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CULTIVATING COMMITMENT: HOW CULTURAL ECOSYSTEM SERVICES AFFECT  
VISITOR LOYALTY IN PARKS AND PROTECTED AREAS

By

Thomas Robinson

MS, Recreation, Management and Policy, 2023

THESIS

Submitted to the University of New Hampshire  
in Partial Fulfilment of  
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In

Recreation, Management and Policy

May, 2023

This thesis was examined and approved in partial fulfilment of the requirements for the degree of Master of Science in Recreation, Management and Policy by:

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On 4/7/2023

Original approval of signatures are on file with the University of New Hampshire Graduate School.

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## ABSTRACT

### CULTIVATING COMMITMENT: HOW CULTURAL ECOSYSTEM SERVICES AFFECT VISITOR LOYALTY IN PARKS AND PROTECTED AREAS

By

Thomas Robinson

University of New Hampshire, May 2023

Parks and protected areas (PPAs) provide essential ecosystem services to society, including both the material and non-material benefits obtained from healthy ecosystems. While research on this topic has mainly focused on material-based ecosystem services, limited attention has been given to the benefits of non-material cultural ecosystem services (CES) such as recreation, history, and culture. Visitor loyalty refers to an individual's commitment and willingness to return to a PPA in perpetuity and is influenced by various factors, including the quality of the recreation experience and the ecological integrity of a natural resource. CES may significantly influence visitor loyalty in PPAs, as visitors are often drawn to certain PPAs because of their cultural relevance or aesthetic beauty. The relationship between CES and visitor loyalty, however, is understudied in PPA settings. Therefore, this study examined the influence of CES on specific elements of visitor loyalty behaviors at the Great Bay National Estuarine Research Reserve (GBE) in southern New Hampshire. The study employed a knock-and-drop population sampling method in the summer of 2022 to collect data from GBE visitors within proximate high-visitation communities (n=645). Structural equation modeling analyses determined a strong relationship between certain CES and various visitor loyalty behaviors. For example, findings suggest that *sense of place* has a strong and consistent influence upon visitor advocacy, financial support, and volunteerism. Overall, this research serves to advance both the ecosystem services and visitor loyalty frameworks and provides empirical evidence for natural resource managers. By recognizing the importance of non-material CES, such as sense of place and recreation, resource managers can enhance visitor loyalty and ensure the long-term management and success of natural resources worldwide.

**Keywords:** Outdoor recreation; Visitor use management; Cultural ecosystem services; Visitor loyalty behaviors; Parks and protected areas; Estuaries

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## **1.0 Introduction**

Visitation to parks and protected areas (PPAs) within the United States increased gradually during the 21<sup>st</sup> century, and skyrocketed in the last few years, due largely to the COVID-19 pandemic (Ferguson et al., 2022c; Ferguson et al., 2022d; Outdoor Foundation, 2021; Rice et al., 2020). Water-based recreation (WBR) is one of the most popular forms of outdoor recreation in the United States with more than 179 million visitors engaged in some form of WBR in 2020 (Mimbs et al., 2020; Outdoor Foundation, 2021). Water-based recreation broadly refers to outdoor recreation activities conducted in and around water resources such as motorized and non-motorized boating, angling, hunting, birding, hiking, and picnicking (Kakoyannis & Stankey, 2002). Recent research suggests ecosystem services, or the benefits provided to humans by healthy ecosystems within WBR settings (e.g., fishing, water), serve as a primary catalyst for WBR recreation visitation (Martin et al., 2020; Mimbs et al., 2020). Research regarding ecosystem services within WBR resources has largely focused on material-based and monetary ecosystem services such as provisioning services (e.g., water), regulating services (e.g., climate regulation), and supporting services (e.g., nutrient cycling) (Grizzetti, et al., 2019; Vallecillo et al., 2019), with a limited focus on cultural ecosystem services (CES). CES refers to the non-material benefits provided to humans by ecosystems such as recreation, aesthetics, history, and culture (Beckmann-Wubbelt et al., 2021; Martin et al., 2020).

Visitor loyalty, in comparison, refers to an individual's commitment and willingness to continue to return to a PPA. An individual visitor's loyalty to a specific PPA is often influenced by various factors such as the ecological integrity and overall quality of a natural resource (Seebunruang et al., 2022). Intuitively, CES and visitor loyalty behaviors are intertwined



concepts as they are both instrumental in WBR and visitor use management. For example, WBR visitors may continue to return to a specific PPA because of its historical and cultural significance (Ament et al., 2016; Pearce & Dowling, 2019). As such, the overall quality of CES may influence an individual's decision to return, and ultimately, their long-term loyalty to a specific PPA. The relationship between CES and visitor loyalty behavioral intentions is burgeoning and understudied, particularly within water-based PPA settings. Accordingly, this study examined the influence of various CES upon visitor loyalty behaviors at the Great Bay National Estuarine Research Reserve (GBE) in New Hampshire. Study findings inform natural resource management and policy at the community, state, and federal levels and aid in the overall conservation of PPAs and the long-term retention and loyalty of PPA visitors.

