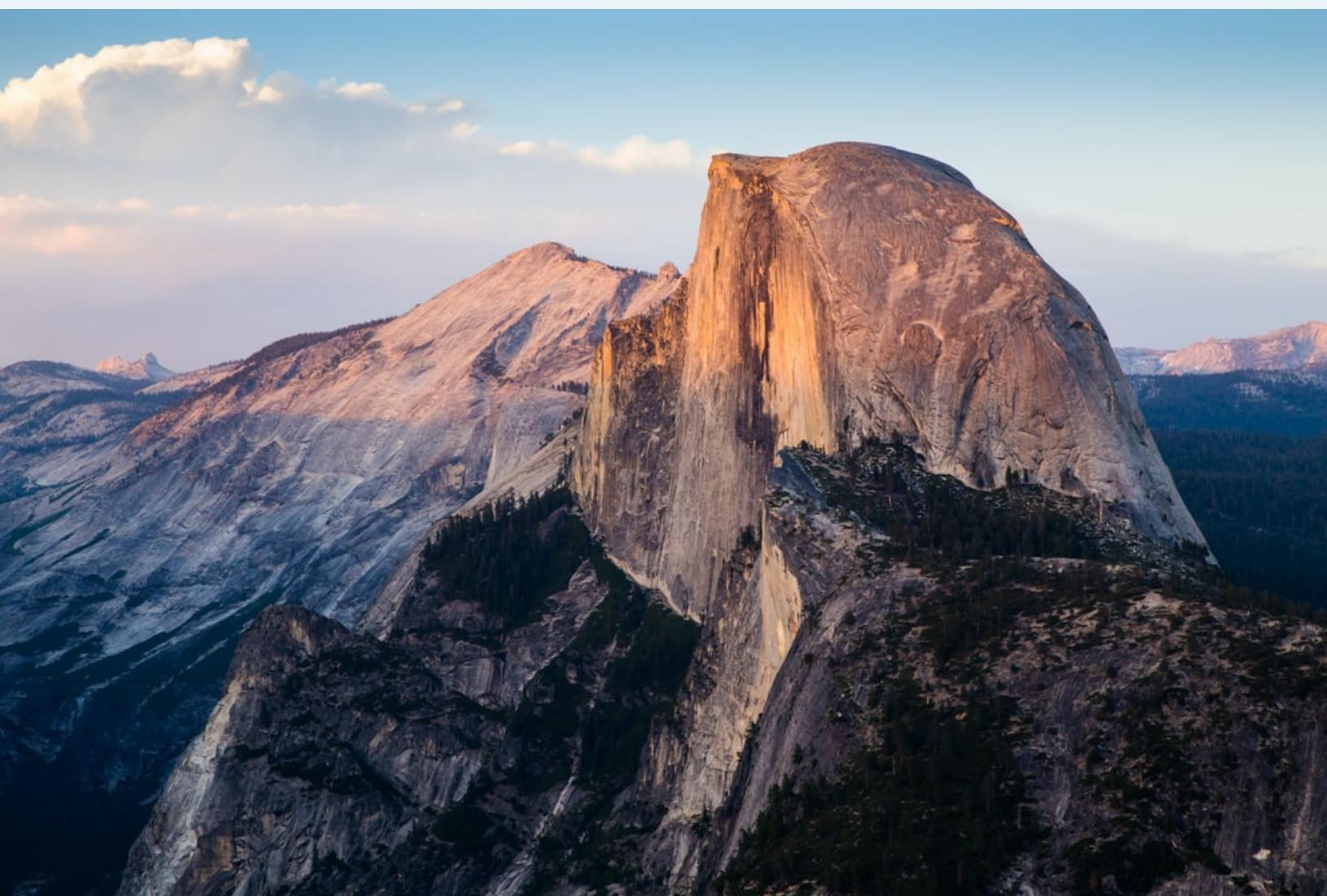


# Improving the Visitor Experience

## An Analysis of the National Park Service

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**Prepared for the National Park Service**

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Applied Policy Project

April 8, 2022

## **ACKNOWLEDGEMENTS**

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## **DISCLAIMER**

The author conducted this study as part of the program of professional education at the Frank Batten School of Leadership and Public Policy, University of Virginia. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgments and conclusions are solely those of the author, and are not necessarily endorsed by the Batten School, by the University of Virginia, or by any other agency.

Additionally, the analysis and conclusions in this report are the author's own and are not necessarily endorsed by the National Park Service.

## **HONOR CODE**

On my honor as a student, I have neither given nor received unauthorized aid on this assignment.



