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An Exploration of Different Motivations Between Stakeholders and Visitors of the Potomac Heritage National Scenic Trail

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AN EXPLORATION OF DIFFERENT MOTIVATIONS BETWEEN STAKEHOLDERS AND VISITORS OF THE POTOMAC HERITAGE NATIONAL SCENIC TRAIL

by

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ABSTRACT

AN EXPLORATION OF DIFFERENT MOTIVATIONS BETWEEN STAKEHOLDERS AND VISITORS OF THE POTOMAC HERITAGE NATIONAL SCENIC TRAIL

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Visitors have different motivations associated with parks and protected areas, and the people who run those areas are also different from visitors due to their unique positions. This is especially true for the Potomac Heritage National Scenic Trail (POHE), where stakeholders – ranging from park managers and Department of Transportation planners to volunteers of nonprofits and historical societies collaborate to manage sections along the 822-mile extent of the trail. Building on previous work itemizing the diversity of motivations for visitation to parks and protected areas, this study investigates similarities and differences in stakeholder and manager Recreation Experience Preferences by clustering responses gathered from a Public Participation Geographic Information System (PPGIS) survey sent to stakeholders and collected from visitors onsite in 2021. Analysis using Multiple Correspondence Analysis and comparison of the demographic and visitor use characteristics associated with these two groups allows stakeholders to understand their demographic similarities and use differences to the visitors, as well as leverage a metric to understand how motivations change over time as demographics and visitor use patterns change. This tool also reinforces the wide range of motivations to this culturally and geographically diverse trail while upholding previous research in the field.

NOMENCLATURE (Acronyms)

Acronym	**Definition**
AT	Appalachian National Scenic Trail
CHOH	Chesapeake and Ohio Canal National Historic Park
CWDW	Civil War Defenses of Washington
DC	Washington, District of Columbia
GAP	Great Allegheny Passage Trail
GIS	Geographic Information Systems
MCA	Multiple Correspondence Analysis
NEPA	National Environmental Protection Act
NPS	National Park System
POHE	Potomac Heritage National Scenic Trail Network
PPA	Parks and Protected Areas
PPGIS	Public Participation Geographic Information Systems
REP	Recreation Experience Preferences scales
SPSS	Statistical Package for the Social Sciences

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INTRODUCTION

The mission statement of the U.S. National Park Service (NPS) is to "preserve unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations" (Organic Act, 1916). This wording highlights the duality and compromise that parks must face. Natural values cannot overshadow cultural values, and both must be preserved for future generations and presented for current visitors. Yet, while this so-called 'dual mandate' for both preservation and use is the focus of a wealth of scholarship (e.g., Jones et al., 2017), less frequently mentioned is that to achieve this mission, the NPS "cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world" (NPS, 2014). Specifically, the use of partnerships to "extend benefits" is increasingly common in NPS units (e.g., the National Park Foundation and other philanthropies, AmeriCorps and other vocational and volunteering partnerships, and many of the commercial services and amenities through private companies), so much so that the agency devotes a specific arm to their facilitation through the Rivers, Trails, Conservation Assistance Program (Matney et al., 2019). And, some unique units are born of partnerships, confederations of state, municipal, federal, and nonprofit entities seeking to advance the mission of the NPS. This can be seen in one of the newest National Scenic Trails, the Potomac Heritage National Scenic Trail Network (hereafter, 'POHE', or 'the trail').

POHE stretches over 800 miles but is administered and maintained locally by a vast network of landowners, partners, and stakeholders. Some of these include other National Parks like the Chesapeake and Ohio Canal National Historic Park, American Indian tribes such as the Delaware Nation, and nonprofits such as the Friends of the Dahlgren Railroad Heritage Trail.

The first mention of the trail in legislation occurs in 1968 when a feasibility study was authorized by Congress, with later laws approving the trail. POHE crosses through natural wilderness areas in its Laurel Highlands and Great Allegheny Passage (GAP trail) sections, but also passes urban centers flanking Washington, D.C. The trail connects and is a part of so many pivotal historic locations in both American History and the Pre-Columbian era, connecting the ancestral home of the Delaware, Piscataway, Catawba, and Nacotchtank tribes with Civil and Revolutionary War forts, and George Washington's home. This bounty of historic character can be attributed to its length and the fact that many sections of the trail were already held by the federal government due to their cultural value. In contrast, the ecology of the area is threatened and fragile, but recovering (U.S. National Park Service, 2022b). The trail is both young and old, urban and wild, historically relevant and environmentally crucial.

As demonstrated by the NPS mission statement above, an important part of any park is its visitors. This is not the only important group of people, however. Arguably, of equal importance are the managers who work in parks either in supervisory or non-supervisory roles, and partners who may not work directly for a park but work to support the missions of parks (Mannetti et al., 2019). Together, in this thesis, I refer to these groups as 'stakeholders.' While visitors are quite commonly studied, less research has been done to investigate park stakeholders (Wellman et al., 1982, Radder et al., 2016). This is an understandable research gap since there are several orders of magnitude more visitors than stakeholders, and stakeholders are unlikely to commission research to study themselves. Those studies which do exist focus often on management activities (Bricker et al., 2008), crowding (Krinksy & Kuehn 2020), and conflict (McClanahan et al., 2008).

To explore the different motivations of these groups, a well-established and flexible scale would lend credibility and applicability. One such scale can be found in the Recreation Experience Preferences (REP) scales, a tool that fuses multiple scales of preferences to be used as a battery to determine motivations (Driver, 1983). This tool has been in use for over 50 years and has been updated and added to when necessary. Due to the size to which this battery has grown (i.e., 230 items in the 1983 Master List), it covers most, if not all internal motivations related to the visitation of parks and protected areas (PPAs). REP scales have been useful in studying multiple groups, for instance, it is common to use a REP-style questionnaire and cluster visitors into groups based on their responses (Brown & Haas, 1980; Manfredo et al., 1983), which can then be used to make generalizations about different 'types' of visitors. REP scales and derivatives are used in various settings, such as wilderness area trails in the Northwest (Hall et al., 2010), urban and rural parks in Australia (Weber & Anderson, 2010; Brown et al., 2014), and rivers across the USA (Heywood, 1987). This adaptability and history of use is integral in the comparative study of any two groups, particularly those along a geographically diverse trail, such as POHE. Another beneficial element of the REP scales long history is the opportunity social scientists leveraged to experiment with it, such as using it to determine differences in motivation among fishers of different cultures in Texas (Hunt & Ditton, 2001). Beyond excluding sections, some researchers also grouped scales into different domains (Manfredo et al., 1996), or broke the scales up into their items and clustered the items in unique ways based on responses (Manning, 2011). This flexibility can lend insight into the experiences that participants have when visiting parks and how different psycho-social catalysts for recreation interact.

In this thesis, I propose to investigate similarities and differences in demographics, use characteristics, and motivations between stakeholders and visitors by clustering responses to

surveys sent to these two groups and analyzing those clusters for statistically significant connections. Clustering REP scales items in this way can be performed through several methods, including Multiple Correspondence Analysis, a tool that outputs both a table of values showing the distance between any pair of items in n-dimensional space, but also gives a graphical representation of that space as well (Abdi &Valentin, 2007). MCA has been previously used in similar studies to understand underlying structures and potential groupings for either study participants or elements (Ferguson et al., 2019; Hjellbrekke, 2018). Once clusters of the REP scales are clear, I used the Chi-square Tests of Association to determine if there was a correlation between a participant's grouping (i.e. whether they are a visitor or a stakeholder), and the clusters of motivations (Field, 2018).

To perform these analyses, I leveraged information I and others previously gathered through a survey for visitors and a survey for stakeholders of POHE. After approval from the U.S. Office of Management and Budget, the visitor survey was administered via stratified random probability sampling at 19 sites across POHE's entire length, distributing links to the survey while collecting emails to send reminders. A variation of non-probability sampling similar to self-selecting and purposive sampling was used where a working group focused on the trail was invited to participate (Creswell 2016). Responses from both surveys were cleaned to remove incomplete responses or data from questions outside the scope of this thesis, and the above analyses was run. Results from these analyses were examined and explored to understand stakeholder and visitor motivations and potential causes for similarities and differences. With this information, stakeholders can not only better understand their visitors and themselves but also use a metric to understand how motivations change over time as demographics and visitor use patterns change. This study will serve to bridge the gap between infrequent, detailed,

expensive technical reports on visitors and the subjective comments received by interpretive rangers every day. In addition, it could be used by decision makers to interrogate their own beliefs about the parks they serve to separate their opinions influenced by circumstances and demography and the facts they are aware of through their work and study in this field.