## **2.0 Literature Review**

### **2.1 Social-Ecological Systems**

The social-ecological systems (SES) framework serves to combine various interconnected social and ecological sub-systems more broadly, such as the connection between natural resources, visitor experiences, and communities (Morse, 2020). PPAs embody this framework through their ability to supply ecological resources as a public service, providing benefits to both visitors and surrounding communities (Colding & Barthel, 2019). PPA research, however, has historically been over-simplified, often narrowly focusing upon social systems, neglecting to incorporate critical and interlinked ecological systems (Colding & Barthel, 2019; Ferguson et al., 2021b; Morse, 2020).

This integrated SES approach serves to assess more broadly the complex and adaptive components of entire ecosystems from a systems perspective (Colding & Barthel, 2019; Ferguson et al., 2022a; Ferguson et al., 2021a). For instance, recent research has established that social and ecological impacts in PPA settings have distinct downstream influences upon visitor perceptions (e.g., ecosystem services), visitor outcomes (e.g., intention to return, loyalty), and proximate community impacts (e.g., economic vitality, health, well-being) (Ferguson et al., 2021b; Morse, 2020; Zajchowski et al., 2022). Thus, the SES framework serves to further explore the complex connections between humans and natural systems while providing for the sustainable management of PPAs.

## **2.2 Cultural Ecosystem Services**

Ecosystem services are a key component to the overall understanding of resource and visitor use management. Ecosystem services refer to the various benefits that healthy ecosystems and both material and non-material resources provide humans (Martin et al., 2020). Outdoor recreation experiences within PPAs fall under the umbrella of cultural ecosystem services (CES) (Ament et al., 2016; Martin et al., 2020). CES consider the cultural aspects provided to humans by an ecosystem or natural resource through the non-material valuation of numerous perspectives such as aesthetics, sense of place, recreation, and culture (Beckmann-Wubbelt et al., 2021; Martin et al., 2020). The integration of CES within WBR settings is underdeveloped; particularly within the context of understanding how visitors value WBR resources (Martin et al., 2020). Breaking CES down into smaller sub-constructs (e.g., aesthetics, culture, recreation, sense of

place) allows for an easier understanding of visitor perceptions of CES on a given WBR resource.

Within CES, various sub-constructs are often represented. For this study, four CES were examined: aesthetics, culture, recreation, and sense of place. Within this study, Aesthetics is defined within the literature as value placed on a resource for components ranging from natural beauty to physical, memorable characteristics (Bryce et al., 2016; Cabana et al., 2020; Martin et al., 2020). Aesthetics is an important CES to consider given that it represents the overall appearance of the resource. Additionally, culture is defined as value placed on a resource because it provides a place where people can continue to pass down traditions or ways of life (Bryce et al., 2016; Cabana et al., 2020; Martin et al., 2020). Culture is an instrumental CES due to its ties with family heritage and generational components. Recreation is defined as value placed on a resource because of outdoor recreational opportunities (Bryce et al., 2016; Cabana et al., 2020; Martin et al., 2020) and is one of the most measurable CES. Lastly, sense of place is defined as the intrinsic and/or sentimental value possessed by an individual that wholistically and/or spiritually connects them to a specific resource (Bryce et al., 2016; Cabana et al., 2020; Martin et al., 2020). Sense of place often demonstrates visitors' connection and sense of belonging to a resource.

### **2.3 Visitor Loyalty**

Visitor loyalty is a broad construct related to an individual's post-visitation behavioral intentions in PPA settings (Moore et al., 2013) and can be defined as an individual's commitment and willingness to repeatedly utilize a PPA (Pearce & Dowling, 2019). Visitor

loyalty is a key outcome indicator related to overall experience quality within PPA and WBR settings (Ferguson et al., 2022b; Ferguson et al., 2021b; Ferguson et al., 2018; Moore et al., 2013; Rodger et al., 2015). Visitor loyalty is critical to effective WBR and PPA management as it promotes commitment to the resource and enables visitor behaviors. It is the mechanism by which visitors can engage in pro-commitment behaviors such as advocacy, financial support, volunteering, and referral, which ultimately lead to/result in visitor retention. Thus, visitor loyalty behaviors serve as an effective and critical outcome measure in PPA settings to assess overall visitor retention and experience quality.