April 8, 2022

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# EXECUTIVE SUMMARY

While the visitor centers in National Parks across America have long served new and returning visitors, the difficulties of maintaining physical buildings have prompted a change. The National Park Service (NPS) hopes to improve the visitor experience of an increasingly diverse group of park visitors by implementing changes to the way they deliver visitor experience.

Two categories of alternatives are examined in this analysis. The first are general recommendations. These are not specific to the visitor experience, but are important for the NPS to consider. The second category are direct responses to the goal of improving visitor experience. The alternatives are as follows:

## General recommendations

- Increase access to the parks via fee-free days/expand fee-free day offerings.
- Increase representation of diverse populations in promotional materials, and diversify National Park staff (specifically park rangers).

## Visitor Experience Alternatives:

1. Invest in improvements to the National Parks app.
2. Create an interactive, scavenger hunt style activity to help direct visitor experience towards meaningful and interesting locations.
3. Increase the number of ways to interact with the National Parks before/without visiting.

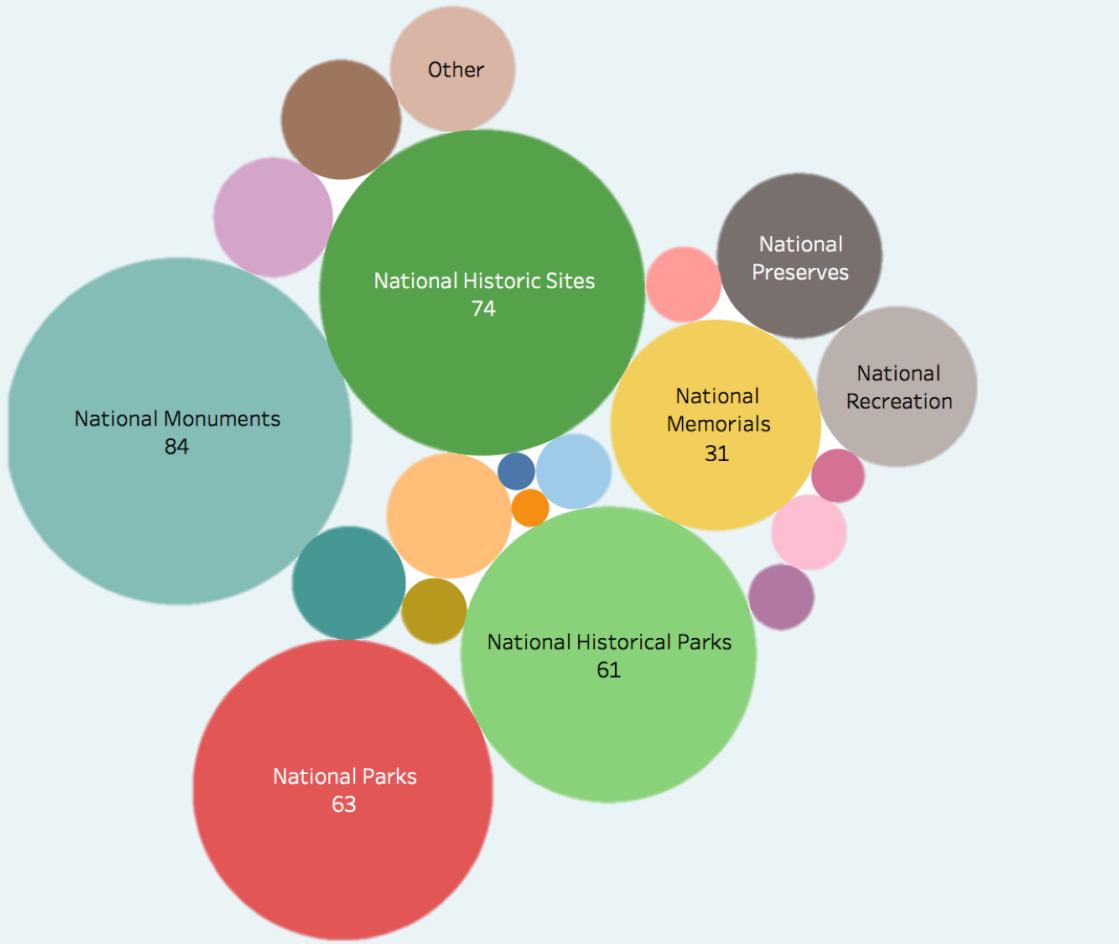
After evaluating each of the visitor experience-oriented alternatives on the criteria of equity, effectiveness, and cost, this memo recommends pursuing option 1: investing in improvements to the National Park Service app. This alternative can be pursued within the NPS's existing Visitor Futures team and will provide the greatest balance of benefits to returning and new visitors.