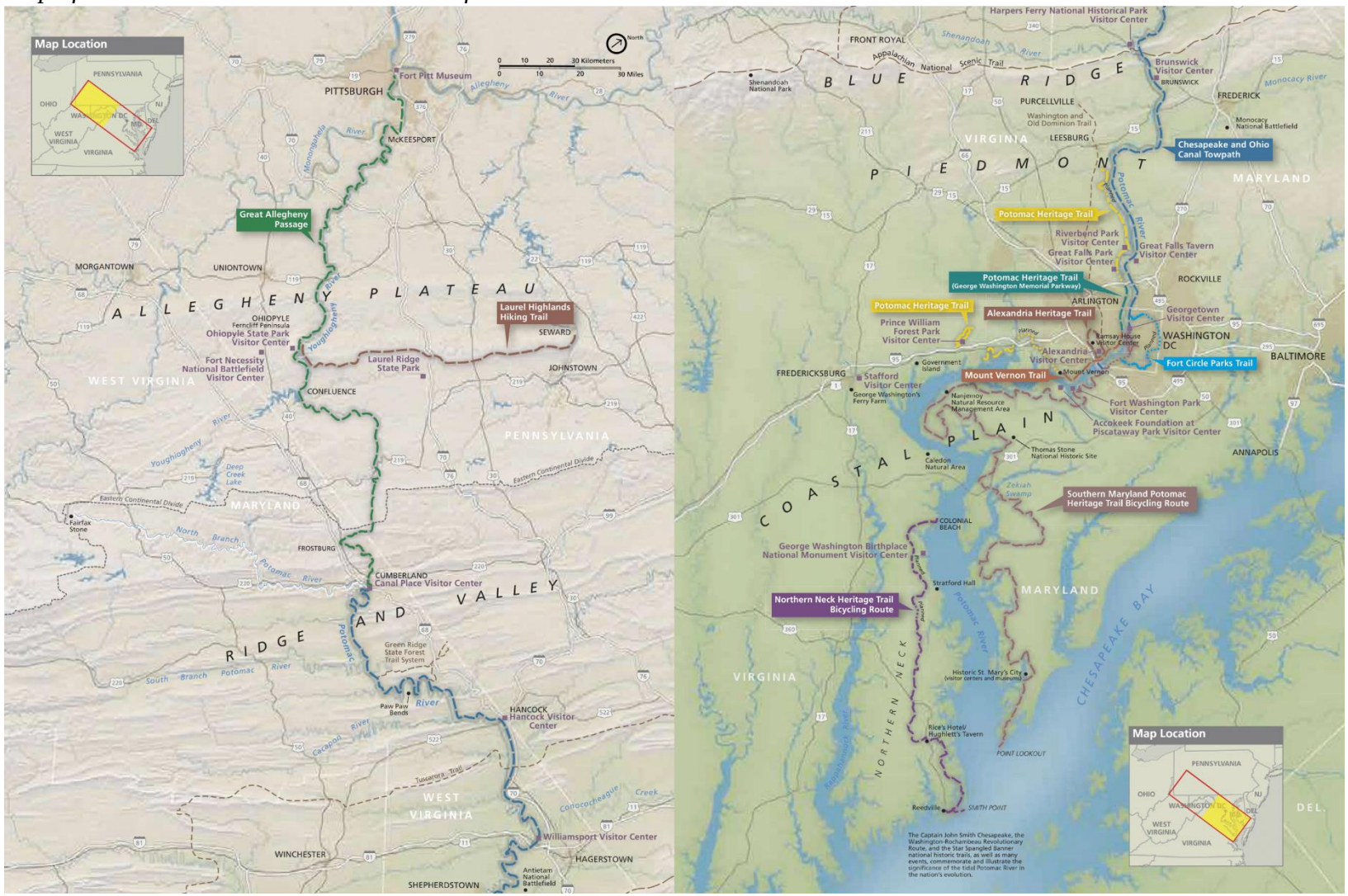
REVIEW OF LITERATURE

The Potomac Heritage National Scenic Trail Network

The Potomac Heritage National Scenic Trail Network is a National Scenic Trail, the same federal designation as other iconic trails, such as the Appalachian National Scenic Trail (also known as the Appalachian Trail or 'AT'). While the National Park Service oversees both, the segments of these trails are owned by various federal, state, and local authorities. As of January 2022, POHE consists of 822 miles in Pennsylvania, Virginia, Maryland, and the District of Columbia (Trott et al., 2022) (Figure 1). While individual segments have been studied both from within the National Park Service and from other entities (e.g., Bowen, 2009; Mihailovic, 2011; Muller & Wiegman, 2009; Rogowski, 2021), no peer reviewed studies exist that investigate the trail network in its entirety; further, the National Park Service does not list any such reports on its website for research done on this particular unit (NPS, 2022c).

Figure 1

Map of Northwest and Southeast Sections of POHE



Note. From *Foundation Document: Potomac Heritage National Scenic Trail*, by the National Park Service, 2014, http://npshistory.com/publications/foundation-documents/pohe-fd-2014.pdf

POHE is a relatively new National Park Service unit, though laws covering its creation date back to 1983. The land it occupies, however, features within the entirety of American History. Long before Columbus, the indigenous Piscataway People lived in what is now known as Piscataway Park. To the south, in Maryland, Historic St. Mary's City was one of the first colonial settlements established in 1634 and is now a major stop along POHE (Historic St. Mary's City, 2022). The trail exists on both sides of the eponymous Potomac River, and opposite Piscataway Park is Mount Vernon, the home of George Washington. North of Mt. Vernon is the Chesapeake and Ohio Canal (CHOH) along with historic towpath, which is now part of the trail. In the case of CHOH, during the initial period of railroad expansion in the 1800s, the race to connect the maritime ports with the resources in Ohio was fierce between the canal and railroads. Ultimately, both would become obsolete, and the canal and associated lands were purchased by the federal government in 1938 and later, in 1971, became a National Park System unit. Farther north, the vestiges of these railroads soon became the Great Allegheny Passage, which makes up yet another section of this braided trail network (NPS, 2022a). POHE also boasts many of the Civil War Defenses of Washington among its trails, a collection of forts built by Union troops to protect the city. The fortifications that remain surround the city, so are also called the Fort Circle parks (NPS, 2011). Visitors can explore the embankments and fortifications that remain, as well as the more intact Fort Washington, which was built after a previous defensive structure was destroyed in the War of 1812 and served to protect the city until after WWII (NPS, 2017). Beyond this, many of the NPS Units associated with the trail saw use in the "Summer in the Parks" campaign of 1968-1976 (Garland-Jackson & Shutika, 2020). In sum, all these historic events were woven into the tapestry of these lands, and in 1983 they were drawn together in an amendment to the National Trails System Act.

The National Scenic Trails of the United States of America were first conceptualized in a report by the Bureau of Outdoor Recreation (1966). This report called for both metropolitan trails and trails in the wilderness. The Appalachian Trail and Pacific Crest Trail were the first designated in the 1968 National Trails System Act (National Trails System Act, 1968). Then, a 1983 amendment laid out a provision to study the feasibility and set a general location for what would become the future POHE trail (National Trails System Act, 1983). While the original concept for POHE called for all land used to be federal, it soon became obvious that partnerships would need to be formed outside this umbrella. The current Strategic Partnership Plan lists multiple federal, state, and local agencies as well as several non-profit organizations (see Table A1) (Trott et al., 2022).

Table 1

Stakeholder Organizations Contacted

Organization Name	
Accokeek Foundation	George Washington's Mount Vernon
Alexandria Archaeology	GMU- Belmont Bay
Alexandria Monthly Meeting of the Religious Society of Friends	Great Allegheny Passage
Alice Ferguson Foundation	Gum Springs Historic Society
Appalachian NST, NPS	King George County
Arlington County Department of Parks and Recreation	Leesylvania State Park, DCR
Bureau of Land Management (Eastern States) - Meadow Wood	Loudoun County Department of Parks, Recreation and Community Services
Caledon State Park, DCR	Maryland Dept. of Natural Resources
Catawba Indian Nation	Maryland Indian Tourism Assoc. Inc
Chesapeake and Ohio Canal NHP, NPS	Maryland State Highway Administration
City of Alexandria Department of Parks and Recreation	Mason Neck State Park
City of Fredericksburg	Mount Vernon Descendants

Organization Name	
City of Leesburg Dept. of Recreation and Parks	National Capital Parks-East, NPS
Civil War Defenses of Washington	National Capital Planning Commission
Conservancy of Broad Creek	Northern Neck Planning District Commission
Dahlgren Trail	Northern Virginia Regional Commission
Delaware Nation	Northern Virginia Regional Park Authority
District of Columbia Department of Transportation	Ohiopyle State Park
Douglas Point/Meadowood SRMA, BLM Eastern States	Pennsylvania Dept. of Conservation and Natural Resources
Fairfax County Dept. of Transportation	Piscataway Indians - Cedar Creek
Fairfax County Park Authority	Potomac River Keeper, Inc.
Fredericksburg and Spotsylvania National Military Park	President of Garrett Trails (elected officials)
Garrett Trails, Inc.	Prince Georges County MNCPPC
George Washington Memorial Parkway, NPS	Tri County Council for Southern Md
George Washington Regional Commission	Prince William County
Prince William County Department of Planning	US Army Garrison, Fort Belvoir
Prince William County Dept of Transportation	US Fish & Wildlife Service Potomac River NWR Complex
Prince William County Dept. of Parks and Recreation	VA Department of Historic Resources
Prince William Forest Park, NPS	VA Tourism Authority as VA Tourism Corporation
Quantico	VDOT, Frederickburg Disctrict
Rock Creek Park, NPS	Virginia Department of Conservation and Recreation
Southern Maryland Heritage Area	Virginia Department of Transportation
St. Mary's County	Virginia Department of Transportation, Northern VA
Stafford County	Virginia Tourism Corporation
Syphax Family-Arlington House	Woodlawn & Pope Leighey House
Town of Occoquan	

These connections are vital to the functioning of POHE; while the enabling legislation for this trail network is dated, sustained effort to standardize and connect the segments began in 2014 with the publication of POHE's foundation document.

The POHE foundation document lays out enabling legislation, the trail's significance and goals, and the current conditions (NPS, 2014). Many of the environmental conditions described in the report were considered impaired and remain so. The Potomac and Youghiogheny rivers are certainly improving (MDE, 2014, 2016), but much work remains to be done to remediate these polluted waterways. The trail's length leads to an important geographic consideration, since it passes through 5 physiographic provinces (e.g., Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateaus) (Henderson et al., 2022). Noise and light pollution along the trail are predictably common in urban areas, though the trail network serves as an important corridor for both animal species and humans to seek darker and quieter experiences (NPS, 2014). Humans also seek cultural experiences along the trail, such as those associated with the Underground Railroad and Civil War (U.S. National Park Service, 2022a). Beyond these, various recreational opportunities exist along the trail, with the National Park Service specifically mentioning hiking, running, cycling, canoeing, kayaking, horseback riding, birdwatching, picnicking, and photography (NPS, 2014). In sum, POHE affords a multitude of opportunities to visitors motivated to seek specific benefits afforded by the unit.

Recreation Experience Preferences Scales

How can researchers understand and quantify people's motivations to visit this park? One way is through the REP scales, developed by Driver and colleagues in the 1970s and refined throughout the 1980's (Driver et al., 1991). It was originally based on the Unmet Needs

hypothesis[1] in the leisure field, which is no longer accepted (Driver, 1983), in part, due to its focus on deficits-based psychology. The motivation field has moved towards positive psychology, which focuses more on benefits. While the REP scales were developed in one theoretical framework and have items and domains associated with it (e.g., "Escape Role Overloads", "Risk Reduction"), it bridges the gap well with plenty of examples that fit well in positive psychology (e.g., "Excitement", "Exploration", "Being with Friends"). While this tool was developed decades ago, because it was developed with economic implications and easy use in mind (Driver et al., 1991), it is still employed today (e.g., Moyle et al., 2017; Sisneros-Kidd et al., 2021; Vistad et al., 2020).

The REP scales evolved over time and has been used in many forms. Variations often take the form of a battery of items to which participants are asked to respond (Manning, 2011). Participants are also asked how much a certain statement, such as "to gain a sense of self-confidence" or "to study nature" represents a trip to a PPA (Further examples can be viewed in Driver's 1983 Master list of items). These respondents may be asked to respond using a Likert scale based in satisfaction, importance, or experience, or through a binary metric (Manfredo et al., 1996). These items are almost always categorized into scales, which are further grouped into domains (Driver, 1983; Manning, 2011); however, the terminology varies (Vaske, 2019). Very few studies use the entire list of items, scales, and domains (Manfredo et al., 1996); especially since the list has evolved over time and expanded. Manfredo et al. (1996) cites Driver's 1983 master list as having 328 items in 19 domains, whereas the version of the 1983 master list used in this study contained 230 items in 21 domains (Driver, 1983). Thus, a third reason that few use the entire list is that there is confusion over what is definitive.