Within visitor loyalty behavioral intentions, various sub-constructs are represented. Within this study, four main loyalty sub-constructs were studied: advocacy, financial support, volunteerism, and referral. Advocacy, for this study, is defined as willingness to write or speak about a recreation resource to friends, family, politicians, or the public (Moore et al., 2015; Pinkus et al., 2016; Rodger et al., 2015). Advocacy is often exhibited by groups and local organizations of visitors that are passionate about the resource. Financial support is another key visitor loyalty behavior that is defined as willingness to donate money to organizations that regulate, conserve, and/or maintain recreation resources and facilities (Moore et al., 2015; Pinkus et al., 2016; Rodger et al., 2015). The financial support of a resource is often one of the most involved forms of visitor loyalty due to the involvement of monetary donation. Similarly, volunteer is defined as willingness to volunteer to improve, conserve, or give back to the given recreation resource and its community (Allison et al., 2002; Moore et al., 2015; Pinkus et al., 2016; Rodger et al., 2015). Visitors who volunteer are often passionate about the physical components of the resource. Referral is referenced to and defined within literature as willingness

to recommend the recreation resource or say positive things to others about the given recreation resource (Moore et al., 2015; Pinkus et al., 2016; Rodger et al., 2015) and is often an informal form of visitor loyalty that is commonplace in conversation. Together, these sub-constructs represent retention-related visitor behaviors.

## **2.4 Summary and Research Questions**

The relationship between CESs and visitor loyalty is emerging and understudied, particularly within water-based settings. This study examined the influence of CESs (e.g., recreation, aesthetics, culture and history, sense of place) upon specific elements of visitor loyalty behaviors (e.g., referral, financial support, volunteerism, advocacy) in an estuary setting. The following research questions were examined to understand the influence of CES on these specific elements of visitor loyalty behaviors in an estuary setting:

**R<sup>1</sup>:** To what extent do visitors value the CES provided by the GBE?

**R<sup>2</sup>:** To what extent are visitors loyal to the GBE?

**R<sup>3</sup>:** What is the relationship between CES and visitor loyalty behaviors at the GBE?

## **3.0 Methods**

### **3.1 Study Context**

The Great Bay National Estuarine Research Reserve (GBE) encompasses more than 10,000 acres of brackish tidal estuary located 10 miles from the New Hampshire coastline (NOAA, 2022b). The GBE is managed at the state level by the New Hampshire Fish and Game

Department and at the federal level by the National Oceanic and Atmospheric Administration, specifically the Office of Coastal Management- National Estuarine Research Reserve program. The National Estuarine Research Reserve program specializes in estuary management and is responsible for 30 protected coastal sites spanning nearly 1.4 million acres across the country (NOAA, 2022a). The brackish waters of the GBE create a unique environment and diverse wildlife habitat including 20 species of waterfowl, 27 species of shorebirds, 13 species of wading birds, more than 600 species of fish, and a multitude of shellfish populations including lobsters and oysters (Mills, 2009). The average daily tidal fluctuations (6.8 feet twice per day) at the GBE create rare and unique wetland and upland habitats in the form of salt marshes, rocky bluffs, and diverse tidal riverine systems (NOAA, 2022a). Additionally, the GBE connects the waters of the Piscataqua River and Little Bay with the Atlantic Ocean, creating a substantial system of interconnected waterways in southern New Hampshire.

The GBE provides countless opportunities for water-based recreation. The GBE is surrounded by 128,000 people within a 20-minute radius and, due to abundant highway access, is located within one day of driving to approximately 25 million people. With more than 100,000 registered boats in the state, there are ample boating opportunities provided in this area (Statista Research Department, 2022). From a recreation resource perspective, the GBE has one visitor center, approximately 15 miles of hiking trails, about 1,500 acres of game lands, one campground, one private marina, and one waterside fueling site (Dolores, 2019; Great Bay Marine, 2022; New Hampshire Coastal Program, n.d.). The GBE also has five boat launches/ramps (four are publicly accessible and one is private), however, only one provides consistent access to the GBE at both high and low tide (GBNERR, 2019; Great Bay Marine,

2022; New Hampshire Coastal Program, n.d.). This unique combination of biological and geological diversity, abundant access, and proximity to the New Hampshire seacoast and dense metropolitan centers makes the GBE an attractive destination for local and regional visitors.

### **3.2 Data Collection**

This study employed an adjusted drop-off pick-up survey technique referred to as a *knock-and-drop* method (Allred & Ross-Davis, 2011; Ferguson et al., 2021a; Jackson-Smith et al., 2016; Steele et al., 2001; Trentelman et al., 2016). Population level data was collected from May to September of 2022 with survey sampling taking place in ten specific towns proximate to the GBE. A secondary analysis of GBE visitor center data was used to determine towns with adequate percentages of GBE visitors (Table 1) (Great Bay Visitors Center, 2021). A stratified cluster sampling design was used for data collection. The study area was first stratified by town, then each town was further divided into clusters, where each cluster was defined as 75-unit parcels. The clusters were generated using the ArcGIS Pro tool Build Balances Zones function. Four clusters were then randomly selected within each stratum and every parcel within the cluster was surveyed. This unique methodology was developed and employed for three primary reasons. First, this technique allows for a social distance survey approach required during the COVID-19 pandemic. Second, this method allowed for the sampling of possibly displaced and/or impacted visitors who would not be captured via on-site survey modalities. Finally, this process provides a more system-wide sampling design, accounting for local, non-local, community members, past, and of course current visitor perceptions and insights.