# INTRODUCTION

The National Park Service (NPS) is a bureau of the Department of the Interior, created in 1916 to oversee national parks, monuments, and other park designations across America (*National Park System*, 2019).

While most people think of the more traditional National Parks, such as Yosemite, Acadia, or Zion National Parks, these represent less than 15% of the 423 total NPS service units. The NPS oversees a variety of other area designations, which might include National Battlefields like Antietam (2.6%), National Memorials like the Flight 93 Memorial (7.3%), National Preserves like the Denali (4.4%), and National Parkways like the Blue Ridge (0.9%), among others (2019). All 50 states as well as DC have some sort of an NPS service unit in them. Figure 1 below shows various NPS designations as well as the count of how many sites fall under this designation. Because of the breadth of designations, there is no ‘one size fits all’ experience at a NPS area, and each serves a variety of visitors in different capacities. When thinking about visitor experiences, it is important to consider the wide range of potential ways to interact with a park unit.

Figure 1: NPS Area Designations & Counts



Data Source: National Parks Service

NPS areas provide a variety of benefits to those who visit. The NPS identifies eight aspects of value: aesthetic, artistic, cultural, ecological, economic, educational, recreational, and scientific (2019). Preserving these spaces, as well as improving their capacity to provide value for visitors, is vital.

## Problem Statement

Spurred by the availability of cars and the creation of interstate highways, a 1900s initiative of the National Park Service (NPS) called ‘Mission 66’ led to the creation of visitor centers — the first big step the NPS took towards curating the visitor experience (*Mission 66: Birth of the Modern National Park*, n.d.). Visitor centers allow guests to familiarize themselves with the park, engage with educational materials, and ask questions before or during their visit. However, more than 50 years later, these visitor centers are not as effective as they once were. Buildings are expensive to maintain, and

the NPS cannot keep up with necessary maintenance nor improve exhibits at reasonable rates (*What Is Deferred Maintenance?*, n.d.). Additionally, the materials provided are not most relevant for a world that is increasingly reliant on technology — nor for what the National Park Service hopes will be an increasingly diverse visitor demographic, more representative of the American population rather than predominantly white and affluent visitors. **The NPS is looking to enhance the visitor experience by improving the inclusivity and accessibility of park education and interpretation materials moving forward.**

## CLIENT OVERVIEW

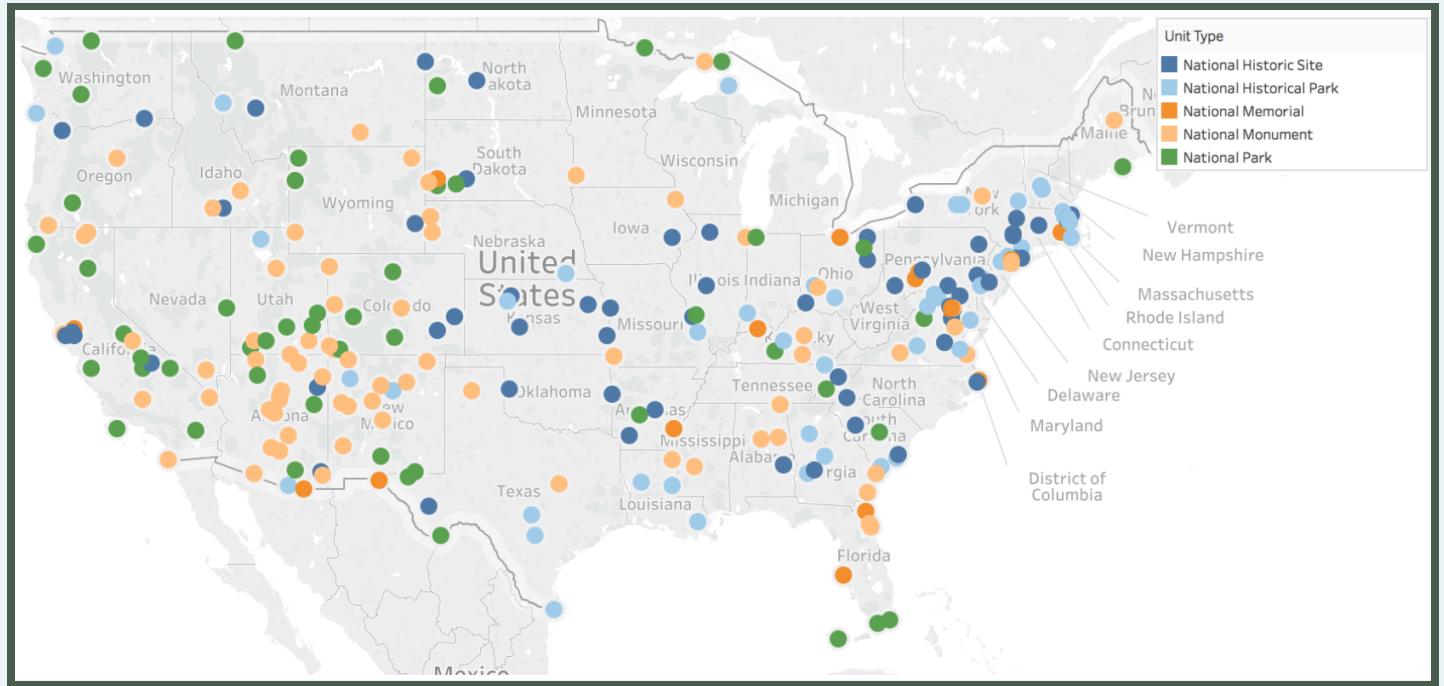
The text of the NPS mission statement reads as follows: “The National Park Service preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world” (*What We Do*, n.d.). Integral to this project is the ‘education’ tenet of what the NPS strives to provide for visitors.

