

ENHANCING THE FORM AND FUNCTION OF THE CHATTAHOOCHEE RIVER
NATIONAL WATER TRAIL – AN APPLICATION OF IMPORTANCE PERFORMANCE
ANALYSIS AND EXPLORATION OF STEWARDSHIP

by

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(Under the Direction of Gary T. Green)

ABSTRACT

Urbanization and recreation demand pressures on rivers have created unique challenges for natural resource managers (NRMs) who attempt to balance conservation, access, and management capacity. Encouragingly, water trails (WTs) (i.e., rivers with paddling routes), are being established, mapped, and designated within urban areas as an effort to promote water resource stewardship and provide high quality recreation experiences. However, water trail research and exploration into their impacts are in their infancy. Thus, this study used a case study and survey approach to 1) analyze paddler use patterns and sociodemographic characteristics along the Chattahoochee River National Water Trail (CRNWT), 2) compare paddler perceptions of importance and performance of WT attributes between two different CRNWT management entities, and 3) explore the link between paddlers and stewardship behavior. Results indicate that paddlers place high importance on water quality, wildlife, and watercraft launches. Additionally, paddlers reported a high likelihood of performing specific stewardship actions.

INDEX WORDS: Chattahoochee River National Water Trail, Human dimensions of natural resource management, Importance performance analysis, Paddling, Recreation management, Stewardship behavior, Water trails

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DEDICATION

What an experience this has been and what an adventure to come. To Desiree and my son Oliver,
oh the rivers we will embark.

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CHAPTER 1

INTRODUCTION

Urban rivers are “one of the most vulnerable zones of human-nature interaction” (Hua & Chen, 2019; p. 11; Delibas & Tezer, 2017). Seldom rivaled in their importance, rivers, are also one of the most important suppliers of ecosystem goods and services for human life (Millennium Ecosystem Assessment, 2005). Remarkably, within an urban environment, river resources and other blue spaces (BSs) are rapidly growing commodities (Smardon et al., 2018). Cities and their inhabitants are increasingly valuing these spaces as *places* for outdoor recreational experiences (e.g., canoeing, kayaking, tubing) because of the wide array of well-established benefits for human well-being among the backdrop of urbanization (Bratman et al., 2019; Hart, 2019; Pearson et al., 2017). Currently, global public health efforts have begun to “include the therapeutic properties of nature, and nature is seen as an antidote to the stress and strains of modern life” (Kling, Fredman, & Wall-Reinius, 2017, p. 502; Brown & Bell, 2007). Additionally, urban rivers typically harbor the last remaining place to re-establish nature within a city (Aberg & Tapsell, 2013).

Urban river recreation demand, which is augmented by urbanization effects, has created unique challenges for natural resource managers (NRMs) trying to balance river conservation and recreation management objectives. Essentially, NRMs are struggling with “attempting to integrate ecological function with human desires, behaviors, and quality of life” (Chapin et al. (Eds.), 2009). Within the United States, this issue is emboldened by a recent and growing trend in paddling recreation and the increasingly researched effects of urbanization elements on the

environment (Johnson & Munshi-South, 2019; OIA, 2014; Boon & Raven (Eds.), 2012).

However, a pioneering and holistic approach is being developed to balance river conservation and recreation management issues by means of establishing nationally designated, recreational *water trails* (WTs). These water-based trails are meant to instill a unique force of factors (e.g., recreation enhancement, tourism popularity, watershed protection) within communities which sustain the river through community-based natural resource stewardship (CBNRS) initiatives. However, WTs and their elements are just beginning to be explored by academic researchers as their popularity within urban areas begin to sprout. Newly established urban WTs, such as the Chattahoochee River National Water Trail (CRNWT), located within the metropolis of Atlanta, GA, will require enormous focus on form and function if they are to be sustained.

In 2012, the National Trail System Act of 1968 was amended by the Secretary of the Interior to establish the National Water Trails System (NWTs), a system which recognizes exemplary rivers and water-based trails as recreation entities. A *national* WT, according to the National Water Trail Systems Act (NWTSA) is “a stretch of river, lake, shoreline, bay, stream, estuary, ocean, canal, or any combination of waterway that has been designated, mapped, and publicly identified with the intent to provide high quality outdoor recreational experiences” (Department of the Interior, 2012, p. 8). Most commonly, rivers are chosen as the recipient of WT labels and subsequently referred to as blueways, canoe trails, greenway water trails, kayak trails, scenic river routes, paddle ways, paddle trails, and a host of other names as a strict nomenclature does not exist. Importantly, in order to receive a national WT designation, the WT should be sustained by a cohort of interagency management partners that promote best management practices (e.g., recreation opportunities, education, conservation, community support, public information, trail maintenance, and planning), fundraising, a development vision,

and publicly accessible river access points or parks (RAPs) (Michigan Water Trails Manual, 2017). These qualities, explicitly tied to a national WT, are meant to establish a culture which then creates a change in awareness of water-based resources “that will increase access to water-based outdoor recreation, encourage community stewardship of local waterways, and promote tourism that fuels local economies across America” (DOI, 2012, p. 1).

Water trails, as Delaney et al. (2007) expressed, are typically managed with “the philosophies of environmental stewardship, environmental education, and accessibility for all users” (p. 12). Additionally, water-based trail systems and associated resource-based adventure activities are increasingly recognized to be important because they can tap into and help foster tourism, stewardship, outdoor recreation, local economies, and overall healthy lifestyles (Larson, Usher, and Chapmon, 2018; Michigan Water Trail Manual, 2017). Recognizing these WT benefits, cities have already established national WTs such as the Chattahoochee River National Water Trail in Atlanta, GA; the Hudson River Greenway Water Trail near Manhattan, NY; the Willamette River Water Trail in Oregon; and the Bayou Teche Paddle Trail in LA (Hines, 2017). However, it is important to note, as Hines (2017) aptly stated, “it should be made clear that not all National Water Trails are located in urban landscapes, and not all urban water trails are National Water Trails” (p. 43). Unfortunately, WTs, regardless of their locations, have received little attention within the academic literature regarding use and management. For instance, Kline, Cardenas, Duffy, and Swanson (2012) stated, “Rarely, are users, managers and the public at large surveyed regarding their views of trails, and particularly paddle trails” (p. 237). Given the establishment of twenty-one national WTs across the United States since 2012, the research gap concerning WT development, management, stewardship, and recreation usership needs to be addressed. Potential insight into these facets of WTs can be found through the application of

Social Science tools and the study of the *Human Dimensions of Natural Resource Management* (HDNRM).

The HDNRM focuses on identifying, quantifying, and understanding visitor motivations, attitudes, behaviors, preferences, and relationships toward natural environments during a *recreation experience* (Baas & Burns, 2016). However, to understand the complex nature of the recreation experience, an adaptive understanding of social-ecological systems (SES) as well as facets of outdoor recreation planning and human psychology need to be considered (Askew, Bowker, English, Zarnoch, & Green, 2017). Understanding these human dimensions is difficult as the recreation experience is a highly complex process that involves aspects of the human condition related to value systems, social norms, belief frameworks, attitudes, and motivations (Riungu, Peterson, Beeco, & Brown, 2019). The change in focus to social science has been spurred by population growth and an ongoing recognition that the current, top-down, managerialist approaches to natural resource management, need to be infused with one of social learning that focuses on a participatory process of sharing local knowledge and value importance (Enqvist et al., 2018; Arakawa et al., 2018; Romolini et al., 2013).

For instance, Larson, Stoeckl, Neil, and Welters (2013) stated, “this trend is in line with international developments as a growing number of countries and international agencies and organisations require that social and cultural considerations be included when assessing the potential for economic development in river catchments” (p. 9). Water trails, which are largely public resources, should therefore be managed by NRMs who harness an understanding of human dimensions and what the public deems important to inform further management actions (Weber & Ringold, 2019).

To promote informed, scientific understanding involved within the HDNRM, certain theories and methods have emerged attempting to encapsulate and measure human values, norms, attitudes, and behaviors such as *normative theory* (NT) and the *cognitive hierarchy model* (CHM) of human behavior. These theories are important because “unlike ecological processes, human behavior is affected by expectations of others’ behaviors and attitudes” (Nyborg et al., 2016, p. 43). Through the NT and CHM perspectives, there is a shared human structure and social network of norms based on values that can be studied empirically and measured to the benefit of NRMs (Hallo, Brownlee, Hughes, Fefer, & Manning, 2018). Specifically, the CHM offers a conceptual framework or structure, typically explained as an inverted pyramid with human values at the bottom and behaviors at the top, which illustrates how a resource user cognitively views the environment (Jones et al., 2016; Fulton et al., 1996). To illustrate, Jones et al. (2016) explained, “*Values* at the bottom of the pyramid, are described as cognitive elements, which transcend situations, are slow to change, and are few in number, whereas *behaviors* are situation specific, faster to change, and numerous” (p. 2). Regarding social norms, it is important to note, NRMs themselves, often embody and reflect normative values of society through general management plans, policy directives, and accepted behaviors or actions (Lertzman, 2009). The reason for this is that NRMs are part of a *management system* which Lertzman (2009) defined as “the sum of the actions [i.e., management actions], the goals and objectives, plus the process through which they are legitimized by social norms, values, and institutions, and the actors involved in carrying them out” (p. 342).

Furthermore, studies have shown links between normative values and stewardship behaviors (Landon, Kyle, Riper, Schuett, & Park, 2018). For instance, van Putten, Boschetti, Fulton, Smith, and Thebaud (2014) stated, stewardship is “a set of normative values that private

individuals may hold, and that entail perceived duties and obligations to carefully manage ... resources” (p.1). These human values can also be projected onto attributes of the environment which can be measured for importance as discussed below (Jones et al., 2016). Encouragingly, as the natural environment is being dominated by an increasingly human world, tools to gain insight into these cognitive and behavioral variables of the social sciences are gaining increased attention by NRMs (Masterson et al., 2017; Jones et al., 2016). Insight into WT through the lens of the HDNRM can highlight and prioritize natural resource management actions for the people, by the people, as well as aid NRMs in understanding WT development into the future.

One promising tool, to aid the HDNRM in making informed decisions on appropriate management actions regarding WTs, is called *Important Performance Analysis* (IPA). The use of IPA in natural resource management applications, also known as importance-satisfaction analysis (ISA), is an emerging and readily applied management tool or framework adapted from marketing and consumer research used to measure human perceptions (Hua & Chen, 2019; Boley, McGehee, & Hammett, 2017; Askew et al., 2017; Martilla & James, 1977). IPA was originally designed to measure consumer satisfaction of a product (e.g., merchandise) by identifying to what degree consumers found product *attributes* (i.e., qualities or features inherent to a product’s form and function) important while also rating the performance of each attribute. Over the course of three decades, IPA has been adapted and applied across a plethora of disciplines such as public administration, tourism, education, food services, healthcare, natural resource management, and banking (Sever, 2015).

Uniquely, an IPA relies on *attribute* identification and interpretation as its main source of information. Within a WT context, attribute examples can range from *wildlife* seen while paddling down the trail, the design and quality of the watercraft *launch* (i.e., ramp or dock) when

putting-in or taking-out of the river, to opportunities of *silence* and *solitude*. Once several attributes of interest are selected for an IPA, they are rated by survey respondents (i.e., paddlers or the “customers” of a recreation experience) on importance and performance (IP) scales in which the results are plotted and interpreted within a two-dimensional matrix. For example, concerning importance, the survey question: “how important is seeing a variety of *wildlife* to your paddle experience?” was used within this study to measure the importance of the *wildlife* attribute. Subsequently, *wildlife* is then evaluated on its performance as well. The attribute is then plotted within an IPA coordinate plane or matrix based on the two attribute ratings of importance and performance. The IPA matrix contains four quadrants (e.g., Q1- keep up the good work, Q2 - concentrate here, Q3 - low priority, and Q4 - possible overkill) that are labeled to be interpreted for specific management actions by NRMs (Figure 1).

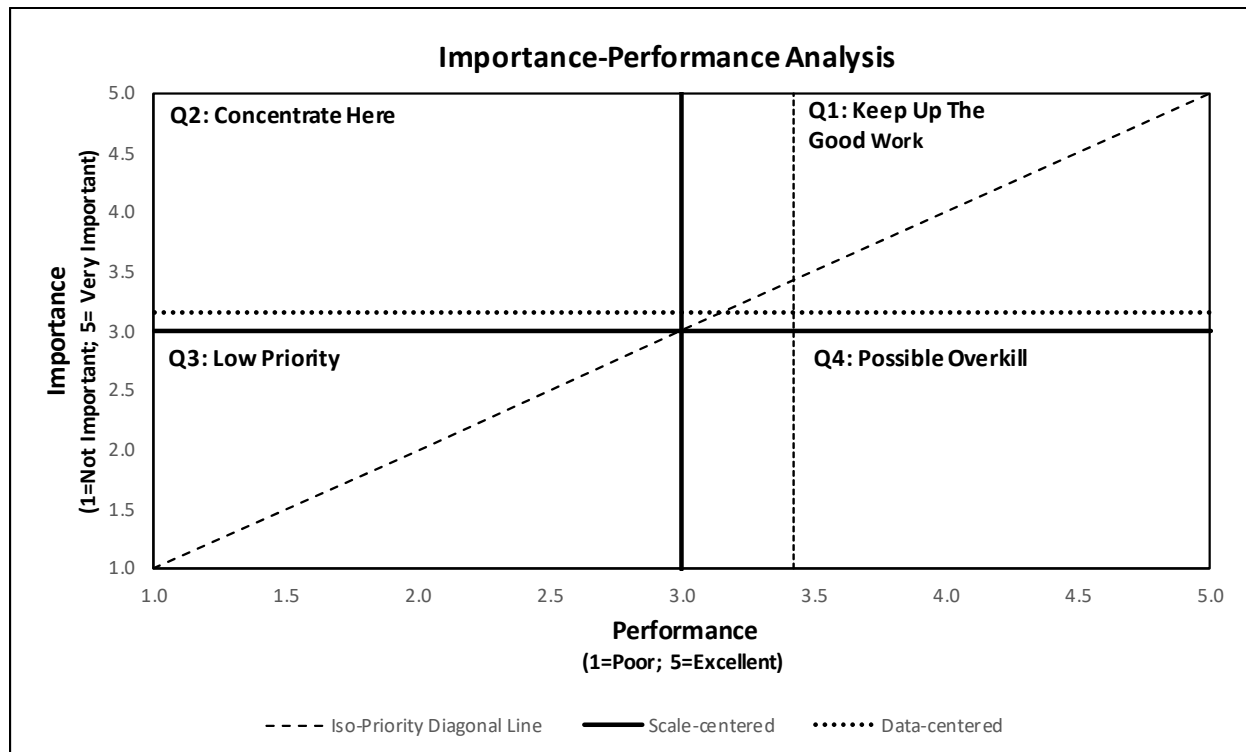


Figure 1. Traditional IPA Coordinate Plane

Each attribute evaluated receives a specific coordinate pair depending on its importance and performance rating by paddlers (Azzopardi & Nash, 2013). Depending upon which quadrant the attribute is plotted, NRMs can identify problem attributes by seeing if they fall into the “Q2 – concentrate here” quadrant. In general, the results of an IPA have applicable management utility and actionable directives as each quadrant highlights empirically tested support for a specific management action (Askew et al., 2017). Specifically, the label of each quadrant (e.g., “Q1 – keep up the good work”) in which the attribute is plotted, symbolizes the action a NRM should take.

An important performance analysis can also bolster efficiency of management actions by NRMs who traditionally have limited resources in improving performance of important attributes (Sever, 2015). For example, if the *water quality* attribute is located in the “Q2 – concentrate here” quadrant, a NRM can then make a scientifically informed decision to concentrate resources on improving the water quality or at least the perception of it by paddlers through education and other stewardship initiatives such as public water quality monitoring. Thus, the managerial insight an IPA can provide is significant to this research as specific facets of WT attributes and their importance to paddlers have not been explored within the literature. As Weber and Ringold (2019) stated, “management decisions in the public interest are more likely when a foundation of knowledge is available regarding what is important to a constituency” (p. 2). Thus, the insight gained through an IPA of river attributes can bolster efforts of NRMs to provide higher quality recreation opportunities which is often a targeted goal (Lepp & Herpy, 2015; Aukerman, 2011; Clark & Stankey, 1979). Furthermore, WTs typically meander through various management zones (e.g., federal, municipal, private entities) where interagency *collaboration* could benefit from attribute IPA comparisons. This is a significant effect as collaboration has also been shown

to increase potential stewardship behaviors (SBs) by recreational users (Lepp & Herpy, 2015; Selin & Chavez, 1995).

“Stewardship has emerged as a leading tool for communities to contribute to the sustainability of their local environments and the resilience of their communities (Svendsen et al., 2016, p. 6). *Stewardship* has also gained increased conceptual and theoretical attention by the academic community with clear pathways to the human dimensions of natural resource management (Bennett et al., 2018). Specifically, the link between stewardship and WTs is significant as a WT’s mission is to “encourage community stewardship of local waterways” as outlined by the National Water Trail System Act of 2012 and is often founded on expectations of stewardship initiatives (DOI, 2012, p. 8). To offer conceptual clarity, stewardship is generally considered as action-based or specific to a behavior that involves the responsible management or caretaking of natural resources or the environment by an individual or group of actors (Masterson et al., 2017). Within an urban environment, “stewards conserve, manage, monitor, and advocate for the local environment; they also educate the public about the local environment” (Svendsen et al., 2016, p.5; Fisher et al., 2007). Uniquely, SBs or actions can aid in transcending typical management hierarchies and create a direct link between government and individual citizens who care for specific places (Arakawa et al., 2018). As evidence of this, NRMs are showing an increased propensity to collaborate with stewardship groups as they do not have the ability to manage social and environmental conditions while working against diminishing resources and budgetary restrictions (Arakawa et al., 2018; Haas & Wells, 2007).

Stewardship organizations are critical as NRMs are increasingly operating under a “do more with less” (e.g., less finances, staff, public funds) operating structure in the wake of competing entities and other organizations vying for funds (Svendsen et al., 2016, p. 6).

Surprisingly, it is not uncommon for stewardship or friend-type groups to be incorporated into management meetings in order for their perspectives to be shared and potentially acted on (Baas & Burns, 2016). Chapin and Knapp (2015) highlighted this steward-manager dynamic by stating that the mechanisms motivating a recreationist, park user, or paddler, to support and conserve the environment should be recognized and investigated by NRMs as these are powerful assets to specific recreation places (e.g., WTs).

Research into stewardship behavior is beginning to shape interdisciplinary understanding and insight into its mechanics, but Bennett et al. (2018) discussed prominent questions that are still relatively unanswered. These questions include: *how can stewardship programs be successful in their design, facilitation, and organization of support groups?*; *how is stewardship measured and what factors play a role in its effectiveness?*; *what are the mechanics involved in driving stewardship actions and behavior?*; and lastly, *what is the best method for engaging with different entities (e.g., non-profits, NRMs, paddlers) to promote and garner support of stewardship initiatives?* While questions still remain, the powerful effects of stewardship and its potential utility to NRMs has attracted a trans-disciplinary approach that is quickly forming and beginning to be shaped into conceptual and theoretical approaches to stewardship (Enqvist et al., 2019; Bennett et al., 2018). These approaches have produced conceptual ideas such as Community-Based Natural Resource Management (CBNRM) concepts, which may be the future of many rivers and parks and protected areas (PPAs) as bureaucracy and funding systems are often too slow to respond and mediate the rapid or sudden changes occurring via urbanization (Smardon et al., 2018; Bennett et al., 2018). In particular, WTs are often predicated on stewardship initiatives of paddlers, but further understanding of specific SBs or actions occurring along WTs are needed to inform management initiatives. Ultimately, as Uunila and Currie

(1998) stated, “the more water trails that are established, the greater increase in the profile of water trails as a viable means of protecting and enhancing recreation opportunities and resources” (p. 122).

Despite the proposed objectives of WT designations such as promoting stewardship and providing quality recreation experiences, methods to quantify or analyze specific SBs within a WT system have not been explored within the literature. Additionally, there is limited evidence that paddlers are likely to engage in voluntary SBs along WTs. Thus, evaluating perceptions of WT attributes via an IPA in tandem with evaluations of paddler’s SBs, offers NRMs a novel, multi-tiered approach to inform and possibly enhance WTs and the recreation experience. To focus these applications within an ideal case-study area, the first nationally designated WT of its kind, The Chattahoochee River National Water Trail (CRNWT) located in Atlanta, GA, will be the concentration of this study.

The CRNWT, in many ways, is an exemplar national WT and study area due to its geographic location and its associated river conservation and recreation management issues related to urbanization. Additionally, the forty-eight-mile long CRNWT meanders its way south, encapsulated by the National Park System’s (NPS) Chattahoochee River National Recreation Area (CRNRA), approximately twenty-miles north of Atlanta, GA. Of particular significance, the CRNRA is composed of approximately fifteen discrete, NPS managed, land-based, river access parks/points (RAPs) (e.g., Paces Mill Park, Powers Island, Johnson Ferry-North) which spatially pepper the CRNWT creating significant management issues in scope and logistics (Wimpey, 2018). Furthering the complexity, several other *private and municipal entities* who act as interagency partners with the NPS (e.g., Sandy Springs’ Morgan Falls Overlook Park) to share

in managing the CRNRA, have their own RAPs and general management plans (GMP) but often do not collaborate.

The recent CRNRA *Trail System Assessment* (TSA) commissioned by the NPS, as per the conditions outlined in the general management plan of the CRNRA, paints a rather bleak picture of the recreation area and WT while outlining an enormously complex task of managing both entities into the future (Wimpey, 2018). “A historic lack of capacity in resources, skills, and effort by the NPS and partners (*managerial sustainability*) has resulted in *physical* and *social sustainability* issues increasing in number and scope over time” (Wimpey, 2018, p. 5). These issues are amplified by the fact that the Atlanta metropolitan area (AMA) is seen as one of the fastest growing urbanized areas in the country (Sun et al., 2018). Continuing on, the Trail System Assessment announced a call-to-stewardship stating, “the numbers of active stewards, their skillsets, and independence all have to be vastly increased to achieve lasting management success” (Wimpey, 2018, p. 16). The Trail System Assessment concluded by suggesting a sustainable future for the CRNRA is only possible if, “a robust trail stewardship program with many partners that maintains the trail system to provide high quality experiences on durable trails” is developed to “lead outreach, education, and training efforts with park visitors, service organizations, and the broader Atlanta community” (Wimpey, 2018, p. 58).

Importantly, paddlers of the CRNWT may harness natural insight into accuracy of the managerial, social, and physical attribute ailments mentioned by the TSA which are increasing in magnitude. The purpose of this research is therefore to investigate paddlers’ perceptions of importance and performance regarding CRNWT attributes. Secondly, this research seeks to investigate SBs of paddlers along the CRNWT to offer NRMs information as to what types of actions are likely to be performed as well as which management agencies along the CRNWT are

producing stronger affiliations of SBs. Lastly, this study seeks to establish WTs within the academic literature in order to facilitate their development, management, and proliferation into the future.

Problem Statement

Lack of exposure within the research literature suggests there are several important problems that need to be addressed to elevate understanding and management of the CRNWT specifically regarding user perceptions of WT attributes and user stewardship behavior along the CRNWT. These problems are:

1. A lack of current baseline data by the NPS and partners on paddler usage characteristics (e.g., frequency of visitation, PWC type, duration of visit, group size, skill level) and sociodemographics along the CRNWT;
2. A lack of insight regarding paddlers' perceptions of *importance* and *performance* of WT attributes along the CRNWT;
3. A lack of insight into identifying and evaluating stewardship behaviors (SBs) along the CRNWT; and
4. Interagency management comparisons (e.g., NPS vs. municipal) of paddlers' baseline sociodemographics, usage characteristics, attribute perceptions, and SBs along the CRNWT have not been adequately investigated.

Statement of Purpose and Research Objectives

This study was designed to investigate paddlers' perceptions of the CRNWT and its attributes as well as identify and evaluate SBs of the paddlers in a four-step process which included: (1) creating and administering an exit survey of paddlers utilizing the CRNWT to collect data on paddlers' perceptions of CRNWT attributes, paddling usage characteristics and

demographics; (2) the operationalization of CRNWT attributes to measure perceptions of importance and performance (3) the adaptation of a valid and reliable metric to quantify stewardship behaviors (SBs) exhibited by paddlers; and (4) the statistical examination of baseline differences between paddlers' SBs and attribute measures of importance and performance at Morgan Falls (MF) Overlook Park, managed by the City of Sandy Springs and Paces Mill Park, managed by the NPS. Both sites are independently managed yet serve as river access parks (RAPs) to the CRNWT.