**Table 1.** GBE Visitation and Survey Response Information

<b>Town Name</b>	<b>% of Total GBE Visitation<sup>a</sup></b>	<b>Distributed Surveys</b>	<b>Completed Surveys</b>	<b>Response Rate</b>
Durham	9.7%	300	104	35%
Portsmouth	8.9%	300	70	23%
Stratham	8.8%	300	49	16%
Exeter	8.5%	300	54	18%
Greenland/Newington	7.5%	300	77	26%
Newmarket	6.5%	300	81	27%
Dover	5.1%	300	64	21%
Hampton	3.2%	300	77	26%
Rye	3.0%	300	69	23%
<b>TOTAL</b>	<b>63.4%</b>	<b>2700</b>	<b>645</b>	<b>24%</b>

\*Note. Percentages may not equal 100 because of rounding.

Note<sup>a</sup>: 2021 Great Bay Visitors Center secondary data

The knock-and-drop survey methodology required trained field researchers to canvas neighborhoods, place survey kits on doorknobs, knock, introduce themselves, and request respondent participation in the survey. Each survey kit utilized a protective bag holding a cover letter, a paper survey, and a return envelope. Two survey response options were provided: 1) a link to an online Qualtrics survey, and 2) a printed survey with a postage-paid return envelope. Approximately two weeks after initial contact, field researchers provided all non-respondents with a reminder postcard. The postcard reminder process was repeated one final time for any remaining non-respondents. Only consenting adults (18+) were eligible to participate in this study.

For a prerequisite screen-out question, respondents were questioned if they had visited the GBE within the past two years. If the respondent replied, “yes”, they began the survey, but if the respondent replied “no”, they proceeded to complete a single non-respondent cultural ecosystems services and socio-demographic survey. At the conclusion of the survey, respondents



received a thank-you and were invited to enter a voluntary prize drawing. In total, 2700 surveys were dispersed, providing 645 filled surveys and a 23.8% response rate (Table 1). 52% of the surveys were completed via the online option while 48% of the surveys were completed via the mail-back option.

### **3.3 Survey Instrumentation**

For each survey question, respondents were prompted to refer to their “most recent visit to the GBE”. The questions within the first section of the survey included trip visitation patterns and sociodemographic characteristics. Next, respondents were asked to assess a series of items evaluating perceptions of CES. This study created and utilized a first-of-its-kind quantitative multi-item CES survey battery. This comprehensive CES assessment was created based on a compilation of smaller previously validated CES scales (Ament et al., 2016; Beckmann-Wubbelt et al., 2021; Bryce et al., 2016; Martin et al., 2020), expert panel review, pilot testing, and extensive statistical analyses (e.g., exploratory and confirmatory factor analyses) to examine overall scale reliability and validity (Table 2). Respondents were asked, “The following are various cultural ecosystem services provided by nature in the GBE. Please tell us how important each of them is to you.” The 12 individual CES items were evaluated on a seven-point Likert scale of 1-7: 1=not at all important and 7=extremely important (Table 2). This multi-item scale represented four previously validated CES sub-constructs: 1) recreation (three items), 2) aesthetics (three items), 3) cultural/historic (three items), and 4) sense of place/identity (three items) (Ament et al., 2016; Beckmann-Wubbelt et al., 2021; Bryce et al., 2016; Martin et al., 2020).

Finally, respondents were asked to assess items related to visitor loyalty. Respondents were prompted with, “Please indicate if you have or would take the following actions.” The 12 individual loyalty items were evaluated on a seven-point Likert scale of 1-7: 1= definitely not and 7=without a doubt (Table 2). This multi-item scale represented four previously validated domains: 1) advocacy (three items), 2) financial support (three items), 3) volunteering (three items), and referral (three items) (Allison et al., 2002; Moore et al., 2013; Pinkus et al., 2016; Rodger et al., 2015).

### **3.4 Data Analysis**

Data analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 27.0. Research questions R1 and R2 were addressed using frequencies, percentages, and measures of central tendency. To address R3, structured equation modeling (SEM) was employed. SEM creates a theoretical model which uses confirmatory factor analysis to create multiple variables and provide visualization of their connection via structural regression pathways.

