collected.	IO. Analysis and interpretation of heritage
Rodríguez García, María José	(2011)	Interpretación ambiental de la pesca artesanal en el Área Marina de Pesca Responsable de Palito, Isla de Chira, Puntarenas	Design of a participatory community interpretive marine trail and training of local guides to preserve the art of handline fishing in a fisherman village	IO. Analysis and interpretation of heritage
Valderramos Morales, Bernal	(2012)	Análisis del proceso de concesión de servicios no esenciales en el PN Chirripó, un insumo para su réplica en otras áreas protegidas del SINAC	A model of concession of non-essential (public use) services to communities surrounding the park	IO. Public use planning and management; IS. Community partnerships
Campbell, Jennifer Christine	(2013)	White-faced Capuchins (*Cebus capucinus*) of Cahuita National Park, Costa Rica: Human Foods and Human Interactions	Analysis of behavioral information of white-faced capuchin monkeys taking food from visitors (handouts or raiding), and	O. Visitor-wildlife interactions/ impacts

			suggestions to minimize the interactions	
Rodrígues Santos, Edilton	(2013)	Impacto del turismo en el comportamiento del mono carablanca (*Cebus capucinus*, Linnaeus, 1758) en el Parque Nacional Manuel Antonio, Costa Rica	Observations of white-faced capuchin monkey behavior when interacting with tourists in search of food. Conclusion indicates the need for better visitor management and the prohibition of food in the park	O. Visitor-wildlife interactions/ impacts
Rodríguez Vega, Carlos; González Escalante, Sofía	(2013)	Elaboración de una guía turística enfocada al turismo ecológico en el Parque Nacional Isla del Coco	Design of a tourism guide for Cocos Island National Park, including terrestrial and marine attractions, as well as historical elements	IO. Analysis and interpretation of heritage
Agüero Flores, Saray; Ledezma Benavides, Carlos y Miranda Rojas, Francinie	(2014)	Propuesta de un plan estratégico de mercadeo ecoturístico, para el sector Pailas ubicado en el PN Rincón de la Vieja del Área de Conservación Guanacaste, tomando en cuenta la vinculación y participación de la oferta turística de la comunidad de Curubandé de Liberia	Proposal for a tourism marketing plan that contemplates community-based tourism products	IO. Public use planning and marketing; IS. Community partnerships
Zúñiga Calderón, Sara	(2014)	Actualización de la capacidad de carga turística en el sendero acuático de uso público Caño Harold, sector Cuatro Esquinas, PN Tortuguero	Calculates carrying capacity for the park	IO. Carrying Capacity
Hidalgo Corrales, Iris; Martínez	(2016)	Interpretación ambiental del sendero natural Los Cantarillos: propuesta para el uso de	Design of an interpretive tour for elementary school kids, using information	IO. Analysis and interpretation of heritage

Campos, Katherine; Uba Fallas, Steven		las tecnologías de información y comunicación en el Monumento Nacional Guayabo, dirigido a niños y niñas entre 10 y 12 años	and communication technologies	
Valverde Jiménez, Jeremy	(2016)	Planificación turística en Cerro Chato, Parque Nacional Volcán Arenal: una estrategia para el manejo y monitoreo del estado de conservación de los recursos naturales y la calidad de la experiencia de los visitantes	Tourism plan and monitoring strategy for impacts over the resources and the visitor experience	IO. Planning for public use management and visitor experiences
Castro Campos, Carlos Manuel	(2017)	Estrategias de sostenibilidad aplicables al diseño, construcción y operación de obras de infraestructura en el Parque Nacional Manuel Antonio, sector Playa Rey	Recommendations of sustainable best practices for the design, construction, and operation of facilities in one section of the park	IO. Infrastructure
Farrera Hernández, Mónica	(2017)	Aspectos ecológicos del mapache (*Procyon lotor*) y su relación con los turistas en el Parque Nacional Manuel Antonio, Costa Rica	Analysis of ecological aspects of racoons (feeding habits, population size, distribution patterns) and behavioral changes related to the interaction with visitors. Recommendations to reduce the impacts	O. Visitor-wildlife interactions/ impacts
Montero Salas, Rosa María	(2017)	Estudio para calcular la capacidad de carga turística y aplicar el sistema de monitoreo del flujo de visitantes	Calculated carrying capacity and applied the visitor flow management tool	IO. Carrying Capacity, Visitation flow and patterns

		del Refugio Nacional de Vida Silvestre Playa Hermosa - Punta Mala		
Pérez Umaña, Dennis Javier	(2017)	Evaluación del potencial turístico de geomorfositios del Parque Nacional Volcán Poás	Identified five geomorphosites in the park with touristic importance, and designed interpretive materials for the most important one	IO. Analysis and interpretation of heritage
Jiménez González, Francisco Javier	(2018)	Zonificación para el manejo del Refugio Nacional de Vida Silvestre Ostional mediante la aplicación de un sistema de información geográfica	Proposed zoning based on layers and maps generated with geographical information systems	IO. Zoning with GIS
Littlejohn, Kerrie L.	(2018)	Personal Norms and Visitor Compliance: A Case Study of Wildlife Tourism in Manuel Antonio National Park, Costa Rica	Uses the Norm Activation Model to understand visitor behavior. Applies SEM and findings support the role of personal norms in predicting visitor behavior in the park	S. Visitor personal norms and behaviors
Mora Arias, Maylin de los Ángeles	(2019)	Procedimiento para la gestión sostenible del sendero marino del Parque Nacional Cahuita	Guidelines for the sustainable management of a marine trail	IO. Infrastructure
Morales Loría, Pamela	(2019)	Establecimiento de una línea base para el monitoreo de los impactos causados por la actividad turística en los ecosistemas marinos de la reserva biológica Isla del Caño	Established a baseline for future monitoring of tourism impacts in marine ecosystems around the island	O. Visitor impacts
Peer reviewed journal articles				
Baldares Carazo, Manuel de	(1990)	Derechos de entrada a las áreas protegidas de Costa Rica	Analysis of visitor attitudes towards the increase of entrance fees	IO. Visitor fees