This project was constructed in collaboration with an employee at the NPS who is on a team focused on visitor experience. Their team is tasked with evaluating the future direction of visitor centers and the visitor experience as a whole. There are two main reasons driving their current desire for action. The first is budgetary; as previously mentioned, the cost of maintaining buildings is very expensive and the NPS has a maintenance backlog totaling over 11 billion dollars. Just over 5 billion of those dollars are deferred maintenance specifically for buildings like the visitor centers (*What Is Deferred Maintenance?*, n.d.). The second reason is to adapt to the needs of their future visitors. Mission 66 aimed to update the park experience for the visitors of years 50-100 of the National Park Service’s existence. Now, the current team is tasked with predicting and meeting the needs of visitors for the next 100 years of the NPS.

Figure 2 shows the locations of many of the NPS service units. Please note that for clarity, only the 5 designations with the most units (Historic Site, Historical Park, Memorial, Monument, and Park) are pictured.

This figure shows the breadth and diversity of the geographic sites and units that the visitor experience team must focus on. This team will have a large amount of autonomy in determining what visitor experience in the park should look like, but will face the challenge of finding solutions for many different parks and resources, and therefore cannot prescribe one single solution nationwide.

Figure 2: NPS Locations & Designations<sup>1</sup>



Data Source: National Parks Service

<sup>1</sup> For a complete breakdown of all service units, please refer back to Figure 1 above. This map also does not reflect units with those designations that are not in the contiguous United States, nor are all bubbles visible (for example, there are numerous monuments in Washington DC that are covered by each other).

# BACKGROUND

As mentioned in the problem statement, Mission 66 was an effort to improve offerings for visitors to national parks, largely spurred by the greater accessibility of parks due to the creation of interstate highways. The Mission 66 plan improved many services, such as bathrooms, camping facilities, and park roads, and was named for the project's goal completion date of 1966 (in time for the 50th birthday of the NPS). This was also the first time that visitor centers were built in the parks. Visitor centers were created to serve as a one-stop-shop for visitor needs, and gave people a place to engage with educational materials, ask questions of park employees, or pick up any information they might need to have a good visit (*Mission 66: Birth of the Modern National Park*, n.d.).

Visitor centers add value to guest visits. An example of this might be due to the timely information they can provide via access to park rangers. While there is not rigorous research to support this point and little available information about how much visitors engage with exhibits or interpretive materials, a series of interviews done by a Lonely Planet writer in 2019 found that many visitors said interactions with a park ranger enhanced their visit in some way (Snow, 2019). Rangers are experts on their parks, and are able to provide up to date information about trail closures or even animal sightings at some parks. This information can help guests adjust their plans for the day, or direct them towards the most exciting activities (Snow, 2019).

## Trends in Visitation

While the NPS does not collect information on the demographics of their visitors, some sources have attempted to approximate this data by comparing it with census data or doing surveys. From 2010-2014, 95% of visitors to the national parks identified themselves as white (Vermeer, 2021). In 2016, another study found that visitors were about 78% white and typically visited one or more of the 63 destination ‘National Park’ units (Rott, 2016). The NPS has identified older white adults who visit National Park units as more ‘traditional’ park visitors, and that the visitor center offerings and visitor experience caters to those people, as opposed to a more diverse group of visitors that the NPS hopes to see in the future.