## **4.0 Results**

### **4.1 Descriptive Statistics**

Of the 645 respondents in the study, 48% self-identified as male, 51% as female, and 1% as non-binary. Most respondents (94%) indicated their race/ethnicity as White, while Black/African American, Spanish/Hispanic/Latino, Asian, and American Indian/Alaskan Native ethnicities were also represented. Respondents average age was 57. The most common recreation

activity among respondents was visiting the Great Bay Discovery Center (36%) with Hiking/Walking (26%) being a close second. Respondents also recreated via Great Bay Discovery Center launch (21%), Adams Point Wilderness Management Area launch (17%), and Great Bay National Wildlife Refuge (13%). Respondents, on average, visited the GBE 3.5 times per month, 30 times per year, and have been visiting for 16 years. Additionally, respondents indicated that they lived four miles away from the GBE on average.

#### **4.2 Research Question One**

To understand the extent to which visitors and community members value the CES provided by the GBE, the researchers utilized frequencies, means, and measures of central tendencies. Overall results suggest visitors do indeed value CES from the GBE, with consistently positive mean values ranging from 4.86 - 6.16 (Table 2). Specific results indicate that aesthetics was the most valued CES ( $M = 6.16$ ) indicating high importance, followed by recreation ( $M = 5.66$ ), and culture ( $M = 5.51$ ) which both indicate moderately high importance. Within aesthetics, the highest valued item was “attractive scenery” ( $M = 6.21$ ). Sense of place was the lowest overall ( $M = 4.86$ ) indicating a lower level of importance.

#### **4.3 Research Question Two**

To investigate the extent to which visitors and community members are loyal to the GBE, the researchers utilized frequencies, means, and measures of central tendencies. Overall results suggest that visitors are indeed loyal to the GBE as all mean scores were generally positive ranging from 3.10 – 6.30 (Table 2). Specific results indicate that the largest elements of visitor

loyalty revolved around referral (M = 6.30) indicating high importance, financial support (M = 4.52) indicating average importance and volunteer (M = 3.79) indicating low importance. Advocacy was the lowest overall (M = 3.10).

#### 4.4 Research Question Three

To evaluate the overarching relationship between CES and visitor loyalty behaviors at the GBE, structural equation modeling (SEM) was employed. Confirmatory factor analysis (CFA) was used to generate a measurement model for CES factors and visitor loyalty behaviors (Table 2). The latent variables derived from these CFAs were then used to predict likelihood of visitor loyalty behaviors using theoretically informed structural regression pathways (see Figure 1). The results indicate significant relationships with satisfactory pathway coefficients between ecosystem services factors and visitor loyalty factors (Table 2; Figure 1).

**Table 2** GBE Confirmatory Factor Analysis for the Structural Equation Model

Code <sup>a</sup>	Item	Loading <sup>b</sup>	Item M (SD)	Domain M (SD)
V1	Attractive scenery	0.94	6.21 (1.12)	
V2	Attractive sights	0.93	6.15 (1.19)	6.16 (1.11)
V3	Aesthetic beauty	0.94	6.11 (1.18)	
V1	Outdoor recreation and tourism opportunities	0.78	5.75 (1.56)	
V2	Water-based outdoor recreation opportunities	0.68	5.73 (1.44)	5.66 (1.52)
V3	Land-based outdoor recreation opportunities	0.77	5.49 (1.64)	
V1	An understanding of culture and/or history	0.96	5.53 (1.51)	5.51 (1.50)
V2	An understanding of natural and/or human history	0.95	5.51 (1.55)	

V3	Opportunities to appreciate history and/or culture	0.97	5.47 (1.55)	
V1	A place I feel attached to	0.78	4.61 (1.87)	
V2	A sense of identity	0.96	4.58 (1.85)	4.86 (1.67)
V3	A sense of belonging	0.97	5.36 (1.63)	
V1	Say positive things about the GBE to others	0.95	6.33 (1.04)	
V2	Recommend the GBE to others	0.97	6.28 (1.07)	6.30 (1.03)
V3	Recommend the GBE to friends and family	0.96	6.31 (1.05)	
V1	Donate money to GBE organizations	0.95	4.56 (1.67)	
V2	Donate money to conserve the GBE	0.94	4.66 (1.68)	4.52 (1.60)
V3	Donate \$ to maintain recreation facilities at the GBE	0.89	4.31 (1.66)	
V1	Volunteer to improve the GBE	0.95	3.75 (1.67)	
V2	Volunteer to help conserve the GBE	0.99	3.79 (1.69)	3.79 (1.62)
V3	Volunteer to give back to the GBE community	0.92	3.82 (1.67)	
V1	Attend public meetings/hearings about the GBE	0.83	3.40 (1.62)	
V2	Write or speak to resource managers about the GBE	0.92	2.90 (1.59)	3.10 (1.50)
V3	Write and/or speak to politicians about the GBE	0.88	3.01 (1.68)	