Jesús y Laarman, Jan G.			and differentiated fees to protected areas. Results showed a positive disposition from visitors.	
Jacobson, Susan K.; Robles, Rafael	(1992)	Ecotourism, sustainable development, and conservation education: Development of a tour guide training program in Tortuguero, Costa Rica	Development of a pilot training program for local guides based on surveyed visitor activities and needs, and community business owner opinions	IO. Guides training; IS. Community partnerships
Jacobson, Susan K.; Figueroa López, Alfredo	(1994)	Biological impacts of ecotourism: Tourists and nesting turtles in Tortuguero National Park, Costa Rica	Analyzed tourist behaviors and impacts on turtle nesting activity	O. Visitor-wildlife interactions/ impacts
Chase, Lisa C.; Lee, David R.; Schulze, William D.; Anderson, Deborah J.	(1998)	Ecotourism demand and differential pricing of national park entrance fees in Costa Rica	Foreign tourists were surveyed to identify preferences for differential pricing of park fees	IO. Visitor fees
Ramírez, Elizabeth	(1998)	Laguna Hule: experiencia de un modelo ecoturístico comunitario	Several touristic products were developed to be managed by the community	IS. Community partnerships
Shultz, Steven; Pinazzo, Jorge; Cifuentes, Miguel	(1998)	Opportunities and limitations of contingent valuation surveys to determine national park entrance fees: evidence from Costa Rica	A contingent valuation method survey was used to determine visitor willingness to pay for entrance fees in three parks	IO. Visitor fees
Chaverri Polini, Adelaida; Cerdas, Manuel	(1999)	Capacidad de carga, instrumento conceptual para el manejo de áreas protegidas	Discusses carrying capacity and other models (LAC, VIM, VERP) used in the US protected areas. Includes estimations of carrying capacity for several parks in Costa Rica	IO. Carrying Capacity

Lindberg, Kreg; Aylward, Bruce	(1999)	Price responsiveness in the developing country nature tourism context: review and Costa Rican case study	Estimates willingness to pay and price elasticities in three parks	IO. Visitor fees
Mora-Sánchez, Nevy	(1999)	Propuesta para el establecimiento de un sendero para personas con discapacidad en el Parque Nacional Tapantí	Basic inventory and general suggestions for a trail for people with disabilities	IO. Analysis and interpretation of heritage
Farrell, Tracy A.; Marion, Jeffrey L.	(2001)	Identifying and assessing ecotourism visitor impacts at eight protected areas in Costa Rica and Belize	Through several qualitative research methods, ecological impact was measured for eight parks in Costa Rica and Belize. Proposes the use of rapid impact assessment for different elements in the areas	O. Visitor impacts
Hearne, Robert R.; Salinas, Zenia M.	(2002)	The use of choice experiments in the analysis of tourist preferences for ecotourism development in Costa Rica	Presents the use of choice experiments for potential public use services and management decisions (infrastructure, information, and fees) in a section of a park	S. Visitor preferences for services and management
Ruiz Rodríguez, Adrián; Chaverri Polini, Adelaida	(2003)	Algunas ideas para el diseño de un programa de interpretación ambiental en el Parque Nacional Volcán Poás para personas con discapacidad	Recommendations for an interpretive program and accessibility for people with disabilities	IO. Interpretive planning; IO. Infrastructure
Cottrell, S.; Van Der Duim, R.; Ankersmid, P.; Kelder, L.	(2009)	Measuring the sustainability of tourism in Manuel Antonio and Texel: A tourist perspective	A survey was conducted to study visitor perception of sustainability in the parks, particularly related to ecological, cultural, and economical dimensions	S. Visitor perceptions of impacts and sustainability