Research Questions

This study's direction was guided by several research questions. These research questions were:

1. What types of paddlers are using the CRNWT? How are these differences among the paddlers reflected within the context of independently managed sites (i.e., RAPs) along the CRNWT?
2. What are the usage patterns (e.g., activity type, group size, skill level, frequency of visit, duration of visit) of paddlers along the CRNWT? How do these patterns differ between management sites?
3. How do paddlers rate perceptions of importance and performance of water trail attributes along the CRNWT? How do the attribute ratings compare between management sites? And,
4. How likely are paddlers to engage in specific acts of stewardship behavior along the CRNWT, and how do these behaviors compare between management sites?

Research Justification

Rivers represent portals of unique outdoor recreation pursuits for the burgeoning masses of paddlesports enthusiasts. Notably, water trails (WT), a novel, federally supported designation of recreational waterways, symbolize a promising new frontier of river conservation and

recreation management opportunities for urban areas. These areas where urban development meets river corridors are ripe with potential scientific insight amidst the backdrop of increasing population growth, water recreation and urbanization. “Water recreation is no longer a matter of simply building a boat ramp, dock, or bathhouse. It involves a thorough understanding of water resources, current and future visitors, experiences sought, regional demand and supply, visitor capacity, and related dimensions” (Baas & Burns (Eds.), 2016, p. 50). Thus, IPA methodology allows a window of insight into specific attributes which promotes an increased understanding of water resources. There is precedent for applying the IPA methodology in the recreation and tourism sciences, yet there exists a paucity of information related to its use within a paddlesports or WT context (Boley et al., 2017; Askew et al., 2017). Furthermore, there is supporting evidence that NRMs may want to investigate and apply adaptive management strategies which foster paddlers who are engaged in action-based stewardship, as these SBs are associated with resource users who *voluntarily* care for their environment (Masterson et al., 2017; Andersson et al., 2015).

Interest in SB is growing as the benefits of stewardship are reflected in environmental quality and increased community cohesion (Larson, Stedman, Cooper, and Decker, 2015). Bennett and colleagues (2018) expressed that future directions of their stewardship framework will rely on case-study examples to “descriptively assess the elements of stewardship” which this research attempts (p. 607). Clarifying specific SBs or providing insight into factors that influence SBs can aid NRMs in developing informed stewardship objectives and programs (Kreutzwiser, 2011) or facilitation frameworks such as the stewardship engagement best practices (SEBP) developed within the CRNRA Trail System Assessment (Wimpey, 2018). In general, the study of stewardship may offer NRMs new insight and perspective on managing novel natural resource

management issues related to recreation and urbanization pressures that have not been traditionally considered (Enqvist et al., 2018). Currently, no studies exist that explore the relationship of stewardship and WT paddlers, nor have perceptions of WT attributes been evaluated.

The CRNWT provides a pioneering opportunity to study recreation use, WT attributes, stewardship, and interagency management systems within a multifaceted and novel context. Notably, the Trail System Assessment states, “there is an untapped opportunity to market the river’s corridor designation as a national water trail” (Wimpey, 2018, p.8). Continuing on, the assessment outlines “declining resource conditions” as the key feature item of the 208-page report (Wimpey, 2018, p. 8). These declining conditions are significant because further development and urbanization pressures are on the horizon. Early in 2019, a \$1.5 million-dollar study grant was awarded by the Atlanta Regional Commission (ARC) to create a 100-mile vision of the Chattahoochee River, coined *Chattahoochee RiverLands*, as a “seamless public realm” (SaportaReport, 2018, p. 5). What effect, good or bad, this will have on the Chattahoochee River is unknown as there exists no baseline data of current paddling usage or insight into the recreation experiences along CRNWT. Consequently, there is a need to gather scientific data to allow the NPS and interagency partners of the CRNWT to collaborate and make informed management decisions so that the CRNWT can maintain its designation under the National Water Trail System Act.

Through applying social science and human dimensions of natural resource management empirical methods such as an IPA and evaluating SBs of paddlers along the CRNWT, NRM, both NPS and municipal, can begin to address, collaborate, and prioritize action steps as they race against the clock of urbanization. These methods can provide a focused, pulse assessment of

paddler perceptions, behaviors, and attribute conditions occurring at select river access parks along the CRNWT. The potential fall-out of not addressing these issues in an adaptive and prioritized manner is that increased recreational demand will begin to detract and destroy the mandated preservation of cultural and aesthetic resources of the CRNRA. For example, recreational users may begin to satisfy their own needs without consideration of the greater system impacts (Wimpey, 2018). Ultimately, as Smardon (1988) stated, if the human dimensions of paddlers are not adequately assessed and understood, competition will favor more easily assessed and monetary means of activity such as business development along the river corridor furthering urbanization effects. Additionally, as Aberg and Tapsell (2013) explained, gaining insight into public perceptions is a must-do for NRMs. “Drastic changes to familiar surroundings, especially within combination with public exclusion, can generate long lasting public discontent” (Aberg & Tapsell, 2013, p. 95). Thus, the CRNRA demands well-planned, adaptive, and finely tuned natural resource management actions which can result in tremendous benefits to outdoor recreation enthusiasts as well as the ecological systems surrounding these areas (Baas & Burns (Eds.), 2016). Overall, WTs “are a critical piece of an overall plan for watershed education, recreation, protection and management” (Elder, 2006, p. 1 as cited by Getchell, 2006). This study offers novel methods and theoretical contributions to the science of the HDNRM and proliferation of WTs. At the very least, this research aims to help NRMs of the CRNRA and CRNWT so that the cultural ecosystem services provided by these places continue for generations and the CRNWT maintains its status as the first and visionary example of an urban WT.

CHAPTER II

LITERATURE REVIEW

The following investigation of the CRNWT, its attributes, and the SBs of the paddlers it supports, involved a four-step process which included: (1) creating and administering a CRNWT exit survey of paddlers utilizing the CRNWT to collect data on paddlers' perceptions of CRNWT attributes, usage characteristics and sociodemographics, (2) the operationalization of CRNWT attributes to measure perceptions of importance and performance, (3) the adaptation of a valid and reliable metric to quantify stewardship behaviors (SBs) exhibited by paddlers, and (4) the examination of baseline differences between paddlers' attribute measures of importance and performance as well as baseline differences in SBs of paddlers among different management entities along the CRNWT (i.e., Morgan Falls and Paces Mill). Literature related to rivers and WT designations are reviewed as well as social science methods to provide insights into WT management. Relevant research includes a brief history of river use and the rise of WT designations, and a snap-shot view of IPA and the role of SBs as management tools used to gain insight into WT systems.

Rivers and Water Trails

“Water trails are rocky seacoasts, a wooded river-bend, sandy shorelines, a quiet marsh and busy harbor. They are recreational waterways between specific locations containing access points and day use sites. They are launch ramps and overnight campsites. They are boats and paddles and cameras and field guides. Water trails are blue ribbons following the wayside sights and sounds of people and nature throughout the continent, with diverse users enjoying this network of liquid pathways from sea to shining sea and from tropic gulf to icy fjord” (Getchell, 2006, p. 6).

Currently, rivers in reference to recreational waterways are largely mentioned within the literature by means of economic and tourism evaluations (Warren, 2015; Pollock, Chase, Ginger & Kolodinsky, 2012; Kline et al., 2012); feasibility studies or design charrettes (Delaney et al., 2007; Uunila & Currie, 1999); human health and recreation impacts (Hines, 2017; Schneider, 2009); paddling recreation (Smardon, 1988); urban planning and landscape design (Liu & Bergen, 2018; Muller, 2012; Dali, Yusuf, & Ibrahim, 2011; Baschak & Brown, 1995; Turner, 1995); water restoration (Smardon et al., 2018; Moran, Perreault, & Smardon, 2016; Aberg & Tapsell, 2013; Smardon, 1988); and water trail manuals or guidebooks (Michigan Water Trails Manual, 2017). However, it is important to first reflect on the history of rivers and waterways as they have played a central role in human life for thousands of years. For instance, Riley (1998) stated, the manipulation, use, and dependency of rivers has a long and robust history with accounts of decorative water plants being commissioned for nature-based recreation by the Romans and Persians around 1000 B.C.E. (Smardon, Moran, & Baptiste, 2018). Later, in the 17th and 18th centuries, Europe relied heavily on rivers as humans pioneered stream and waterway engineering techniques. Notably, landscape design and aesthetic riverine features also became prominent in this time (Smardon et al., 2018). North America has its own story of river usage, as passage by water was a critical element of its history. Specifically, Native Americans depended on waterways and utilized traditional dug-out canoes for their livelihoods. Furthermore, post-colonial Americans brought steamboats and agricultural barges to waterways as a main source of transportation (Smardon, 1988). Consequently, as human industry expanded, rivers continued to play a key role in the movement of goods and trade but also as avenues of exploration as American settlers pushed west into the frontier. However, the dependence on rivers largely changed with the introduction of the automobile and the development of road networks (Shafer,

Lee & Turner, 2000). Dali, Yusuf, and Ibrahim (2011) stated that over time rivers became largely neglected and “most urban rivers became little more than open sewers and conduits for waste” (p. 21).

The deleterious treatment of rivers in the United States spawned government designations and natural resource management actions for the protection and management of rivers. Notably, the 1960’s produced prominent federal acts such as the Wild and Scenic River Act of 1968 that trickled down to spur state level protective acts across the country such as the Georgia Planning Act of 1989 (Carmon, 1997; Smardon, 1988). These protective acts helped focus rivers and water-based systems as places for recreation and brought about the idea of WT’s into the mainstream. While it is difficult to pin-point where the term WT first originated, there is some evidence that the establishment of Maine’s Allagash Wilderness and Minnesota’s Boundary Waters Canoe Area Wilderness in the late 1970’s coined the term wilderness *waterways* (Getchell, 2006). Concurrently, the famous urban landscape architect, John Ormsbee Simonds, influenced by the works of Frederick Law Olmstead, coined the term “blueway” as a linear, water-based park system focused on connecting “natural and human land-use relationships” for “recreational, scenic, and ecological value” (Muller, 2012, p. 315). To note, the conception of blueways in the time of Ormsbee did not include recreation as occurring on the water, but rather along the water’s edge for pedestrians and bicyclists for example. However, it wasn’t until 1993 where the term WT first began to take hold at a water trail conference sponsored by the NPS’s Rivers and Trails Program and the Maine Island Trail Association (Getchell, 2006).

Water trail designations of rivers and other waterways then began to emanate from a variety of sources, stakeholders, and concerned citizens throughout the 1990’s without a central, governing body to officiate these designations. Commonly, WT designations stem from either

local, grassroot, 501I(3) type entities (e.g., Georgia River Network, riverkeepers, land trusts, community organizations, etc.) or state government actors such as the Michigan Department of Natural Resources and the Virginia Department of Conservation and Recreation aiming to bolster recreation and stewardship efforts towards their rivers. However, with the passing of the National Water Trails System Act (NWTSA) of 2012, *rivers as trails* became official, *federally* recognized entities and opened up a new designation label of National Water Trails. It is important to note, WTs continue to be designated outside of federal designations through mechanisms that are not well documented or understood such as in many rural areas. Regardless, official, nationally recognized WTs, focus on highlighting exceptional pre-established WTs and on promoting and supporting struggling river systems and communities which have shown promise and potential through community support and stewardship efforts. Overall, the new, federal recognition of national WTs has cast a spotlight onto rivers as trails and their benefits are beginning to have profound effects on resource use and paddling popularity (Hines, 2017).

These effects are amplified by the human desire for blue spaces (BSs) (i.e., a river, stream, lake, body of water, or waterway system) as urbanization encroaches on land-based resources and the health benefits associated with BSs and exposure to nature become more pronounced (Bratman et al., 2019; Hart, 2019). Notably, rivers in combination with human-powered recreational use (e.g., paddling, canoeing, kayaking, etc.) offer a unique series of concomitant benefits related to social connectivity, mental, and physical health (Pearson et al., 2017). Schneider (2009) noted that urban livelihoods can be greatly bolstered by water-based recreation such as paddling along a water trail due to the impact of physical activity on well-being. Subsequently, paddling recreation is becoming a national trend as barriers to participation

regarding time, money, and physical ability are relatively low (Michigan Water Trails Manual, 2017; Outdoor Industry Association, 2015).

A study by the Outdoor Industry Association (OIA) (2014), initiated in 2010 and updated in 2014, showed 7.4% of Americans (21.7 million) participated in paddling activities with a growth of 3 million people from 2010 to 2014. This growth is not surprising as rivers are, as Foley and Kistemann (2015) expressed, inherently activity-promoting, such as a river beckoning a paddler to embark. This view is shared by Delany et al. (2007) who stated, a WT designation by its very nature “attracts visiting paddlers to an area” (p. 12). These water-based trails, similar to greenways for land-based recreationists, provide a corridor of benefits and urban connectivity for increasingly popular paddlesports such as canoeing, kayaking, stand up paddle (SUP) boarding, tubing, rafting, or other human-powered personal watercraft (PWC) activities (Larson et al., 2016). For example, cities that showcase paddlesports recreation opportunities, clean water initiatives, and a diversity of plant and animal species, are becoming beacons of a flourishing environment, cityscape, and an urban collective of citizens that promote stewardship and recognize future generations of users (Smardon et al., 2018). Additionally, Dali et al. (2011) stated, “City planners are realizing that an attractive riverfront can act as a magnet that keeps people and businesses within the city center and counteracts sprawl” (p. 21).

Hence, many rivers within urbanized areas are frequently desired as recreation destinations, real estate hotspots for developers, or as new sites for urban green and blue infrastructure pathways (e.g., WTs or greenways) which promise a variety of human system benefits in balance with nature (Hart, 2019; Hua & Chen, 2019; Nicholls & Crompton, 2018; Kowarik, 2018). These benefits of outdoor recreation are increasingly well established as the 21st century has spawned a growing awareness of the value received from nature and ecosystems in

regard to human-health and well-being (Larson et al., 2016). Consequently, paddling and WT development are predicted to experience consistent annual growth which implies NRMs need to be prepared to manage WTs in ways that promote the highest level of river conservation in tandem with recreation management (Uunila & Currie, 1999). A focused understanding of how physical, social, and managerial attributes of WTs are perceived by recreational users (e.g. paddlers) as well as an evaluation of their stewardship behaviors (SBs) can aid NRMs in achieving this balance of river conservation and recreation management. Regarding perceptions of WT attributes by paddlers, an importance performance analysis allows quick management insight into specific attributes and will thus be evaluated within the literature.

Importance Performance Analysis

“The IPA technique is a basic diagnostic decision tool that facilitates the identification of improvement prioritization, the mobilization and deployment of scarce resources to where they are needed most, and the harmonization of strategic planning efforts to enhance relative competitiveness” (Azzopardi & Nash, 2013, p. 223)

“Managing rivers in society’s best interest requires data on river condition” (Weber & Ringold, 2019, p. 1). Understanding a river’s condition can be achieved by a myriad of ways, one of which is an evaluation of the attributes recreational users (e.g., paddlers) deem important. This can be accomplished through an importance performance analysis (IPA) which is a useful, non-monetary-based, management tool that can be deployed by NRMs to provide a richer understanding of river attributes through a public participatory process (i.e., surveys). An IPA is significant to NRMs as they often “lack knowledge of which underlying conditions [e.g., attributes] of a site are most important to measure and understand in order to make wise management decisions and evaluate their outcomes” (Latham et al., 2019, p. 7).

Insight into the resource environment of rivers through an attribute lens has been explored by NRMs since the late 1970's. For example, Brown (1977) stated, “from the perspective of selecting management objectives, it might be useful to determine which of these factors (i.e., attributes) are perceived by users as being important” (p. 195). However, going a step further, such as then evaluating the attribute's *performance*, has not traditionally been explored by NRMs, especially within a novel WT context.

To understand how an IPA functions, the term *importance* within the context of an IPA should be defined. Explained by Askew et al. (2017), importance in reference to an attribute “is said to be important if a change in the individual's perception of that product leads to a change in the attitude toward the product” (p. 4). The focus on a *product* (e.g., attribute) stems from the work of Martilla and James (1977) who developed the IPA framework as a marketing tool based on theory from consumer science. Through the original framework, customer satisfaction could be assessed and managed to inform business performance and the consumer-product experience (Askew et al., 2017). This assessment is important to consumer understanding as a positive experience can lead to “increased loyalty, reduced price elasticity, increased cross-buying, and positive word of mouth” (Matzler et al., 2004, p. 271). These generally positive facets of a consumer-business transaction can be adapted to natural resource management understandings of a recreationist-NRM transaction. This sentiment is harnessed through the NPS adage, “managers manage, recreationists consume, society gains” (Auckerman, 2011, p. viii).

These sentiments can be further understood through a theoretical framework of the disconfirmation of expectations paradigm which underpins IPA interpretation (Hua & Chen, 2019; Weber et al., 2017; Askew et al., 2017; Boley et al., 2017; Sever, 2015; Oliver, 1980). The paradigm can be used to offer a greater understanding of the paddler recreational experience

through analyzing negative disconfirmations (dissatisfaction) and positive disconfirmations (satisfaction). These (+, -) disconfirmations which are assessed via attribute ratings, allow NRMs subtle insight into the recreation opportunity as meeting expectations (i.e., perceived performance exceeds importance) or failing them (performance falls below expectations). Gaining insight into the positive and negative disconfirmations of WT attributes is important as they have the power to affect the quality of the recreation experience thus the overall recreation opportunity (Auckerman, 2011).

To clarify, through the lens of a WT context, if an attribute (e.g., flora, fauna, boat launch, silence, river map, etc.) does not meet pre-conceived expectations of importance, a paddler's emotions can then be theoretically activated to produce a pleasurable experience or a non-pleasurable one (Westbrook & Reilly, 1983). This approach is significant for NRMs to understand as a recreationist can often pre-conceptualize a recreation experience with implicit notions of importance regarding the recreational setting and attributes. In other words, a paddler can prime themselves for a certain type of experience with expectations that will be met or not met. For example, Delaney et al. (2007) stated, "an ideal blueway includes an abundance of scenery and wildlife as well as easy canoe access" (p. 12). Hence, in this example, three attributes (e.g., scenery, wildlife, boat launch design) are highlighted that have the potential to either meet or diminish expectations which will affect the overall recreation experience. In this example, if a paddler were to see destruction of scenery and wildlife habitat from human civilization and development, the attributes which are considered high in importance (i.e., scenery, wildlife, boat launch design) would theoretically receive low performance ratings within an IPA placing it in the "Q2 – concentrate here" management quadrant (see: *Introduction*, Figure 1).

These gaps in disconfirmations between importance and performance allow NRMs a way to focus and prioritize management actions that generally target the *failing* attributes. “These attributes have the highest priority in terms of investments” (Sever, 2015, p. 44). Additionally, in the case of the CRNWT, these highlighted gaps in expectations can serve as comparative measures with other interagency partners and RAPs along the CRNWT which may promote competition and collaboration (Boley et al., 2017).

Attributes within the IPA framework are considered the “currency” of the IPA and are highly important to the mechanics of an IPA (Weber & Ringold, 2019, p. 2). Hence, the process for identifying attributes is critical to the success of the overall importance-performance (IP) analysis. First, it is recommended that validity practices based upon the context of the area of study should be explored when identifying attributes. This validity can be accomplished through discussing attributes with local NRMs and other resource users that have expertise and familiarity with the area under study (Martilla & James, 1977). Typically, methods for determining attributes of the IPA stem from first producing a comprehensive list of which attributes are significant given the objectives. However, sometimes an IPA needs to be performed or pilot tested by researchers just to identify public ideas of important attributes as NRM’s ideas of important attributes do not always line up with resource users. Establishing a valid item base of attributes is therefore key to a fine-tuned analysis. While no published research has explored specific WT attributes, a few examples of the process regarding identifying river attributes within similar contexts will be explored to offer a more robust conceptual understanding.

One of the most extensive and recent research studies to determine which river attributes are important to people came from Weber and Ringold (2019) with their study of the Willamette

watershed in western Oregon. This study took a qualitative approach which engaged multiple focus groups. The groups helped the researchers determine important river attribute themes between rural and urban population segments which formed a “remarkable coalescence of feedback” (Weber & Ringold, 2019, p. 17). Overall, forty-nine river attribute statements were developed around prominent themes of wildlife habitat, landscape aesthetics, and water recreation which were important to the rural and urban populations regarding the Willamette watershed.

In another study, Hua and Chen (2019), took an ecosystem-services based approach to understand how Guangzhou (south China) citizens perceived their urban rivers. The researchers wanted to identify which urban river ecosystem services were most important to focus on by NRMs. The attributes in this study were also rendered from focus group type methods as well as a pilot, qualitative survey that contained open-ended questions on urban rivers’ benefits. Within the survey, attributes were expressed as statements which corresponded to shorter abbreviations that described the overall idea. For example, “urban rivers offer important natural habitats for diverse floral and faunal species” was a survey statement or stem which was coded as “biodiversity” (p. 14). The study’s final conclusion suggested NRMs and local communities should focus on improving *water purification* or *water quality* as the number one attribute for management action.

Lastly, Larson et al. (2013) assessed social and cultural values of Australian Tropical Rivers held by the Australian people living in proximity to certain rivers. Their research wanted greater insight into people’s river values in order to inform water policy and planning efforts of the Australian government. In their research process, river attributes were first identified by referring back to relevant studies within the literature which involved the local communities of

interest. Certain themes emerged from this process that were later coalesced through focus group discussions. Due to the large volume of themes produced within the focus group discussions, cognitive mapping was used to focus the extensive list of values generated. Subsequently, questionnaires were used to provide greater focus on specific value themes. In a similar manner to Hua and Chen (2019) and Larson et al. (2013), their research produced statements such as “the river keeps a variety of plants and animals alive” that were then used within a survey to assess the importance of a certain coded value (e.g., biodiversity) (p. 11). The most important values identified in the study were biodiversity and water-for-human-life. In conclusion, the literature does explore various instances of assessing and identifying important river attributes for an IPA and this is shown to be an important process entailing a variety of methods.

Evaluating river attributes are also central to the discussion of recreation opportunities afforded by rivers and water-based systems which have traditionally been left out of management frameworks until recently. For example, only within the last decade, has the NPS incorporated water-based resources into traditionally land-based, recreation management frameworks such as the Recreation Opportunity Spectrum (ROS) (Clarke & Stankey, 1979). The ROS, changed to the *Water* and Land Recreation Opportunity Spectrum (WALROS) in 2011, offers a more balanced and informed perspective of water-based resources for NRMs as paddlesports become more popular (Auckerman, 2011).

The WALROS, is a multi-faceted management tool that can inform planning and promote recreation management and conservation efforts. This framework, originally developed in the late 1970's by the United States Department of Agriculture and the United States Forest Service, can be adapted to inform a variety of NRMs across different agency settings (i.e., NPS, municipal, private). For example, WALROS largely focuses on the NRM's role in identifying

and managing recreational settings which are composed of attributes (i.e., physical, social, managerial) inherent to specific recreational experiences (REs). Thus, it was important to consider and understand the WALROS framework in applying an IPA for the purpose of this study. Specifically, the WALROS can aid the identification of river setting attributes for an IPA based on a tested model (i.e., physical, social, and managerial attribute classification) used within the NPS.

For example, attributes within the WALROS are codified within an outdoor *recreation setting* made up of *physical*, *social*, and *managerial* attributes. To explain, a *physical attribute* refers to the environmental features of the setting such as surrounding biota, water quality, and human infrastructure presence. A *social attribute* focuses on how users interact with each other during a recreation experience. Lastly, a *managerial attribute* refers to specific facets of how park system staff and partners are able to manage the parks and surrounding areas (e.g., on-site presence of staff and volunteers, the design of a watercraft launch, and the development of river maps). With proper management of recreational setting attributes given a certain recreation activity (i.e., paddling, hiking, walking), an ideal recreation experience can be achieved in tandem with unique societal benefits (Auckerman, 2011). This sentiment is harnessed through the NPS adage, “managers manage, recreationists consume, society gains” or through a simple formula of recreation activity + recreation setting = recreation experience + benefits (Auckerman, 2011. p. viii). Furthermore, the WALROS suggested zoning and promoting recreation experience settings (urban, suburban, rural-developed, rural-natural, semi-primitive, primitive), based on the presence of certain attributes so that a recreationist can make an informed decision as to what type of recreation opportunity can be assumed. For example, a paddler choosing to have a recreation experience within an *urban* WALROS zone, should

expect to see a higher frequency of users, human development, and RAPs with developed parking lots and restrooms for example. The ROS and now, WALROS, offers a valuable framework for identifying river attributes that be used for an IPA with clear applications to support WT development and paddling recreation.

Outside of the realm of river and natural resource management, IPA has been applied to numerous studies within the literature including public administration, tourism, education, food services, healthcare, natural resource management, and banking (Sever, 2015). While an IPA has been ubiquitously used throughout these areas, Sever (2015) makes a clear argument of the conceptual and methodological issues that prevail within its application that require further scientific tinkering. In the study, Sever (2015) described a range of conceptual IPA issues stemming from confusion around the semantics of the term “importance” to methodological issues involved in determining specific attributes and their subsequent interpretation within the quadrants.