[1] A theory that recreational behavior can be explained through certain needs which are not satisfied by non-recreational behavior.

One view of PPA management holds that professionals must consider the units they are entrusted with as both precious resources to be conserved, and as a public good that has a market value (Moiseichik, 2016). The REP scales work well in this role, as its' links to economics allow it to dovetail into discussions of budgets and allocations (Driver et al., 1991); while its' versatility and long history of use allows park staff to understand social-environmental dynamic of visitation to wilderness areas, rivers, urban parks, and more. Preferences can also be studied to investigate potential visitor conflict (Wolf et al., 2017), and how individuals feel about increasing visitor use and crowding (Sisneros-Kidd et al., 2021). Also, if a park utilizes an Outcomes-Focused Management framework (Manning, 2011), achievement of desired preferences is an important benefit for stakeholders to consider (Weber & Anderson, 2010). All the above are excellent reasons that managers and resource specialists consult REP scales and inventories based on them.

When the REP scales were first developed, items were drawn from previous literature, focus groups, and other item pools (Driver et al., 1991). These items were then clustered into the domains and scales seen today, following Driver's over 50 studies to assess various forms of reliability and validity. In these studies, it was found that items within sub-scales are highly correlated with each other, having Cronbach's alphas above .6 and independence between items in different domains and scales. A meta-analysis by Manfredo, Driver, and Tarrant (1996) cautioned against clustering REP items into scales or domains different than those used by Driver when using the full list of items, scales, and domains. However, multiple studies that modify the REP scales and exclude some domains clustered them differently and found statistical significance (Brown et al., 2014; Brown & Haas, 1980; Heywood, 1987; Vistad et al., 2020; Weber & Anderson, 2010). Many of these papers acknowledge that the REP tool is

cumbersome in its' full state and using some but not all the REP scales is a way to deal with this constraint and reduce response burden.

Many studies investigated how different types of visitors respond to the REP scales and clustered the participants into groups (Brown & Haas, 1980; Manfredo et al., 1983). Others have looked at the effect of setting on these variables, looking into what responses are common in wilderness areas (Hall et al., 2010), urban areas (Weber & Anderson, 2010), at a national scale (Brown et al., 2014), along rivers (Heywood, 1987), and many more. It has also been pointed out that individuals may define motivations differently based on their own experiences (Manning, 2011), such as the meaning of "solitude" to an urban park visitor and a rural park visitor. Repeat visitors may also be sensitive to changes that first time visitors would not notice (Manning, 2011), which is of interest here since stakeholders will almost always be repeat visitors. Finally, demographics such as race/ethnicity can affect motivations (Hunt & Ditton, 2001) and the REP scales can be used to illuminate this.

Motivations, in situ

As explained by the recreation demand hierarchy, the preferences measured by REP are theoretically bound to activities, at certain settings, leading to outcomes, linked to lasting benefits (c.f., Manning, 2011; Sisneros-Kidd et al., 2021). This correlation with location was eventually developed into the Recreation Opportunity Spectrum (ROS) (Manfredo et al., 1996), a powerful tool that roughly classifies lands into one of several categories based on physical, social, and managerial qualities (Cerveny et al., 2011). As computing has progressed, other implements provide more insight into spatial patterns in visitor behavior. One way to do this is to have participants carry GPS devices during their experiences to gather spatial data (D'Antonio & Monz, 2016).

A particularly powerful offshoot of this spatial method is Public Participation in Geographic Information Systems (PPGIS), a variation of Geographic Information Systems (GIS) which leverages the public to provide information or work. This is often used for urban planning and development, tracking social issues, and is sometimes seen in citizen science projects (Brown & Kyttä, 2014). In citizen science, the public does not always have expertise in the subject being studied (i.e., identifying species for bio blitzes), however, this drawback is more than made up by the benefits of larger sample sizes and access to locations that could be difficult or impossible to study (Mocnik et al., 2019). PPGIS techniques are also especially useful when gathering information about the public, such as their motivations or important locations, since the participants often hold the best access to that information. In PPAs, PPGIS combines visitor surveys with the ability to visualize locations and pinpoint the settings of positive or negative experiences, though the spatial accuracy of this has been criticized (Brown et al., 2014).

Stakeholder vs. Visitor Perspectives

Researchers regularly study different classes of visitors, such as hikers (Vistad et al., 2020), canoeists (Peterson et al., 1974), and birders, hunters, and horseback riders (Morgan et al., 2007). Those who work in and for PPAs are an incredibly important part of these areas, but are rarely studied. These individuals perform many roles, from tribal leaders to superintendents of parks to arborists. In this study, like other researchers (Mannetti et al., 2019), I classified these individuals together as “stakeholders,” regardless of job title. While many positions are represented in our sample, it can be presumed that they deeply care about POHE due to their involvement in a working group focused on the trail, and care about public land in general based on their position within an organization that manages or supports a National Scenic Trail. Like

other individuals who interact with PPAs, it can also be assumed that stakeholder motivations change over time and may differ from visitors (Wellman et al., 1982).

Much of the research that compares stakeholder and visitor perceptions was performed in the 1970's and 80's, in part, due to the lack of visitor input into management processes during that time (Hendee & Harris, 1970). As various decision-making processes that involved the public became codified into law, a legislative imperative for managers to gather and consider visitor perspectives before acting altered this approach (NEPA, 1969). While much of the previous research is applicable today, even Wellman et al. (1982), writing forty years ago, suggests time since previous studies in this area constitutes a literature gap that must be filled. The gap seems to even exist in other fields. In economics, the differences between manager and consumer perspectives of value are heavily studied to maximize consumer value. However even in that field, there are few examples of research into this topic relating to wilderness tourism and PPAs (Radder et al., 2016).

While stakeholder motivations and perceptions may change over time (Wellman et al., 1982), several common themes have emerged in the PPA literature. When expressing their own preferences, decision makers tend towards conservation over development, though not to the level espoused by some conservation groups (Hendee & Harris 1970). Conversely, Peterson's (1974) study in the Boundary Waters Canoe Area, Minnesota, found that stakeholders and visitors shared similar views as to the acceptability of canoeing and fishing, as well as the unacceptability of mining. This study found that these agreements diverged when it came to hunting, logging, and snowmobiling; where most managers approved of these uses where the canoeists did not (Peterson, 1974).

Other research sought to investigate how well managers can predict visitor's desires, revealing the lack of predictive power (Brown & Haas, 1980). For example, one of the first studies found that stakeholders were fairly good at predicting visitor responses to an attitude questionnaire but did not fully understand visitors' perspectives on management actions and norms (Hendee & Harris, 1970) indicating a lack of understanding by managers of visitor's motivations which is relevant to this study, though this paper does not examine managers' predictions. Germane to this proposed study, Clark et al. (1971) used a version of the REP scales and found that managers would underestimate the importance of environmental features to car campers and overestimated the dissatisfaction with strict rules to conserve the PPAs. Wellman et al. (1982) also found that stakeholders had an imperfect knowledge of their visitors, especially when they were compared with professionals in similar fields such as Landscape Architecture who did not seem to have this issue. None of these papers were designed to clearly define the reason for this gap, nonetheless they all put forward similar possible explanations. Hendee & Harris (1971) suggested the explanation that stakeholders often interact with "vocal conservation groups" in addition to campers, who desire very developed, comfortable campgrounds, without having much contact with more middle-of-the-road typical visitors, and when Wellman et al. (1982) investigated this issue, they concurred. While they agree with this conclusion, Clark et al. (1971) goes further and offers an additional explanation that stakeholders need to base their understanding of visitors on contradictory visitor statements and actions, leading to understandable confusion.

Beyond differences between actual visitor perceptions and stakeholder's predictions, the underlying differences between their attitudinal and perceptual differences deserve study and explanation. While research into the exact reasoning of this disconnect is sparse, many of the

previously cited studies suggest potential explanation. One proposed justification is the activities in which these different groups participate while in a PPA. The recreational activities that stakeholders engage in during their free time are similar to those of visitors according to historical research (Peterson, 1974) as well as contemporary work covering this subject (van Riper et al., 2016). However, the actions that are part of their job duties might substantially differ from leisure pursuits and could be responsible in a change of perspective, seeing aspects of a PPA as responsibilities or burdens, not benefits (Hendee & Harris, 1970; Wellman et al., 1982). Due to their job duties, or due to the education needed to achieve their positions, managers may be better informed about the areas in which they work and hold differing perspectives based on that information (Peterson, 1974). This also could be due to higher or simply different standards based on their interactions with visitors. Clark et al. (1971) studied highly developed campgrounds, where visitors were accepting of more litter, noise, and vandalism than stakeholders expected, and felt in touch with the environment when the more informed staff had higher standards.

These different standards may also take the form of different definitions (Martin et al., 1989). For example, Clark et al. (1971) reported that campers would rate ‘solitude’ as very important 65% of the time, yet only rated “getting away from campers not in my camping party” as very important 25% of the time. These potentially self-contradictory statements led the authors to wonder if people are understanding ‘solitude’ differently based on their own experiences of solitude and crowding, as opposed to the textbook definitions that managers might apply in their work or learn in their training. This leads to the final interpretation, which can be complimentary with previous speculations: these different groups hold different perspectives, motives, and attitudes because they may, in fact, be demographically different.

Vistad et al. (2020) noted that different classes of hikers in Norway held different motivations based on their different age, gender, nationality, education, and household income, as well as some characteristics of their hike and group. Other studies illuminate that because of factors such as hiring qualifications, stakeholders are often more likely to be white/Caucasian, hold higher levels of formal education, and more likely to be middle aged (van Riper et al., 2016).

These demographic and definitional differences can be addressed with administrative action by the land management agencies, such as training and hiring strategies, but some demographic differences are inherent to the positions. While PPAs continue to take strides to diversify their workforce in terms of gender and racial representation (e.g., NPS and Forestry Service initiatives to reduce discrimination against women and NRPA encouraging agencies to develop DEI plans; Moiseichik, 2016; NPS, 2021b; Williams, 2002), Hendee and Harris (1970) point out that simple geographic differences may also drive a disconnect: many visitors to wilderness areas come from urban and suburban areas, which may give them different preferences to the people living and working in those remote rural areas. It would be impractical and unethical to require employees to commute from urban areas to work in parks, so the imperative to management is clear: to understand the differences and effects thereof when it is impossible to resolve them. These differences have important implications for management actions, such as addressing perceived crowding (Krinsky & Kuehn 2020), which is a major focus for many stakeholders. Differences in perspective can also lead to conflict between PPAs and locals, which can be disastrous (Foley, 2015; McClanahan et al., 2008). Thus, research must be done into the perceptual similarities and differences between stakeholders and visitors, as well as how this relates to demographics and use characteristics, not only to reinvestigate the work done

in this area in the 1970's and 80's but also to encourage stakeholders to reflect on potential dissimilarities in motivations and how it can affect their work.