Aguirre González, Juan Antonio	(2006a)	Linking National Parks with its Gateway Communities for Tourism Development in Central America: Nindiri, Nicaragua, Bagazit, Costa Rica and Portobelo, Panama	A survey was conducted to study community perception about impacts in communities, ability to care and provide services for tourists, and relationship with the park	IS. Community perceptions about tourism and public use
Alpizar, Francisco	(2006)	The pricing of protected areas in nature-based tourism: A local perspective	Suggests a theoretical model for optimal pricing for park entrance fees based on visitor nationality by assigning different welfare weights to different groups of visitors	IO. Visitor fees
Campbell, L. M.; Smith, C.	(2006)	What makes them pay? Values of volunteer tourists working for sea turtle conservation	Identified visitor volunteer values and experiences related to a turtle research and conservation program through in-depth interviews	S. Visitor values and visitor-wildlife interactions
Aguirre González, Juan Antonio	(2007)	Asignación de recursos, satisfacción del visitante, administración y manejo de parques nacionales en Costa Rica, Honduras y Nicaragua	Studied local and foreign visitor satisfaction towards infrastructure, services and recreational options. Offered recommendations for management to improve visitor satisfaction	S. Visitor satisfaction
Aguirre González, Juan Antonio; Ahearn, Megan	(2007)	Tourism, volcanic eruptions, and information: lessons for crisis management in National Parks, Costa Rica, 2006	Analyzes the impact on surrounding communities because of park closure due to volcanic eruptions. Recommendations for better communication between park and communities, planning, and management	IS. Community-park partnerships ; IO. Public use planning and risk management . Tourism impacts on

				the community
Aguirre González, Juan Antonio	(2008a)	Financiamiento del servicio de educación al turista en áreas protegidas: concesión u operación estatal	A survey was conducted to determine visitor desire of using the park auditorium, willingness to pay an additional fee, and preferences about the product offered and payment options	S. Visitor preferences for services and management
Aguirre González, Juan Antonio	(2008b)	Midiendo el impacto económico del gasto turístico de los visitantes a los Parques Nacionales de Costa Rica	The study conducted a census to estimate the economic impact on surrounding communities related to the park closing to the public due to volcanic eruptions	IO. Economic impact of park´s public use services closure on surrounding communitie s
Alpizar, Francisco; Carlsson, Fredrik; Johansson-Stenman, Olof	(2008)	Anonymity, reciprocity, and conformity: Evidence from voluntary contributions to a national park in Costa Rica	Experimental design to investigate the role of anonymity, reciprocity, and conformity for voluntary contributions on the park	O. Visitor donations
Aguirre González, Juan Antonio	(2009a)	A practical application of statistical gap analysis in National Park Management in Costa Rica	A survey studied visitor satisfaction through the expectations-disconfirmation model. Offered recommendations for improvement of park infrastructure, services, and recreational opportunities	S. Visitors satisfaction; IO. Public use planning
Aguirre González, Juan Antonio	(2009b)	Sustainable Trail Management in Costa Rica National Parks: The use of photography for trail surfacing	A survey and photo elicitation were used to identify variables that affect visitor trail surface preferences and	S. Visitor preferences and satisfaction; IO.

		decisions under tropical rainforest conditions	satisfaction. Recommendations for trail design, construction, and maintenance	Infrastructure
Meletis, Zoë A.; Harrison, Emma C.	(2010)	Tourists and Turtles: Searching for a Balance in Tortuguero, Costa Rica	The study used surveys to identify tourist perceptions of turtle tours and discussion about the boundaries of visitor interactions with turtles	S. Visitor perceptions about tours
Montero-Cordero, Andrea; Lobo, Jorge	(2010)	Effect of tourist vessels on the behaviour of the pantropical spotted dolphin, *Stenella attenuata*, in Drake Bay and Caño Island, Costa Rica	Analyzed the effect of tourism on feeding, resting habits, and cause of negative reactions. Includes some general management recommendations	O. Visitor-wildlife interactions/ impacts
Aguirre González, Juan Antonio	(2011)	Turismo, información, cambio climático: el caso del Parque Nacional Volcán Poás, Costa Rica	A survey was used to explore visitor perceptions about climate change, and where did they obtain the information from	S. Visitor perceptions about climate change; IO. Interpretive planning
Aguirre González, Juan Antonio	(2012)	Climate change and tourism: Comparing female Costa Rican and American perceptions	Compared Costa Rican vs. American women´s perceptions about climate change	S. Visitor perceptions about climate change
Moreno-Díaz, Mary Luz	(2012)	Actividades socioeconómicas en el Parque Nacional Isla del Coco, Costa Rica y posibles efectos de la variabilidad climática	Cluster analysis and a dynamic value chain was used to identify most important socioeconomic activities, including public use, and the effect of climate change on them	IO. Economic activities and influence of climate change
Rodríguez García, María José;	(2012)	Interpretación Ambiental de un sendero marino en	Design of a participatory community interpretive marine trail and training of local guides to preserve	IO. Analysis and interpretation of heritage

Mayorga Castro, Marisol		Palito, Isla de Chira, Puntarenas, Costa Rica	the art of handline fishing in a fisherman village located in Chira Island, a protected mangrove in the Gulf of Nicoya	
García Hernandez, Olga	(2013)	Interpretación socioambiental (ISA), herramienta para la gestión del uso público en las áreas protegidas. Estudio de caso: Parque Nacional Marino Las Baulas de Guanacaste, Costa Rica	The study involved the analysis of current interpretive program with local guides, and the development of materials and a training program to improve the interpretive skills for the guides	IO. Interpretive planning; IS. Community partnerships
McKinney, Tracie	(2014)	Species-Specific Responses to Tourist Interactions by White-Faced Capuchins (*Cebus imitator*) and Mantled Howlers (*Alouatta palliata*) in a Costa Rican Wildlife Refuge	Behaviors of white-faced and howler monkeys in response to interactions with visitors. As the result the behaviors are significantly different between species, the study suggests the development of species-specific guidelines for ecotourism	O. Visitor-wildlife interactions/ impacts
Webb, Shasta E.; McCoy, Michael B.	(2014)	Ecotourism and primate habituation: Behavioral variation in two groups of white-faced capuchins (*Cebus capucinus*) from Costa Rica	Analysis of behaviors of white-faced capuchin monkeys interacting with visitors and suggestions to avoid over-habituation	O. Visitor-wildlife interactions/ impacts
Alpízar, F., Martinsson, P., Nordén, A.	(2015)	Do entrance fees crowd out donations for public goods? Evidence from a protected area in Costa Rica	Studied visitor preferences for donating money to a park and how different levels of entrance fees affect the preferences for donations	IO. Visitor fees
Quirós-Arias, Lilliam	(2017)	Turismo y territorio en áreas naturales protegidas, Parque	The article presents a detailed description of	IO. Inventory of public use