The disproportionately white visitorship seen in the NPS may stem from several factors. A series of informal interviews conducted in Tucson, Arizona in 2016 found that many local residents in a predominantly Hispanic community thought that visiting nearby Saguaro National Park was cost prohibitive due to park entrance fees, too time

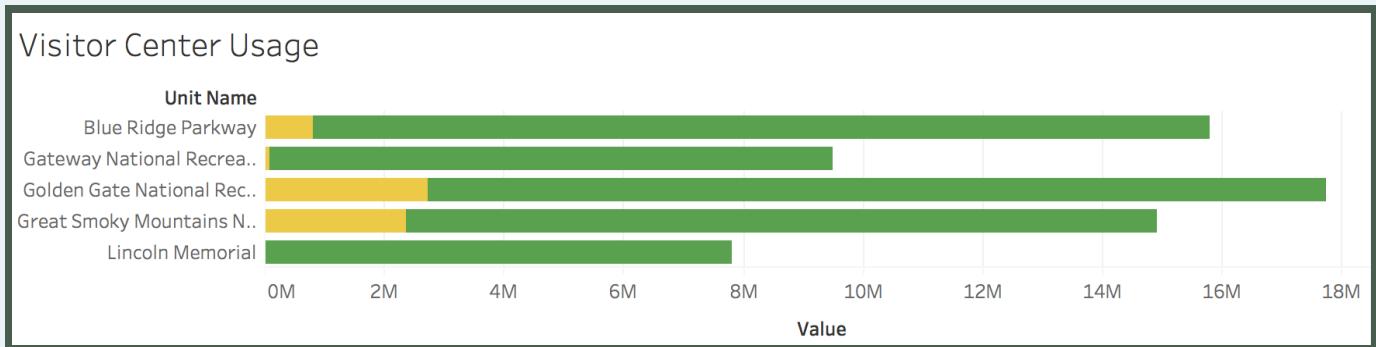
consuming to fit into their work schedules, or too difficult to get to due to a lack of public transportation. The same interviews also found that many residents viewed visiting national parks as a privileged activity, for those with the time and resources (like camping or hiking equipment). Another community leader who was interviewed noted that while the messaging of national parks might feel inviting to some, it can reject others (Rott, 2016). The article does not speculate on what messaging in particular feels inclusive or exclusive, representing a gap in literature.

Due to the COVID-19 pandemic, visitation trends have changed dramatically in the past two years. Visitation numbers across all 423 NPS sites in 2020 dropped 28% from 2019 levels, however many individual park units broke visitation records and were able to host visitors who had not been before. This is likely because people were looking for safe, outdoor activities they could engage in nearby, leading to greater visitation from local residents as opposed to destination visits (*National Parks Hosted 237 Million Visitors in 2020*, 2021).

In 2021, the NPS saw an increase in visitation as compared to 2020, but the numbers did not return to pre-pandemic levels. Interestingly enough, just 25 park units received more than 50% of the total visits in 2021, meaning that those parks that were well known or sought after by visitors were well attended. There were eleven parks that had over five million visitors apiece (*NPS Visitation 2021 - Office of Communications (U.S. National Park Service)*, 2022). These numbers may suggest that park visitation will continue to rise towards pre-pandemic levels in the coming years. This could present a valuable opportunity to roll out and receive feedback on new resources for visitors.

Recorded rates of visitor center usage are relatively low (even though most who visit say that the information is helpful, as noted above). Figure 3 reflects 2019 visitor center usage as compared to total visitation numbers for the top five most visited park units.

Figure 3: Visitor Center Usage<sup>2</sup>



Data Source: National Parks Service

The percentage of visitors taking advantage of visitor centers even at the most visited parks is relatively low. The Golden Gate National Recreation Area and the Great Smoky Mountains National Park both served visitors at visitor centers at a rate of roughly 18%. The Blue Ridge Parkway visitor center saw roughly 6% of visitors, and the Gateway National Recreation Area visitor center served less than 1%.

This data is incomplete as the Lincoln Memorial does not have a designated visitor center and therefore cannot collect data surrounding visitor center usage. Additionally, the difference in these park units may impact the proportion of visitors who feel compelled to stop at the visitor center. For example, the Blue Ridge Parkway has many visits from people just looking for a scenic drive or those who do not need the assistance of a center to know where they are going. Consider college students or area residents who are interested in hiking Humpback Rocks, but are already familiar with the area and route. They likely do not feel the need to stop at visitor centers the same way they might in a more unfamiliar area.