Research Questions

Due to this background information, the following research questions guided this study:

R1. How do demographics, use characteristics, activities, and past sites visited differ between stakeholders and visitors?

R2. How do motivations differ between stakeholders and visitors?

R3. What clusters of motivations are formed via Multiple Correspondence Analysis?

R4. How are these clusters correlated with the variables in research question 1?

METHODOLOGY

This research was conducted in two phases. The focus of this thesis is on the second phase, however, here I describe both phases to explain the full scope of the project. In the first phase, researchers from Old Dominion University, Kansas State University, and Clemson University conducted manager interviews and social media analysis to identify questions and locations of interest along POHE. Data were also gathered about visitors' spatiotemporal behaviors and place of residence within the trail network via Streetlight Insight, a location-based GIS tool. In the second phase, along with research assistants from Kansas State University and Old Dominion University, I surveyed visitors at select locations along the trail identified during the first phase (see Table A2), as well as stakeholders working or volunteering at units that make up the trail (see Table A1). These surveys used questions from the established Pool of Known Questions (NPS, 2021), and staff at the NPS Social Science Program and the U.S. Office of Management and Budget reviewed and granted final approval of the survey instruments. I describe the sampling procedures for both groups in detail below.

Table 2

Locations Sampled

Mt Vernon Trail	Great Falls Tavern
Brunswick	Historic St. Mary's City
C&O Canal Lock 75	Laurel Highland Hiking Trail (LHHT)
Confluence, PA	Leesylvania State Park
Crow's Nest	Neabsco Park
Cumberland	Ohiopyle State Park VC
Dahlgren RR Heritage Area	PA Route 653 Trailhead of of LHHT
Fletchers Cove	Pine Grove
Fort Dupont	Piscataway Park
Fort Reno	Point Lookout State Park
Fort Washington	Potomac Overlook
Friendsville	Rockybottom Campground
George Washington Birthplace	Turkey Run
Georgetown Waterfront Park	Windy Run

Stakeholder Sampling

During the first phase of research, individuals involved in managing the trail network were identified by National Park Service representatives. These individuals were designated as having significant influence over the functioning of POHE and associated areas given the group title of ‘stakeholders.’ Surveys were sent to each via email, while some stakeholders forwarded these to individuals within their organizations more directly involved with trail operations. This

pool of respondents includes representatives of non-profit organizations, state parks, Native American tribes, county parks, Departments of Transportation, units of the National Park Service, the Appalachian Trail, and Quantico National Cemetery (see Table A1 for a full list of organizations contacted). Survey distribution began November 19th, 2021. One initial email and two follow ups were used, making use of a modified Dillman technique (Dillman, 2011). This sampling strategy allowed us to contact stakeholders across a broad geographic area and manage risk during the COVID-19 pandemic. Over 6 weeks, 133 stakeholders in total were contacted; 95 respondents began the survey (71.42% response rate), and 67 completed it (70.52% completion rate).

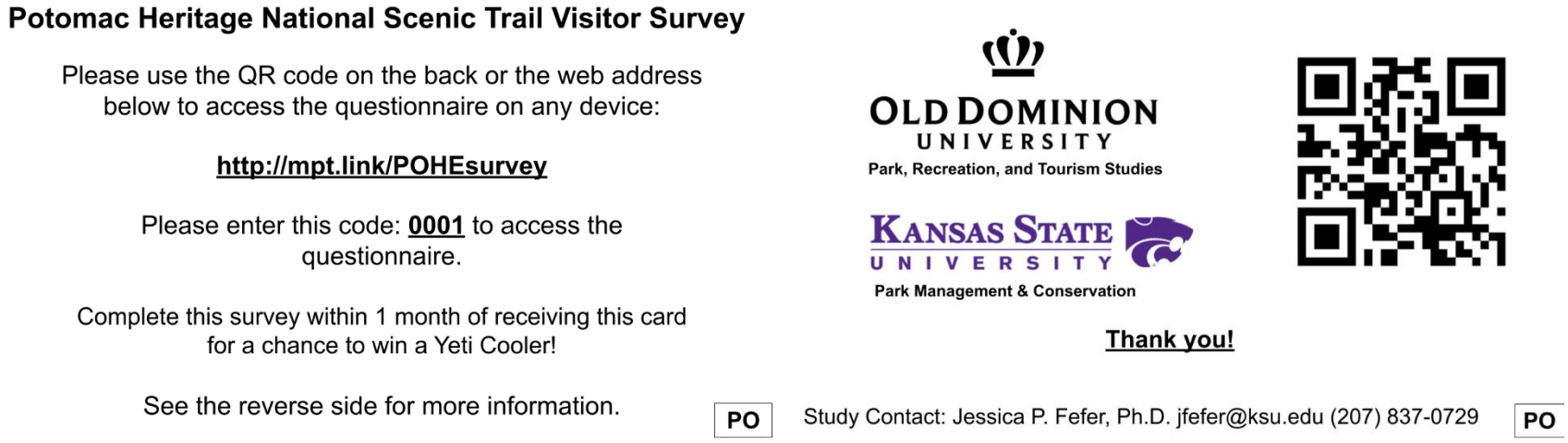
Visitor Sampling

Distribution of surveys to visitors began on August 1st, 2021, using stratified random probability sampling (Field, 2018). Locations were selected through discussion between researchers and park managers, including 19 locations at sites across Pennsylvania, Maryland, Virginia, and the District of Columbia (Table A2). Surveys were distributed via 3” x 5” cardstock handouts containing a link and a QR code to the survey along with a contact info, and a four-digit unique identifier to preserve participant anonymity (Figure 2). Distribution occurred in four-hour intervals at each location during both the morning and afternoon and during the week and weekend for a total of 36 weeks spread out seasonally between Summer 2021, Fall 2021, and Spring 2022. These methods were modified from previous work done by Perry et al. (2021) to reduce physical contact between researchers and participants to adapt to constraints experienced during the COVID-19 pandemic. Those who received the handout were asked to provide an email address, which was used to send three follow up reminders to complete the

survey. This response reminder method mirrored the technique used for stakeholder surveying with the main difference being either an online (stakeholder) or in-person (visitor) intercept.

Figure 2

On-site Survey Handout, front (left) and back (right)



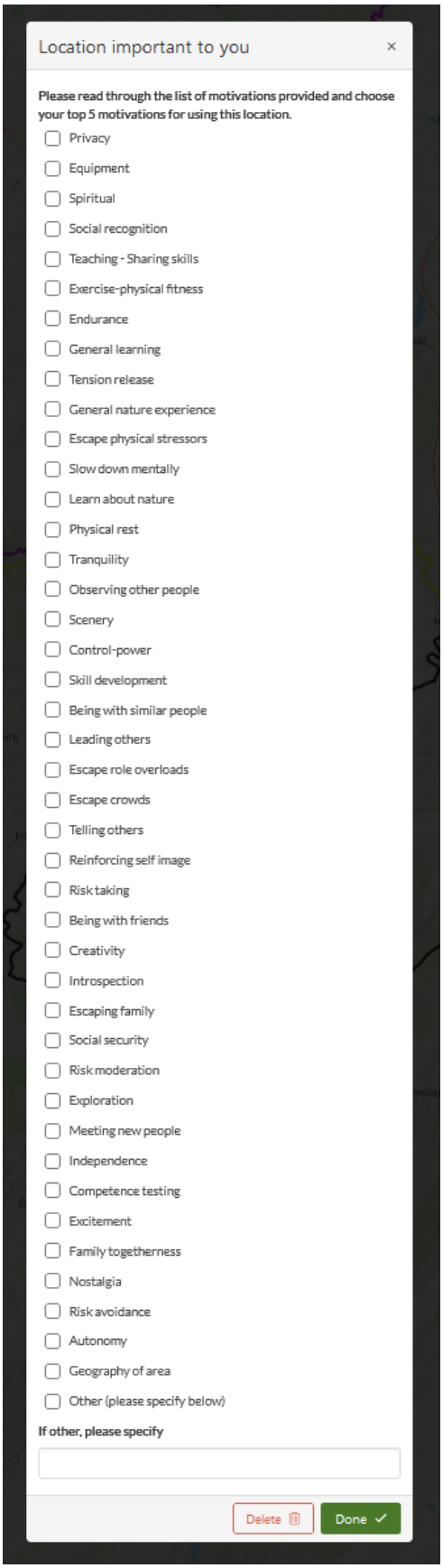
Measures

Both surveys contained questions relating to demographic information, awareness of POHE, visitation information, and a Public Participation Geographic Imaging Systems (PPGIS) component. The survey was 23-questions for visitors and 28 questions for stakeholders. Most survey questions fell into two broad categories: demographics and use characteristics. The demographic questions covered topics such as age, gender, race, education, and annual household income. Use characteristics included awareness of management units of POHE, context of visit, and reason for visit. Participants were asked to indicate what activities they take part in during visits and which sites along POHE they visited. The PPGIS component asked visitors and stakeholders to mark on a virtual map the most important location to them along the trail and provide five motivations for that decision (Figure 3). For the stakeholders, this question is asked a total of 3 times, including their second and third most important place in the trail network. For the visitors, this question was only asked 1 time to reduce response burden.

In the PPGIS component, once individuals selected a location on the virtual map, they were able to select up to 5 motivations for the visit. These motivations were pulled from Driver's (1983) master list of items for the Recreation Experience Preference scales. This version of the list contains over 200 items, divided into 43 scales, which fall into 21 domains. For this study, the 43 scales were used as selectable motivations, in place of the more extensive 230 item battery. This was done to reduce survey fatigue for the participants, which was found to be an issue during this time period (e.g., de Koning et al., 2021). These sections include "meeting new people", "independence" and "scenery" as motivations for visits.

Figure 3

Top 5 Motivations Selection Screen



Analyses

The first step in analysis involved data cleaning, where the responses from visitors and stakeholders were reviewed to check that each respondent had completed at least one PPGIS question. Those who failed to complete the survey were removed from this pool of participants, but their contributions may be included in future scientific work focused on POHE. Included data was screened for outliers and normality.