Regarding methodological issues, there is acceptance within the IPA literature that determining the thresholds or crosshairs of the quadrants is a “major issue” (Hua & Chen, 2019, p. 14; Boley et al., 2017; Azzopardi & Nash, 2013; Oh, 2001). Originally, Martilla and James (1977) considered this a “matter of judgement,” yet over the decades, methods have evolved to try and make this process of identifying crosshair placement more analytical (p. 79). Currently, there are three different methods available pertaining to placement of the crosshairs which include a scale-centered, data-centered, or iso-rating line approach to data analysis and interpretation (Azzopardi & Nash, 2013). These different approaches can help control for the type of “ceiling effects” traditionally found in respondents’ ratings of importance (Oh, 2001). Furthermore, as Weber et al. (2017) discussed, research does suggest a data-centered approach is

preferable as the attributes are compared to each other versus being compared to the static, scale-centered approach. However, the lack of theory in applying these approaches led to Jaccard, Brinberg, and Ackerman (1986) to compare six different methods of assessing attribute importance which produced no major findings on how to improve these approaches.

Additionally, significant methodological issues of an IPA relate to the validity and reliability of attributes assessed using traditional Likert-based scale approaches (Sever, 2015). Regarding Likert-based scales, one of the main arguments is that bias is introduced on the part of the respondent which creates ceiling effects as mentioned previously. However, these types of biases (e.g., sampling, fatigue, social desirability, and recall bias) can be controlled for with the development of a quality survey as described using the Tailored Design Method developed by Dillman, Smyth, and Christian (2014). In summation, the future of IPA will rely on a continued discussion and scientific investigation of how to mitigate these methodological issues and control for them within analytical procedures.

In a final approach to understanding an IPA, it is important to focus on the “analysis” process as several approaches have been evaluated within the literature over the course of three decades. First, it should be noted, an implicit assumption is made within the framework of an IPA which is: (1) importance and performance constructs are considered both independent variables of each other regardless of xy axis orientation within the coordinate plane (Matzler, Bailom, Hinterhuber, Renzl, & Pichler, 2004). With those assumptions in place, the prevailing, or crux, foundation of the analysis lays within first establishing measurements of central tendency (i.e., mean, median, and mode) for each attribute. Typically, the means are used as these measurements provide a higher level of detail and specification. Once the means have been calculated for each attribute across all respondents’ data, their IP coordinates are then placed

upon a two-dimensional matrix or quad graph. The x (i.e., importance) and y (i.e., performance) axes contain measurement units typically ranging from one to five as this is the range of the Likert-scale generally used within the survey. To note, Likert-scales can range from one to five or one to seven depending on the preferred method and variability of the data. Once the coordinates are plotted to the grid, each attribute is interpreted within the plane based on its conforming quadrant. Each quadrant, Q1-Q4, is labeled accordingly: “Q1 – keep up the good work” (high importance-high performance) , “Q2 – concentrate here” (high importance-low performance), “Q3 – low priority” (low importance-low performance), and “Q4 - possible overkill” (low importance-high performance) (Hua & Chen, 2019). The process described above is the traditional foundation of the IP analysis, however, more advance studies do often continue with statistical procedures and inference methods such as significance testing (i.e., hypothesis testing) and internal reliability measures (i.e., Cronbach’s alpha and confirmatory or exploratory factor analysis)(Hua & Chen, 2019).

To note, the sophistication and complexity of various IPA statistical methods varies depending on the research questions being explored and the context of the research. In some cases, such as with Anderson, Hsu, and Kinney (2016), who applied an IPA to inform instructional design within education, the use of t -tests to compare IP means across four factors (i.e., attributes of instructional design) where adequate for the objectives of their study. Conversely, Hua and Chen (2019) used a host of statistical procedures including an exploratory factor analysis of river attributes categorized based on ecosystem service constructs, followed by a Cronbach’s alpha to measure internal consistency of the grouping categories. Furthermore, the Hua and Chen (2019) study involved a comparative (i.e., gap) analysis of river attribute IP ratings between the local and non-local citizens of the Guangzhou region in China. Thus, a gap

analysis table of the IP means for each population was used and assessed for statistical significance (i.e., individual paired-samples *t*-test). Other IP analysis examples highlight the use of linear regression statistical methods to “extract” deeper understanding of statistical relationships among factors as mentioned by Askew and colleagues (2017).

Regardless of the statistical methods being used, it is *pro forma* within the IP analysis, that actionable attributes are highlighted and displayed for interpretation. For example, Hua and Chen (2019), Askew et al. (2017), and Anderson et al. (2016) all conclude in their applications of IPA, by highlighting the attributes that require the most attention or action by NRMs (i.e., high importance-low performance – “Q2 – concentrate here” quadrant attributes)(e.g., water quality, real-world skills, restroom cleanliness). In addition, a “quadrant placement” table is typically constructed to allow facilitated interpretation of the results based on the four quadrant zones of management action (i.e., keep up the good work, concentrate here, low priority, and possible overkill) (Weber et al., 2017, p. 154). This approach allows NRMs, who may not be trained in statistical inference to easily interpret the results, which again, is a strong suit of an IPA. Overall, the IP analysis process across disciplinary lines is based on a similar foundation of plotting attribute means and interpreting their quadrant placements. In advance of this foundation, the academic literature shows statistical procedures and variations of IPA are being revisited to bolster its application and reputation into the future (Sever, 2015). In addition to understanding paddlers’ perception of attribute importance and performance, NRMs are also seeking ways to harness the collective stewardship power of local communities. Ultimately, WT, which are a designation based on a foundation of stewardship, will require NRMs to understand the mechanisms and facilitation pathways of Stewardship Behaviors (SBs).

Stewardship

“First, we define local environmental stewardship as the actions taken by individuals, groups or networks of actors, with various motivations and levels of capacity, to protect, care for or responsibly use the environment in pursuit of environmental and/or social outcomes in diverse social-ecological contexts” (Bennett et al., 2018, p. 597).

The recognition of importance and value held within the human-nature connection and the call-to-action of stewardship for natural resources is omnipresent in today’s global climate (Bennett et al., 2018; MEA, 2005). Consequently, “locally-oriented stewardship practices, policies and programs have emerged in fisheries, agriculture, forestry, protected areas, wildlife, ecosystem services, and water management applications across rural to urban landscapes” (Bennett et al., 2018, p. 598). The term *stewardship* often lacks clarity as it is shared across theories, morphs within specific contexts, and is interpreted within various ecological, economic, or social frameworks making a cohesive approach difficult (Jones et al., 2016; Kreutzwiser et al., 2011; Heuer, 2010; Fulton et al., 1996; Brown, Hanson, Liverman, & Merideth, 1987). Stewardship is routinely referenced to within the literature using terms such as environmental stewardship, cultural stewardship, civic stewardship, ecological stewardship, sustainability, financial stewardship, pro-environmental behavior (PEB) or even religious stewardship. Regarding the history of these terms, some may elicit thoughts of Aldo Leopold and his book, *Sand County Almanac*, which helped establish the term *land-ethic* and the importance of caring for the human-nature connection within the United States mid-way through the 20th century (Latham et al., 2019; Leopold, 1949). However, Lertzman (2009) noted traditional concepts of stewardship have existed for millennia, outside of western concepts, through indigenous peoples and their unique connections with the earth and environment in which they live.

The varying perspectives of stewardship across space and time act can serve as an “Achilles-heel,” producing theoretical confusion and lack of coherency within the literature. However, Enqvist et al. (2018) interpreted this issue as an asset and proposed a novel approach to stewardship understanding in labeling it a ‘boundary object’ in that a conceptual framework of the term should remain ‘plastic’ and accessible to a range of perspectives (p. 18). Furthermore, De Young (2000) suggested stewardship will always be malleable and that universal explanations of SB may never be achieved because of the plethora of contexts in which stewardship is carried out. For clarity and the purpose of this research, stewardship and stewardship-behavioral actions will be explored through the lens of natural resource management related contexts. In this manner, stewardship is “always concerned with conservation and sustainability” of natural resources and should be understood as a management strategy (Lertzman, 2009, p. 348).

In its simplest form, Masterson et al. (2017) defined stewardship as the responsible management or caretaking, often of natural resources or the environment. In addition, Boicourt, Pirani, and Johnson (2016) described stewardship as actions “to conserve, manage some area of, restore or transform, monitor the quality of, advocate for, or educate the public about the local environment” (p. 590). Lastly, Vezeau, Powell, Stern, Moore, and Wright (2017) expressed, “Stewardship behaviors are generally considered pro-environmental behaviors that minimize impacts caused by visitation and enhance the protection of natural and cultural landscapes ...” (p. 192). For example, engaging in stewardship actions could be as simple as picking up trash another person has left behind while paddling on a river, planting a tree during a service-work day, establishing a community garden, or financially supporting an environmental organization. Within a WT context, stewardship of the river may include paddlers, community organizations, management entities, and other individuals “who manage sections of the trail – working with

landowners, planning routes and upgrades, installing and maintaining signs, developing portages, access points, campsites and privies” (Delaney et al., 2007, p.14). SBs are often facilitated through stewardship organizations which are largely supported by individuals or member groups who do so voluntarily, motivated by a sense of altruism and operate under a host of organizational frameworks (Svendsen et al., 2016). Regarding water-based resources such as WTs or other BSs, these localized stewardship actions can have profound positive influences (Latham et al., 2019).

However, As Enqvist et al. (2018) explained, within a natural resource management organizational framework, stewardship and the inclusion of multiple stakeholders involving collaboration across agencies, is a relatively novel phenomenon for NRMs that traditionally operate under a “techno-managerial, control-oriented” approach (p. 18). Aberg and Tapsell (2013) stated these *top-down* approaches have led to a fraying of the human-nature fabric and a managerial system that often does not incorporate the social and physical connections people have to rivers. Bodin (2017) suggested “further efforts to advance unconventional forms of public and private leadership more focused on network weaving and facilitation, and less on command and control” will be needed to provide a balance to complex social-ecological system issues (p. 7). Unfortunately, NRMs typically do not have established frameworks or training on how to facilitate stewardship actions within their natural resource management areas. The advantage of a more community based system of natural resource management is that local stewards (e.g., paddlers) are often motivated by a different set of factors that bind them to a resource (e.g., river), generally have a greater knowledge of the resource, and are able to operate change through a different set of rules compared to traditional NRMs (Ostrom, 1999). Overall, stewardship is a complex topic that is wide ranging and spread across a variety of disciplines that

often lack operational definitions of stewardship. In response, recent research approaches have attempted to produce a common ground for understanding stewardship through analytical frameworks.

For example, research from Bennett and colleagues (2018), proposed a stewardship analytical framework as well as offered an encompassing understanding of stewardship within the academic literature. Within their framework, the mechanics of stewardship was explored and its leverage points for practitioners were identified. Specifically, the research framework for stewardship proposed by Bennett and colleagues (2018) is built on a system of *actors*, *motivations*, and *capacity* where “local environmental stewardship actions” (LESAs) are produced in response to a social-ecological change within a particular system or environment (p. 599). Stewardship actions are defined as the “the suite of approaches, activities, behaviors, and technologies that are applied to protect, restore or sustainably use the environment” (Bennett et al., 2018, p. 603). Through this perspective, stewardship is often carried out by an individual actor or group of actors who are motivated, intrinsically and extrinsically, and have supportive resources (i.e., assets and institutions) to engage with. For example, in response to a local river boat launch (e.g., access point/ramp) being destroyed by flooding (i.e., a social-ecological change), a group of paddlers (i.e., actors with motivation), who are members of a local riverkeeper organization (capacity), collectively utilize their resources which result in LESAs such as reconstructing the launch and restoring the wildlife habitat. Observable stewardship *actions* and *behaviors* tend to dominate the research literature; yet it is important to note, stewardship can also be achieved through other more complex mechanisms outside of observation such as with “purposeful inaction” (e.g., NRM allowing a forest to regenerate) or via indirect pathways (e.g., policy changes, environmental education, and scientific monitoring)

(Bennett et al., 2018, p. 603). Overall, the Bennett et al. (2018) framework allows stewardship to be analyzed and discussed within the literature through a common language and framework that should be promoted.

Likewise, Enqvist and colleagues (2018) produced a similar conceptual model which codes stewardship *actions* as supported by *ethics*, *motivations*, and *outcomes* which stem from elements of *knowledge*, *agency*, and *care*. Across both frameworks, SBs are described as highly diverse, multifaceted, and expressed across spatial and temporal scales that are not well-defined (Bennett et al., 2018). However, both frameworks do agree that stewardship is often described and exemplified with an action-based orientation. Additionally, both frameworks identify stewards or actors as agents of change who are embedded within the environment they are attempting to positively influence; this distinction is made in comparison with a NRM who may or may not be motivated by personal interest (Enqvist et al., 2019; Chapin et al., 2009). Furthermore, Arakawa, Sachdeva, and Shandas (2018), expressed that stewardship actors often have a foundation of deeply held environmental values which are reflected through their attitudes and behaviors (Fulton et al., 1996). However, some evidence suggests that stewardship is propelled by social norms in which actors or stewards are largely motivated by these norms in order to belong to a specific social group (Measham & Barnett, 2008; Bennett et al., 2018). Within this perspective, it is also important to note that stewardship is not a static entity; rather, it is dynamic and subject to ebb and flow factors of social norms, incentives, capacity, and motivations that require further investigation and documentation (Bennett et al., 2018). Ultimately, if SBs are enacted within a particular system (e.g., WT), the ability to effectively measure and prove the actions produced positive outcomes is essential to the legitimacy and reputation of stewardship initiatives (Bennett et al., 2018).

“The effectiveness of local stewardship can be improved through monitoring and evaluation, either by scientists or through participatory processes” (Bennett et al., 2018, p. 608). Within the literature, stewardship of natural resources is referenced across a spectrum of contexts. Bennett et al. (2018) offer a comprehensive list of these contexts which include stewardship within forests, freshwater, grasslands and rangelands, rural agricultural landscapes, fisheries, coastal or marine habitats, and urban environments. Unfortunately, no studies exist that address stewardship along a national WT, and it is difficult to find research that attempts to measure and identify specific stewardship actions and behaviors within a WT or river use context. However, the following studies of stewardship within natural resource management contexts will be explored to showcase the variation in stewardship understanding and facilitation.

For example, Kreutzwiser et al. (2011) examined SBs related to drinking well ownership of private landowners in Canada. The study was in response to the increased risk private well owners have in maintaining their drinking water which is not subject to the same health regulations as public water sources. In general, stewardship of private wells must come from motivation of the landowners to protect themselves; however, the research suggests the government should do much more to support landowners in their stewardship endeavors. Therefore, Kreutzwiser and colleagues (2011) suggested private landowner’s stewardship behaviors and the factors that influence those behaviors must be evaluated before government intervention can provide targeted support. To do this evaluation, their study facilitated several focus groups in order to define SBs such as frequency of well water tests, the process of well inspection, and measures taken to protect water quality. Interestingly, one of the unique findings from this research revealed private well owners lack clarity or information on just how to perform SB related to their wells. This result is significant in that simply understanding how to

perform specific SBs was often an “antecedent to action” (p. 1104). The research concludes with a statement calling for the merging of well owners and government to sustain “constant encouragement” and a flow of information as complacency of well operation is a common issue (p. 1113). In conclusion, this study demonstrated how SBs were identified allowing government stewardship initiatives to be more informed, efficient, and targeted.

In another example, Boicourt, Pirani, Johnson, Svendsen, and Campbell (2016) focused on civic engagement and stewardship within the New York-New Jersey Harbor Estuary. In their research, it was important to understand how and where stewardship was occurring in order to improve access to the waterways along the harbor. Boicourt and colleagues (2016) provided a stewardship mapping methodology to identify where stewardship was occurring which was then overlaid with socioeconomic data to find access was generally limited in lower income areas. Specifically, in the 1,592 miles of Harbor Estuary, approximately 60% of the waterfront was inaccessible. Furthermore, the authors engaged civic stewardship groups in the area to gain insight into the types and focus of certain SBs performed across the various wetland area parks. The “stewardship turfs” (i.e., locations of stewardship organizations and their activities) were mapped and assessed to identify geographical attributes such as *capacity* (e.g., funding sources, budgets, staffing, and hours) and *generalized stewardship efforts* (e.g., education, conservation, advocacy, monitoring, and management). Boicourt and colleagues (2016) found that educating the public on the local environment was the main focus of stewardship groups within the area and educational curricula was one of the main services offered. A specific focus on stewardship for recreation and sports (including boating) was found to not be a high priority. Furthermore, *data collection* was only offered by a small percentage (i.e., 16.3%) of the stewardship organizations which suggests scientific training or resources are needed if a consistent and

reliable source of stewardship insight is to be maintained and measured (Silva & Krasny, 2016). Understanding the differences in capacity, actions, and actors of various stewardship groups is important for collaboration and development of programs (Enqvist et al., 2019). Unfortunately, the study did not provide much insight into exactly how the various SBs (e.g., education, community organizing, labor, programming) are facilitated, organized, or measured. Regardless, this research is significant in that there was an attempt to organize stewardship organizations by location, goal, and capacity attributes which allows NRMs a greater understanding of where (i.e., a specific geographic location) to act and with whom to potentially partner regarding accomplishing a specific objective such as improving access to the river.

Conversely, Vezeau and colleagues (2017) tried to measure SBs through development of a stewardship behavior scale (SBS). Their study investigated children's SBs that occurred in three different settings including a *park* type setting (e.g., clean up litter left by others, learn more about the park's natural environment) within the children's *communities* (e.g., volunteer to help the environment, talk to others about protecting nature, suggest visiting the national parks to other people) and at *home* (e.g., turn off water when brushing teeth, recycle, walk or bike instead of driving) after exposure to environmental education (EE) topics. Specifically, the children were part of a junior ranger (JR) program in the Great Smoky Mountains National Park where park officials and other stakeholders wanted to see the behavioral effects the JR curriculum had on the JRs in-training regarding certain identified outcomes of SB. This methodology involved a pre and post-test survey to see if there was statistical evidence for a change in behavior.

Unfortunately, while pre and post-test Mean and SD scores for each item were produced, the objective of the study was to evaluate the development of the scales and their fit, not to provide inferences of the data regarding the success of the program. Thus, conclusions are not made as to

whether changes in behavior were significant. However, using a confirmatory factor analysis (CFA) and host of other statistical procedures, four different models were tested with various factor loadings which ultimately proved the SBs (i.e., park, home, and community) were distinct categories of behaviors. This result is significant to NRMs because SBs are proven to be context specific; therefore, NRMs and other stakeholders “cannot assume programming will consistently influence all types” of stewardship (Vezeau et al., 2017).

To offer one last perspective of stewardship within the academic literature, the Chattahoochee River, the research site of this study, and the CRNRA Trail System Assessment (TSA) developed by Wimpey (2018) will be explored to show links between the CRNWT and the importance of evaluating SBs of its resource users (e.g. canoers, kayakers, tubers, and other paddlers).

The CRNRA’s Trail System Assessment declared, “the numbers of active stewards, their skillsets, and independence all have to be vastly increased to achieve lasting management success” within the CRNRA (Wimpey, 2018, p. 16). The assessment uniquely concludes with a call-to-action stating NRMs and other stakeholders should “lead outreach, education, and training efforts with park visitors, service organizations, and the broader Atlanta community ...” around stewardship initiatives to foster sustainability of the river and recreation area (p. 58). Additionally, the assessment is the only study found within the literature review of SBs to offer an applied model of *stewardship engagement best practices* (SEBP) for NRMs. The SEBP offers a framework for NRMs who are generally untrained in facilitating stewardship initiatives or activities that are outward facing to the public. The framework offers a detailed approach to developing and carrying out successful stewardship objectives such as identifying the benefits of using volunteers; identifying goals and processes for stewardship volunteers and their

management; developing needs and capacity assessments for specific sites; interagency collaboration and assessment tips; and volunteer event planning, implementation, and checklist resources. Frameworks such as the SEBP offer NRMs a starting point to begin facilitating successful stewardship actions, while stewardship frameworks and the research examples explored previously help shape how stewardship can be applied and evaluated within certain contexts. Ultimately, insight into specific SBs of paddlers along the CRNWT can inform targeted management actions along various river access parks (RAPs) as well as contribute to a greater understanding of stewardship mechanisms within WT systems.

CHAPTER III

METHODS

“Water recreation is no longer a matter of simply building a boat ramp, dock, or bathhouse. It involves a thorough understanding of water resources, current and future visitors, experiences sought, regional demand and supply, visitor capacity, and related dimensions” (Baas & Burns (Eds.), 2016, p. 50).

Statement of Purpose and Research Objectives

The primary goals of this study were to create an CRNWT exit survey to capture paddlers’ perceptions of importance and performance of WT attributes of the CRNWT as well as explore potential stewardship behaviors of paddlers along the CRNWT. Specifically, this study compared paddlers’ attribute perceptions and stewardship behaviors across two study sites: (1) West Palisades Park Unit (i.e., Paces Mill RAP), managed by the NPS vs. (2) Morgan Falls Overlook RAP, managed by the city of Sandy Springs. This study’s design was guided by the following research objectives.

Objective 1

To create a CRNWT exit survey (Appendix A) that would capture paddlers’ perceptions of CRNWT attributes, paddlers’ usage characteristics (e.g., frequency of visitation, PWC type, duration of visit, group size, skill level) and sociodemographics.

Objective 2

To operationalize twelve CRNWT attributes regarding paddlers’ perceived importance and performance and compare the results between Paces Mill (PM) and Morgan Falls (MF) study sites.

Objective 3

To measure the likelihood of seven specific stewardship behaviors (SBs) and actions performed by paddlers and compare the results between PM and MF study sites.

Permitting Process

To proceed with this study, the Institutional Review Board (IRB) at the University of Georgia performed a review procedure via an application for approval of Human Subjects Research. The review concluded this study was exempt and approval was granted by the IRB. The approval number for this project was #00000429 (Appendix B). Additionally, it should be noted, establishing contacts with the NPS and Morgan Falls to gain insight on permit procedures took roughly 1.5 years. Once contact with the appropriate individuals was established, the actual permitting process required four-five weeks. For the National Park Service, in order to conduct research, an application through the Research Permit and Reporting System (RPRS) had to be submitted (Appendix C). For Morgan Falls Overlook Park, several emails and phone calls were exchanged with the park Director as well as the Owner of High Country Outfitters Paddle Shack to gain permission to survey within the park (Appendix D). Ultimately, permission was only granted at each site for data collection during the summer months of June - July of 2019. Based upon recommendations and stipulations from permit procedures, participants were not solicited for this study, but rather had to volunteer to be surveyed (see: *Limitations*).

CRNWT Survey Construction & Implementation

A four-page CRNWT survey was created specifically for this study following guidelines and recommendations of Dillman, Smyth, and Christian (2014). Additionally, the CRNWT survey questions were based on prior research (Keith & Boley, 2019; Larson et al., 2018, Auckerman, 2011) as well as insight from the NPS, Sandy Springs Parks and Recreation

Department, and the Parks, Recreation, and Tourism Program at the University of Georgia. Both the NPS and Morgan Falls Overlook Park officials reviewed the CRNWT survey before implementation and provided feedback. The overall survey format and description was as follows: the first page of the survey (i.e., page 1) was designed to capture usage information of the paddler's recreational visit on the CR that day (e.g., frequency of visitation, PWC type, duration of visit, group size, skill level). Usage questions were placed first as they are generally straight-forward and do not place an excessive cognitive burden on the respondent to begin the survey (Dillman et al., 2014). The more cognitively taxing questions regarding the main constructs of research interest were designed to be within the middle pages (i.e., page 2 and 3). The constructs of *importance* and *performance* (IP) were measured utilizing a quantitative-based, five-point Likert-scale in which statements were based on twelve pre-selected CRNWT attributes (Table 1). Similarly, the construct of Stewardship Behavior (SB) was measured using a valid and reliable, five-point Likert-scale based on seven statements adapted from previous research (Larson et al., 2018) (Table 2). The last page of the survey (i.e., page 4) captured demographic information such as zip code, gender, age, education level, race/ethnicity adapted from Census questions. This information was asked last as these questions are generally perceived as being more sensitive in nature, but with low levels of cognitive burden (Dillman et al., 2014).

Table 1. CRNWT Attributes and Survey Statements.

CRNWT Attributes for IP Scales
Survey stems: <i>“How important are the following when you go paddling?”</i> and <i>“How well does this section of the CR perform on ...?”</i>
A) Seeing a variety of plant life
B) Seeing a variety of animal life
C) Seeing signs of human civilization (e.g., human infrastructure, development)
D) Having an official river map
E) Learning about the cultural history of the river
F) On-site availability of park staff and volunteers
G) Opportunities for solitude (e.g., lack of other paddlers)
H) Distance of the river site from nearest amenities (e.g., food, gas, supplies)
I) Water quality (cleanliness) of the river
J) Design of watercraft launch (i.e., boat ramp, dock)
K) Opportunities for silence
L) On-site availability of watercraft rentals
I - Scale: 1 = <i>not important</i> , 3 = <i>moderately important</i> , 5 = <i>very important</i> .
P - Scale: 1 = <i>poor</i> , 3 = <i>good</i> , 5 = <i>excellent</i> .