## Accessibility

The NPS faces issues regarding accessibility based on physical ability status. Natural areas with rough terrain may be inaccessible, and cannot be modified. There are other aspects of NPS visitation and accessibility that can be changed more easily. Strides have been made in recent years, including in 2012 with the creation of the NPS Accessibility Task Force (ATF) which hopes to assess and implement potential improvements to accessibility in the parks (Charitan, 2019). The ATF has made improvements to many facilities since then. For example, in visitor centers, there are more opportunities for audio descriptions of exhibits as well as maps or informational pamphlets in braille or

<sup>2</sup> As noted in the key, the yellow parts of the bars represent visitors who visited the visitor center, whereas the green bars represent total visitation/those who did not utilize the visitor center.

larger fonts. Other improvements include increasing the wheelchair accessibility of bathrooms and picnic areas in parks (*What We Do - Accessibility* (U.S. National Park Service), n.d.). There is still a lot of work to be done — while the ATF still exists, their strategic plan was set to end in 2020 and it is unclear whether there are plans for further assessment or action to fill in more gaps in accessibility.

Despite these initiatives, there is much more the NPS could do to increase accessibility and inclusivity. The NPS should continue to strive to tell the stories of diverse places and spaces in America, and should also improve the ways in which people can interact with this information. They should lean into the success of recent initiatives to continue making improvements in these areas.

# EVIDENCE REVIEW: BEST PRACTICES OF VENUES FOR VISITOR EXPERIENCE

This section will detail the existing best practices of places that curate visitor experience. To the extent that literature is available, the decisions behind these experiences as well as their impact will be explained. For the purposes of brevity, this section will focus on art museums, science museums, and aquariums/zoo as areas of interest. There will be a particular focus on case studies that are using technology. As society becomes increasingly more dependent on these technologies, places may want to adapt to interactive or integrative activities that take advantage of technology patrons already have on them during their visits (Ralston n.d.). Importantly, the 2021 Census found that 84% of American households had at least one smartphone in 2018 (*Computer and Internet Use in the United States: 2018, 2021*). Knowledge of what virtual resources can be delivered via smartphones is important to consider.

## Framing the Visitor Experience

One useful frame for this evidence is evaluating the desired relationship between visitor and destination. An evaluation of several Smithsonian museums determined that there are three potential lenses through which museum patrons can be viewed: either as strangers, guests, or clients (Doering, 1999). Museums that view visitors as strangers focus more on the curation of their collection or space than they do on the visitor experience. The collection is curated from the best possible options, without regard for what visitors necessarily want to see or what they might learn. In the guest framework, museums feel that they have a mission-based responsibility to welcome their visitors and deliver information or education to them. There is something that museums feel their guests need to know, and it is their job to make sure they leave with that takeaway, regardless of whether or not it is their only visit or the first of many. Finally, if viewed as clients, then it is the museum's responsibility to anticipate what their visitors will want and cater to their needs. In this scenario, museums exist to provide the visitor experience (Doering, 1999). It is likely that the NPS strategy will need to fall somewhere between the lens of guest and client. *While it will be important to cater to the desires and expectations of visitors, NPS officials are the experts on the offerings of each park and therefore have a responsibility to help direct visitors towards the most important or exciting aspects of each park.*

Additionally, there are four types of experiences that allow patrons to have positive interactions with the space they are visiting. These are social, object, cognitive, and

introspective experiences (Doering, 1999). Social experiences involve a visitor interacting with someone else. Object experiences center engagement around an artifact or piece that is associated with the setting. Cognitive experiences are more interpretive and invite visitors to think critically about the information they are consuming. Introspective experiences encourage visitors to reflect, either on their visit or how it connects to their life (Doering, 1999). *It is likely that the NPS will want to devote attention to each of these aspects, and they should consider how they work together or balance each other out.*

It will also be important to consider the level at which information is delivered. Accessibility of language is key to any potential improvements. Focusing on important information and removing complicated or overly technical language as much as possible reduces frustration and increases learning (Lijek & Fankhauser, 2016).

## **Art Museums**

A 2001 report from the Smithsonian Office of Policy & Analysis found that modifying art museum settings either by changing the physical setting or by creating other ways to engage outside of physical spaces can encourage more diverse groups to visit art museums (*Increasing Museum Visitation by Under Represented Audiences: An Exploratory Study of Art Museum Practices*, 2001). This analysis will assume that this applies to virtual spaces as well, implying that improving the virtual resources available to visitors could increase their level of comfort interacting with a park. By extension, this could increase engagement and their chances of having a positive experience. People are generally receptive to interacting with a museum or other visitor oriented space virtually. A 2021 study found that 67% of people reacted either positively or strongly positively to the idea of increasing their interaction with museums through virtual platforms (Resta et al., 2021). This is strong evidence for the NPS to consider.