Next, the demographics and past use characteristics of visitors and stakeholders were then compared against each other using a Chi-square Test of Association. The resultant contingency tables were reviewed to check which characteristics are shared between the groups and which are independent (Field, 2018). The lack of association shown through this test indicates a statistically significant difference between visitors and stakeholders with respect to the characteristic in question.

To analyze stakeholder and visitor motivations, the 43 items were run through Multiple Correspondence Analysis (MCA) to cluster them. This technique analyzes complex patterns found in sets of data with many variables and categories. It is often used in ecology and marketing, where vast sets of data corresponding to thousands of individuals, preferences, and locations are analyzed and condensed (Doey & Kurta, 2011). Due to its use in marketing, MCA is often used in tourism settings to reduce the number of items in a battery that need to be analyzed (Brida et al., 2010), to confirm a logistic regression and graphically represent data (Tang et al., 2021), and to group museum visitors by cultural taste (Hanquinet, 2013). While Multiple Correspondence Analysis is relatively new to the parks and recreation field (Ferguson et al., 2019), a similar tool has been utilized. Principal Component Analysis has been used to cluster 26 items into a more manageable set of 4 factors before exploration using other statistical

methods (Hayday et al., 2019). This example is notable in its similarity to the proposed analyses of this study, however, here I selected MCA due to a categorical use of motivations in the survey, instead of continuous Likert type item structure.

To perform MCA, a database of responses was formed in SPSS, with each REP response dummy-coded in binary and extraneous variables (i.e., those REP scales that neither visitors nor stakeholder identified as important) removed. SPSS version 28 analyzed the rows and columns of this database for variation, which is known as inertia in this form of geometric data analysis (Hjellbrekke, 2019). Many terms related to MCA come from physics, such as barycenter, since both need vocabulary to describe points in arbitrary, unitless space. Once the database of responses was analyzed, a correspondence table was formed showing the frequency of each element (Abdi & Valentin, 2007). SPSS used this to automatically generate a point cloud in n-dimensional space, and plot it as a graph, with each column and row represented with a point. The number of dimensions is often selected qualitatively based on how much of the total variance each dimension explains, with 2 or 3 being most common (Doey & Kurta, 2011). As they have similar variance and frequencies, these points can be grouped into clusters based on how close they are on the graph, or through further analysis of the correspondence table (Hjellbrekke, 2019). The resulting table and graph were then analyzed to see what clusters could group REP sections together. Due to only one cluster being identified, the top 10 motivations were analyzed instead for difference between groups (stakeholders and visitors). Thus, tests that show statistically significant independence, indicate that stakeholders and visitors are motivated to different degrees by these different benefits that could be derived from POHE.

RESULTS

Data Cleaning

Participants who did not complete the PPGIS question at the end of the survey, which was the focus of research, were removed from the sample. Likewise, the data was cleaned to remove or correct issues in the dataset, such as participants who responded that their reason for visiting POHE was other than recreating, business, or another option; and when asked what that other reason was responded "recreation." Once this process was complete, 67 stakeholder and 363 visitor respondents remained, though not all answered every question. In the following pages, sample size per question is indicated where applicable. Certain variables could not be analyzed via Chi Squared Test of Association, due to not meeting the assumption of a large enough sample, and so were evaluated via Fisher's Exact Test, which is more accurate for small proportions but can be computationally taxing (Field, 2018). In addition to this, the data were prepared for clustering via Multiple Correspondence Analysis by recoding variables to avoid values of 0 in the sample, and removing variables without variance, such as the motivations of *control-power* and *social security*, which were not selected by any participants as one of their most important motivations.

Descriptive Findings

The demographics of the two samples were typical of stakeholders and visitors, though some related research illustrates more significant differences between the two (van Riper et al., 2016). As Table 1 illustrates, both samples were mostly white/Caucasian, well-educated, had high household income, and were middle-aged. Visitors were slightly more diverse, with a mostly even distribution between male (52%) and female (48%) respondents, along with a higher percentage responding that their race is Asian (3%), Native Hawaiian or other Pacific Islander

(1%), or Other (3%). There was more variation in age among visitors than stakeholders, with most stakeholders (52%) reporting between 40-60 years old; very few reported ages under 30 (5%) or over 70 (8%), compared to the visitor sample (<30 = 10%; >70 = 15%).

Table 3

Gender, Race and Age of Sample

		Stakeholders			Visitors		
	Demographics	Count	%	N	Count	%	N
Gender	Male	41	65	63	188	52	363
	Female	22	35		173	48	
	Other	0	0		2	1	
Race	American Indian or Alaskan Native	1	2	63	1	0	357
	Asian	0	0		9	3	
	Black or African American	7	11		12	3	
	Native Hawaiian or other Pacific Islander	0	0		2	1	
	White	58	92		326	91	
	Other	1	2		11	3	
Age	18-19	0	0	63	1	0	361
	20-29	3	5		35	10	
	30-29	8	13		55	15	
	40-49	13	21		49	14	
	50-59	20	32		80	22	
	60-69	14	22		88	24	
	70-79	4	6		49	14	
	80-89	1	2		4	1	

Income also follows this pattern, with no stakeholders responding with an annual household income less than $50,000 and few above $200,000 (Table 2), despite POHE passing through both high- and low-income areas. This may have been caused by the selection of decision-maker stakeholders, rather than representing a difference between the two populations, however, this finding has been reported in literature without this limitation (van Riper et al., 2016). Both groups were unlikely to have served in the military.

Table 4

Education, Military Service, and Household Income of Sample

		Stakeholders			Visitors		
	Demographics	Count	%	N	Count	%	N
Education	Some high school	0	0	65	0	0	363
	High school diploma	0	0		13	4	
	Some college	3	5		34	9	
	Two-year college degree	0	0		15	4	
	Four-year college degree	23	35		115	32	
	Graduate, professional, or doctoral	39	60		183	50	
	Do not wish to answer	0	0		3	1	
Military experience	Never served in the military	48	87	55	317	87	363
	Only on active duty for training in the reserves or national guard	0	0		2	1	
	Now on active duty	0	0		5	1	
	On active duty in the past, but not now	7	13		39	11	
Annual combined household income	Less than $24,999	0	0	52	10	3	363
	$25,000-$34,999	0	0		11	3	
	$35,000-$49,999	0	0		18	5	
	$50,000-$74,999	7	13		30	8	
	$75,000-$99,999	8	15		47	13	
	$100,000-$149,999	15	29		73	20	
	$150,000-$199,999	7	13		50	14	
	$200,000 or more	7	13		68	19	
	Do not wish to answer	8	15		56	15	

In terms of how participants use and are aware of the sites, there are both some striking similarities and differences that shed light on the "organic image" of the scenic trail (i.e., how is thought of by visitors; Tasci et al., 2007) which may inform how the unit is managed. The groups responded to slightly different questions regarding awareness of the trail network and its constituent parts, due to different solicitation methods and contexts. Stakeholders were asked if they were aware of POHE before joining their organization and just over half were unaware (52%). Thirty-five percent of visitors were aware that POHE is associated with the site they visited and 44% were aware that POHE is administered by the NPS (Table 3). Despite

stakeholders being much more aware, generally, there were approximately 10% of stakeholders that were unaware of this connection, which is notable due to this sample being recruited from a working group focused on POHE

Table 5

Awareness Table

		Stakeholders			Visitors		
Prior to this survey, were you…		Count	%	N	Count	%	N
…aware the site is a part of POHE	Yes	60	90	67	126	35	363
	No	4	6		226	62	
	Not Sure	3	4		14	4	
…aware that POHE is part of NPS	Yes	61	91	67	160	44	363
	No	4	6		188	52	
	Not Sure	2	3		15	4	
…aware of POHE	Yes	30	45	67	N/A		
	No	35	52		N/A		
	Not Sure	2	3		N/A		

When visitors frequent POHE and its component sections, it is most often the primary destination for them and their personal group (64%). The next most common reason was to visit several destinations with POHE as one of them (20%). It was less common but by no means rare to have unplanned visits (15%). Visitors were much more likely to have listed POHE as a primary destination than stakeholders (40%), perhaps in part due to stakeholders visiting as part of work trips, which may be more likely to involve several locations and unexpected visits. Similar to this, when investigating with whom people visit, stakeholders visit alone (33%) more often than visitors, who are more likely to visit with family (45%) or friends (20%). While visiting with coworkers was not an option for this question, it was a common write-in response for stakeholders, much more than visitors. This can be seen through the difference in write-in responses between stakeholders (24%) compared with visitors (1%). Rounding out this trend,

there are virtually no visitors making trips to the trail network for business (1%), and almost no stakeholders visiting simply to visit POHE (3%), though both answered that they were likely to visit to recreate (Table 4).

Table 6

Use Characteristics Table

		Stakeholders			Visitors		
	Use Characteristics	Count	%	N	Count	%	N
Context of last visit	POHE was primary	27	40	67	233	64	363
	POHE was one of several destinations	21	31		74	20	
	POHE was not a planned destination	19	28		56	15	
Personal group on last visit	Alone	22	33	67	110	30	363
	Family	14	21		163	45	
	Friends	10	15		74	20	
	Friends and Family	4	6		12	3	
	Other	17	25		4	1	
Reason for last visit	Business	23	34	67	2	1	363
	Commuting	3	4		3	1	
	Passing through unplanned	7	10		14	4	
	To recreate	22	33		188	52	
	To visit POHE	2	3		73	20	
	To visit other NPS sites	3	4		18	5	
	To visit other area	6	9		24	7	
	To visit relative/friend	1	1		13	4	
	Other	0	0		28	8	

When provided with the opportunity to express the activities they have participated in while using the trail network, it is unsurprising that many of the visitors selected movement-based activities such as walking (60%), hiking (49%), and bicycling (37%). Other popular activities included enjoying nature (56%) and history (23%), along with photography and videography (22%). When breaking activities down by group, stakeholders are more likely to participate in scenic drives (24%) and auto-tours (6%), two car-dependent experiences. They are

also more likely to answer “other” (22%), mostly due to work related activities such as inspecting the trail. In turn, visitors were more likely to have picnicked (18%) or camped (7%) in the sites comprising the trail network (Table 5). Of the locations that were named in this survey, the most visited by survey participants – across both groups – were Great Falls Park (56%), George Washington Memorial Parkway (50%), and the Chesapeake and Ohio Canal National Historical Park (51%). Each are managed by the NPS and located in or proximate to Washington, D.C. When visitation rates are compared between the groups, stakeholders appear to visit more sites (Table 6). Perhaps this is because they are driving to several sites, as indicated by their activities and context for last visit.