Table 2. Stewardship Behavior Scale Survey Statements

Stewardship Behavior Statements
Survey stem: <i>“How likely are you to engage in the following behaviors related to the Chattahoochee River in the next 12 months?”</i>
A) Volunteer for river trash clean-ups
B) Call, write a letter, or express views related to changing policy and legislation related to the CR?
C) Pick up trash someone else left behind
D) Talk to others about the importance of protecting the CR for recreation
E) Pay to support the protection of the CR
F) Participate as an active member in an environmental group or non-profit organization focused on protecting and promoting recreation on the CR
G) Vote for laws or policies that guard against additional development along the CR
Scale: 1 = <i>very unlikely</i> , 3 = <i>not sure</i> , 5 = <i>very likely</i> .

Approximately 500 copies of the CRNWT survey were printed within a two-page (i.e., front and back), paper booklet for distribution. Morgan Falls Overlook Park (MF) (City of Sandy Springs) and Paces Mill (PM) (NPS) study sites were chosen to administer the survey based upon recommendations from the NPS for achieving sufficient sample sizes. Additionally, MF and PM sites were chosen because they are independently managed sites that support the research objectives aiming to compare differences in the dependent variables (i.e., importance

ratings of attributes, performance ratings of attributes, and stewardship behaviors). Initially, the survey was pilot-tested at each site (i.e., MF and PM) during a single weekend with approximately equal sample sizes ($n_{Morgan\ Falls} = 42$, $n_{Paces\ Mill} = 50$) to check for irregularities in the CRNWT survey design as well as trends in popularity or paddler activity. The pilot-tested surveys revealed minor errors (e.g., one item anchor scale within the performance construct was mis-numbered as 1-2-2-4-5 and a “raft” option was added to choices of watercrafts used on page 1 after noticing rafts could be rented) and were corrected promptly. Pilot-test results were subsequently included into the overall research results for the study as no major errors were found.

To attract participants for the study, a survey research station (SRS) was set-up at specific locations within view of the river access point (RAP) or watercraft launch at MF and PM. The SRS involved several key items to provide the researcher with the necessary support to attract and administer the survey as well as provide shade and a comfortable area for the researcher who spent several hours outdoors (Appendix E). Additionally, the SRS included several key incentive signs as well as a reward *water trail sticker* (Appendix F) to entice paddlers to volunteer for the survey. For extra visibility, a small dry erase board sign was placed down at the bottom of the watercraft launch so paddlers would see the sign immediately coming off the river.

The CRNWT survey was administered as a self-selected, volunteer, exit survey to paddlers taking-out of the Chattahoochee River (CR) after a recreational experience using a personal watercraft (PWC). Due to permitting logistics, data collection of the CRNWT survey occurred on strategically selected *weekends* (i.e., Saturday and Sunday) based on weather conditions (see: *Limitations*) which influenced paddler activity. Survey weekends took place during the popular paddling months of June – July 2019 and between the hours of 9:00 AM to

6:00 PM rain or shine. It is important to note, two *weekdays* (i.e., Fridays) at each site were tested to confirm low-usage frequency by paddlers and each day resulted in the lowest count of received surveys ($n_{Morgan\ Falls} = 2$, $n_{Paces\ Mill} = 8$) (Appendix G). Additionally, the CRNWT surveys were only available to adult *paddlers* (18 years and older) who had concluded their recreational experiences on the CR and hence were not available to other recreational users (e.g., hikers, bikers, runners, etc.). Importantly, surveys were completed based upon post-paddle experience compared to pre-paddle experience. This fact is important due to the construct of performance in that the measure of performance must occur post-experience because of the evaluative nature of the construct. A limitation of this approach is that measures of importance are not captured pre-experience which could elucidate motivations as to why the experience was chosen (Askew et al., 2017; Oh, 2001). The alternative to this process would require both pre and post-paddle surveys, which was unfeasible given permit and time constraints for this study.

No data was collected concerning why some paddlers did or did not approach the SRS and researcher, however several logically determined motivations include thirst for iced lemon water, collecting a 1st edition WT sticker, or curiosity regarding the UGA research being conducted at the CR could all have influenced paddlers decisions to participate. Generally, one person in each group would complete the survey if over the age of eighteen. Again, paddlers were considered the main target population for this study and additional resource users (e.g., bikers, hikers, dog-walkers) were informed of the research purpose and politely turned down for participation in the CRNWT survey. Once the respondents (i.e., paddlers) agreed to participate in the survey, they would receive the CRNWT survey on a clipboard with a pen and were asked to take a seat in the shade. Each survey would typically take on average approximately six minutes to complete.

Importance Performance Analysis

The construction of the attribute statements within the IP constructs used in the CRNWT survey were based on previous work (Keith & Boley, 2019). In particular, the statements (i.e., CRNWT attributes of interest) were represented within two, separate measurement scales of importance and performance. In total, twelve attributes were adapted into statements that fit the survey stem for the importance and performance scales. For example, the attribute *wildlife*, was adapted to the survey statement of *seeing a variety of wildlife*. The statement was then phrased to flow with the survey stem question of “*how important are the following when you go paddling?*” and “*how well does this section of the CR perform on.*” All of the twelve attributes were adapted in this manner and were selected from the physical, social, and managerial attribute categories developed within the NPS’s Water and Land Recreation Opportunity Spectrum (WALROS) (Auckerman, 2011).

Martilla and James (1977) highlighted the necessity of expertise and prior study in evaluating which attributes should be chosen for an IPA as the process of attribute identification is critical to the success of the overall analysis. Thus, as mentioned previously, social, physical, and managerial attributes were adopted from the WALROS handbook developed by Auckerman (2011) for the U.S. Department of the Interior. The WALROS essentially serves as a decision-making framework for NPS NRMs in assessing and developing recreation opportunities along water and land-based units. Therefore, the attributes used within this framework were considered as a valid source. Additionally, utilizing attributes that are recognized and familiar to the NPS can aid in management interpretation and decision making for the CRNRA. Thus, a total of twelve attributes were selected from the WALROS and adapted into IP statements for the CRNWT survey.

A five-point, bi-polar, Likert-scale was chosen to measure the twelve attributes' importance and performance. Each attribute statement was measured with survey anchors ranging from 1 = Not Important to 5 = Very Important. Likewise, each attribute performance statement was measured using a similar anchor scale ranging from 1 = Poor to 5 = Excellent. In general, there is debate on the validity of Likert style variables regarding statistical applications (Oh, 2001). Much of the debate lies within considering Likert-type statements and scales as parametric or non-parametric (Askew et al., 2017). To give a simple example, the true difference between "important" and "very important" may not be a perfect interval or equal to the difference between "not important" and "somewhat important." For the purpose of this research, the Likert-scale anchors were measured as intervals which is common within social science research (Askew et al., 2017).

Data analysis of the attribute IP measurements were performed with an importance performance analysis (IPA) based off of similar work (Keith & Boley, 2019). Specifically, the grand mean for each statement (i.e., attribute) of the IP Likert-scale data for each paddler was entered into the IP coordinate matrix or IPA map within four management decision quadrants. Important to remember, interpretation of the attributes within the IP map relies on methods for determining placement of the quadrant crosshairs.

Explained by Azzopardi and Nash (2013), a data-centered approach to placing the cross hairs was utilized. However, the IPA results regarding data collected for this study also showcased the scale-centered and iso-priority line methods for comparison. The benefit of other methods such as the iso-priority line allow the interpreter or NRM to visibly see the expectancy disconfirmation paradigm represented within the IP coordinate map. The iso-priority line therefore represents a threshold of the attributes either exceeding ($P > I$) or underperforming ($I >$

P) which adds another layer of general insight to the data (Keith & Boley, 2019) (see: *Literature Review*). In addition to interpreting the IP map and identifying the quadrant placement of each attribute statement, independent-samples *t*-testing was utilized to compare attribute ratings of importance and performance for each of the twenty-four statements between study site #1 and #2 (see: *Results*). The SPSS version 25.0 and Microsoft Excel version 16.3 were used for all IPA and other statistical procedures. Measures of the Stewardship Behavior (SB) construct for the CRNWT were designed and analyzed in a similar manner.

Measuring Stewardship

Following the stewardship theoretical framework of Bennett et al. (2018), local environmental stewardship actions (LESAs) used as statements to measure stewardship behavior pertaining to a water trail or river recreation experience were not found within the literature. Stewardship actions are considered a facet of stewardship behavior (SB) which Stern (2000) defined as actions done with the intent to benefit and promote the local environment (Landon et al., 2018). Ultimately, LESAs were adapted for the CRNWT survey from a seven statement, Likert-scale of Larson and colleagues (2018) related to measuring high and low-effort pro-environmental behavior (PEB) which is essentially a type of SB. Specifically, Larson et al. (2018) developed the PEB scale by dividing each statement into a high or low-effort category based off factor analysis results. Similarly, the work of Landon and colleagues (2018) utilized a similar SB scale to gain insight into SBs of anglers within recreational fisheries. The Landon et al. (2018) stewardship instrument, also adapted from Larson et al. (2018), placed the SB variables into social and public-sphere constructs of SB. Thus, for this research, the seven variable statements utilized in the Larson et al. (2018) and Landon et al. (2018) studies were adapted to represent SBs and actions paddlers may perform.

For example, the statement: “*donated money to support fisheries or aquatic conservation*” was changed to “*pay to support protection of the CR*” (Landon et al., 2018). Each statement was measured using a five-point, bi-polar, Likert scale based on the likelihood of performing the stewardship action. The survey anchors used for measuring SB ranged from 1 = Very Unlikely to 5 = Likely. Overall, the seven-statement SB scale had a high level of internal consistency with a Cronbach’s alpha of 0.868 providing evidence of its reliability. For a final analysis, similar to the IPA methods above, the SB statements were assessed via independent samples *t*-tests between the two study sites. The SPSS version 25.0 and Microsoft Excel version 16.3 were used for all statistical procedures.

Study Context

“the congress finds the natural, scenic, recreation, historic, and other values of a forty-eight-mile segment of the Chattahoochee River and certain adjoining lands in the State of Georgia from Buford Dam downstream to Peachtree Creek are of special national significance, and that such values should be preserved and protected from development and uses which would substantially impair or destroy them. In order to assure such preservation and protection for public benefit and enjoyment, there is hereby established the Chattahoochee River National Recreation Area. The recreation area shall consist of the river and its bed together with the lands, waters, and interests ... therein within the boundary originally depicted on the map entitled CRNRA” (Senate Report No. 106-62, 1999).

The geographical context of the study sites were approximately 20-miles north of Atlanta, GA just outside the I- 285 perimeter along the Chattahoochee River National Water Trail (CRNWT). As previously mentioned, the CRNWT is a highly unique, urbanized section of the Chattahoochee River that meanders its way through the Chattahoochee River (CR) National Recreation Area (CRNRA), one of eighteen National Recreation Areas managed by the National Park System (NPS) within the United States. The CRNRA was established under President Jimmy Carter in 1978 and is composed of approximately fifteen discrete, land-based, river

access parks (RAPs) along a 48-mile section of the CR within metropolitan Atlanta, GA. Important to note, the Chattahoochee River runs a total of 434 miles across the state of GA, making the 48-mile CRNRA and CRNWT a small percentage of its overall length (Georgia River Network, 2019) (see: *Introduction*).

Outside of the fifteen RAPs managed by the NPS, there are a host of other official and unofficial access locations to the CR within the CRNRA that are managed by private landholders, municipalities, and other government agencies (e.g., Morgan Falls Overlook Park managed by the City of Sandy Springs). Documented evidence of collaboration between the NPS and other agencies along the CR could not be found within the academic literature, but it is suggested that the NPS must focus on building interagency partnerships to help manage the CR (Wimpey, 2018). Notably, not all RAPs provide the same form and functionality of access to the CR. For example, the NPS managed sites traditionally have large, concrete access ramps that are designed for high use and a variety of recreational opportunities (e.g., motorized and non-motorized or human-powered watercrafts). Conversely, RAPs such as Morgan Falls Overlook Park, which was a study site #2 of this research, provides access for human-powered personal watercraft users only by way of a floating dock which is ADA (Americans with Disabilities Act) certified.

To achieve the objectives for this research, two RAPs of the CRNWT were decided on as research sites based on similar qualities of heavy recreational paddler use, access to on-site recreational outfitters (i.e., High Country Outfitters Paddle Shack and the Nantahala Outdoor Center) and geographic proximity (i.e., the sites are approximately eight river miles from each other). Thus, West Palisades Park Unit (a.k.a., Paces Mill) managed by the NPS and Morgan Falls Overlook Park managed by the City of Sandy Springs were chosen as study site #1 and #2

(Figure 2). Both study sites served as take-out (i.e., take out of the river) locations for paddlers on the CRNWT who concluded a recreational experience on the CR. It is important to note, respondents surveyed (i.e., paddlers who exited the river) at Paces Mill generally accessed the CR from Powers Island or Johnson Ferry RAPs approximately 3.5 – 6 miles upriver from Paces Mill but both of these sites are also managed by the NPS. Respondents surveyed at Morgan Falls Overlook generally put-in and took-out of the CR at the same location (Table 3).

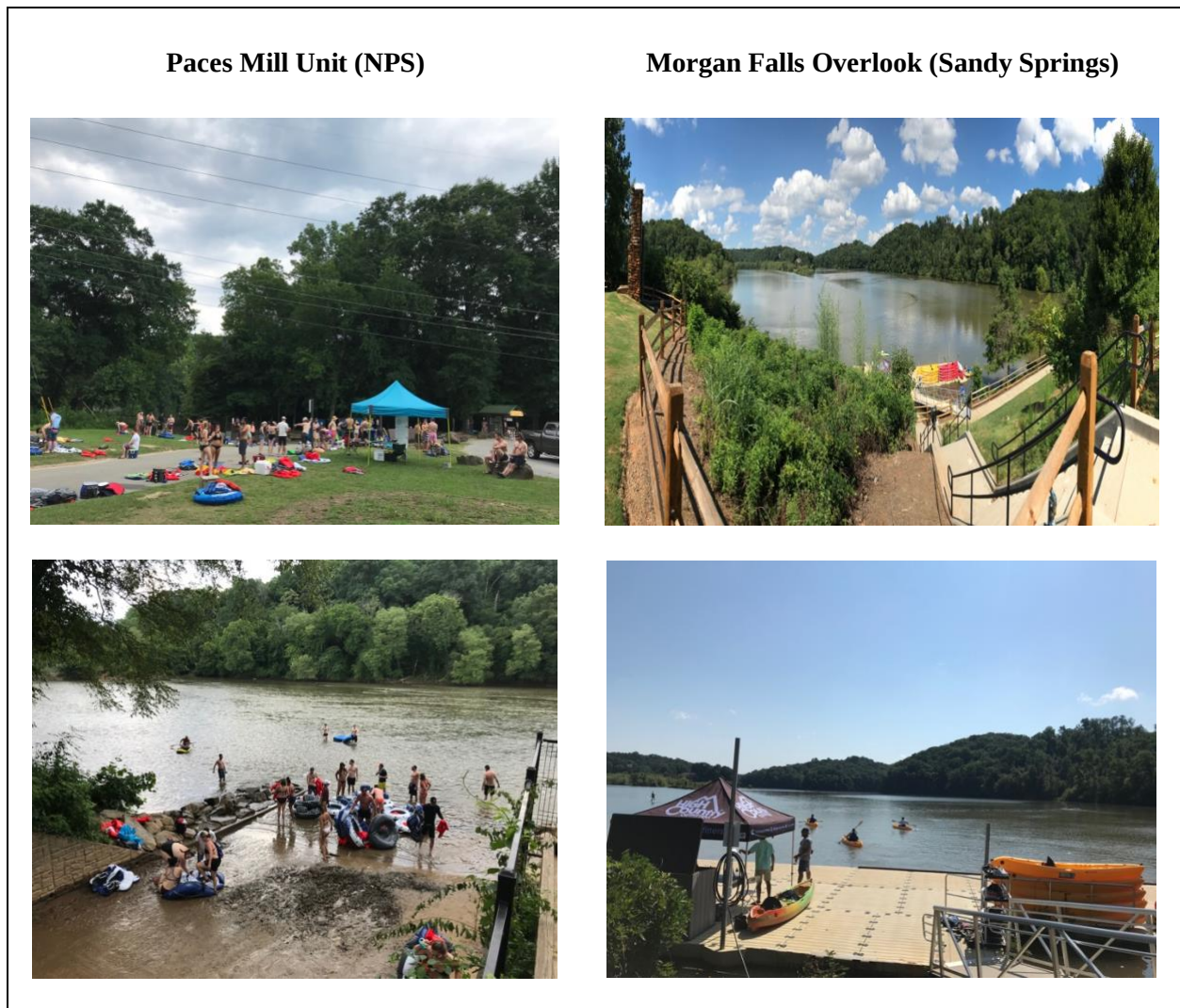


Figure 2. Photo Comparison of Paces Mill and Morgan Falls Study Sites.



Figure 2. Continued.

Limitations

This study included several limitations that should be acknowledged when interpreting the results. First, both study sites required lengthy permit requirements in which data was not able to be collected until the second summer of the researcher's two-year MS program. Thus, necessary trade-offs were made to the research process in terms of survey design and ability to acquire large sample sizes. For example, the sampling time frame was constrained to the permitted summer months during the weekends when weather was good (i.e., no summer thunderstorms) and when paddlers typically frequented the CR.

Table 3. Comparison of Paces Mill Park and Morgan Falls Overlook Park.

Comparison of CRNWT Study Sites		
Study Sites	#1: Paces Mill	#2: Morgan Falls Overlook Park
Management Agency	Federal - National Park Service	Municipal - City of Sandy Springs
Location	Atlanta, GA (Cobb County); west side of CR	Atlanta, GA (Fulton County); east side of CR
RAP Attributes	Established in 1978; 100+ acres; picnic tables, grills, restrooms, hiking trails, concrete boat ramp, scenic river views, and parking for 100+ people; staff includes 1-2 full-time NPS maintenance employees responsible for all CRNRA's 15 parks;	Established in 2010; 27.811 acres; picnic pavilions, playground, restrooms, boat dock, hiking trails, parking, fire pit, swinging benches, scenic river views, parking for 50+ people; staff includes 3-4 part-time maintenance employees responsible for 3 parks
River Attributes	The CR at this site is south of the Buford and Morgan Falls Dam. Thus, the river current is slow to fast depending on dam release schedule and c.f.s. Typically, paddlers flow downstream with flow.	The CR at this site sits up-river from the Morgan Falls Dam which can be seen from the MF. The dam creates a large, lake type river setting called Bull Sluice Lake. There is little to no river flow or current. Typically, paddlers paddle around the lake or up-river.
Predominant User Group	Tubers and kayakers	SUP boarders and kayakers
Water Quality	Varies based on turbidity levels and E-coli counts. Managed by the USGS website	Varies based on turbidity levels and E-coli counts. Managed by the USGS website
Population Density	High	High

Table 3. Continued.

Design of Watercraft Launch	Concrete ramp	Floating dock with ADA PWC slide
Rental Watercrafts Available	Tubes, inflatable kayaks, rafts, SUP boards. The NOC manages an outpost that rents PWCs to patrons at Johnson Ferry and Powers Island who then float or paddle the 3-6 miles to PM take-out. A shuttle is necessary at this location to return to cars parked at original put-in.	SUP boards, kayaks, canoes. High Country Outfitter's Paddle Shack manages an outpost at MF. Typically, paddlers explore the lake area around the put-in or paddle up-river 2-3 miles then back to the MF watercraft launch dock for a total of 5-6 miles paddled. A shuttle is not necessarily needed at this location.
Access Points of Interest	PM is the last take-out boat ramp of the 48-mile CRNWT. Typically, paddlers put-in the CR north of PM at Powers Island or Johnson Ferry North Unit and paddle the 3-6 miles south to PM. Both these sites are managed by the NPS	MF is roughly 8-miles north of PM. Typically, paddlers put-in the CR from this location as well as take-out. Rarely do paddlers take-out at MF who have put-in the river at other locations north of MF.

Several survey weekends were cancelled due to severe weather and unsafe river c.f.s. (cubic feet per second) levels of the CR. Additionally, due to constraints imposed by the NPS and Morgan Falls Research Permits, paddlers were not allowed to be solicited for participation in the CRNWT survey and had to self-volunteer to participate. Thus, the convenience-based sampling method does not allow for statistical inferences to apply to the entire population as the sample is not representative of all paddlers or paddlers that frequent the CR during other months and weather conditions. Secondly, the study sites were chosen based upon similarities in geographic proximity, paddle length, and attributes. However, the Morgan Falls Overlook Park is unique in that it is located before the Morgan Falls Dam creating a lake type reservoir for recreation. This is opposed to the flowing current of the CR south (i.e., down river) of the dam at the NPS Paces

Mill study site. These attributes may have influenced users' perceptions as well as watercraft preferences. Lastly, a place attachment (PA) scale based off of work from Larson et al. (2018) was used within the CRNWT survey but the results are not reported as the construct was determined to not fit within the overall objectives of the research. Regardless, the convenience-based sampling method allowed for an initial approach into understanding sociodemographics, usage, perceptions and stewardship behaviors of paddlers along the CRNWT.

CHAPTER IV

RESULTS

“The results from an IPA can supplement planning for improving efficient provision of recreation opportunities through management of setting attributes, which in turn could reinforce activity popularity and intensity” (Askew et al., 2017, p.1).

The results of the data analysis corresponding to each research objective (i.e., objective 1, 2, & 3) are described in this chapter. Results for each process stage of the research (survey creation and data collection, applying an IPA to CRNWT attributes, and measuring potential stewardship behaviors of paddlers along the CRNWT) are presented in chronological order.

CRNWT Survey Construction and Implementation

Adults, eighteen years and older, were able to participate in the study. A total of 360 paddlers completed the survey with a sample size of $n = 191$ at NPS’s Paces Mill Park and $n = 169$ at the Sandy Springs’ Morgan Falls Overlook Park. Figure 3 illustrates the various access sites or RAPs paddlers would put-in the CR during the CRNWT survey data collection period. Again, paddlers exiting the river at Paces Mill largely accessed the river from Johnson Ferry or Powers Island parks of the NPS which were located several miles upstream from Paces Mill. Conversely, all paddlers at Morgan Falls put-in *and* exited the CR via Morgan Falls (i.e., the put-in and take-out locations are one in the same). However, unique statistical differences between the two study sites were found regarding paddler usage patterns and sociodemographics between the two sites.

Sociodemographic Profile of Paddler Respondents and Usage Patterns

Table 4 illustrates the sociodemographic characteristics of paddlers surveyed at each study site. At the MF study site, the largest user group was female (56.3%) and White (75.4%). In contrast, the Paces Mill site yielded the largest user group male (52.6%) with a slightly higher percent of White (84.7%) paddlers. However, chi-square results proved these differences were not statistically significant, $\chi^2(5) = 10.401, p = .065$. Furthermore, regarding race, African American and Hispanic users were equally represented between the two sites with the third most popular user group at each site being Asian paddlers. Notably, there was a statistical difference between user groups at each site regarding level of education and total household income. The Morgan Falls site reported nearly fifty percent of paddlers having a graduate or professional degree (49.1%) while the Paces Mill site reported 26.8% of paddlers having a graduate or professional degree. Likewise in comparison, the Morgan Falls site paddlers had a higher percentage of total household income levels over \$100,000 (59.9%). Conversely, the Paces Mill site paddlers who reported \$100,000+ for total household income accounted for 43.3%. In general, the Paces Mill site appeared to have users that were less educated as well as earned less than the Morgan Falls user base. For clarity, Table 4 and Table 5 report the chi-square test of homogeneity results among the two sites regarding the categorical variables measured in the sociodemographic and usage questions of the survey (i.e., Page 4 and Page 1) (Appendix A).