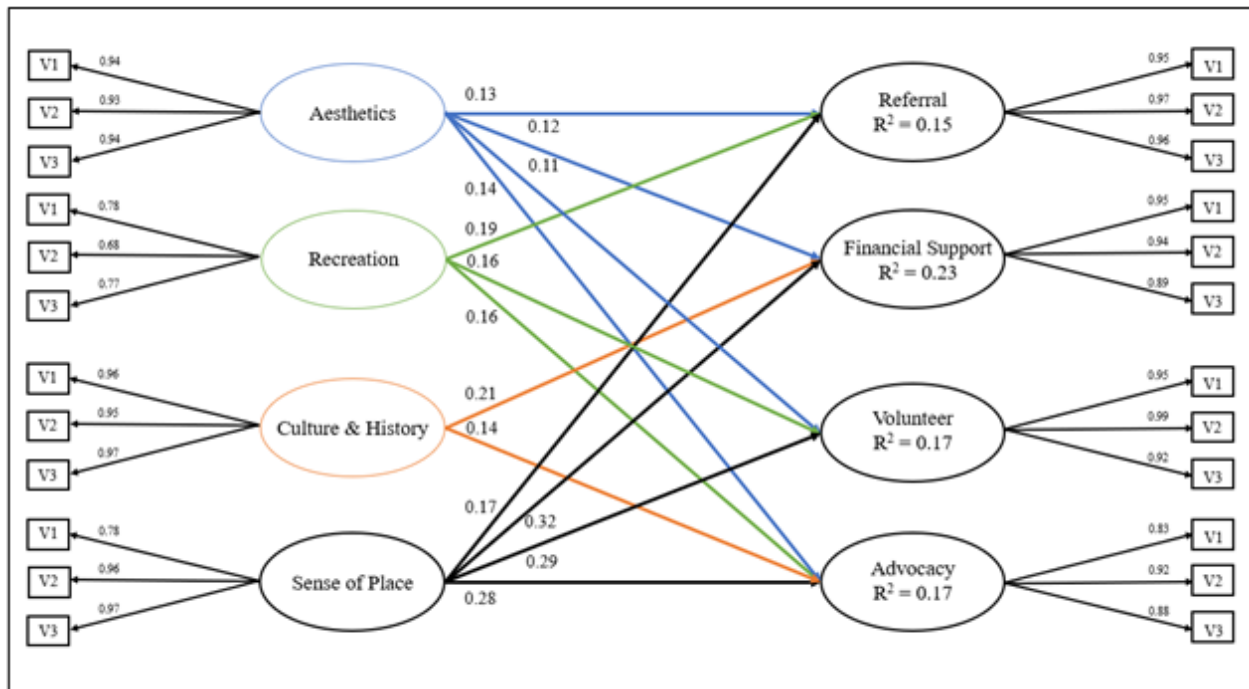
<sup>a</sup>Note: Variable code refers to SEM model, see Figure 1.

<sup>b</sup>Note: Standardized factor loadings. All loadings were significant at  $p < 0.001$ .

<sup>c</sup>Note: Aesthetics, Recreation, Cultural and History, Sense of Place latent variable items (1 = not at all, 7 = extremely important).

<sup>d</sup>Note: Referral, Financial Support, Volunteer, Advocacy latent variable items (1 = definitely not, 7 = without a doubt).

**Figure 1.** Structural Equations Model for GBE Visitors<sup>a</sup>



<sup>a</sup>Note:  $\chi^2:451.6$ ;  $df=224$ ;  $p<.001$ ; CFI=0.981; TLI=0.977; RMSEA=0.047; SRMR=.038; estimation: maximum likelihood

The SEM, with all CFAs and structural regression pathways, is displayed in Figure 1.

The SEM showed a very good fit to the data ( $\chi^2:451.6$ ;  $df=224$ ;  $p<.001$ ; CFI=0.981; TLI=0.977; RMSEA=0.047; SRMR=.038) (Hooper et al., 2008). Model pathways suggest sense of place has the largest influence of any of the four categories of CES on the behaviors of visitor loyalty to support GBE in the future (Figure 1). The standardized beta coefficients for the pathways from sense of place to advocacy, financial support, and volunteering are about twice as large as for the other CES latent variables. A reasonable percentage of the variation in visitor loyalty behaviors is explained by CES latent items (15-23%, see R<sup>2</sup> values). The range of behaviors predicted by the importance that visitors attach to CES reveals the multifaceted influence of these services –

they incentivize everything from speaking with friends, to communicating with managers and politicians, to donating money, to volunteering one's time.