Table 7

Activities Frequencies Table

	Stakeholders			Visitors		
	Count	%	N	Count	%	N
Walking	39	58.21%	67	217	59.78%	363
Enjoy nature	32	47.76%		203	55.92%	
Hiking	36	53.73%		177	48.76%	
Bicycling	18	26.87%		133	36.64%	
Enjoy history	23	34.33%		85	23.42%	
Photography/Videography	17	25.37%		79	21.76%	
Scenic driving	16	23.88%		42	11.57%	
Learn about historic events	14	20.90%		51	14.05%	
Dog walking	9	13.43%		66	18.18%	
Other Activity	15	22.39%		30	8.26%	
Bird watching	8	11.94%		63	17.36%	
Learn about nature	8	11.94%		56	15.43%	
Picnicking	4	5.97%		65	17.91%	
Paddling	5	7.46%		49	13.50%	
Multi-day bike tour	3	4.48%		31	8.54%	
Fishing	3	4.48%		24	6.61%	
Auto-tour	4	5.97%		3	0.83%	
Camping	0	0.00%		24	6.61%	
Stargazing	1	1.49%		11	3.03%	
Attended ranger-led programs	1	1.49%		8	2.20%	
Multi-day hiking	1	1.49%		7	1.93%	
Cross country skiing	1	1.49%		3	0.83%	
Electronic bicycling	1	1.49%		3	0.83%	
Horseback riding	1	1.49%		3	0.83%	
Ice skating	0	0.00%		2	0.55%	

Note. Percentage values do not total 100%, as responses were not mutually exclusive.

Table 6

Past Site Visitation Frequencies

	Stakeholders					
	Count	%	N	Count	%	N
Great Falls Park	30	50.00%	60	174	56.68%	307
George Washington Memorial Parkway	35	58.33%		147	47.88%	
Potomac Heritage Trail	36	60.00%		135	43.97%	
Chesapeake and Ohio Canal National Historic Park	30	50.00%		156	50.81%	
Mount Vernon Trail	30	50.00%		131	42.67%	
Fairfax County Parks	20	33.33%		73	23.78%	
Northern Virginia Regional Park Authority Parks	20	33.33%		71	23.13%	
Prince William Forest Park	22	36.67%		52	16.94%	
Great Allegheny Passage	12	20.00%		75	24.43%	
Civil War Defenses of Washington	15	25.00%		43	14.01%	
Prince William County Parks	15	25.00%		34	11.07%	
Caledon State Park	11	18.33%		24	7.82%	
Piscataway Park	11	18.33%		22	7.17%	
Loudoun County Parks	9	15.00%		29	9.45%	
Laurel Highlands Hiking Trail	7	11.67%		35	11.40%	
Leesburg Municipal Parks	9	15.00%		13	4.23%	
Southern Maryland Potomac Heritage Trail on Road Bicycling Route	6	10.00%		26	8.47%	
Northern Neck Heritage Trail Bicycling Route	9	15.00%		6	1.95%	
Garrett County Trails	5	8.33%		16	5.21%	
Other park	5	8.33%		16	5.21%	
Eastern Continental Divide Loop	4	6.67%		15	4.89%	

Note. Percentage values do not total 100%, as responses were not mutually exclusive.

Finally, motivations selected by participants as part of the PPGIS question both matched and deviated from expectations. Overall, the most common motivations were *scenery, general nature experience, exercise-physical fitness, geography of area, exploration, tranquility, being with friends, learn about nature, slow down mentally,* and *escape crowds,* as shown in Table 7. None of the participants selected *control-power* and *social security,* which could indicate that these options were not well understood by participants. *Competence testing, escape role overloads,* and *autonomy* were also rarely selected, gathering less than 2% of the total sample. Generally, the two groups selected similar responses, with the proportions that picked *meeting new people* (visitors = 3%; stakeholders = 3%), *being with friends* (visitors = 19%; stakeholders = 19%), and *exploration* being the most similar (visitors = 27%; stakeholders = 28%). Motivations that stakeholders picked more often than visitors, are often academic or otherwise mental preferences, such as *leading others* (12%), *teaching/sharing skills* (13%), *general learning* (19%), and *learning about nature* (27%). When exploring the lineup of items more popular with visitors than stakeholders, there are many instances of low response rates, with many of the uncommon motivations being selected by a handful of visitors and no stakeholders. Among these are *competence testing* (1%), *escape role overloads* (2%), and *autonomy* (2%), although *privacy, escape crowds,* and *independence* were selected by slightly more visitors than stakeholders too (See Table 7). This mirrors Clark et al. (1971), where park managers did not see a car camping site as an appropriate place to seek solitude, but visitors found it an important component of their trip. As expected, another motivation that visitors chose more often was *family togetherness* (21%), though there is not a corresponding difference in *escaping family* – both groups found that about equally important (~3%).

Table 7

Table of Motivation Frequencies

	Stakeholders			Visitors		
	Count	%	N	Count	%	N
Scenery	34	50.75%	67	233	64.19%	363
General nature experience	36	53.73%		174	47.93%	
Exercise/physical fitness	26	38.81%		212	58.40%	
Geography of area	27	40.30%		132	36.36%	
Exploration	19	28.36%		99	27.27%	
Tranquility	14	20.90%		111	30.58%	
Being with friends	13	19.40%		70	19.28%	
Learn about nature	18	26.87%		41	11.29%	
Slow down mentally	10	14.93%		74	20.39%	
Escape crowds	6	8.96%		83	22.87%	
Other	15	22.39%		29	7.99%	
Family togetherness	6	8.96%		76	20.94%	
General learning	13	19.40%		21	5.79%	
Tension release	7	10.45%		53	14.60%	
Escape physical stressors	9	13.43%		41	11.29%	
Endurance	7	10.45%		35	9.64%	
Spiritual	6	8.96%		26	7.16%	
Introspection	5	7.46%		29	7.99%	
Teaching/Sharing skills	9	13.43%		5	1.38%	
Being with similar people	4	5.97%		25	6.89%	
Leading others	8	11.94%		2	0.55%	
Nostalgia	5	7.46%		17	4.68%	
Privacy	2	2.99%		28	7.71%	
Physical rest	3	4.48%		18	4.96%	
Independence	2	2.99%		20	5.51%	
Observing other people	3	4.48%		11	3.03%	
Excitement	2	2.99%		13	3.58%	
Escaping family	2	2.99%		13	3.58%	
Telling others	3	4.48%		6	1.65%	
Meeting new people	2	2.99%		11	3.03%	
Skill development	1	1.49%		9	2.48%	
Creativity	1	1.49%		9	2.48%	
Risk avoidance	0	0.00%		13	3.58%	
Risk moderation	1	1.49%		7	1.93%	
Reinforcing self-image	2	2.99%		1	0.28%	
Risk-taking	1	1.49%		5	1.38%	
Social recognition	1	1.49%		4	1.10%	

	Stakeholders			Visitors		
	Count	%	N	Count	%	N
Equipment	1	1.49%	67	2	0.55%	363
Autonomy	0	0.00%		7	1.93%	
Escape role overloads	0	0.00%		6	1.65%	
Competence testing	0	0.00%		3	0.83%	
Control-power	0	0.00%		0	0.00%	
Social security	0	0.00%		0	0.00%	

Note. Percentage values do not total 100%, as responses were not mutually exclusive.

Many of the "other" responses to the REP question were from stakeholders indicating their motivations to visit the trail network were work related, though there were a few responses relating to ease of access/proximity and two related to the history of these areas. While REP items have been used in many different contexts, and this survey measured the activities "enjoy history" and "learn about historic events" this version does not specifically measure motivations related to the cultural resources of places like Harper's Ferry, Mt. Vernon, and the Civil War forts of Washington DC. The closest motivation to this is *general learning*.

Inferential Analyses

To answer research question 1, following descriptive analyses, Chi-square analyses were run for the categorical variables in the survey, except for the motivations which were run through an MCA for clustering. Some issues occurred with these analyses due to the low sample size for stakeholders: several variables required adjustment to meet the assumptions of Chi-square tests of association, and, in some cases, a Fisher's Exact test was used. Chi-square assumes a high sample size, and it is generally acknowledged that 80% or more of the cases must have an expected value of 5 or greater to be valid (Field, 2018). In cases such as age and income, this was achieved by combining adjoining categories with low scores. For instance, the 18-19 year old category and the 20-29 year old category were combined as well as the annual household income categories of "Less than $24,999", "$25,000-$34,999", "$35,000-$49,999", and "$50,000-

$74,999". In other variables that did not meet the assumptions, answers such as "Do not know" or "Do not wish to answer" were deleted and recoded as missing data. Finally, in cases with a 2x2 contingency table, such as the Boolean race variables and the site/activity variables, a Fisher's Exact test was used, due to its similarity to Chi-square and common use in these circumstances (Field, 2018). In only one case was this not sufficient, with the question regarding the primary reason for a visit to POHE (e.g., business, commute, recreation, etc.) For this question, a high level of significance was found, with the highest Chi-square statistic in the analyses, χ^2 (6, N = 430) = 142.19, $p < .01$. Due to this it is included in the table despite barely failing to meet the assumptions. Other than finding extremely low *p* values, some were high due to low numbers of individuals in those categories. The association between stakeholder/visitor status and the variables of Native Hawaiian or other Pacific Islander race and Other race category were both run via Fisher's Exact test receiving a *p* value of exactly 1 with a sample size of 419. In activities, attending ranger led programs, ice skating, and multi-day hiking also received a *p* value of 1.

Table 7

Chi-Square Table for Demographics

Variable tested against Visitor/Stakeholder status	χ^2	df	*p*	N
Black or African American *		1	0.01	419
Education	7.62	4	0.11	425
Age categories	8.18	6	0.23	424
American Indian or Alaskan Native		1	0.28	419
Asian		1	0.37	419
Gender	3.65	1	0.56	424
White	0.41	1	0.84	419
Native Hawaiian or other Pacific Islander		1	1.00	419
Other Race		1	1.00	419

Note: Analyses performed by Fisher's Exact test are reported without a χ^2 value as SPSS only provides degrees of freedom, p value, and number of cases for this test.
*p<.05

Additional items were found to be statistically significant in their differences below an α = .05. Fisher's Exact test illustrated there were proportionally more Black or African American stakeholders than visitors (p = .01) (Table 7). The same test also shows significance between the number of stakeholders who wish to have interpretive information in languages other than English than visitors, at p < .01. Along with the question asking stakeholders and visitors the primary reason for their visit, the related questions of context and personal group were also significantly different at χ^2 (2, N = 430) =13.84, p <.01 and χ^2 (4, N = 430) =72.67, p <.01, respectively. This shows that even if these groups are not radically different in their demographics, the way they use sites are dissimilar, as expected.