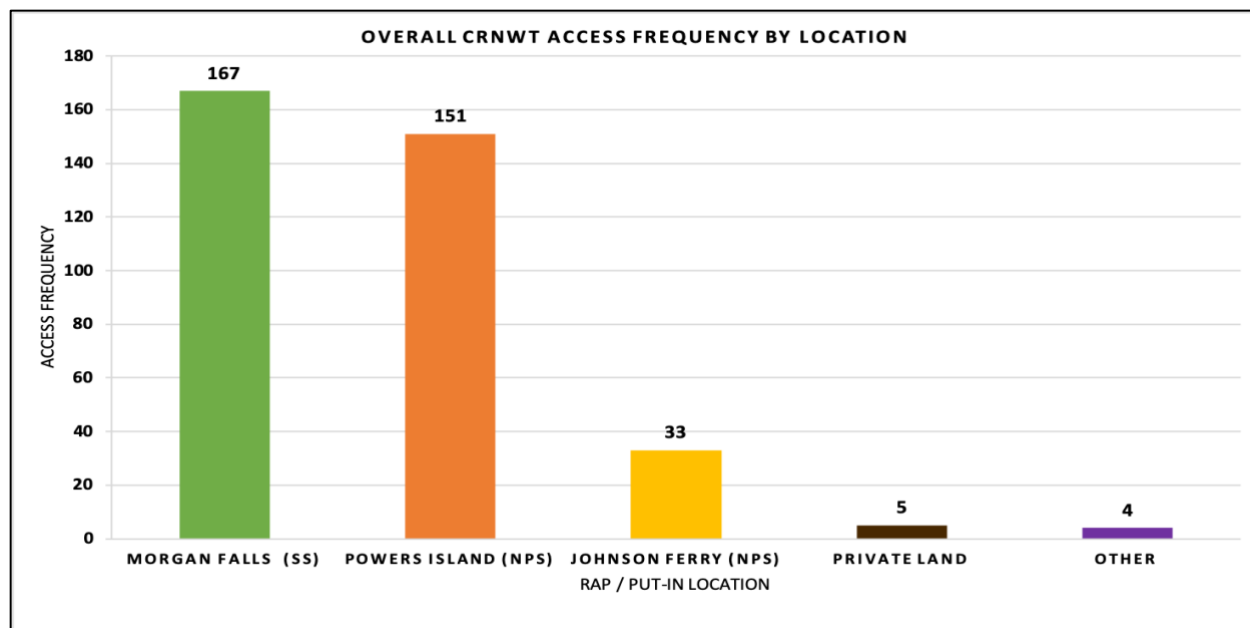


Figure 3. Distribution of Access Location Frequency of Paddlers

In continuation, Figure 4 illustrates the age distribution of user groups between the two sites. Due to the large range of ages and frequencies, a bar chart was used to show patterns for each set of data. Overall, the Paces Mill site had a higher frequency of young paddlers with notable percentages at ages 18 (7.0%), 24 (6.3%), 26 (5.3), and 30 (5.8%). The Morgan Falls site ages with the highest percentages were 26 (6.0%), 37 (4.8%), 39 (4.8%), and 48 (5.4%).

However, a chi-square test of homogeneity was run to compare the age distribution between the two sites and the two multinomial probability distributions showed no statistical difference was present between the age of paddlers at each site, $\chi^2(52) = 61.057, p = .183$. Usage characteristics and patterns are illustrated in Table 5.

Table 4. Sociodemographic Characteristics of CRNWT Paddlers at Each Study Site, Summer 2019.

Variable	Morgan Falls (%)	Paces Mill (%)	χ^2
Gender ($n_{Morgan\ Falls} = 169, n_{Paces\ Mill} = 191$)			$\chi^2 (1) = 3.232, p = .072$
Female	56.3	47.4	
Male	43.1	52.6	
Other	.6	0.0	
Highest Level of Education ($n_{Morgan\ Falls} = 169, n_{Paces\ Mill} = 191$)			$\chi^2 (4) = 28.201, p = .000$
Some High School	0.0	2.1	
High school or GED	5.4	12.6	
Technical, Vocational, or Trade School	6.0	15.3	
Bachelor's or Associates Degree	39.5	42.1	
Graduate or Professional Degree (MS, MD, DVM, PhD)	49.1	26.8	
Total Household Income ($n_{Morgan\ Falls} = 169, n_{Paces\ Mill} = 178$)			$\chi^2 (5) = 13.190, p = .022$
Less than \$25,000	6.0	6.7	
\$25,000-\$34,999	1.8	6.2	
\$35,000-\$49,999	6.6	9.6	
\$50,000-\$74,999	14.4	16.3	
\$75,000-\$99,999	11.4	18.0	
\$100,000+	59.9	43.3	
Race/ethnicity ($n_{Morgan\ Falls} = 169, n_{Paces\ Mill} = 191$)			$\chi^2 (5) = 10.401, p = .065$
American Indian	.6	1.1	
Asian	11.4	5.3	
Black or African American	4.8	4.2	
Hispanic or Latino	6.0	4.7	
White or Caucasian	75.4	84.7	
Other	1.8	0.0	

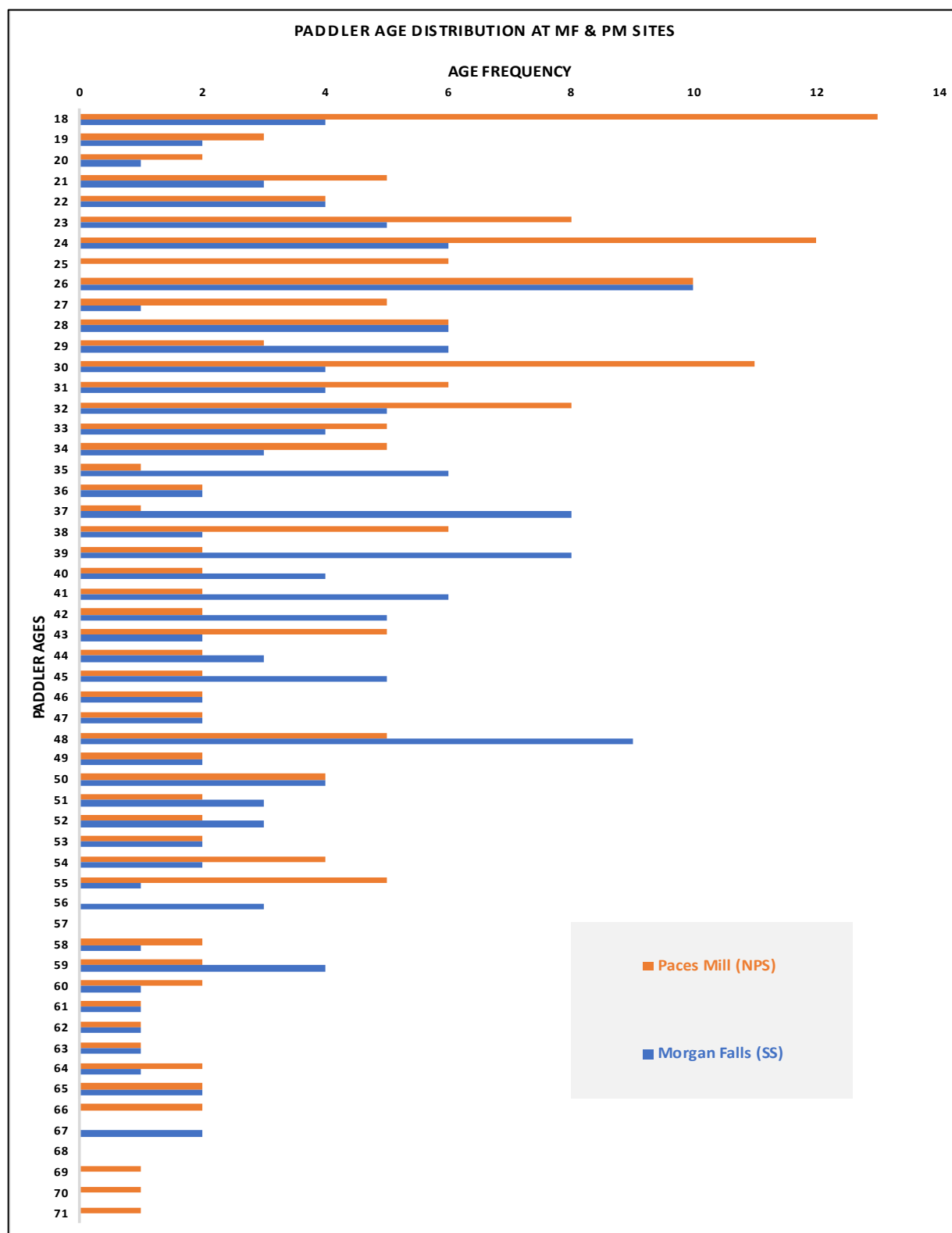


Figure 4. Age Distribution and Frequency of CRNWT Paddlers at Each Study Site, Summer 2019.

Beginning with paddle hours or time spent paddling while on the CR, the majority of paddlers at Morgan Falls spent one to two hours on the water which accounts for 75.9% of the total sample population at the site. Comparatively, the Paces Mill paddlers showed significantly higher spikes in usage for either two to three hours (38.4%) or three-four hours (30.0%) on the CR. Overall, Morgan Falls paddlers spent significantly less time on the CR than the Paces Mill paddlers, $\chi^2 (5) = 108.500, p = .000$. The time difference may be due to personal watercraft (PWC) (e.g., canoe, kayak, SUP, etc.) choice and usage between the two sites. Notably, rental PWCs shared a large percentage of the usage at Morgan Falls given the access to a rental outfitter mentioned previously. Specifically,, Morgan Falls had a high percentage of Rental SUP users (37.3%) and Rental Kayak users (27.7%). Likewise, Paces Mill paddlers also had access to a rental outfitter, yet the most frequent PWC usage was with Personal Inflatable Inner Tubes (28.9%) and with Personal Kayaks (27.9%) which is in contrast to findings at Morgan Falls. It is important to note, Paces Mill users did not have access to Rental SUP boards and Morgan Falls users did not have access to rental rafts or tubes most likely given the river characteristics (e.g., flow or current). However, there were similarities in the Rental Kayak user groups between the two sites as both sites reported rental kayak percentages in the low to high twenties. Overall, Morgan Falls users relied more heavily on rental PWCs than did Paces Mill users. Results of the chi-square illustrate that a statistical difference among the percentages of watercraft choice between the two sites was present, $\chi^2 (9) = 200.246, p = .000$. Likewise, regarding group size or how many users paddled together during a recreational experience on the CR, both sites reported statistical differences, $\chi^2 (4) = 38.639, p = .000$. For example, Morgan Falls reported nearly 40.4% of its paddlers were in groups of *two* (i.e., two people paddled together). This finding is in stark contrast to Paces Mill where nearly 47.4% of the paddlers recreated in groups of more than *four*

people. For closer inspection, the distribution of paddler group size between the two sites can be reviewed in Figure 5. Surprisingly, both sites were shown to be fairly equal in annual frequency of paddling the CR as no statistical difference was present, $\chi^2 (5) = 6.301, p = .278$. For example, Morgan Falls's paddlers largely experienced the CR at that location for the very first time (47% of respondents). Similarly, Paces Mill reported 37.4% of users had never been on that section of the CR before, thus were first time users. Remarkably, both sites had similar percentages of high frequency paddlers that reported using the CR at those specific locations at least seven plus days a year. No additional comparisons of trends between high versus low frequency users were made but should be investigated for future research (see: *Discussion*).

Importance Performance Analysis

The results of the IPA for Morgan Falls and Paces Mill are presented using traditional IPA maps in Figures 6 and 7 as well as in a combined IPA map for the two study sites (Figure 8). However, to provide clarity for all attributes within each construct (i.e., importance and performance) independent samples t-tests were orchestrated to determine if there were differences in the twelve attributes' importance and performance between Morgan Falls and Paces Mill. Those results are presented in Tables 6 and 7. Additionally, mean comparisons of the attributes based on the five-point Likert scale for importance and performance are presented as bar charts in Figures 9 and 10. Lastly, Table 8 illustrates the quadrant placement for each attribute which outlines the traditional inferences and management decisions produced from the IPA results. Overall, the top three most important attributes across both Morgan Falls and Paces Mill parks were (I) *water quality* ($M = 4.21, SD = .92$), (B) *seeing a variety of animal life* ($M = 3.72, SD = 1.16$), and the (J) *design of the watercraft launch* (i.e., boat ramp or dock) ($M = 3.46, SD = 1.13$).

Table 5. Paddler Usage Characteristics at Each Study Site, Summer 2019.

Variable	Morgan Falls (%)	Paces Mill (%)	χ^2
Paddle Hours ($n_{Morgan\ Falls} = 166$, $n_{Paces\ Mill} = 190$)			$\chi^2 (5) = 108.500, p = .000$
< 1 hour	3.0	1.1	
1-2 hours	75.9	24.2	
2+ to 3 hours	13.9	38.4	
3+ to 4 hours	3.0	30.0	
4+ to 5 hours	1.8	5.8	
Other	2.4	.5	
Watercraft ($n_{Morgan\ Falls} = 166$, $n_{Paces\ Mill} = 190$)			$\chi^2 (9) = 200.246, p = .000$
Personal Canoe	.6	3.2	
Rental Canoe	.6	1.1	
Personal Kayak	10.8	27.9	
Rental Kayak	27.7	21.1	
Personal SUP	22.9	1.6	
Rental SUP	37.3	0.0	
Personal Tube	0.0	28.9	
Rental Tube	0.0	8.9	
Raft	0.0	6.8	
Group Size ($n_{Morgan\ Falls} = 166$, $n_{Paces\ Mill} = 190$)			$\chi^2 (4) = 38.639, p = .000$
1 person/ solo	6.0	6.3	
2 people	40.4	18.4	
3 people	15.7	10.5	
4 people	19.3	17.4	
> 4 people	18.7	47.4	
Annual Paddle Frequency ($n_{Morgan\ Falls} = 166$, $n_{Paces\ Mill} = 190$)			$\chi^2 (5) = 6.301, p = .278$
First day ever on the CR	47.0	37.4	
1 - 2 days	13.3	17.4	
3 - 4 days	10.8	11.6	
5 - 6 days	5.4	9.5	
7+ days	19.9	17.4	
Other	3.6	6.8	
Paddler Experience Level ($n_{Morgan\ Falls} = 166$, $n_{Paces\ Mill} = 190$)			$\chi^2 (3) = 5.967, p = .113$
Beginner/novice	38.6	31.6	
Intermediate	47.0	43.7	
Advanced	13.3	21.6	
Professional guide/instructor	1.2	3.2	

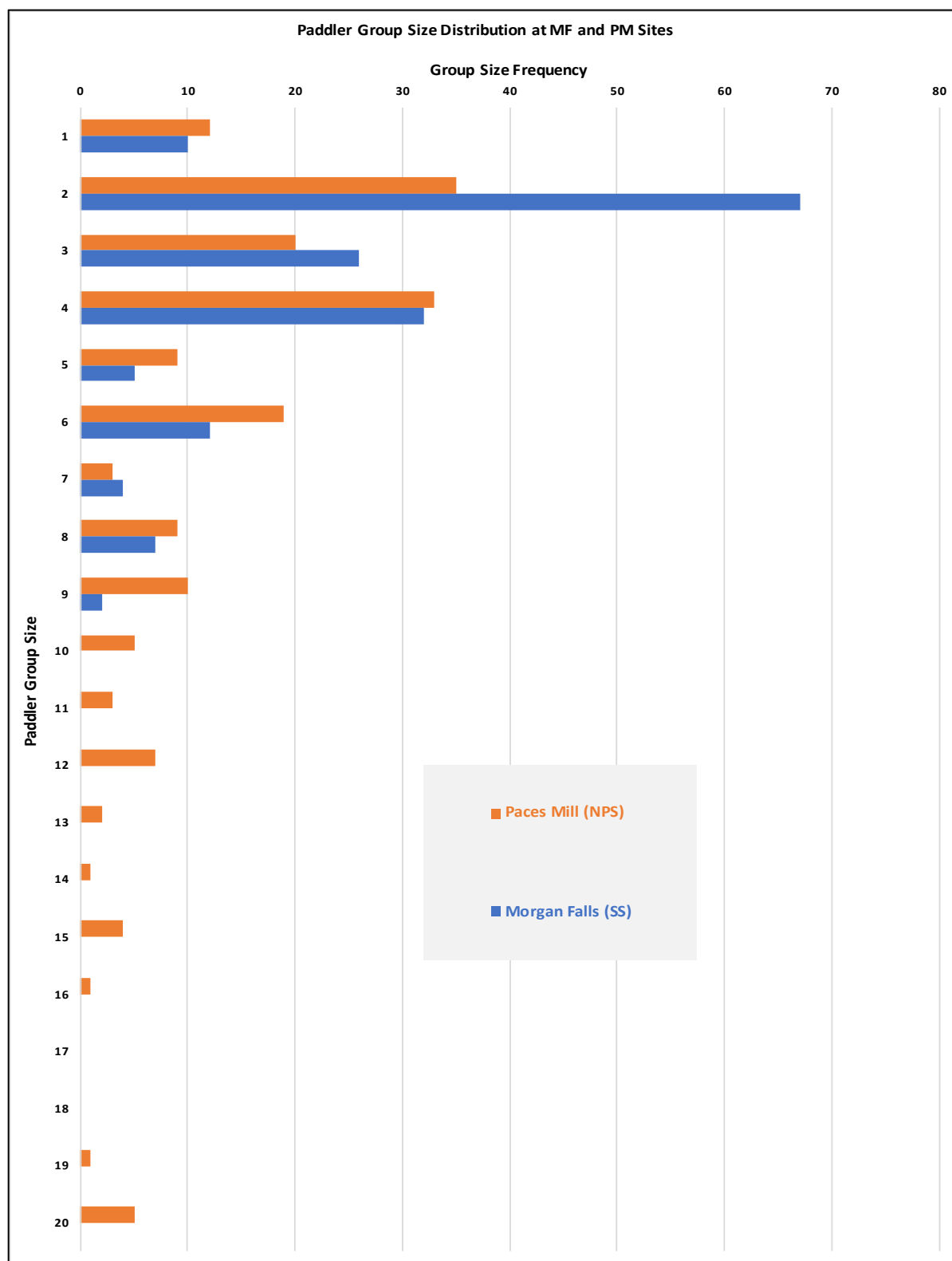


Figure 5. Group Size Distribution and Frequency of CRNWT Paddlers at Each Study Site, Summer 2019.

The top three performing attributes across both Morgan Falls and Paces Mill parks were (L) *on-site availability of watercraft rentals* ($M = 4.32$, $SD = .83$), (J) *design of the watercraft launch* ($M = 4.03$, $SD = 1.15$), and the (H) *distance of the CR to nearby amenities* (e.g., food, gas, supplies) ($M = 3.75$, $SD = .95$) (Figure 8). It is important to note, assumptions of normality and homogeneity of variances have been violated for nearly all of the independent samples t-tests, yet statistical applications proceeded regardless (Laerd Statistics, 2015) (see: *Limitations*).

Paddlers at Morgan Falls Overlook Park reported that the (B) *wildlife* and the condition of the (I) *water quality* of the CR should be the top two attributes to be focused on and should therefore require increased attention by the NRMs. Attributes that paddlers found to be performing well included (A) *plant life*, the ADA certified (J) *watercraft dock*, (K) *opportunities for silence*, and (L) *availability of watercraft rentals* at the Paddle Shack rental outfitter. Interestingly, attributes that were overperforming or considered “possible overkill” at Morgan Falls were the (F) *park staff and volunteer presence* as well as its (H) *distance from amenities* (i.e., possibly too close to amenities or too many amenities in the area). Notably, four attributes at Morgan Falls were identified to be a “low priority” for paddlers which included (G) *opportunities for solitude*, (D) *access to an official river map*, (E) *learning about the CR cultural history*, and (C) *seeing signs of human civilization* (e.g., human infrastructure or development). It is important to note, the IPA maps illustrated in Figures 6, 7, and 8 can be interpreted using two other crosshair methods (i.e., scale-centered or iso-priority line) which provide different perspectives on possible management decisions (see: *Literature Review*).

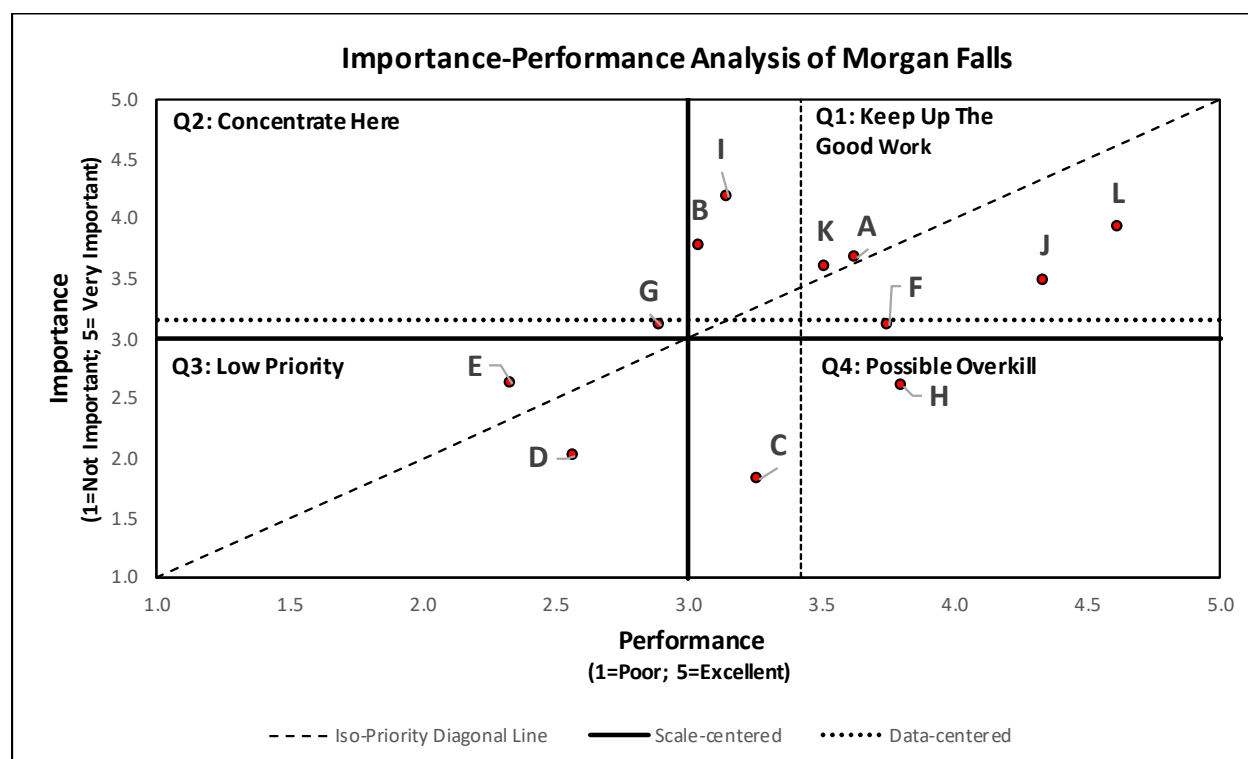


Figure 6. Morgan Falls IPA Map.

Paddlers at Paces Mill Park reported that (K) *opportunities for silence* and the condition of the (I) *water quality* of the CR should be the top two attributes to be focused on and thus should require increased attention by the NRMs. Attributes that paddlers found to be performing well at Paces Mill included (A) *plant life*, (B) *animal life*, and the (J) *design of the watercraft launch*. Attributes that were overperforming or considered “possible overkill” at Paces Mill included the CR’s (H) *distance from amenities* (i.e., possibly too close to amenities or too many amenities in the area), (L) *on-site availability of watercraft rentals*, and the (C) *presence of human civilization* (e.g., infrastructure or development). Similar to Morgan Falls, Paces Mill paddlers identified (G) *opportunities for solitude*, (D) *access to an official river map*, (E) *learning about the CR cultural history* as “low priority” attributes. Notably, (F) *on-site availability of park staff or volunteers* was also considered a “low priority” at Paces Mill which is in contrast to Morgan Falls paddlers where the attribute was considered “possible overkill.”