		Nacional Santa Rosa: del Monumento Nacional a la conservación del Bosque Tropical Seco, área de conservación Guanacaste, Costa Rica	tourism attractions and public use services	services and attractions
Tuk-Durán, Juan	(2017)	Sendero peatonal en el Parque Nacional Cahuita. La naturaleza al alcance de todos	Describes the construction process and characteristics of materials used for an elevated trail near the beach	IO. Infrastructure
Zumbado Morales, Félix	(2017)	Manejo de visitantes y atención del turista en áreas protegidas costeras. Estudio de la capacidad de carga en el Parque Nacional Marino Ballena, Costa Rica	Calculates carrying capacity for the park, based on the formulas for physical carrying capacity, real carrying capacity, and effective carrying capacity. Offers specific recommendations about zoning, and services (parking, camping, etc.), as well as staffing needs	IO. Carrying Capacity; IO. Public use planning
Vindas-Arce, Rafael Alonso	(2018)	Manejo responsable de observadores de aves acuáticas coloniales en la Isla Pájaros, Parque Nacional Palo Verde, Área de Conservación Arenal-Tempisque, Guanacaste, Costa Rica	Based on the inventory of public use services, visitor profiles, legislation for the park, and heritage elements (particularly colonial birds) specific guidelines for the management of birdwatchers were developed	IO. Public use planning
Carvache-Franco, M.; Víquez-Paniagua, A. G.; Carvache-Franco, O.; Perez-Orozco,	(2019)	Motivations, intentions to return and to recommend protected areas: A study in Costa Rica	The study performed a factor analysis and multiple regression to analyze motivations for doing ecotourism and their influence on the intentions	S. Visitor motivations and intentions to act

A.; Carvache-Franco, W.			to return and recommend a protected area	
Santos, Edilton R.; Ferrari, Stephen F.; Beltrão-Mendes, Raone; Gutiérrez-Espeleta, Gustavo A.	(2019)	Anointing with commercial insect repellent by free-ranging *Cebus capucinus* in Manuel Antonio National Park, Quepos, Costa Rica	Observations of white-faced capuchin monkey behavior when stealing a bottle of repellent from a tourist and rubbing it in their bodies. Some of the animals partially ingested the repellent composed mainly of extracts of eucalyptus and citronella. The study states a clear need for more regulations about contact between visitors and wildlife	O. Visitor-wildlife interactions/ impacts
Carvache-Franco, M.; Perez-Orozco, A.; Carvache-Franco, O.; Víquez-Paniagua, A. G.; Carvache-Franco, W.	(2020)	The Perceived Value in Ecotourism Related to Satisfaction and Loyalty: A Study from Costa Rica	Through a factorial analysis, the study established the dimensions of perceived value in ecotourism (economic-functional, emotional, and social) and analyzed its relationship with satisfaction and loyalty	S. Visitor perceived value, satisfaction, and loyalty
Alvarado, Guillermo E.; Esquivel, Lidier; Sánchez, Blas	(2021)	Mejoras en el paradigma del manejo de la gestión del riesgo en los parques nacionales volcánicos de Costa Rica, entre el año 2000 y el 2020	Discusses improvements for management and design of infrastructure to protect different users (tourists, staff, researchers) from volcanic eruptions in volcanic parks	IO. Public use planning; IO. Infrastructur e
Carvache-Franco, M.; Carvache-Franco, O.; Víquez-Paniagua, A. G.; Carvache-Franco,W.;	(2021)	Sociodemographic aspects and their relationship with motivations, satisfaction, and loyalty in ecotourism: a study in Costa Rica	The study analyzed the relationships between sociodemographic variables with visitor satisfaction and loyalty through factor analysis and multiple regression	S. Visitor motivations, satisfaction, and loyalty