Table 8

Chi-Square Table for Demographics and Use Characteristics

Variable tested against Visitor/Stakeholder status	χ^2	df	p	N
Information in another language		1	<.01	413
Which of the following best fits the context of your most recent visit?*	13.84	2	<.01	430
On your most recent visit what kind of personal group were you with?*	72.67	4	<.01	430
On your most recent visit what was the primary reason for visiting POHE?**	142.19	6	<.01	430
Annual household income	3.31	5	0.65	415
Military Experience	0.00	1	0.99	418

Note: Analyses performed by Fisher's Exact test are reported without a χ^2 value as SPSS only provides degrees of freedom, p value, and number of cases for this test.
*p<.05
**Did not meet assumptions

In activities, the auto tour and scenic driving options were both statistically significant (p = .01) with more stakeholders participating in them, with camping and picnicking being

preferred by visitors to a statistically significant extent (p = .04 and p = .01, respectively). The "other" activities option was also found to have a χ^2 (1, N = 430) =12.04, p <.01, though it is difficult to attribute this. Likely it is due to stakeholders writing in work related activities.

Table 9

Chi-Square Table for Activities

Variable tested against Visitor/Stakeholder status	χ^2	df	p	N
Other activity*	12.04	1	<.01	430
Auto tour*		1	0.01	430
Picnicking*	5.98	1	0.01	430
Scenic driving*	7.35	1	0.01	430
Camping*		1	0.04	430
Bicycling	2.37	1	0.12	430
Learn about historic events	2.07	1	0.15	430
Paddling	1.88	1	0.17	430
Enjoy nature	1.52	1	0.22	430
Multiday bike tour	1.28	1	0.26	430
Birdwatching	1.2	1	0.27	430
Dog walking	0.89	1	0.35	430
Hiking	0.56	1	0.46	430
Learn about nature	0.54	1	0.46	430
Cross country skiing		1	0.49	430
Electronic bicycling		1	0.49	430
Horseback riding		1	0.49	430
Photography/Videography	0.43	1	0.51	430
Stargazing		1	0.70	430
Fishing		1	0.78	430
Walking	0.06	1	0.81	430
Attend ranger led programs		1	1.00	430
Ice-skating		1	1.00	430

Note: Analyses performed by Fisher's Exact test are reported without a χ^2 value as SPSS only provides degrees of freedom, p value, and number of cases for this test.

*p<.05

Many sites featured statistically significant differences in previous visitation, including the Civil War Defenses of Washington, Leesburg Municipal Parks, the Northern Neck Heritage

Trail Bicycling Route, Piscataway Park, Prince William Country Parks, Prince William Forest Park, Caledon State Park, and the catchall for otherwise unaffiliated sections of POHE.

Table 10

Chi-Square Table for Past Site Visitation

Variable tested against Visitor/Stakeholder status	χ^2	df	p	N
Northern Neck Heritage Trail Bicycling Route*		1	<.01	367
Prince William Forest Park*	12.14	1	<.01	367
Leesburg Municipal Parks*		1	0.01	367
Piscataway Park*	7.65	1	0.01	367
Prince William County Parks*	8.41	1	0.01	367
Caledon State Park*	6.43	1	0.01	367
Potomac Heritage Trail*	5.18	1	0.02	367
Civil War Defenses of Washington*	4.56	1	0.03	367
Northern Virginia Regional Park Authority Parks	2.8	1	0.09	367
Fairfax County Parks	2.42	1	0.12	367
George Washington Memorial Parkway	2.26	1	0.13	368
Loudon County Parks	1.67	1	0.20	367
Mount Vernon Trail	1.1	1	0.30	367
Great Falls Park	0.91	1	0.34	367
Garrett County Trails		1	0.36	367
Other Park		1	0.36	367
Great Allegheny Passage	0.55	1	0.46	367
Eastern Continental Divide Loop		1	0.53	367
Southern Maryland Potomac Heritage Trail on Road Bicycling Route	0.15	1	0.70	367
Chesapeake and Ohio Canal National Historic Park	0.01	1	0.91	367
Laurel Highlands Hiking Trail	0.01	1	0.95	367

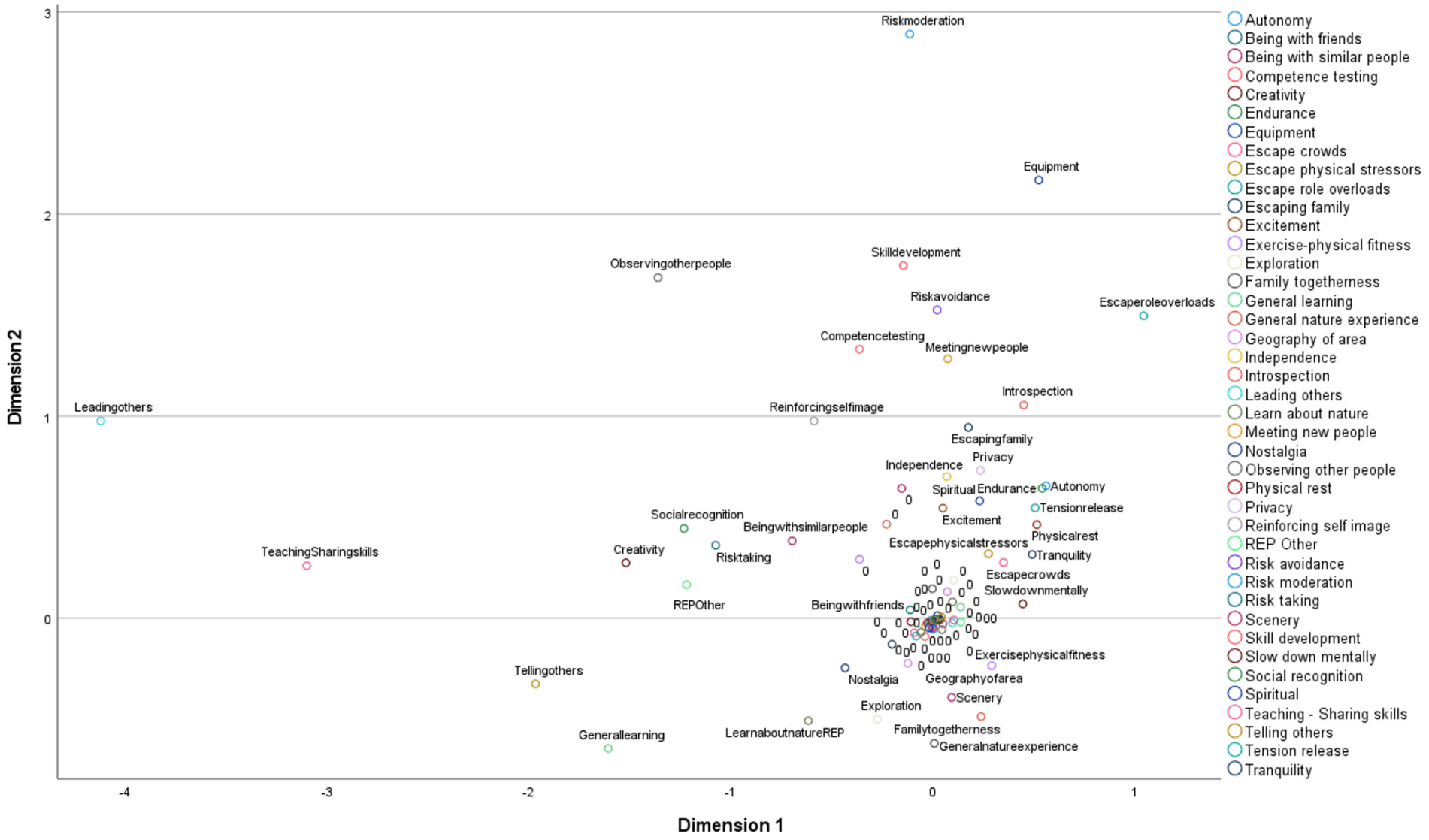
Note: Analyses performed by Fisher's Exact test are reported without a χ^2 value as SPSS only provides degrees of freedom, p value, and number of cases for this test.

*p<.05

Next, to answer research question 3, once the data was prepared for clustering via Multiple Correspondence Analysis, the algorithm was run to produce a summary, a biplot (Figure 4), and a correlation table. The summary showed a mean Cronbach's α =.492 for the model, showing low reliability in the MCA model. Also, to consider in the summary is the total inertia of 0.09, which indicates that many of the points on the biplot will be found close to the center and a percent of variance for both arbitrary, unitless variables between 4 and 5. This low percent of variance accounted for by the dimensions indicate that this data set may resist clustering (Hjellbrekke, 2019). Indeed, when the biplot is analyzed, most points are clustered around the center.

Figure 4

Multiple Correspondence Analysis biplot



Each motivation that was run through MCA is represented with two points, for the two possible responses to each motivation: true and false (i.e., true = selected *tranquility* as one of their top five motivations; false = did not). Due to the large number of potential options and only the ability to select 5, when analyzing the false options, the algorithm finds very little difference between these subsets of the data and so they are clustered near the barycenter. These points have been labeled with a "0" for recognition purposes. Responses that indicate a motivation is one of the top five for an individual have been coded with that variable's name (i.e., tranquility). Many of these are also clustered around the barycenter.

Some interpretations can be gathered from this graph, inferentially, based on distances between points, though it is important to note that the MCA biplot is not scaled to a reference due to the axes being unitless, arbitrary dimensions. This means that I cannot claim that conclusions drawn from this graph are statistically significant. It would be fair to say that the motivation *leading others* and *escape role overloads* were not often selected together, if ever, and should not be clustered together. Due to their proximity on the graph, *creativity, social recognition, risk taking, being with similar people,* and *other* are likely to have been selected by the same people and could be clustered together. However, due to the large mass of items located around the center and the general layout of the biplot, clustering may not be reasonable with this data set.

Unfortunately, this is confirmed when investigating the correlation values (this table is not included due to its size at 41x41 variables and lack of relevant data outside of this one correlation). Of the Pearson's *r* correlation values inputted into the analysis, only a single pair showed a moderate correlation, *teaching-sharing skills* and *leading others* ($r = .32$). This can be confirmed with the biplot. While the two motivations are a moderate distance from each other,

they are further from other motivation items. While these two items could be grouped together, this would leave 40 variables for analysis. Instead, to answer research question 2, the most common 10 responses shared between the two groups (i.e., the sum of both groups' top five preferences) were selected and tested against the Visitor/Stakeholder status to determine statistically significant differences between groups. Of these, 4 were found to be significant; *scenery*, *exercise-physical fitness*, and *escape crowds* were all more common with visitors, while *learn about nature* was a more common motivation for stakeholders.