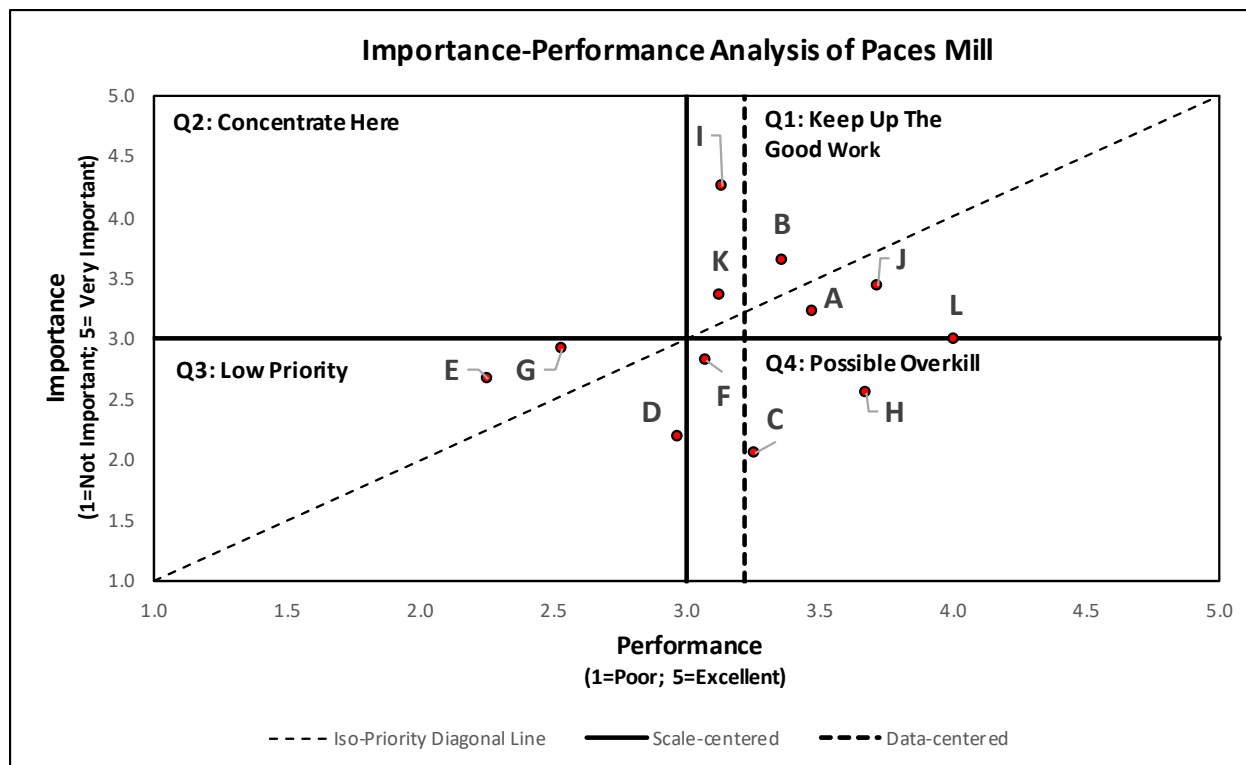


Figure 7. Paces Mill IPA Map.

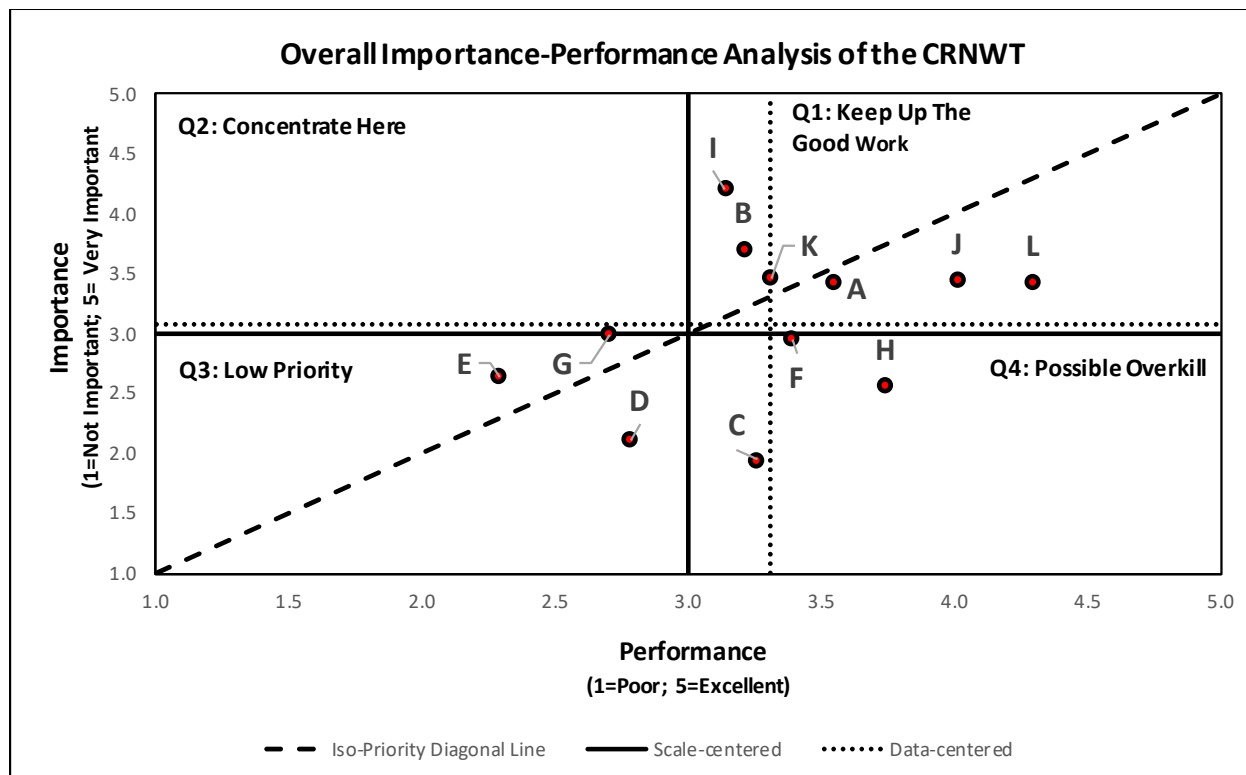


Figure 8. Combined Morgan Falls and Paces Mill IPA Map.

Table 6 displays the results of the independent samples t-tests for importance ratings of all attributes between the two study sites. There was a statistically significant difference in four of the twelve attribute importance ratings between Morgan Falls and Paces Mill, illustrated by the results of the t-tests. Those attributes which reported statistical differences included (A) *seeing a variety of plant life* $t(356), p = .001$, (K) *opportunities for silence* $t(356), p = .048$, (F) *on-site availability of park staff and volunteers* $t(358), p = .028$, and (L) *on-site availability of watercraft rentals* $t(357), p = .001$. Overall, Figure 9 displays how attribute importance was rated by paddlers for each attribute statement between the two study sites.

Table 7 displays the results of the independent samples t-tests for performance ratings of all attributes between the two study sites. There was a statistically significant difference in seven of the twelve attribute importance ratings between Morgan Falls and Paces Mill. Those attributes included (B) *having a variety of animal life* $t(341), p = .004$, (G) *having opportunities for solitude* $t(354), p = .002$, (K) *having opportunities for silence* $t(350), p = .001$, (D) *providing and official river map* $t(356), p = .002$, (F) *on-site availability of park staff and volunteers* $t(355), p = .001$, (J) *design of watercraft launch* $t(356), p = .001$, and (L) *on-site availability of watercraft rentals* $t(347), p = .001$. Of the statistically significant attributes, paddlers at Morgan Falls reported higher levels of performance with the following attributes: (K) *having opportunities for silence*, (G) *having opportunities for solitude*, (F) *on-site availability of park staff and volunteers*, (J) *design of the watercraft launch*, and (L) *on-site availability of watercraft rentals*. Conversely, paddlers at Paces Mill found that the (B) *variety of animal life* and (D) *access to an official river map* performed better within the NPS managed section of the CR (Figure 10).

Table 6. Independent Samples T-Tests for Attribute Importance Between MF and PM.

Scale and statement description	Morgan Falls (SS)		Paces Mill (NPS)				
Attribute Importance Statements	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
1) Seeing a variety of plant life	3.66	1.046	3.22	1.279	356	3.611	.000***
2) Seeing a variety of animal life	3.78	1.127	3.65	1.195	356	.986	.325
3) Seeing signs of human civilization (e.g., human infrastructure, development)	1.83	1.155	2.07	1.290	358	-1.860	.064
4) Water quality (cleanliness) of the river	4.17	.919	4.25	.917	352	-.822	.412
5) Learning about the cultural history of the river	2.62	1.139	2.68	1.147	353	-.448	.154
6) Opportunities for solitude (e.g., lack of other paddlers)	3.10	1.223	2.92	1.315	357	1.378	.169
7) Opportunities for silence	3.60	1.109	3.35	1.251	358	1.984	.048*
8) Distance of the river site from nearest amenities (e.g., food, gas, supplies)	2.60	1.140	2.55	1.208	356	.435	.664
9) Having an official river map	2.02	1.121	2.20	1.355	356	-1.428	.159
10) On-site availability of park staff and volunteers	3.11	1.172	2.83	1.280	358	2.206	.028*
11) Design of watercraft launch (i.e., boat ramp, dock)	3.48	1.086	3.43	1.172	357	.376	.707
12) On-site availability of watercraft rentals	3.92	1.167	2.99	1.444	355	6.735	.000***

* $p \leq 0.05$, two-tailed. *** $p \leq .001$, two-tailed.

Scale: 1 = *not important*, 3 = *moderately important*, 5 = *very important*.

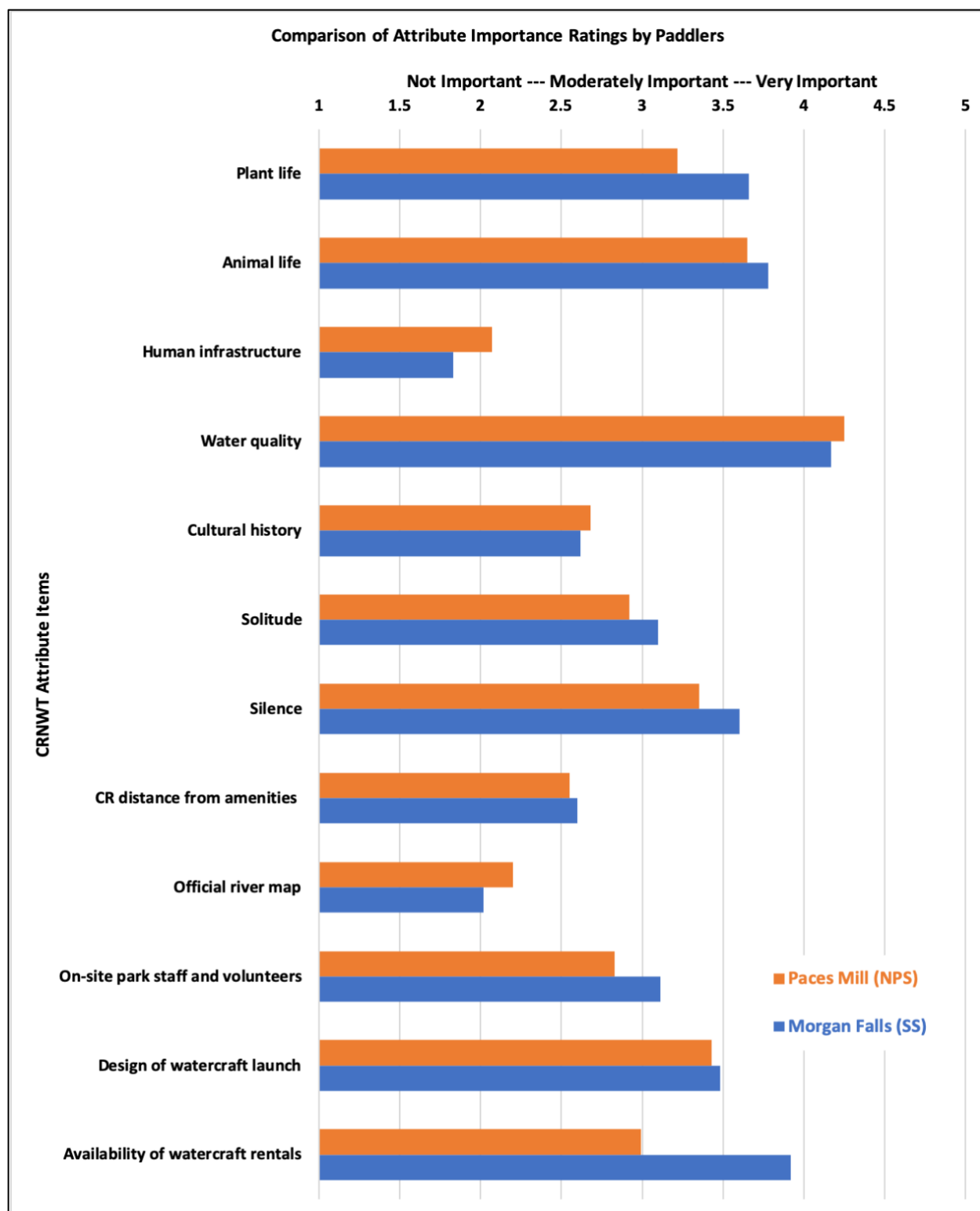


Figure 9. CRNWT Attribute Importance Ratings Between MF and PM.

Table 7. Independent Samples T-Tests for Attribute Performance Between MF and PM.

Scale and statement description	Morgan Falls (SS)		Paces Mill (NPS)				
Attribute Performance Statements	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
1) Having a variety of plant life	3.63	.923	3.47	.853	344	1.693	.091
2) Having a variety of animal life	3.05	1.045	3.36	.947	341	-2.936	.004*
3) Having signs of human civilization (e.g., human infrastructure, development)	3.26	.984	3.26	1.165	356	.022	.983
4) Water quality (cleanliness) of the river	3.15	1.127	3.14	1.004	339	.098	.922
5) Showcasing the cultural history of the river	2.34	1.123	2.25	1.013	341	.746	.456
6) Having opportunities for solitude (e.g., lack of other paddlers)	2.89	1.086	2.54	1.120	354	3.060	.002**
7) Having opportunities for silence	3.52	1.086	3.13	1.062	350	3.471	.001***
8) Distance of the river site from nearest amenities (e.g., food, gas, supplies)	3.81	.906	3.68	1.001	357	1.308	.192
9) Providing an official river map	2.57	1.168	2.97	1.238	356	-3.104	.002**
10) On-site availability of park staff and volunteers	3.75	1.127	3.07	1.180	355	5.563	.000***
11) Design of watercraft launch (i.e., boat ramp, dock)	4.34	.900	3.72	.956	356	6.403	.000***
12) On-site availability of watercraft rentals	4.62	.706	4.01	.948	347	6.968	.000***

* $p \leq 0.05$, two-tailed. $p \leq 0.01$ **, two-tailed. *** $p \leq .001$, two-tailed.
Scale: 1 = *poor*, 3 = *good*, 5 = *excellent*.

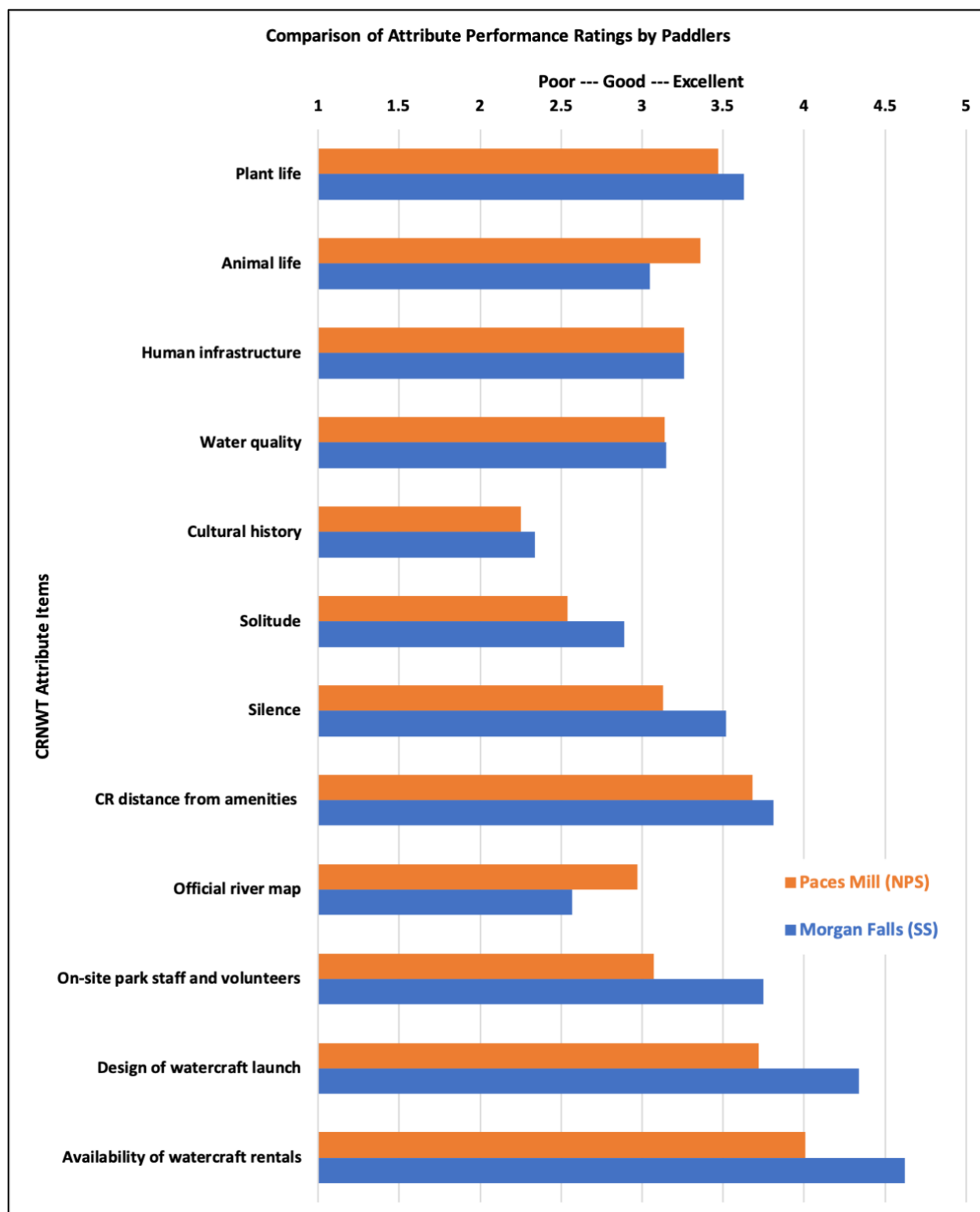


Figure 10. CRNWT Attribute Performance Ratings Between MF and PM.

Table 8. Colorized¹ Attribute Quadrant Placement by Study Site and Combined.

CRNWT Attributes	Overall	Morgan Falls	Paces Mill
A) Plant life	Q1: Keep up the good work	Q1: Keep up the good work	Q1: Keep up the good work
B) Animal life	Q2: Concentrate here	Q2: Concentrate here	Q1: Keep up the good work
C) Human civilization	Q3: Low priority	Q3: Low priority	Q4: Possible overkill
D) River map	Q3: Low priority	Q3: Low priority	Q3: Low priority
E) River cultural history	Q3: Low priority	Q3: Low priority	Q3: Low priority
F) Park Staff/Volunteer Presence	Q4: Possible overkill	Q4: Possible overkill	Q3: Low priority
G) Solitude	Q3: Low priority	Q3: Low priority	Q3: Low priority
H) Distance from amenities	Q4: Possible overkill	Q4: Possible overkill	Q4: Possible overkill
I) Water Quality	Q2: Concentrate here	Q2: Concentrate here	Q2: Concentrate here
J) Design of Watercraft launch	Q1: Keep up the good work	Q1: Keep up the good work	Q1: Keep up the good work
K) Opportunities for silence	Q1: Keep up the good work	Q1: Keep up the good work	Q2: Concentrate here
L) Availability of watercraft rentals	Q1: Keep up the good work	Q1: Keep up the good work	Q4: Possible overkill
¹ Color patterns developed for ease of interpretation: green = Q1: Keep up the good work, red = Q2: Concentrate here, orange = Q3: Low priority, blue = Q4: Possible overkill			

Measuring Stewardship

Using SPSS, an independent-samples t-test was conducted to determine if there were differences in paddlers' SBs between both study sites at Morgan Falls and Paces Mill. The t-test revealed no statistically significant differences existed between the two sites for the specified SBs produced by Larson et al., 2018 (Table 9). However, the seven-statement scale did have a high level of internal consistency with a Cronbach's alpha of 0.868. Additionally, the results showed that specific SBs are more likely to be performed than others (Figure 11) and that paddlers in general do report a high likelihood of performing SBs. For example, SBs regarding

voting for laws to protect the CR and picking-up trash others left behind on the river are likely to be performed by paddlers. Stewardship behaviors that did not receive high scores or where paddlers reported being unsure as to likelihood of performing the behavior were participating in an environmental organization supporting the CR as well as expressing political views related to changing policy or legislation of the CR.

Table 9. Independent Samples T-Tests for Stewardship Behavior Items Between Each Site.

Scale and statement description	Morgan Falls (SS)		Paces Mill (NPS)				
Stewardship Behavior Scale $\alpha = 0.868$¹	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
1) Volunteer for river trash clean-ups	3.22	1.271	3.22	1.270	357	.028	.977
2) Call, write a letter, or express views related to changing policy and legislation related to the CR?	2.72	1.272	2.50	1.259	357	1.659	.098
3) Pick up trash someone else left behind	4.24	.888	4.23	.963	357	.106	.916
4) Talk to others about the importance of protecting the CR for recreation	3.59	1.060	3.66	1.165	357	-.605	.546
5) Pay to support the protection of the CR	3.39	1.097	3.39	1.157	357	.009	.993
6) Participate as an active member in an environmental group or non-profit organization focused on protecting and promoting recreation on the CR	3.01	1.210	3.10	1.254	357	-.676	.499
7) Vote for laws or policies that guard against additional development along the CR	4.12	1.124	4.01	1.177	357	.933	.351

¹Chronbach's alpha for stewardship behavior statements
Scale: 1 = *very unlikely*, 3 = *not sure*, 5 = *very likely*

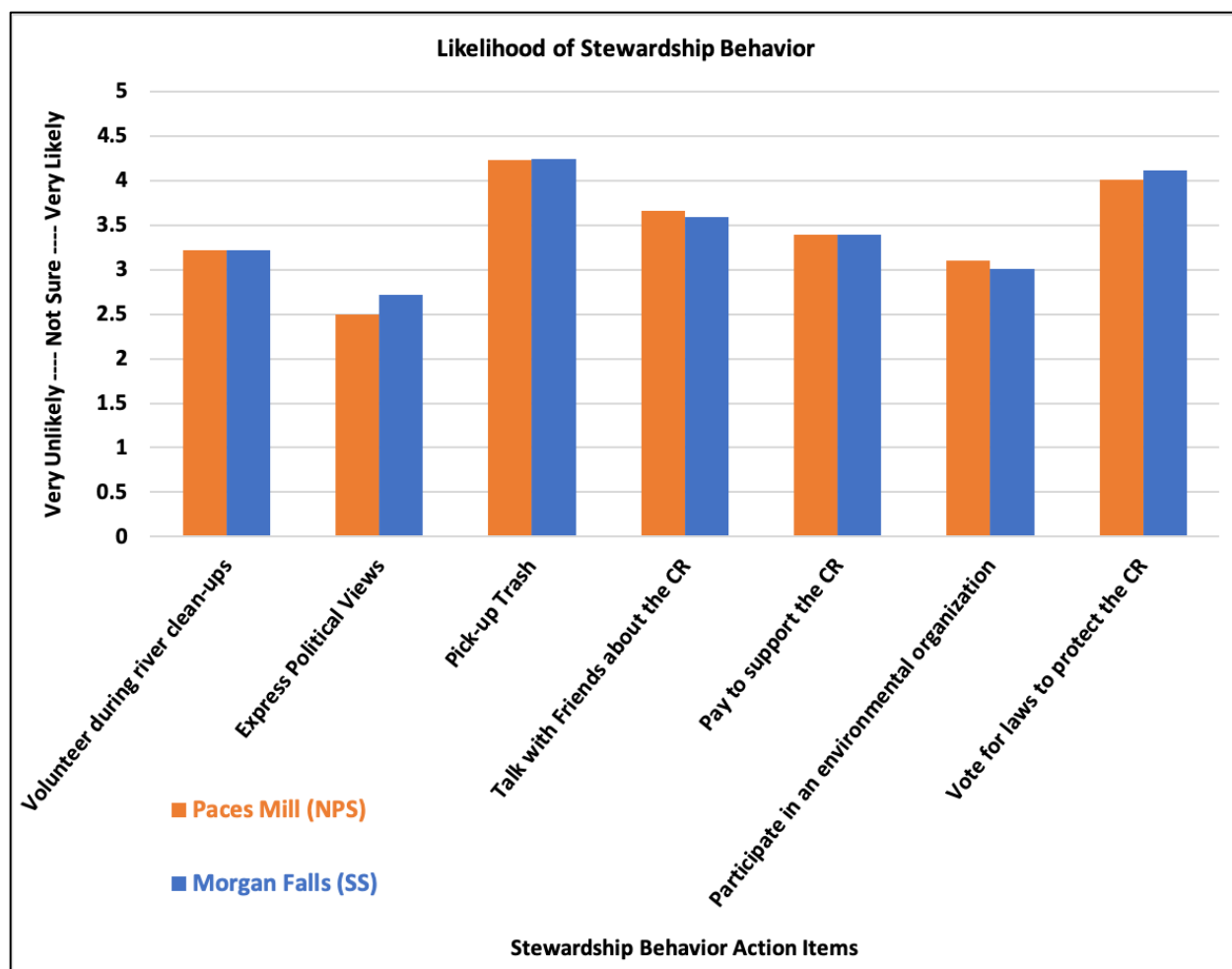


Figure 11. Stewardship Behavior Comparison for Each Study Site.