The previously referenced Smithsonian report also details the power of a ‘pre-visit’ interaction, whether this is marketing or learning about an exhibit before physically entering the museum. A positive pre-visit experience not only increases the likelihood that a person will actually visit, but also improves their experience while there since they have been primed to consume the information being presented to them (*Increasing Museum Visitation by Under Represented Audiences: An Exploratory Study of Art Museum Practices*, 2001).

## **Science Museums**

Science museums are a particularly good place to look at visitor experience because they are typically highly interactive and immersive, much like experiences in national

parks. Due to this, they often have changing and evolving exhibits and experiences, unlike other types of museums that might be more rigid.

Hands-on learning, specifically in science, has been associated with greater retention of materials as well as an increase in feelings of self-efficacy regarding one's ability to learn and engage with scientific material (Gutwill, 2018). Another study in 2017 found that similar material delivered through different mediums (a theatrical play as compared to a more traditional exhibit) resulted in different levels of information retention for children (Peleg & Baram-Tsabari, 2017). Additionally, prior knowledge impacted experience — the information was about robotics, and children often brought in prior knowledge when answering interview questions about either the play or the exhibit. Those that had a level of prior knowledge of the topic were more likely to retain information from the exhibit. Most children had trouble figuring out what factual information or messages they were supposed to learn from the play, however. Despite this, most children who saw the play expressed enjoyment and connection with the characters in the play (Peleg & Baram-Tsabari, 2017).

*This sort of information could be valuable when considering how visitor experience might change across NPS units.* At sites like Gettysburg, where most visitors have some level of background information, the visitor experience might be developed differently than at a park unit where the average visitor has no knowledge of the history upon entering. In concert with the framing questions that have arisen around visitor experience, this is important for those developing the NPS experience to remember. Are there certain sites/pieces of sites where visitors should just have fun and enjoy? How does the visitor experience look different in those areas of the park as opposed to areas where the NPS hopes to deliver education or specific information? While this study is rigorous and credible, it is primarily focused on the experience of children (and their families, where possible), meaning results are not necessarily generalizable to the NPS context.

There is also very strong evidence for the effectiveness of specific interactive activities like scavenger hunts in science learning (among other settings). Interactive learning is associated with greater retention of material (similar to the above study), as well as increases in feelings of self-efficacy regarding one's ability to learn and engage with scientific material (Gutwill, 2018). Another study found that scavenger hunts led to positive feelings of engagement and experience (LaChance, 2016). While not in a museum context, a study of children's engineering classes done at Purdue University in 2009 found that students who participated in a hands-on lab before taking an exam scored almost 20% higher, on average, than those who did not (Medaris, 2009).

Another study draws on the importance of the connection between knowledge construction and contextualization specifically in science learning. Here, construction refers to knowledge that people (specifically students) have from their everyday lives, while contextualization refers to the ability to actually connect that knowledge to the larger problems that face the world (Korfiatis, 2005). An associated study that used Korfiatis as a framework found that while students in the study typically were not enthusiastic about their science education in the classroom, they responded very positively to the learning experience in a science museum or other similar informal learning context and found it interesting when informal learning could be connected to problems they see out in the world (Kim & Dopico, 2014). These results suggest that informal and formal learning venues should be more in sync, either via the coordination of goals or by having more traditionally formal avenues such as a classroom incorporate elements of informal learning more frequently. *This could present an interesting challenge to the NPS — since their visitors are not all students, like in this study, are there any spaces or institutions that many of their visitors do interact with that could present partners for curating visitor experience?* Beyond that, the focus on knowledge contextualization provides important insight. The NPS should highlight the ways in which experiences or knowledge visitors gain connects to other places or aspects of their lives.

Many science museums offer information that can be accessed outside of their physical space. Offerings like videos, activity kits, professional development courses for educators, or online interactive modules are all relatively common for more robust science museums and provide another facet of visitor experience and education (Portland Science Center Team, 2019). The availability and investment in these resources by the Portland Science Center and other museums suggests that institutions place value on the mission they have to educate and share information, aligning with the Doering framework of viewing visitors as guests. *If the NPS hopes to focus on visitor experience outside of visitor centers, then this is important to consider — how can you continue to deliver information or an experience even when visitors are not physically at a NPS site?* There does not appear to be significant evidence that these resources are positively impacting those who use them, representing a gap in the literature in this area.

## Aquariums and Zoos

Aquariums and zoos, like science museums, provide immersive and self-directed experiences for guests. Similar to national parks, they have conservation and nature as

their focus, making them effective case studies when considering improvements that NPS could make.