Pérez-Orozco, A.				
Carvache-Franco, M.; Carvache-Franco, W.; Víquez-Paniagua, A. G.; Carvache-Franco, O.; Pérez-Orozco, A.	(2021)	Satisfaction and its relationship with loyalty in ecotourism: A study in Costa Rica	The study analyzed the relationships between sociodemographic variables with visitor satisfaction and loyalty through factor analysis and multiple regression	S. Visitor satisfaction and loyalty
Carvache-Franco, M.; Carvache-Franco, W.; Váquez-Paniagua, A. G.; Carvache-Franco, O.; Pérez-Orozco, A.	(2021)	The role of motivations in the segmentation of ecotourism destinations: A study from Costa Rica	The study determined through Spearman's statistical method of correlation aspects that influenced satisfaction (accessibility and infrastructure, tranquility, gastronomic quality, and the treatment received). Aspects that influenced the return intentions were the tourist information and signage, the gastronomic quality, the accessibility of the infrastructure, and the equipment and facilities of the restaurant	S. Visitor satisfaction, loyalty, and intentions to act
Carvache-Franco, M.; Pérez-Orozco, A.; Carvache-Franco, W.; Víquez-Paniagua, A. G.; Carvache-Franco, O.	(2021)	Motivations and their influence on satisfaction and loyalty in eco-tourism: a study of the foreign tourist in Costa Rica	The study performed a factor analysis and multiple regression to analyze motivations to doing ecotourism and their influence on satisfaction, intentions to return, and recommend a protected area	S. Visitor motivations, satisfaction, and intentions to act

Naranjo-Arriola, Adriana	(2021)	Tourist carrying capacity as a sustainability management tool for coral reefs in Caño Island Biological Reserve, Costa Rica	The carrying capacity for scuba diving and snorkeling tourism was determined to prevent further degradation of its coral reef ecosystems, using formulas for physical carrying capacity, real carrying capacity, and operative carrying capacity	IO. Carrying Capacity
Rojas Sánchez, Mario; Palos-Sánchez, Pedro R.; Velicia-Martin, Felix	(2021)	Eco-friendly performance as a determining factor of the Adoption of Virtual Reality Applications in National Parks	The study developed a structural equation model based on the Unified Theory of Acceptance and Use of Technology Model and a survey to find whether tourists are willing to use Virtual Reality to contribute to the eco-friendly performance of the area and to protect flora and fauna	S. Visitor intentions to act
Reports				
Cifuentes, Miguel; Alpízar, William; Barroso, Francisco; Courrau, José; Falck, María Luisa; Jiménez, Rogelio; Ortiz, Patricia; Rodríguez, Jorge; Romero, Juan Carlos; Tejada, Julio	(1990)	Capacidad de carga turística de la Reserva Biológica Carara	Calculates carrying capacity for different sectors of the park, based on the formulas for physical carrying capacity, real carrying capacity, and effective carrying capacity	IO. Carrying Capacity

Cifuentes, M.; Mesquita, C.A.; Méndez, J.; Morales, M.E.; Aguilar, N.; Delmar, C.; Gallo, M.; Jolón, M.; Ramírez, C.; Ribeiro, N.; Sandoval, E.; Turcios, M.	(1999)	Capacidad de carga turística de las áreas de uso público del Monumento Nacional Guayabo, Costa Rica	Calculates carrying capacity for different sectors of the park, based on the formulas for physical carrying capacity, real carrying capacity, and effective carrying capacity	IO. Carrying Capacity
Sobrero, Raúl	(2002)	Efectos de la actividad turística en los patrones de comportamiento de *Stenella Attenuata* Gray, 1846 (Delfín manchado) del Pacifico Central de Costa Rica	Analysis of dolphin behaviors around tourists and recommendations for public use management	O. Visitor-wildlife interactions/ impacts; IO. Public use planning
Castillo A., Yerko	(2004)	Recomendaciones para trasladar el área de acampar del sector Bahía de Junquillal (ACG)	The document includes a series of recommendations to move the camping area to a different location, considering the conditions of the space	IO. Public use planning
Rodríguez Fonseca, Javier	(2010)	Memorias del plan piloto para un modelo de Turismo Marino Sostenible (TMS): para capitanes y guías de turismo marino de Agujitas-Drake y Bahía-Uvita y autoridades locales del MINAET (PNM Ballena y RB Isla del Caño), INCOPESCA y Servicio Nacional de Guardacostas (Golfito) Cantón de Osa,	Pilot plan for a sustainable tourism model with vessel captains and marine tourism guides	IO. Public use services

		Provincia de Puntarenas, Costa Rica 2008-2009		
The School for Field Studies	(2010)	El manejo de impactos negativos de la visitación al Parque Nacional Manuel Antonio. Propuesta para establecer un sistema de Límites de Cambio Aceptable	Application of LAC and development of a baseline for impacts at the park (crowding, noise, guide/visitor interactions, animal disturbance, infrastructure deterioration, trampling, and pollution)	IO. Limits of acceptable change
The School for Field Studies/Sergio Molina	(2010)	Evaluación de servicios turísticos en el PN Volcán Poás	Through a survey it determined visitor profile, services, and satisfaction	IO. Public use services; IO. Visitor profiles; S. Visitor satisfaction
The School for Field Studies/Sergio Molina	(2011)	Patrones de comportamiento de los visitantes al PN Volcán Poás durante el II semestre-2011	Through a survey it determined visitor profile, services, and satisfaction	IO. Public use services; IO. Visitor profiles; S. Visitor satisfaction
Rodríguez Rodríguez, Yendri Carolina; Zúñiga Meza, Oscar Gerardo	(2013)	Estudio de capacidad de carga turística Reserva Natural Absoluta Cabo Blanco periodo 2012-2013	Calculates carrying capacity for the park, based on the formulas for physical carrying capacity, real carrying capacity, and effective carrying capacity	IO. Carrying Capacity
The School for Field Studies/Edgar do Arévalo	(2013)	Evaluación de algunos efectos de la visitación turística sobre la vida silvestre en el Parque Nacional Volcán Poás, Costa Rica	Analysis of levels of noise around public use infrastructure in the park, inventory of birds around the same infrastructure, and interactions of visitors and wildlife and potential risks	O. Visitor-wildlife interactions/ impacts