CHAPTER V

DISCUSSION AND IMPLICATIONS

“We have a tendency to dichotomize discussions of these types of situations-- either stewardship and conservation values are present or they are not, a society can be classed as either “conservationists” or not. The reality is clearly much more complex. It is thus a central challenge for us as researchers to understand better the processes through which different values emerge to dominate among individuals, communities, and societies and how those values are translated into actions” (Lertzman, 2009, p. 353).

This study was designed to investigate perceptions of the CRNWT, its attributes, and SBs of the paddlers it supports in a four-step process which included: (1) creating and administering a CRNWT exit survey of paddlers utilizing the CRNWT to collect data on a) paddlers’ perceptions of CRNWT attributes, b) paddlers’ usage characteristics, and c) sociodemographics; (2) the operationalization CRNWT attributes to measure perceptions of importance and performance (3) the adaptation of a statistically valid and reliable metric to quantify stewardship behaviors (SBs) exhibited by paddlers; and (4) the examination of baseline differences between paddlers’ SBs and attribute measures of importance and performance at MF and PM study sites. A discussion of results along with management implications and suggestions for future research are described in this chapter.

CRNWT Survey Construction and Implementation

Likert-based data is commonly used within the social sciences and is an essential tool for researchers attempting to gain insight into human attitudes, perceptions, and behaviors (Subedi, 2016). However, issues of Likert scale construction, reliability, and validity are frequently debated within the academic literature. The CRNWT survey was created using Likert-based

scales to measure the constructs of importance, performance, and stewardship behavior following common practices and methods from prior social science research (Boone & Boone, 2012).

Throughout the development of the CRNWT survey, it was important to the researchers to keep the survey within a five to seven-minute completion time for respondents while balancing the needs to collect sufficient data to meet the outlined objectives of this study. Furthermore, the time required for survey completion (i.e., completing all four pages of the survey) was critical due to the transient nature of paddlers exiting the CR. For example, paddlers upon exiting the river typically appeared to be wet (i.e., uncomfortable), physically exhausted, and pre-occupied with loading boats back on their vehicles or finding a shuttle. Thus, paddlers typically wanted to take the CRNWT survey quickly to satisfy other, more important needs (e.g., getting in dry clothes, finding local restaurants or food, or boarding the shuttle to get back to their cars at a specific put-in). Notably, time was actually used as an incentive (Appendix F) which anecdotally was generally appreciated by respondents. For example, signs read “survey complete in five minutes” and “no writing required.” Incentivizing the fact that no writing was required for the CRNWT survey (i.e., only circling or checking off answers) may have contributed to respondent’s desire to participate in the CRNWT survey but this question was not investigated.

Time was also a critical component to developing the sections of the survey (i.e., page 1, 2, 3, and 4) and influenced the choice and number of questions, statements, and scales to be included in the survey. It was important that each of the four pages of the CRNWT survey include all statements that correspond to a specific research objective. For instance, page 1 of the CRNWT survey was composed of questions that all related to collecting information of paddlers’

usage characteristics (e.g. frequency of visitation, PWC type, duration of visit, group size, skill level). Likewise, page two was designed to only capture data for the IPA, while pages three and four were each constructed in a similar manner for capturing SBs and sociodemographic information. In essence, the entire CRNWT survey was organized, efficient, and created using best practices identified by Dillman et al. (2014). Additionally, support from the NPS, Morgan Falls Overlook Park, and the Parks, Recreation, and Tourism Management program at the University of Georgia helped to focus the survey questions and statements into only four pages that required five to six-minutes to complete. It should be noted, future research regarding survey methods could attempt to harness an understanding of the elements involved in motivating a respondent to take a survey such as the time required to complete it or other factors (e.g., signage, bias, incentives, curiosity, aesthetics of the SRS, etc.). Additionally, research pertaining to the perceptions of the survey itself such as the medium used (e.g., paper booklet, iPad, take-home), style of questions, aesthetics of the survey, etc. could aid researchers in creating more effective surveys.

Administration of the CRNWT survey was limited by permitting procedures (see: *Methods*). Additionally, the SRS set-up location and visibility to paddlers at each park was crucial. At Morgan Falls, for example, the SRS set-up area was discussed and approved by the park managers on the first day of arrival which is an important aspect to consider when planning a study at a site that requires a permit. The SRS was eventually constructed outside the flow of the outfitter business but adjacent to the parking lot where departing paddlers could see the SRS. Overall, an ideal and visible location was chosen for the SRS, but assuming a SRS location can be set-up wherever the researcher pleases is an assumption that should be evaluated before the research is implemented. Hence, researchers should always check with local management

regarding specific details on how and where participants can be approached or engaged to take a survey.

Similarly, administration of the CRNWT survey at Paces Mill park of the NPS revealed several logistical challenges that were not anticipated beforehand. For example, the section of the CR surrounding Paces Mill is down river of the dam at Morgan Falls. Thus, the current or flow of the CR, which is distinct from the dammed Morgan Falls section, requires that paddlers generally put-in at one location (e.g., Johnson Ferry or Powers Island), paddle with the flow, and then take-out at another location down river (e.g. Paces Mill). These characteristics required paddlers to have transportation (e.g., shuttle) back to their automobiles at the put-in site, which had both positive and negative implications for this study. For example, the NOC rental outfitters provided a shuttle for a ten-dollar fee that picked-up the paddlers and their boats (i.e., often NOC rental boats) at Paces Mill for transportation back to their automobiles typically parked at Powers Island or Johnson Ferry. Numerous opportunities for paddlers to take the CRNWT survey were therefore terminated due to the arrival of the NOC shuttle. For example, paddlers waiting on the shuttle reported being too nervous to begin the survey because the shuttle might arrive, and they didn't want to miss their rides. Conversely, paddlers who did not rely on the NOC shuttle typically were forced to wait for longer periods of time for pick-up by friends, Uber, or their automobiles were already staged at the take-out. This logistical effect resulted in those paddlers generally participating in the survey as they waited and had more time to notice the SRS.

Additionally, Paces Mill presented unique issues regarding the set-up location of the SRS because of the density of paddlers and tubers that exited the river at one time. The high traffic caused the SRS to be blocked by large groups of paddlers and incentive signs were rendered invisible to many exiting paddlers (Figure 12). This visual impairment was not anticipated due to

the assumption that more paddlers would equate to a larger sample size. However, unless signage or methods to intercept paddlers is improved and enhanced, the SRS can be lost in the crowd.

Sociodemographic Profile of Paddler Respondents and Usage Patterns

Examination of paddler usage and sociodemographic data revealed similarities and differences between study sites. For example, while each site resembled similar percentages of female and male paddlers; the age distribution for Morgan Falls paddlers in comparison to Paces Mill paddlers appeared to show discrepancies based upon Figure 4. For example, Figure 4 (see: *Results*) presents an age distribution for Paces Mill paddlers that is skewed-right with a high frequency of paddlers thirty-years of age and younger. Surprisingly, Paces Mill also showed the highest frequency of paddlers seventy-years of age and older. However, a chi-square test of homogeneity was run to compare the age distribution between the two sites and the two multinomial probability distributions actually showed no statistical difference between the age of paddlers at each site $\chi^2 (52) = 61.057, p = .183$. Future research should examine the correlation between activity type (i.e., kayaking, canoeing, tubing, SUPing, etc.), age, and group size to look for trends that may be statistically significant. For instance, Paces Mill had a higher frequency of tubers that typically traveled in large groups. Additional examination of the data may reveal tubers were younger in age (e.g., < 30 y.o.) where floating in groups might be more popular.

Conversely, while the differences in age were not found to be statistically significant, Morgan Falls age data did not show the same skewness of the age distribution, rather, its distribution was more normally distributed with the highest frequency of paddlers between the ages of twenty-six and fifty-years of age. In a similar fashion as Paces Mill, reasons as to this trend were not assessed, but there is an assumption that Morgan Falls paddlers may have been more representative of the local community (i.e., Sandy Springs) which is managed by the City

of Sandy Springs, contrary to the federal government at Paces Mill. Closer inspection of Sandy Springs Census data would be required to verify this assumption and compare to the Morgan Falls paddler age data. Future research should also assess the patterns between age and Stand Up Paddle boarding (i.e., SUPing) as this was the dominant activity type at Morgan Falls. This data may reveal a trend in SUPing popularity for certain age groups which would be beneficial data to managers trying to understand the effects of offering certain watercraft rental options and the types of resource users that may be attracted to rent them.

Likewise, statistically significant differences continued to be found among paddlers between each study site regarding the paddlers' sociodemographic data of education ($\chi^2 (4) = 28.201, p = .000$) and household income ($\chi^2 (5) = 13.190, p = .022$). Morgan Falls, for example, had approximately twice as many paddlers with graduate or professional degrees with less than ten percent of paddlers having equal to or less than technical or trade school education. In comparison, the level of education received by Paces Mill paddlers was generally equal to or less than a bachelor's degree. Additional examination of the data could illustrate that age was the limiting factor as there is an assumed pattern between age, education received, and household income. Furthermore, a link between household income and activity type should be explored to find any potential relationships. For example, inflatable inner tubes are generally much cheaper than canoes, kayaks, and SUP boards, thus people with less household income may tend to prefer activities that require less financial burden or even skill level. However, access to rental outfitters that offer various watercraft choices at much cheaper prices than purchasing a watercraft would also need to be explored to see if a similar pattern exists for rental paddlers. Furthermore, tubing versus other pursuits (e.g., canoeing, kayaking, SUPing) could be evaluated based on mechanisms of effort, skill, or the barriers present to having a recreational experience. For

instance, tubing experiences may require less effort or skill to plan and less logistics in personal watercraft transportation. It is assumed that transporting and managing a tube requires less effort than transporting and managing a kayak or canoe.

Group size and watercraft choice were also variables of interest for investigators based on a noticeable difference between the two sites as illustrated in Figure 5 and Table 5 (see: *Results*). Starting with Morgan Falls, paddlers at this site had twice as many (40.4%) paddlers who were in groups of two than Paces Mill (18.4%). Explanations of this group size difference are possibly related to paddling activity or watercraft choice. As previously discussed, Morgan Falls also had a larger percentage of rental SUPers (e.g., Paces Mill had no SUPers) while Paces Mill catered to personal tubers who were the largest user group (e.g., Morgan Falls had no tubers). These differences were proven by a chi-square test of homogeneity which revealed there were statistically significant differences between the group sizes of paddlers between the two study sites $\chi^2 (4) = 38.639, p = .000$ as well as the choice of watercraft between the two study sites $\chi^2 (9) = 200.246, p = .000$. This dichotomy could be explained by trends or norms specific to paddling activities (kayaking, SUPing, canoeing, tubing) which should be investigated by future research. For example, SUPing may be more common in smaller groups or SUPing might be an activity which is associated with individualistic pursuits of silence or solitude. Interestingly, Morgan Falls paddlers did report higher percentages of importance for solitude and silence attributes than the Paces Mill paddlers. Additionally, trends in personal versus rental watercraft usage should be investigated based off these findings. To note, site or river access park characteristics may influence personal versus rental watercraft choice as well as accessibility. For example, researchers observed *personal* (i.e., paddlers who brought their own PWCs) watercraft users at Morgan Falls being confused as to if river access was public or private. To

explain, the river access pathway to the CR at Morgan Falls starts directly adjacent to the recreational outfitter building and check-in, without explicit signage that all paddlers (i.e., renters and personal watercraft users) can use the pathway. Additionally, many paddlers were unaware of the portage option to continue the CRNWT below the Morgan Falls Dam as no signage or information was observed. Thus, the interactive elements of group size, activity choice, and site characteristics for WT's should be further evaluated to allow NRMs greater leverage in planning and decision making as well as promoting river access for all.

As another example, understanding that a specific WT section largely attracts tubers, may indicate to NRMs that certain infrastructure issues will arise based on trends in tubing and large group sizes. For example, if tubing is considered to be popular for large group sizes, then tubers may require services such as larger restroom facilities, a robust watercraft launch, trash disposal, and potentially larger parking lots. These elements are significant because sites like Morgan Falls, with a floating watercraft launch, would be unable or overwhelmed to facilitate large amounts of resource users putting-in or taking-out of the river based on capacity and safety regulations of the floating launch. Thus, NRMs need to be proactive in understanding paddler use trends as certain river access parks may have to consider building other watercraft launches or result to restrictive use management which takes time, money, and resources. Ultimately, if access is not provided when paddling usage and popularity is increasing, this combination may result in paddlers finding their own ways to exit or access the CR which may involve using private land or the destruction of sensitive riparian habitat. Latham et al. (2019) points out that increased "access can harm riparian vegetation and promote erosion, sedimentation, and eutrophication" (p. 7). Some researchers even suggest that managers should take caution in

promoting WTs until the impacts of users is understood and low impact policies are set in place (Uunila & Currie, 1998).

Interestingly, alcohol use is not allowed at Morgan Falls within the land-based park setting, but once on the WT, which is federal NPS jurisdiction, drinking is allowed. Accordingly, Paces Mill, managed by the NPS, allows paddlers to consume alcohol on the river and within all NPS managed RAPs. However, the percentage of paddlers at Paces Mill consuming alcohol was not investigated, but researchers perceived a significant difference in the amount of alcohol trash (e.g., cans, bottle, cardboard boxes) that was disposed of within two large trash receptacles after each survey day (Figure 12). The “CRNRA Units [RAPs or parks] are strong destinations that are accessible to a much broader population demographic who may not have a context for or a compelled interest in recreation that Leaves No Trace, a strict regulatory compliance, or respect for natural resources.” (Wimpey, 2018, p. 14).

Lastly, discrepancies in the paddle hours or time spent on the CRNWT for paddlers at each study site were found to be statistically significant based on a chi-square test of homogeneity, $\chi^2 (5) = 108.500, p = .000$. Approximately 76% of paddlers at Morgan Falls spent one to two-hours on the CR while 68% of paddlers at Paces Mill spent two or more hours on the river. Mentioned previously, the water flow characteristics are assumed to be the reason for this discrepancy. For example, the paddle route from Powers Island (i.e., the put-in site that received the largest access frequency for the NPS section) (Figure 3) to Paces Mill is approximately 3.5 miles. To paddle or float this section from Powers Island to Paces Mill takes 1.5 – 3 hours which corresponds to the results. Conversely, Morgan Falls paddlers were free to roam and paddle the Bull Sluice Lake environment because of the negligible flow rate of the river created by the Morgan Falls Dam.



Figure 12. Paces Mill Trash Receptacles (left) and Blue SRS Tent (rear).

Thus, paddlers were not locked-in to navigate a pre-determined distance between the put-in and take-out. Another explanation for the shorter paddle time spent on the CR by paddlers at Morgan Falls concerns rental fees. Paddlers at Morgan Falls, who relied on rentals more so than Paces Mill paddlers, paid for the rentals per hour thus financial constraints may have played a role in amount of time rental paddlers spent on the CR. Future research should investigate how time or duration of a paddle experience influences perceptions and SBs.

In general, usage patterns were focused on in the aforementioned discussion as those variables were expected to produce the most discrepancies between sites. However, some results were surprising concerning the specific differences in paddler age, group size, and activity type (i.e., watercraft choice). Implications from these findings support the notion that WT usage by paddlers may significantly vary between sites and differences in management objectives of river access parks may influence the overall recreation experience along the WT. Further research

should compare and contrast other management sites which provide recreation opportunities and access to the CRNWT to bolster the understanding of interagency dynamics of usage and sociodemographic characteristics of paddlers.

Importance Performance Analysis

As Latham et al. (2019) put starkly, “For managers, deep detail gets in the way of time-conscious decision-making. In other words, specific scientific knowledge must be adapted to general management needs (despite identified variability or uncertainties), providing approaches that can fit many situations, or it is ignored” (p. 19). An importance performance analysis is a tool that facilitates understanding of general management needs for NRMs without the deep detail as mentioned by Latham and colleagues (2019). This study is the first to utilize an importance performance analysis (IPA) to understand paddlers’ perceptions of water trail attributes.

Results indicated that paddlers perceptions of WT attributes were generally similar between both study sites at Paces Mill and Morgan Falls. In particular, attributes such as (I) *water quality*, (B) *seeing wildlife*, (J) *the design of the watercraft launch*, and (K) *opportunities for silence* were all found to be of high importance between both sites. These findings reinforce prior research which also found water quality and wildlife attributes to be important to river users (Hua & Chen, 2019; Weber & Ringold, 2019; Larson et al., 2013). However, Weber and Ringold (2019) on river attributes reported that “trees, fish, and birds were highly prevalent themes, yet people rarely mentioned specific types” (p. 17). Thus, further research into WT attributes could explore specific examples which are less vague such as identifying which types of wildlife paddlers prefer or how paddlers define water quality. Insight into the types of wildlife paddlers enjoy could allow NRMs to put efforts in place to protect habitat or improve education.

Furthermore, Nassauer (1993) stated that people who are more knowledgeable about biodiversity and its importance are more likely to appreciate it. Levels of environmental or ecological knowledge were not assessed, but the results do illustrate that Morgan Falls paddlers were generally more educated ($\chi^2 (4) = 28.201, p = .000$) as well as rated attributes of plant and animal life to be slightly more important than Paces Mill paddlers (see: *Results*).

Regarding water quality, for example, the main questions revolve around how paddlers interpret or define water quality. Do they think that water quality is defined by the clarity of the water, its drinkability, the ability to safely swim without getting sick, or the level of bacteria present? The answer may be a combination of two or more of these attributes. Interestingly, the CR water quality levels used to promote safe recreation is largely managed through a system called BacteriAlert by the USGS (USGS, 2019). Basically, the USGS records daily updates of the levels of E-coli bacteria found in the CR. When levels are above a certain threshold, paddling or other forms of river recreation are not advised. However, distribution and education efforts of this data was not evaluated. Unfortunately, E-coli levels were not recorded for each survey day, yet investigators noted paddlers and management did report being aware of high levels on certain days (i.e., typically after rainfall and run-off) which caused the paddlers to try and avoid contact with the water. In general, it appeared to researchers that paddlers were unaware of exactly how to interpret the BacteriAlert levels or did not even know that bacteria monitoring existed for the CR. When a general understanding of E-coli and bacteria levels are not understood by paddlers, promoting bacteria level announcements might not be the most effective way to promote water quality education due to the idea that any level of bacteria or E-coli found could be considered bad to an uneducated paddler. Insight into these matters can allow NRM to target or reframe specific water related educational campaigns or environmental standards to improve the

recreation experience along the CRNWT. Overall, the insight gained from exploring simple comparisons of attribute *importance* can begin the foundation of a discussion by NRMs to infer as to why some attributes are more important than others. Understanding which attributes are more important to paddlers as well as their levels of performance can then facilitate management decisions and interventions that are framed within *public* perceptions of the WT that are often more readily accepted (Smardon et al., 2018).

Additionally, the results illustrated that between the two study sites, paddlers' *perceptions* of WT attributes were similar regarding the highest performing ones. These attributes included (L) *access to watercraft rentals*, (J) *the design of the watercraft launch*, and (H) *the distance of the CR to nearby amenities*. Specifically, watercraft rentals were a large influencer of paddling activity on the CRNWT as illustrated in Table 5. In fact, a high percentage of paddlers relied on rental PWCs to paddle the CR. Thus, it is not surprising that paddlers generally reported high levels of performance for both outfitters at each site. Interestingly, paddlers at Morgan Falls relied more heavily on renting PWCs for their recreation experiences as well as considered availability of watercraft rentals to be more important than did paddlers at Paces Mill. A possible explanation for this is that Morgan Falls reported a higher percentage (47%) of first time CR paddlers than Paces Mill (37.4%). It is assumed that first time paddlers do not own their own PWCs and perhaps rely on rental outfitters to provide them.

In comparison, the results also indicated similarities in attributes that are considered to be of *low importance* which offers a unique perspective that might not be appreciated by NRMs. For example, the three attributes (D) *having an official river map*, (E) *cultural history of the CR*, and (C) *signs of human infrastructure* were considered by paddlers at both sites to be only “somewhat important” based on the five-point Likert scale. To highlight an example, the low

importance of the *cultural history of the CR* attribute is significant because educational signage was noted by researchers at both parks which is assumed to require financial resources to construct. However, implications from these findings may signify that allocating money for cultural educational signage is not the most effective way to showcase cultural information because it is not perceived to be important by paddlers. Thus, financial resources can be used in different ways or for other priorities. Further investigations should be made into the perceptions of cultural and historical signage including the finances required to develop, construct, and maintain the signage. A relationship may be found that shows more expensive signage impacts users the same as low budget signage as it is not generally noticed or appreciated.

However, it is important to understand, signage regarding WT management elements such as exit signs, rules and regulations, mile markers, etc., should also be investigated separately from cultural and historical signage as these signs may be interpreted differently by users. Many management signs are specifically placed for safety education and risk management reasons thus the decision-making framework for installing these signs might be more rigid. Regardless, theory into how signs are designed, how they are placed along the WT, and perceptions of them by users should be developed (For more information see: Michigan Water Trail Manual, 2017). Additionally, other *creative engagement* efforts such as murals or works of art along a WT should be investigated by NRMs as these attributes can bring wider attention to a WT (Smardon et al., 2018)

Another surprising finding was that having a river map while paddling on the CR was surprisingly considered to also be of low importance. Reasons for this could be that paddlers at Paces Mill did not require a map to navigate because the route is relatively simple (i.e., there are no deviations or alternate routes of the river) with adequate exit signage at Paces Mill (Figure

13). However, the NPS *does* have an official CR map that is widely accessible on-site at all NPS park units (e.g., Powers Island, Johnson Ferry, and Paces Mill) or online. Thus, Paces Mill paddlers may have used a map to visualize and memorize the simple route but considered having an official river map while paddling as only somewhat important. Evidence of this can be inferred from the “good” performance of the *river map* attribute for Paces Mill paddlers which signifies there was exposure or at least awareness of the NPS Chattahoochee River map. Conversely, Morgan Falls paddlers did not have on-site access to the official NPS CR map, but rental paddlers were shown a small Google Earth print-out of the Bulls Sluice Lake that was provided at check-in with the rental outfitter. Thus, Morgan Falls paddlers perceived the performance of access to an official river map as more “Fair” than “Good.” In conclusion, it is important to realize that many ratings of attribute importance and performance for paddlers may be experiential based (Oh,2001). Hence, a paddler may or may not realize the importance of an attribute until having experienced it within a diversity of settings. Future research should investigate the perceptions of river maps and the influence maps may have on the recreational experience. For example, maps that are aesthetically pleasing and contain educational information regarding locales of wildlife, plant-life, and other cultural sites along the river may promote stewardship or facilitate education better than land-based signage. In general, efforts to understand paddlers’ perceptions of maps and signage as well as their impact on the recreational experience should be headed by NRMs before limited time and financial resources are devoted to establishing them.



Figure 13. Paces Mill Large Yellow Exit/Take-out Signage on River Right.

After the similarities in importance and performance of attributes between the two sites were assessed individually, the attributes were analyzed via an IPA where specific management actions could be interpreted. Table 8 (see: *Results*), combines IPA results portrayed in Figures 6, 7, and 8, and illustrates the comprehensive results of the IPA based on both study sites and overall (i.e., combined). Of particular interest, the attributes designated within the “Q2 – concentrate here” quadrant will be focused on for the following discussion using the data-centered method explained by Azzopardi and Nash (2013). Additionally, the results of the t-tests suggest that statistical differences between ratings of importance and performance for specific attributes do exist (see: *Results*). The t-test findings can provide a foundation for interagency collaboration and communication regarding why statistical differences occurred along the CRNWT for specific attributes.

Regarding Table 8 and IPA placement of attributes overall (i.e., MF and PM sites combined), paddlers on the CRNWT were dissatisfied by the attribute of (B) *seeing animals or wildlife* while paddling on the CR due to paddler attribute ratings of high importance yet low

performance. Based on the expectancy disconfirmation paradigm (Oliver, 1980), this combination of perceptions placed the wildlife attribute in the “Q2- concentrate here” quadrant which should focus the attention of NRMs. Based off this result, NRMs should first understand why seeing wildlife on the river might be of suboptimal performance, then second, proceed to making decisions on how to improve it. However, when the overall IPA results were divided into site specific results seen in Figures 6 and 7, the wildlife attribute was located in different quadrants.

For example, when the wildlife attribute is analyzed within the Paces Mill setting, it is located in the “Q1- keep up the good work” quadrant while at Morgan Falls it is located in the “Q2 – concentrate here” quadrant. This discrepancy in responses may be due to the temporal effects of more time spent on the water which may provide more opportunities for wildlife sightings at Paces Mill. It could also be that the Paces Mill section genuinely harbors more wildlife habitat than Morgan Falls which is why the performance is better. Determining the reasons why this difference occurred for the wildlife attribute along with other attribute differences was not investigated or a part of the research objectives, but future WT research endeavors should potentially employ qualitative methods to gain deeper insight into importance and performance ratings of attributes.