## **5.0 Discussion**

This study examined the influence of CES (e.g., recreation, aesthetics, culture and history, sense of place) upon specific elements of visitor loyalty behaviors (e.g., referral, financial support, volunteerism, advocacy) at the GBE. Study findings show a strong relationship between CES and visitor loyalty behaviors. Sense of place and outdoor recreation were particularly influential. This research advances both the ecosystem services and visitor loyalty frameworks and provides empirical insight into the sustainable management of PPAs.

### **5.1 Theoretical implications**

This study has several key theoretical implications for social science research related to CES survey instrumentation, CES and its relationship with visitor loyalty, and the power of sense of place. First, this study created and utilized a first-of-its-kind quantitative multi-item CES survey battery. This comprehensive CES assessment was created based on a compilation of smaller previously validated CES scales (Ament et al., 2016; Beckmann-Wubbelt et al., 2021; Bryce et al., 2016; Martin et al., 2020), expert panel review, pilot testing, and extensive statistical analyses to ensure overall scale reliability and validity. The successful employment and validation of an all-encompassing multi-item CES quantitative survey item contributes significantly to the social science literature. Further validation of this novel survey construct and sub-constructs and scale should be examined.

Next, this study validates the CES literature as well as addresses a gap regarding the connection between CES and visitor loyalty. Findings suggest PPA visitors do indeed highly value the CES provided by a healthy natural resource, corroborating previous CES literature in both land- and water-based PPA settings (Bryce et al., 2016; Cabana et al., 2020; Martin et al., 2020; Rodger et al., 2015). Moreover, study results have implications for the relationship between the theoretical constructs of CES and visitor loyalty. This research determined a strong and consistent statistical relationship between CES and visitor loyalty when using CES as a predictor of visitor loyalty behaviors. These findings, in combination with the employment of a novel CES scale, contribute significantly to the literature. As this is one of the first studies employing this comprehensive CES scale, future research should investigate the validity and repeatability of CES as a predictor of visitor loyalty.

Finally, study findings suggest sense of place is a significant predictor of visitor loyalty behaviors on the GBE. Sense of place as an antecedent has been previously and extensively documented within both the CES and PPA literatures (Bryce et al., 2016; Cabana et al., 2020; Martin et al., 2020). For this study, however, sense of place served as the most consistent and robust predictor of visitor loyalty behaviors by a large margin (see Figure 1). This advances both the CES and visitor loyalty literature by identifying a large level of significance within one specific CES item that previously has been understudied. As CES is a novel concept, future studies should investigate the validity of this high level of significance and overall relationship.



## 5.2 Managerial implications

There are several study takeaways that serve to benefit resource managers, community members, and GBE visitors which primarily involve visitor perceptions of four specific visitor loyalty behaviors (e.g., advocacy, referral, volunteer, financial support) and the extent to which various CES influence these behaviors. First, the above-average mean scores for all loyalty and CES items should be viewed positively by resource managers as affirmation of their hard work and resource management best practices. Moreover, study findings indicate that each of the visitor loyalty behaviors are primarily influenced by the CES of *sense of place* and *recreation at the GBE*. Broadly, these findings suggest continued capital investments and improvement should be made towards efforts to preserve and enhance all CES on the GBE, but specifically sense of place and recreation related opportunities.

Sense of place is driving each of the visitor loyalty behaviors on the GBE. For instance, sense of place is the strongest predictor of financial support. Research indicates that community connection, visitor education, and resource marketing/branding often foster the strongest connection and sense of place between visitors and a PPA. Managers can influence and increase community connection via programming that highlights key components that visitors value, like guided naturalist tours or fishing derbies along popular access points (Hosany et al., 2017; Yuan et al., 2019). Similarly, educating visitors on these cultural and heritage components may instill a stronger sense of place (Hosany et al., 2017; Yuan et al., 2019). Increased investment in guided cultural and historical tours of the GBE might achieve this. Additionally, marketing/branding the GBE could help to promote recreation resources, visitation, and a sense of place. Studies have utilized tag lines (e.g., Don't take the GBE for granite or It's not just a good bay- it's a *great*

bay) to foster community connection and a sense of place (Hosany et al., 2017; Yuan et al., 2019).

Another important finding is that the perceived importance of recreation is also driving most of the visitor loyalty behaviors on the GBE. For instance, recreation is a strong predictor of visitor advocacy. Research indicates that accessibility, signage and infrastructure, and programming often enhance outdoor recreation visitation within a PPA (Riungu et al., 2020). The GBE specifically would benefit from improving all five of its boat launches/ramps to be available at all tides. Similarly improving and constructing visitor-based infrastructure, like restroom facilities and signage, would help increase overall visitor recreation (Mimbs et al., 2020). Furthermore, implementing planned recreational programming (e.g., fitness classes, guided nature and/or history tours, boat trips) has also been shown to increase interest in recreation within visitors (Kil et al., 2021). It should be noted that there is a lack of connection between recreation and financial support. This could be associated with the fact that many recreators view financial support, specifically fees, as barriers to access and often actively seek out locations to recreate that do not have access fees.