The School for Field Studies/Irene Alvarado	(2014)	Grado de satisfacción de los visitantes sobre los servicios brindados y nivel de conocimiento sobre carbono neutralidad en el PN Volcán Poás	Descriptive analysis about visitor satisfaction regarding public use services in the park, and their knowledge and actions regarding climate change and carbon neutrality	S.Visitor satisfaction; IO.Environmental Education
Pérez Campos, Andy	(2014)	Programa de Ecoturismo Parque Nacional Marino Las Baulas de Guanacaste Área de Conservación Tempisque. Informe de proyecto de voluntariado	Design of an interpretive trail and guided visits for seniors	IO. Analysis and interpretation of heritage
Sistema Nacional de Áreas de Conservación	(2015b)	Plan Turismo Sostenible del RNVSM Caño Negro	Sustainable tourism plan, including the following sections: background, social and environmental context, strategic planning context, tourism supply and demand analysis for the site and surrounding areas, participatory workshops and DAFO about tourism in the region, sustainable tourism plan, including tourism product development, marketing, and monitoring of impacts	IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015c)	Plan Turismo Sostenible Parque Nacional Cahuita		IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015d)	Plan Turismo Sostenible Parque Nacional Manuel Antonio		IO. Public use planning

Sistema Nacional de Áreas de Conservación	(2015e)	Plan Turismo Sostenible Parque Nacional Marino Ballena		IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015f)	Plan Turismo Sostenible Parque Nacional Rincón de la Vieja		IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015g)	Plan Turismo Sostenible Parque Nacional Volcán Arenal		IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015h)	Plan Turismo Sostenible Parque Nacional Volcán Irazú		IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015i)	Plan Turismo Sostenible Parque Nacional Volcán Poás		IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015j)	Plan Turismo Sostenible Parque Nacional Tortuguero		IO. Public use planning
Sistema Nacional de Áreas de Conservación	(2015k)	Plan Turismo Sostenible Parque Nacional Corcovado		IO. Public use planning
BIOMARCC-SINAC-GIZ	(2016)	Caracterización de la actividad de buceo recreativo en las Áreas Marinas Protegidas de Costa Rica	Descriptive analysis about recreational diving hotspots in marine protected areas, current threats, touristic activity, and management capacity for each site	IO. Public use planning
Undergraduate Research				
Jiménez Montealegre, Patricia	(1989)	Efectos del turismo en el Parque Nacional Volcán Poás	Impacts of tourism on the park	O.Visitor impacts

Valerio Barrantes, María Mayela; Valencia Delgado, Cindy	(2008)	Planeamiento para la interpretación ambiental para no videntes en el Parque Nacional Rincón de la Vieja	Interpretive planning for people visually impaired	IO.Interpretive planning
Alpízar Segura, Rodrigo	(2009)	Propuesta del diseño de un sendero interpretativo en el Refugio Nacional de Vida Silvestre Hacienda El Viejo, Filadelfia, Guanacaste 2008-2009	Proposal for an interpretive trail	IO. Analysis and interpretation of heritage
Elizondo Zamora, Edgar; Matarrita Soto, Walter; Rodríguez Chaves, Pablo	(2010)	Santa Cruz no es solo sol y playa: estrategia para el aprovechamiento de los recursos ecoturísticos del Parque Nacional Diriá 2009-2010	Strategy for increasing visitation to ecotourism attractions in Diriá National Park	IO. Public use planning
Baltodano Martínez, Lenin A.; Bonilla Guzmán, Gustavo A.; Ortega Chavarría, Olbert G.	(2011)	Propuesta de interpretación para el sendero Los Gigantes del Bosque, en el Parque Nacional Rincón de la Vieja, Guanacaste	Proposal for an interpretive trail in Rincón de la Vieja National Park	IO. Analysis and interpretation of heritage
Campos Morales, Juan Pablo; González Díaz, Luis Manuel	(2011)	Propuesta para el aprovechamiento ecoturístico del sendero "El Cráter" en el Parque Nacional Rincón de la Vieja, mediante la interpretación ambiental	Proposal for ecotourism development and an interpretive trail in Rincón de la Vieja National Park	IO. Analysis and interpretation of heritage
Alvarado Rodríguez, Johan; Bello	(2012)	Propuesta para el aprovechamiento sostenible de los	Proposal for sustainable development of a trail in	IO. Public use planning