Table 11

Chi-Square Comparisons Between Top 10 Motivations for Stakeholders and Visitors

Motivation	$\chi 2$	df	p	N
Learn about nature*	11.58	1	<.01	430
Exercise-physical fitness*	8.79	1	0.01	430
Escape crowds*	6.67	1	0.01	430
Scenery*	4.34	1	0.04	430
Tranquility	2.57	1	0.11	430
Slow down mentally	1.07	1	0.30	430
General nature experience	0.76	1	0.38	430
Geography of area	0.37	1	0.54	430
Exploration	0.03	1	0.86	430
Being with friends	0.01	1	0.98	430

*p<.05

DISCUSSION

The purpose of this thesis was to examine the potential mis/alignment between stakeholders' and visitors' motivations for visitation of POHE, as well as potential differences (or similarities) in demographic and past use characteristics of both groups. Many of the demographics between the two groups were not found to be statistically different, though many of the use characteristics were. 20% of activities and 38% of sites previously visited had significant differences between stakeholders and visitors. That said, what is, perhaps, most worth of discussion is the inferential results, specifically the resistance of REP scales motivational items to clustering. There are many potential explanations. First, the reliability of the original clustering of REP items has remained consistent throughout the life of this measure. Manfredo et al. (1996) performed a meta-analysis and found that, when the tool is used in its full form, REP scales (the middle level of the measure that was used here to build out the items) are independent from each other. These results support that finding. That said, these results do not necessarily support the domains (top level categorization) that REP scales are often consolidated into, as those connections were missing. In this sample, *skill development* and *competence testing* were moderately associated on the MCA biplot, both of which are found within the REP scales *achievement/stimulation* domain; however, correlations indicated this connection is weak (r = .17). Similarly, other associations in the graph do not match the domains laid out in the 1983 master list (Driver, 1983).

A more likely reason motivational items resisted clustering is that this population is diversely motivated. While the demographics of this sample show homogeneity in the areas of race and education; ages, incomes, and gender identities were more variable. So, too, is there diversity in use characteristics, activities, and sites visited. These factors have been associated

with motivation before (Marquez et al., 2015; Whiting et al., 2017), so it is understandable that diverse stakeholders and visitors at sites spread across the range of the trail network would produce a constellation of motivations that resists attempt to shape it into smaller groups.

Put differently, the multiple different sites that make up the 822 miles of trail could also stymy this inquiry. POHE consists of many different types of areas spread across a wide swath of land from biking routes along busy roads to a quiet path through a tree lined National Cemetery. It spans from the mighty Potomac's humble headwaters in Pennsylvania, through DC and onward on both sides of the Chesapeake Bay. POHE serves to connect the waterfalls of Great Falls Park to brackish bays along the Northern Neck of Virginia. These sections represent the majority of Recreation Opportunity Spectrum (ROS) classes (e.g., semi-primitive non-motorized, semi-primitive motorized, roaded natural, rural, and urban; Lukoseviciute, 2021). The ROS is effectively designed to distribute these diverse motivations across varying physical and social geographies; thus, like the so-called "average camper who does not exist" (Shafer, 1969), there is no typical user of POHE, but rather users desiring diverse benefits from its diverse range of sites. In hindsight, it seems that the motivations of a multi-day hiker along the Great Allegheny Passage and the motivations of a history buff visiting a Civil War fort in Washington, D.C. would resist clustering together without losing important information. It is therefore important that each site be managed both in the context of this sprawling trail network, yet also using the unique attributes and visitors to each location.

With the activities that visitors selected, there are some important implications. While movement-based activities were quite popular, their multi-day counterparts were not. Bicycling was selected 37% of the time compared to multi-day bike tour, which was selected 9% of the time. Participants had hiked in POHE previously 49% of the time but had hiked over multiple

days only 2% of the time. Through this data it can be inferred that visitors to POHE are visiting a collection of sites linked by a trail, not a trail that runs through a collection of sites. Beyond this, it is hard to draw firm conclusions about activities without spatially locating them. Should stereotypical park activities that were unpopular, such as attending ranger-led programs (2%) or camping (7%) be focused on? Alternatively, management could work to improve the experiences of already popular activities and leverage their strengths. Those strategic decisions are outside the purview of this paper.

An overall lack of awareness of the POHE designation is another implication for managers. As expected, POHE is not well known among visitors, nor is the connection to NPS. This deprives the public of the potential to experience this unique venue in its context as POHE and potentially deprives managers of specific sites from being able to leverage interest from locals for volunteer opportunities or friend groups. Luckily, POHE sites boast an active user base that is committed to distinct sections, parks, or units, as can be shown through visitors mostly visiting specific areas as a primary destination (64%) and to visit POHE (20%) as opposed to passing through (4%) or commuting (1%). In terms of stakeholders, the fact that 10% of the sample were unaware before the survey that their organization was considered a stakeholder of POHE should be mildly concerning, due to this sample being drawn from members of a working group focused on POHE. Everyone making decisions that affect these sites should be aware that they also affect the other stakeholder organizations and the National Park Service as a whole.

The frequencies, Chi-square tests, and Fisher's Exact tests on demographics variables show that the trail stakeholders are roughly representational of their visitor population. While land management agencies have a mixed history with hiring and promoting women (NPS, 2021b; Williams, 2002), there was no statistical difference found between the two groups in

terms of gender. However, stakeholder organizations should continue the progress they have made in this area, as men were still overrepresented in this group. The opposite takeaway can be seen when considering race. While it is laudable to have a higher percentage of Black stakeholders (11%) than visitors (3%), the areas that POHE passes through include areas where the largest racial group is not white/Caucasian (i.e., Prince George's County, MD; Charles County, MD; and Washington, DC; Census Bureau, 2021). Furthermore, the George Washington Memorial Parkway and the Chesapeake and Ohio Canal National Historical Park are national destinations, being two of the top 25 most visited NPS sites in the country (NPS, 2022d). Presumably, these diverse counties and national destinations would be reflected in the demographics of visitors, but this is not the case. Are sites along POHE not appealing to this population? Do African Americans not feel welcome? Or, perhaps more simply, is this an extension of the awareness issue? No matter the cause, further research into this topic should be undertaken, such as comparing these results with perceptions of non-visitors from BIPOC populations.

Finally, what conjectures can be drawn from the motivations that were selected by participants in this study? Past research illustrates that nature-based motivations and solitude-based motivations are fairly common for both stakeholders and visitors (Clark et al., 1971), and that can be said of this data set as well, with *general nature experience*, *geography of area*, *tranquility*, and *slow down mentally* being common responses without significant differences between the groups. During visitor intercepts, many visitors were found going on daily morning walks or walking dogs, which might explain the predominance of visitors using POHE for exercise. The significant difference between the two groups in the motivation of *learn about nature* is befuddling due to the agreement in terms of *general nature experience*. A possible

explanation is that because stakeholders are experts on their site, they are able to learn about nature unguided, whereas visitors would want or need interpretation to achieve this.

Limitations

This research shows that, while there is not a vast difference between demographics of stakeholders and visitors, there are many significant differences in how they both use the trail and how they are motivated. It also aligns with historical research into the REP scales' item validity. That said, as mentioned before, these results cannot be directly compared against non-visitors to POHE or visitors to other National Scenic Trails due to the limited population that was studied. Additionally, a major limitation to this research is that data collection took place during the COVID-19 pandemic, and so utilized an adapted on-site sampling method. Instead of visitors being able to respond to the survey during their visit to POHE, they responded anywhere from a few hours to a few weeks later. This is unlikely to affect the responses to demographic questions, though this time frame could lead participants to forget some of the context of their visit. Additionally, this method was found to have a lower response rate (41.68% for visitors).

Sample size was another limitation, specifically for stakeholders. While it is not expected that stakeholders would be as numerous as visitors, 133 stakeholders were contacted, 95 began the survey, and only 67 completed the survey and were included in the data set. The low response rate (71.42% for stakeholders) could be due, in part, to contacting stakeholders via email, staff turnover, the busy schedules of this population, hesitancy to answer personal questions, or a combination of several reasons. Twenty eight stakeholders' responses were removed from the sample due to not answering the first PPGIS question, which contained the motivation information. This question was located at the end of a ~15-minute survey, and required the most reading and in-depth processing. It would be interesting to attempt an alternate

survey design where PPGIS items were frontloaded, or other methods for survey collection from this workforce. If this study were focused on a single agency or park staff, perhaps setting up a survey station in the office or having supervisors send the emails, instead of researchers, would be more effective at gathering participants. Unfortunately, those strategies would not work in this more distributed sample of stakeholders, and could also yield to other issues, such as courtesy bias.

The use of 43 scales from the REP tool, as opposed to using the full 230 item battery, is also a potential limitation. It would not have been possible to gather this large of a sample with a 230-item battery, as the instrument would likely induce much higher rates of survey fatigue; however, there would be benefits. This format would align better with how the REP scales was used in the past and the additional depth of information could have led to the MCA being more effective (i.e., clustering 230 items into the 43 scales I used for this survey). Similar to this, querying visitors about the motivations for multiple important locations – not just one – would allow for analysis between first second and third most important locations and their associated benefits; that said, the dropout rate between first and second and second and third were about 50% for stakeholders, so this would not have gathered much useful information. Lastly, no participants selected the motivations *control-power* or *social security*, which may indicate that participants were confused by these two options, which indicate a feeling of being in control and a feeling that one is with considerate and respectful people. Other potential confusing motivations include *escape physical* stressors, which relates to escaping from noise and negative aesthetic experiences and *telling others*, which refers to telling others about the trip. For this last motivation, the burgeoning use of social media in PPAs (Miller et al., 2019) could lead one to presume this variable would be more popular among the sample.

Conclusion

Differences in stakeholder and visitor use and motivations have not been thoroughly examined in some time (e.g., Wellman et al. 1982). The Recreation Experience Preferences scales is often given in a limited form, but this inquiry shows the benefits and costs of condensing down and asking participants to self-select the scales that are important to them. Multiple Correspondence Analysis is a popular tool in Europe and in the fields of marketing and ecology (e.g., Hjellbrekke, 2018), but rarely used in PPA research (Ferguson et al., 2019). There have been no previous peer reviewed studies of POHE as a whole, and this work lays the foundation for further inquiries. Potential options for this include research using the Recreation Opportunities Spectrum and how different ROS classes along the trail affect motivational attainment. POHE is an excellent site for this due to its length, diversity of locations, and the ubiquity of the ROS tool among land management agencies. It would also be interesting to see how activities and motivations are arranged spatially. Would motivations and activities related to nature all clump together at certain key spots? Does each location feature its own unique constellation of motivations? Are the benefits of the REP scales internal enough that individuals can receive any benefit at any location? These questions certainly are worthy of more research efforts and I hope this thesis assists others in continuing their investigation of these topics and tools.

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