Finally, it is important to note that both aesthetics and culture and history had the least influence upon visitor loyalty behaviors on the GBE. For example, culture and history are moderate predictors of visitor advocacy. That said, both aesthetics and culture and history remain important to GBE visitors and should be integrated into further management decisions, albeit to a lesser financial extent. Managers should work towards increasing the quality of key viewsapes (e.g., beaches, walking trails, overlooks, watch towers) that are frequently used by visitors. This can be done by removing obstructions to views and cleaning surrounding hardscape to improve

visual appearance (Wang et al., 2021). Additionally, the implementation of educational infrastructure (e.g., interpretive signage, kiosks, information stations) regarding the cultural and historical infrastructure and events on the GBE could help promote visitor perceptions of culture and history (Winter et al., 2020).

### **5.3 Study limitations and implications for future research**

There were several study limitations and implications for future research such as the employment of secondary data, visitor residency status, and the CES multi-item battery. This study's survey method required the use of secondary data to identify survey distribution locations based on GBE visitor density. While this method was effective, future research should consider triangulating multiple secondary datasets for potentially more robust sampling. Moreover, while approximately 64% of all GBE visitation was accounted for in this sampling framework, it should be noted that this study focused on in-state/New Hampshire visitors due largely to funding constraints as well as the relatively low percentage of overall visitation represented by out-of-state visitors. Future research should consider pursuing both in-state and out-of-state samples for potentially more robust sampling.

Finally, this study created and utilized a first-of-its-kind quantitative multi-item CES survey battery. Extensive statistical analyses were conducted to ensure the reliability and validity of the scale. It should be noted that the original CES survey battery included eight CES sub-constructs consisting of 24 individual items. Due to a lack of statistical significance with visitor loyalty behaviors, however, four of the original CES sub-constructs (e.g., education, nature, sound, community) were dropped from the analyses. Future research should consider utilizing

the full CES survey battery with all eight sub-constructs included in addition to other empirically validated CES survey items to assess visitor perceptions of CES most accurately and holistically in natural resource settings.

## **6.0 Conclusion**

This study examined the influence of cultural ecosystem services (CES) upon visitor loyalty behaviors in a national estuarine setting. Data suggests visitors are loyal to and greatly value the numerous CES provided by the Great Bay National Estuarine Research Reserve (GBE). Results indicate a strong relationship between CES and visitor loyalty behaviors. Visitors reiterated the importance of CES, such as aesthetics, outdoor recreation, and culture and history, upon their overall loyalty behaviors, particularly referral and financial support. Structural equation modeling results indicate *sense of place* is the most powerful predictor of visitor loyalty, particularly in terms of visitor advocacy, financial support, and volunteerism. These findings suggest resource managers may be able to increase visitor loyalty and ultimately preserve the visitor experience by enhancing specific CES. Overall, this study demonstrates the importance and influence of ecosystem services in shaping visitor behaviors and decision-making. This research advances both the ecosystem services and visitor loyalty frameworks and provides empirical evidence for natural resource managers. By recognizing the importance of CES, such as *sense of place* and recreation, managers can enhance visitor loyalty and ensure the long-term management of PPAs.

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## 8.0 Appendix

### 8.1 Institutional review board



# University of New Hampshire

Research Integrity Services  
51 College Road, Durham, NH 03824  
[research.integrity@unh.edu](mailto:research.integrity@unh.edu)

Apr 6, 2022 3:25:35 PM EDT

Michael Ferguson  
Recreation Management & Policy

Study Title: Informing Visitor Use Management in the Great Bay Estuary  
IRB #: IRB-FY2022-309  
Approval: April 6, 2022

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Exempt as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 104(d). Approval is granted to conduct your study as described in your protocol.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the document, [Responsibilities of Directors of Research Studies Involving Human Subjects](#). Please read this document carefully before commencing your work involving human subjects.

Note: IRB approval is separate from UNH Purchasing approval of any proposed methods of paying study participants. Before making any payments to study participants, researchers should review the Payment of Incentives/ Compensation to Research Participants [guidance](#) to ensure they are complying with institutional requirements. If such institutional requirements are not consistent with the confidentiality or anonymity assurances in the IRB-approved protocol and consent documents, you may need to request a modification from the IRB.

Upon completion of your study, please submit a study closure form through [Cayuse IRB/Human](#)

[Ethics](#) along with a report of your findings.

If you have questions or concerns about your study or this approval, please feel free to contact Melissa McGee at 603-862-2005 or [melissa.mcgee@unh.edu](mailto:melissa.mcgee@unh.edu). Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,

A handwritten signature in blue ink that reads "Julie F. Simpson". The signature is written in a cursive style with a large initial "J".

Julie F. Simpson  
Director