Castillo, Pamela M.; López Gómez, Mirllana		recursos naturales del Sendero Circular Las Pailas del Parque Nacional Rincón de la Vieja	Rincón de la Vieja National Park	
Cordero Elizondo, Paola; Elizondo González, Evelyn; Salas Rodríguez, Eilyn Tatiana	(2012)	Propuesta de aprovechamiento ecoturístico de la Reserva Biológica Lomas de Barbudal	Proposal for ecotourism development in Lomas de Barbudal Biological Reserve	IO. Public use planning
Delgado Campos, Kevin; García Figueroa, Bryan; Orozco Sibaja, Marianela; Rojas Morales, Yuri	(2012)	Capacidad de Carga Turística (CCT), para el aprovechamiento turístico sostenible del sendero La Cangreja en el Parque Nacional Rincón de la Vieja	Calculates carrying capacity for a trail in Rincón de la Vieja National Park	IO. Carrying Capacity
Jiménez Lezama, Evelyn; Jiménez Lezama, Evelyn Rodríguez Vargas, Alice	(2012)	Plan ecoturístico para el sendero El Bonito: una alternativa de recreación para los visitantes del Parque Nacional Piedras Blancas	Ecotourism development plan in Piedras Blancas National Park	IO. Public use planning
Piña Berrocal, Karina; Solís Varela, Mariela; Vargas Sibaja, Karen M.	(2012)	Propuesta para el aprovechamiento ecoturístico del Parque Nacional Marino Las Baulas	Proposal for ecotourism development of Las Baulas National Marine Park	IO. Public use planning
Morales-Mesén, Ronny Josué	(2016)	Propuesta de interpretación ambiental de historia natural en el sendero	Design of signs for a trail in Juan Castro Blanco Water National Park	IO. Analysis and interpretation of heritage

		Las Súrtubas del Parque Nacional del Agua Juan Castro Blanco, Estación Biológica Volcán Viejo		
Picado-Mena, Rudy Antonio	(2018)	Propuesta de interpretación ambiental y turística para el sendero elevado y la torre de avistamiento del Refugio Nacional de Vida Silvestre Mixto Caño Negro	Design of interpretive signs, maps, and a guidebook for Caño Negro Wildlife Refuge	IO. Analysis and interpretation of heritage

Appendix B - Social Research Needs Assessment Survey (original in Spanish)

Thank you for completing this survey. Your contribution is very important and will help us to develop different tools to support public use management in protected areas. **Responses to this survey are anonymous and confidential**. There is no personal information required, and there are no anticipated risks as a result of the study. You can stop at any time without penalty.

Intended audience: Managers and other relevant stakeholders in protected areas

Objective: To identify the needs of managers and staff of protected areas in Costa Rica related to public use research and evaluation, technical assistance and training, and preferred delivery methods for outreach and communications.

Time to complete the survey: 5 minutes

I. Indicate the type of heritage site you represent or your link to one or more of these sites:
   - o Protected area
   - o Stakeholder
   - o Other: _____

II. Based on your experience please rate the importance to your park of each research task described below as "Very Important", "Important", "Not important" or "Don´t know/No opinion"

Importance for the site → **Topic of research**	**Very important**	**Important**	**Not important**	**Don't know/ No opinion**
1. Factors that influence visitor experience				
2. Willingness to pay entrance and services				
3. Perceptions, expectations, motivations, attitudes				
4. Evaluation of education and interpretive programs				
5. Visitor impacts on heritage, facilities, and other visitors				

6. Nature's influence on visitor's well-being				
7. Visitor preferred activities and schedules				
8. Visitor distribution and use patterns				
9. Visitor interaction with exhibits and facilities				
10. Current audiences use of the site				
11. Potential visitors				
12. Special needs audiences, minorities				
13. Conflicts between different audiences				
14. Values and attitudes from surrounding communities				
15. Community participation in sites interpretation				
16. Communication effectiveness with visitors and communities				
17. Partnerships with communities for public use management				
18. Quality of programs and activities, services, and facilities				
19. Public use management models and best practices				
20. Impacts of management decisions over the site and other people				
21. Visitor safety and risk management				
22. Tour operators' needs regarding the site				
23. Visitation forecasting and economic impact				

III. Please rate your current needs related to technical assistance and training for the following aspects as "Very Important", "Important", "Not important" or "Don´t know/No opinion"

Importance for the site → Topic of research	**Very important**	**Important**	**Not important**	**Don't know/ No opinion**
24. Planning and development of programs, projects, and activities				
25. Implementation and comparison of different public use models and strategies				

26. Cultural sensitivity workshops				
27. Trail management and risk assessment				
28. Recreation and leisure practices and therapies				
29. Customer relations best practices				
30. Software management				
31. Social media management, impact analysis				
32. Virtual program techniques and tools				
33. Methods and instruments for visitor data collection and analysis				
34. Conflict resolution				

IV. Please rate your preferred methods for outreach and communication: 1 for the most preferred, and 5 for the least.

Priority → **Type of training materials and strategies**	**1**	**2**	**3**	**4**	**5**
35. Face to face activities (workshops, talks, guided tours, theatrical presentations, interpretive exhibits)					
36. Printed publications (handbooks, field guides, books, flyers, brochures, posters, infographics)					
37. Digital publications (audio guides, podcasts, videos, blogs, articles)					
38. Virtual events (virtual workshops, webinars)					
39. Webpages, social media					

Thank you very much for your time!

Appendix C - Visitor Perception of Authenticity Survey (original in Spanish)

Thank you for responding to this survey. Your contribution is very important to understand and facilitate better visitor experiences. Responses to this survey are confidential and anonymous and might be used in future research. There are no anticipated risks as a result of the study. There might be concerns about COVID-19 safety while filling up the survey, but all the protocols will be followed to avoid its transmission. If you decide it, however, you can stop participating at any time without penalty.