Moving on, the attribute *water quality* was also found to be in the “Q2- concentrate here” quadrant for all IPA categories (i.e., overall, PM, and MF). To note, the CRNRA Trail System Assessment highlights that the original conception for the CRNRA in the 1970’s was to protect water quality and other natural resources found within the recreation area (Wimpey, 2018). Indicated by “Q2 – concentrate here” placement in the results, protecting, monitoring, and educating users on *water quality* of the Chattahoochee River (CR) will be a consistent and

potentially forever-lasting management objective. Regardless, future research should focus on mechanisms to improve public perceptions of the CR's water quality so that the NPS can continue providing and improving high quality recreational experiences for WT paddlers.

Finally, the last attribute to be placed within the "Q2 – concentrate here" quadrant was the *opportunities for silence* attribute at Paces Mill. Paddlers at Paces Mill were generally dissatisfied with their opportunities for silence which caused the attribute to be placed into the "Q2 – concentrate here" quadrant. This finding can potentially indicate to NRMs that this particular WT section on the CR is experiencing high use or crowding which may limit the opportunities for silence. Again, the Paces Mill WT section did have a higher percentage of groups paddling together which may be a possible explanation for the noise level or perceived dissatisfaction. In some cases, the results showed the Paces Mill section could have a group of twenty or more people paddling together which is assumed to create a higher noise impact. Interestingly, this grouping behavior could also be linked to behavioral norms or trends in the watercraft or activity choice (e.g. tubing). Unfortunately, within urban WT environments that are increasing in paddling demand, paddlers who place a high importance on opportunities for silence may be displaced to other less noisy WTs or forced to alter their recreation experiences and expectations. The NRMs should thus consider how noise levels produced by other paddlers or other urban elements (automobiles, trains, machinery, etc.) may affect paddling usage along a WT. In conclusion, NRMs can identify failing attributes (i.e., Q2 attributes) through an IPA which can then be combined with targeted stewardship actions or policies to move the attribute into the "Q1-keep up the good work" quadrant. Ultimately, NRMs may rely on community-based local environmental stewardship actions as well as facilitation and education of stewardship behaviors to accomplish this quadrant change.

Measuring Stewardship

“As staffing levels are unlikely to change, a concerted effort to build volunteer and other external stewardship capacity is the most vital need in redeveloping and managing the CRNRA toward a more sustainable future.” (Wimpey, 2018, p. 16). Knowledge of stewardship behaviors, specifically, which behaviors or actions paddlers are likely to engage in, can help NRMs target and leverage educational materials and other efforts that foster further stewardship (Landon et al., 2018). The results of this research helped to identify specifically which SBs paddlers may be more likely to be engaged in. Interestingly, the stewardship actions that were the most likely to be performed were *picking up trash someone else left behind* or *voting for laws that guard against additional development along the CR*. Reasons as to why certain SBs were not investigated but motivations for these two stewardship behaviors could include paddlers find picking up trash easy, they want to be seen by their peers to be picking up trash for social reasons, and/or they are genuinely concerned about trash being in the river and want to help (Bennett et al., 2018). In a similar fashion, paddlers may be likely to vote for anti-development laws along the CR due to negative perceptions of increased human infrastructure visible from the river or based on the idea that more development is a bad thing for the river. Obviously, finding answers as to why certain SBs are more likely than others is a complex process which will require further conceptual and theoretical development of stewardship. However, it is also reassuring to see in the results that paddlers reported high likelihoods of performing SBs. This finding is promotive of WT development which relies on the stewardship actions of paddlers. Future research into recreational stewardship should investigate discrepancies in SBs between recreation pursuits or sports (e.g., paddlers vs. hikers). Most importantly, however, this study

identified which SBs NRMs on the Chattahoochee River should prioritize based on the results of the seven statement SB scale utilized in the CRNWT survey.

For instance, the results illustrated that *picking up trash someone else left behind* is more likely to be done than *to call, write a letter, or express views related to changing policy and legislation on the CR*. Again, identifying reasons that provide answers to this discrepancy was not part of the research objectives, but it may be that certain SBs are more involved (e.g., financially, physically, cognitively) than others and some SBs are easier to perform. To illustrate this idea with another example based on the results, NRMs on the CR may be more effective organizing and advertising a river trash clean-up compared to promoting membership within a local friend's group that supports the CR. This dichotomy in effectiveness of stewardship promotion is because becoming a member of a local friend's group may involve financial resources and other time commitments. However, trends in low versus high-effort SBs should be explored to continue the work of Larson et al. (2018).

Fascinatingly, Bennett and colleagues (2018) mentioned that simple stewardship actions such as volunteer river trash clean-ups often exposed stewards to one another where ideas were then shared, and other stewardship related issues were exposed. These small-scale encounters can be a conduit for other larger, global stewardship actions (Bennett et al., 2018). In other words, NRMs may need to start small by first attracting stewards for simple projects or actions where community can first be built. Afterwards, more advanced or high-effort SBs can then be slowly developed through successive stewardship involvement on the CR. At the very least, identifying which SBs are more likely to be performed by WT paddlers can lead NRMs to create more effective stewardship campaigns and facilitation programs. Overall, further research should help identify a large list of potential SBs that WT paddlers are likely to perform. Perhaps then

specific WT stewardship initiatives or facilitation protocols can be developed based on those SBs that apply to WTs across the US.

To that point, the results encouragingly showed that paddlers likelihood of performing SBs did not vary between the Morgan Falls and Paces Mill sites. Remarkably, the results showed that paddlers at both sites reported nearly identical measures of stewardship likelihood for all seven stewardship statements. This result is significant because it may signify that SBs are universal for all paddlers and are not influenced by management agency, sociodemographics, or usage characteristics. Thus, a common understanding of paddler SBs could facilitate interagency collaboration. Collaboration could then allow certain agencies on the CR that have more capacity (e.g., assets and governance) as well as stewards with high levels of motivations to interweave or share distribution of stewardship efforts throughout the CRNWT (Bennett et al., 2018).

Overall, as Landon and colleagues (2018) stated, paddlers or other resources users (e.g., anglers) who rely on rivers, typically have a unique connection and perspective of the river resource thus their perspectives and actions are instrumental in protecting it. Because of this bond, NRMs need to be holistic in their approach towards a stewardship intervention through understanding the current dynamics of stewardship already at work. In an effort of NRMs to meet their own stewardship goals, certain levers may be pulled that diminish the effectiveness or respect of the local efforts (Bennett et al., 2018). This statement provides further evidence of the importance of collaboration between WT management agencies and specific knowledge of current SBs being performed along the CR. Identifying and implementing SBs is a complex task for NRMs that involves deciding between goals and priorities, establishing stewardship incentives, balancing societal constraints, and making effective decisions without complete certainty (Latham et al., 2019). Hopefully, fostering stewardship behaviors will lead to deeper

physical and emotional connections to the CR. “By restoring people’s cultural and emotional connection to their local rivers, these fragile ecosystems stand a much better chance against future unsustainable exploitation” (Aberg & Tapsell, 2013, p. 102).

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APPENDICES

Appendix A: CRNWT Survey

Date/TOD:
A Chattahoochee River Paddler Experience Survey  Warnell School of Forestry & Natural Resources UNIVERSITY OF GEORGIA We are conducting research about paddler's experiences on the Chattahoochee River (CR). Your input will be used to help shape future use of the river. The survey will take approximately 5 minutes to complete. Your answers will be anonymous & kept confidential. Thank you for your help! Please check ONLY ONE ANSWER (☑) for each question unless stated otherwise. 1. Where did you <u>access/put-in</u> on the Chattahoochee River today? ☐ Morgan Falls Overlook Park/Dog Park (SS) ☐ Power's Island (NPS) ☐ Johnson Ferry Park North (NPS) ☐ Private land ☐ Other (<i>please specify location here</i>): _____ 2. Approximately, how many hours did you paddle on the Chattahoochee River today? ☐ < than 1 hour ☐ 1 - 2 hours ☐ 3+to 4 hours ☐ Other (<i>please write # of hours</i>): _____ ☐ 2+ to 3 hours ☐ 4+to 5 hours 3. Which <u>watercraft</u> did you paddle on the CR today? ☐ Personal Canoe ☐ Personal Kayak ☐ Personal Stand-Up Paddle board (SUP) ☐ Personal Tube ☐ Other (<i>please specify type of craft here</i>): _____ ☐ Rental canoe ☐ Rental kayak ☐ Rental SUP ☐ Rental Tube ☐ Raft 4. How many people were with you on the CR today as a group (including yourself)? ☐ 1 person (Myself/Solo) ☐ 2 people ☐ 3 people ☐ 4 people ☐ > 4 (<i>please write # of people here</i>): _____ people 5. Approximately, how many <u>days per year</u> do you paddle <u>this section</u> of the river? ☐ Today is my first time paddling this section ☐ 1-2 days per year ☐ 3-4 days per year ☐ 5-6 days per year ☐ 7+ days per year ☐ other (<i># of days here</i>): _____ days 6. How would you best describe your <u>level of experience</u> with paddling before today? ☐ Beginner/novice paddler ☐ Intermediate paddler ☐ Advance paddler ☐ Professional guide/instructor 7. How likely are you to post pictures on social media of your experience today? ☐ Very Unlikely ☐ Unlikely ☐ Not Sure ☐ Likely ☐ Very Likely

Please **CIRCLE** ONLY ONE NUMBER for each of the statements below

How IMPORTANT are the following when you go paddling?

	Not Important	Slightly Important	Moderately Important	Important	Very Important
Seeing a variety of plant life	1	2	3	4	5
Seeing a variety of animal life	1	2	3	4	5
Seeing signs of human civilization	1	2	3	4	5
Having an official river map	1	2	3	4	5
Learning about the cultural history of the river	1	2	3	4	5
On-site availability of park staff/volunteers	1	2	3	4	5
Solitude (i.e., lack of other paddlers)	1	2	3	4	5
Distance of the river site from the nearest amenities (<i>food, gas, supplies</i>)	1	2	3	4	5
Water quality (cleanliness) of the river	1	2	3	4	5
Design of the watercraft launch (i.e. ramp, dock)	1	2	3	4	5
Opportunities for silence	1	2	3	4	5
On-site availability of watercraft rentals	1	2	3	4	5

How well does this section of the Chattahoochee River PERFORM on...?

	Poor	Fair	Good	Very Good	Excellent
Having a variety of plant life	1	2	3	4	5
Having a variety of animal life	1	2	3	4	5
Having signs of human civilization	1	2	3	4	5
Providing access to an official river map	1	2	3	4	5
Showcasing its cultural history	1	2	3	4	5
Availability of on-site park staff or volunteers	1	2	3	4	5
Solitude (i.e., lack of other paddlers)	1	2	3	4	5
Its location to nearby amenities (food, gas, etc.)	1	2	3	4	5
Its water quality (cleanliness)	1	2	3	4	5
Having a well-designed watercraft launch (ramp/dock)	1	2	3	4	5
Having opportunities for silence	1	2	3	4	5
Availability of watercraft rentals	1	2	3	4	5

8. Overall, how satisfied are you with your experience paddling on the CR today?

☐ Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied

How LIKELY are you to engage in the following behaviors related to the Chattahoochee River in the next 12 months?

	Very Unlikely	Unlikely	Not Sure	Likely	Very Likely
Volunteer for river trash clean-ups	1	2	3	4	5
Call, write a letter, or express views related to changing policy and legislation related to the CR	1	2	3	4	5
Pick-up trash someone else left behind	1	2	3	4	5
Talk to others about the importance of protecting the CR for recreation	1	2	3	4	5
Pay to support the protection of the CR	1	2	3	4	5
Participate as an active member in an environmental group or non-profit organization focused on protecting and promoting recreation on the CR	1	2	3	4	5
Vote for laws or policies that guard against additional development along the CR	1	2	3	4	5

9. How likely are you to recommend paddling this section of the CR to others?

☐ Very Unlikely ☐ Unlikely ☐ Not Sure ☐ Likely ☐ Very Likely

How strongly do you DISAGREE or AGREE with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
The CR means a lot to me	1	2	3	4	5
I would rather use the CR then another river	1	2	3	4	5
The CR says a lot about who I am	1	2	3	4	5
The CR is the best place for doing the things I enjoy	1	2	3	4	5
I really miss the CR when I am away too long	1	2	3	4	5
I feel happiest when I am on the CR	1	2	3	4	5
I feel that I can really be myself when I am on the CR	1	2	3	4	5
I am very attached to the CR	1	2	3	4	5
I have a special connection to the CR & the people in the area	1	2	3	4	5

ALL ANSWERS ARE KEPT ANONYMOUS AND CONFIDENTIAL

10. What is your ZIP code? _____ (used to see where visitors come from to paddle the CR)

11. What gender do you identify with?

- ☐ Female ☐ Male ☐ Other (please specify) _____

12. What is your age? _____

13. What is your race/ethnicity? (Check ALL that apply)

- ☐ American Indian ☐ Black or African American ☐ White/Caucasian
☐ Asian ☐ Hispanic/Latino ☐ Other

14. What is the highest level of education that you have completed? (Please check ONE box):

- ☐ Some high school ☐ College, tech. school, ☐ Graduate/professional degree
☐ High school/GED or advanced degree (MS, MD, DVM, PhD, etc.)
☐ Bachelor's/Associates
Degree

**15. Please indicate your total household income range before taxes last year
(Please check ONE box)**

- ☐ Less than \$25,000 ☐ \$35,000 to \$49,999 ☐ \$75,000 to \$99,999
☐ \$25,000 to \$34,999 ☐ \$50,000 to \$74,999 ☐ \$100,000+

16. How many of the people in your group were under the age of 18?

- ☐ Please write the # of minors that paddled in your group: _____
☐ No minors were in our group

17. Lastly, what other activities did you participate in today while on the river? (Check ALL that apply)

- ☐ Fishing ☐ SUP Yoga ☐ Trash Pick-up
☐ Hired Guide ☐ Swimming ☐ None
☐ Photography ☐ Other _____

THANK YOU!

Thank you so much for your time & feedback.
If you would like more information about this survey
or results, please contact:

Ben Fowler at thefowlerben@uga.edu

or

Dr. Gary T. Green
University of Georgia Warnell School of Forestry &
Natural Resources, Building 1, Office 1-301

Warnell School of Forestry
and Natural Resources
180 E Green Street
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TEL. 706-542-2686 | FAX 706-542-8356
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Appendix B: UGA IRB Approval



Tucker Hall, Room 212
 310 E. Campus Rd.
 Athens, Georgia 30602
 TEL 706-542-3199 | FAX 706-542-5638
 IRB@uga.edu
<http://research.uga.edu/hso/irb/>

Human Research Protection Program

EXEMPT DETERMINATION

May 1, 2019

Dear [Gary Green](#):

On 5/1/2019, the Human Subjects Office reviewed the following submission:

Title of Study:	Examining the Paddler Experience – Analysis of Attribute Importance-Performance (IPA), Recreational Stewardship & Place Attachment on the Chattahoochee River National Water
Investigator:	Gary Green
Co-Investigator:	Benjamin Fowler
IRB ID:	PROJECT00000429
Funding:	None
Review Category:	Exempt, HHS 2(i)

We have approved the protocol on 5/1/2019. Please submit a Progress Report by 4/30/2024.

This is an Exempt study, so it's not necessary to submit a modification for minor changes to study procedure. You can keep us informed of changes that don't affect the risk of the study by using "Add Public Comment".

Please close this study when it is complete.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103).

Sincerely,

William Westbrook, IRB Analyst
 Human Subjects Office, University of Georgia

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An Equal Opportunity, Affirmative Action, Veteran, Disability Institution

Appendix C: NPS Scientific Research and Collecting Permit

 SCIENTIFIC RESEARCH AND COLLECTING PERMIT Grants permission in accordance with the attached general and special conditions United States Department of the Interior National Park Service Chattahoochee River	Study#: CHAT-00138 Permit#: CHAT-2019-SCI-0003 Start Date: May 04, 2019 Expiration Date: Jul 15, 2019 Coop Agreement#: Optional Park Code:
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Name of principal investigator: Name: Benjamin Fowler Phone: 404-625-0534 Email: thefowlerben@uga.edu
Name of institution represented: The University of Georgia
Additional investigators or key field assistants: Name: Dr. Gary T. Green Phone: 706-296-3029 Email: gtgreen@uga.edu
Study Title: Examining the Paddler Experience -- Analysis of Attribute Importance-Performance, Recreational Stewardship & Place Attachment on the Chattahoochee River National Water Trail
Purpose of study: Water trails (WTs) may be the next frontier of recreational opportunity pursuits as land-based recreation faces a host of unprecedented natural resource management challenges. A WT, or blueway, is very similar to a hiking trail, except what is normally done on foot and on land, is done by canoe, kayak, Stand Up Paddle (SUP) board, or other human-powered personal water craft (PWC) on water. However, much is not understood relating to a WT's development, implementation, use, long-term management and recreation benefits. As the first nationally designated WT by the U.S. Secretary of Interior in 2012, the Chattahoochee River (CR) National Water Trail (CRNWT) sets the stage for a new era of water-based recreation management and planning, yet its own future and use has largely been "untapped" in research and management vision. The Chattahoochee River National Recreation Area (CRNRA), signed into protection in 1978 by President Jimmy Carter, is composed of approximately 20 discrete, land-based units housing various river access parks (RAPs) which are dotted along the CRNWT (Read et al., 2011). These land units and RAPs, spanning four different metro Atlanta counties, comprise roughly 9,238 acres of which 4,500 are federally owned and managed while the remaining acres are managed by a mixture of regional and city governments. The CRNRA and CRNWT combined, form a tremendous natural resource duo and recreational asset as both land and water attract approximately 3.5 million visitors annually according to 1999 estimates. Together, the natural resource managers (NRMs) along the CR, both federally situated and those operating within municipal recreation and parks divisions, are facing an increasingly difficult task of striking a balance between preservation & enhancing the experience of outdoor recreational activities for current and future users at their respective sites. To understand the complex nature of the recreation experience, an adaptive understanding of social-ecological systems as well as facets of outdoor recreation planning and human psychology need to be considered. (Askew et al., 2017). "Water recreation is no longer a matter of simply building a boat ramp, dock, or bathhouse, it involves a thorough understanding of water resources, current & future visitors, experiences sought, regional demand & supply, visitor capacity, & related dimensions" (Baas; 2016). The following research aims to give insight into the paddler experience along the CR through examining the effects of management on paddlers at two separate RAPs along the CR that provide public access to the CRNWT. Morgan Falls Overlook Park, managed by the city of Sandy Springs and Powers Island managed by the National Parks System will be the two study sites of choice. The research objectives include: 1) Identify and quantify existing conditions and paddler usage characteristics (i.e. group size, watercraft type, frequency of visitation, distance paddled, etc.) of two individual River Access Parks along the CRNWT including: Morgan Falls Overlook and Dog Park (Sandy Springs) and Powers Island (NPS). 2) Analyze Important-Performance Analyses of paddlers and identify differences between attribute valuations at each study site 3) Determine if the strength of recreational stewardship behavior varies between the two study sites 4) Determine if socio-demographic factors interact with IPA, recreational stewardship behaviors, and place attachment
Subject/Discipline: Recreation / Aesthetics
Locations authorized: The surveys will be conducted at Powers Island river park. I plan to have a small table set up off to the side of the parking lot (out of the way from NOC flow of business) with a sign asking for volunteers to participate in a UGA research study.
Transportation method to research site(s): I will access the park by parking in the parking lot with a vehicle.

Appendix D: Morgan Falls Overlook Park Research Permit



Benjamin T. Fowler

UGA

Subject: Research collection at Sandy Springs Overlook Park

Via email

Dear Benjamin

You have permission to survey visitors to Morgan Falls Overlook Park for the purpose of your research project. This permission may be withdrawn at any time should the city determine it is causing a negative experience for park visitors. Approval is granted for the months of May – July 2019. Notify me by email on the day before you first begin and the last day you are collecting data at the park. I trust you will use good judgement in the application of your research methodology. I recommend you keep this letter in your possession should you be asked to provide proof of approval.

Please be sure to copy Mr. Sloan of High County Outfitters as well as myself with the results of your study. We hope your findings and recommendations will provide input into providing our citizens with improved experiences. Let me know if you have any questions. My best.

A handwritten signature in black ink, appearing to read 'Michael Perry', is written over a light blue horizontal line.

Michael Perry, Director of Recreation and Parks

City of Sandy Springs, Georgia

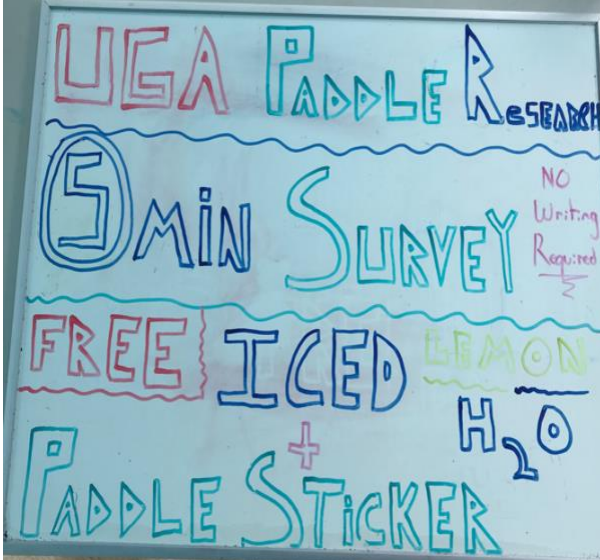
Cc: John Sloan, HCO

Appendix E: Survey Research Station Items and Protocol.

Survey Research Station (SRS) Items and Protocol

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> • 10 x 10 Blue EZ-Up Shade Tent (color recommended for aesthetics) | <ul style="list-style-type: none"> • 4-5 lemons. Rinse with water thoroughly to remove pesticides. Slice and place into 5-gallon cooler | <ul style="list-style-type: none"> • Survey tent signage (Figure 4, 5, & 6) with eyelets in all four corners |
| <ul style="list-style-type: none"> • 3ft x 4ft plastic pop-up table | <ul style="list-style-type: none"> • Incentive stickers | <ul style="list-style-type: none"> • Paper cups for iced lemon water and small dog bowl for water for paddler dogs |
| <ul style="list-style-type: none"> • Clean, blue, 5-gallon, igloo style water cooler. Fill with ice, sliced lemons, and water | <ul style="list-style-type: none"> • 8-10, 8.5 x 11 clipboards for survey booklet | <ul style="list-style-type: none"> • 10-12 ball point pens with container to hold them on table |
| <ul style="list-style-type: none"> • Small, 20 L, durable cooler for 10lb bag of ice and food for researcher | <ul style="list-style-type: none"> • Survey copies. Count will vary depending on site usership | <ul style="list-style-type: none"> • 10lb bag of ice |
| <ul style="list-style-type: none"> • 3-4 folding chairs positioned in the shade of the tent for participants | <ul style="list-style-type: none"> • Duct tape, cord/string, & scissors for hanging incentive signs | <ul style="list-style-type: none"> • 2-3 fist size rocks for paper weights |
| <ul style="list-style-type: none"> • Large, durable storage container with lid to transport SRS items | <ul style="list-style-type: none"> • 23 ft x 17 ft dry erase board for additional back-up signage near river (Figure 7) | <ul style="list-style-type: none"> • Copies of Research Permits (Appendix C & D) and business cards. |

Appendix F: SRS Incentive Signs and Sticker

	FREE 1st Edition "Water Trail" STICKER 
	• Did You PADDLE on the Chattahoochee River Today? • Take UGA Research <u>SURVEY</u> • Complete in <u>5 MINUTES</u>    

Appendix F. Continued



How was your paddle experience today on the Chattahoochee River National Water Trail?

 **UNIVERSITY OF GEORGIA**
Warnell School of Forestry & Natural Resources

Volunteers - Age 18+

Appendix G. June – July Survey Schedule, Conditions, and Counts.

Study Site	Day	Date	Temperature (°F)	Weather	Survey Count
MF	Saturday	06/01/2019	90°	Sunny	41
PM	Sunday	06/02/2019	90°	Sunny	50
PM	Saturday	06/15/2019	81°	Sunny/Cloudy	26
MF	Sunday	06/16/2019	80°	Sunny	38
MF	Friday	06/21/2019	80°	Cloudy	2
PM	Sunday	06/23/2019	86°	Cloudy/Rainy	22
MF	Saturday	06/29/2019	84°	Cloudy	11
PM	Sunday	06/30/2019	92°	Cloudy	26
PM	Friday	07/05/2019	88°	Sunny	8
PM	Saturday	07/06/2019	89°	Sunny	32
PM	Sunday	07/07/2019	88°	Sunny	13
MF	Saturday	07/13/2019	84°	Cloudy/Rainy	25
MF	Sunday	07/21/2019	80°	Sunny/Cloudy	52