Based on your experience today at the park, please rate the following statements according to the following scale:

1. Strongly disagree
2. Disagree
3. Somewhat disagree
4. Neither agree nor disagree
5. Somewhat agree
6. Agree
7. Strongly agree

Statement							
1. I saw animals that I would have a hard time finding anywhere else.	1	2	3	4	5	6	7
2. I had a spiritual experience in this place.	1	2	3	4	5	6	7
3. This location exceeded my expectations.	1	2	3	4	5	6	7
4. I felt connected with human history and civilization in this place.	1	2	3	4	5	6	7
5. I would visit this place again.	1	2	3	4	5	6	7
6. The buildings and infrastructure definitely belong in this setting.	1	2	3	4	5	6	7
7. The design of the trails in this place was exceptional.	1	2	3	4	5	6	7
8. Visiting this place says a lot about who I am.	1	2	3	4	5	6	7
9. I learned about the local culture by participating in activities in this setting.	1	2	3	4	5	6	7

10. The staff had many experts about this place.	1	2	3	4	5	6	7
11. I saw plants that I would have a hard time finding anywhere else.	1	2	3	4	5	6	7
12. I now feel a greater appreciation for local traditions in this place.	1	2	3	4	5	6	7
13. I felt immersed in the local atmosphere because of the culture and local pride.	1	2	3	4	5	6	7
14. The tour and exhibits were of high quality.	1	2	3	4	5	6	7
15. I learned a lot about this place from the information I received on site.	1	2	3	4	5	6	7
16. I felt connected to the natural/cultural history of this setting.	1	2	3	4	5	6	7
17. The design of the buildings and infrastructure reflected the history of the local people.	1	2	3	4	5	6	7
18. During the visit I felt a connection with the place's history, legends, or historical personalities.	1	2	3	4	5	6	7
19. I am impressed with the variety of landscapes.	1	2	3	4	5	6	7
20. I will recommend this site to other people.	1	2	3	4	5	6	7
21. The service provided by employees at this place was exceptional.	1	2	3	4	5	6	7
22. This place shows a real, natural ecosystem.	1	2	3	4	5	6	7
23. I feel like I am part of nature in this place.	1	2	3	4	5	6	7
24. The historical artifacts I saw were real.	1	2	3	4	5	6	7
25. This place presented local history/culture very well.	1	2	3	4	5	6	7
26. I am motivated to contribute to the preservation of this place.	1	2	3	4	5	6	7
27. I felt a special connection with the people who lived here in the past.	1	2	3	4	5	6	7
28. Artifacts I saw here would be hard to find anywhere else.	1	2	3	4	5	6	7

29. This place made me feel physically energized and satisfied.	1	2	3	4	5	6	7
30. I learned more about myself at this destination.	1	2	3	4	5	6	7
31. I would bring my friends and family to visit this place.	1	2	3	4	5	6	7
32. I observed many interactions between plants and animals.	1	2	3	4	5	6	7
33. I am convinced of the originality of the architecture/design of the buildings/infrastructure.	1	2	3	4	5	6	7
34. I liked the way the place blends with the natural landscape.	1	2	3	4	5	6	7
35. The story of this place reflects its importance for society.	1	2	3	4	5	6	7
36. Compared to other parks I usually visit this place is less polluted	1	2	3	4	5	6	7
37. The stories told here relate to the significance the park is communicating about this place.	1	2	3	4	5	6	7
38. Natural elements in this place are exceptional.	1	2	3	4	5	6	7
39. Some elements in this site look out of place or artificial.	1	2	3	4	5	6	7
40. I could easily have had this experience anywhere else.	1	2	3	4	5	6	7
41. I sensed a lot of history when I looked at objects and infrastructure in this place.	1	2	3	4	5	6	7
42. I deeply value the time I spent with my family or friends here.	1	2	3	4	5	6	7
43. I am in touch with my feelings and emotions at this destination.	1	2	3	4	5	6	7
44. I do not feel committed to this place.	1	2	3	4	5	6	7
45. I feel personally connected to the local culture and traditions.	1	2	3	4	5	6	7
46. I felt free in this place.	1	2	3	4	5	6	7

About you:

47. Which sex do you identify with? ❑ Female ❑ Male ❑ NR

48. In which year were you born? _____

49. What is your education level? _____

50. Where do you live?
    - ❑ Costa Rica (cantón, distrito): _____
    - ❑ Overseas (country, zip code): _____

Thank you very much for your time!

Appendix D - IRB Approval

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Ryan Sharp
Horticulture & Nat Resources
Manhattan, KS 66506

Proposal Number: IRB-10784

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 08/05/2021

RE: Proposal Entitled, "Public Use Management Research: Review and Applications for Outdoor Recreation in Costa Rica."

The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written – and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §104(d), category:Exempt Category 2 Subsection ii.**

Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.

Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Electronically signed by Heath Ritter on 08/05/2021 11:34 AM ET
On Behalf of IRB Chair

203 Fairchild Hall, Manhattan, KS 66502 | (785) 532-3224 | fax: (785) 532-3278