Research suggests that visitor experiences are most positive when the goals of guests are aligned with those of the organization. A study at an Australian aquarium found that visitors who did not prioritize conservation prior to their visit were less likely to retain conservation information after their visit (Ballantyne & Packer, 2016). This represents an important connection to the Doering framework. Here, zoo employees and visitors were interviewed about their intentions and experiences. Zoo employees viewed their visitors as guests, and felt they had a responsibility to provide a safe and welcoming space where guests could learn about animals and conservation. Since this was similar to the stated goals and expectations of many of the interviewed guests, this represents an alignment between institution and patron, leading to a positive visitor experience (Ballantyne & Packer, 2016). This study was small, but covered a significant geographic area. However, many interviewees were repeat visitors, which may not have strong generalizability to NPS sites, where some sites are not conducive to frequent repeat visitors.

Another study highlighted the importance of narrative framing for visitor experience — while framing can be subtle or even subconscious, it impacts the way that visitors interact with their environment. The same experience delivered to different individuals can have wildly different impacts depending on how they were primed before interacting with an exhibit or activity (Mileham, 2021). While there is no silver bullet when it comes to choosing a frame, it will be important for the NPS to think about how they want visitors to be primed (if at all) to experience the full site. Much of this will come down to whether or not they want visitor takeaways to be somewhat standardized, or whether they are okay with different visitors leaving with unique and personal takeaways. If they wish to standardize, then it will be important to consider how and where to provide context and framing as guests are planning or entering their park experience.

# ANALYSIS OF ALTERNATIVES

Three alternatives will be evaluated in this analysis. These alternatives are directed at improving the visitor experience, specifically by making information easier to access for park visitors. The alternatives<sup>3</sup> are as follows:

1. Invest in improvements to the National Parks app.
2. Create an interactive, scavenger hunt style activity to help direct visitor experience towards meaningful and interesting locations.
3. Increase the number of ways to interact with the National Parks before/without visiting.

These alternatives will be assessed on three criteria: equity, effectiveness, and cost. For the purposes of this analysis, the term visitor experience will be used to refer to the quality of the interaction a visitor has with a park, whether that is with the information they receive, the staff they interact with, or the features of the park they visit.

**Equity** should be a priority in all alternatives, especially given concerns about the accessibility and inclusivity of the National Parks. Equity should be focused on in two dimensions: (1) access, in which all people are able to interact with the alternative and (2) engagement among groups who are historically underrepresented in park visitation, whether that is connected to race, socioeconomic status, or something else. In order to measure this, this analysis will examine existing changes in engagement, specifically the quality of their engagement. Measuring **effectiveness** is also necessary to compare the impact of different alternatives on visitor experience. As this is difficult to quantify across alternatives, this will be ranked across the three alternatives (from highest effectiveness to lowest effectiveness). These rankings will be determined by comparing relevant examples of how these interventions have been used in other settings. Effectiveness will focus specifically on the degree to which the alternative would improve visitor experience while in the parks. Finally, assessing direct **costs** will be helpful given the budgetary constraints of the NPS. This should be measured as cost in dollars (or full time equivalent employee costs) over 12 months.

## General Recommendations

Before discussing recommendations specific to improving the visitor experience, this section details a few overarching recommendations that the NPS should pursue.

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<sup>3</sup> A ‘status quo’ option will not be analyzed in this memo, since the NPS visitor experience team has already decided that improvements must be made.

### ***Increase access to the parks via fee-free days/expand fee free day offerings.***

Fee-free days or programs such as Every Kid Outdoors, which provides a free parks pass for fourth grade students and their families (*Every Kid Outdoors*, n.d.) are a great way to reduce costs for individuals and families looking to visit National Parks. However, these opportunities are time bound. One option to increase flexibility in these initiatives might be creating a voucher system, where people can claim a day-long pass for free during a promotional window, but are able to use that pass on a day that works for them. A Smithsonian report from 2007 found that implementing one free admission day per week in one of their smaller museums did increase attendance on that day over the course of the study (Neves & Pekarik, 2007). Visitors that are drawn in on a fee free day or by using a fee free entrance voucher are able to see the benefits of visiting a park in a low stakes way, and it may encourage them to become repeat visitors.

### ***Increase representation of diverse populations in promotional materials, and diversify National Park staff (specifically park rangers).***

In order to attract visitors that are representative of the American population, any content created by the NPS should reflect the American population. This includes increasing representation of people from all backgrounds (race, body type, socioeconomic status, etc.) on promotional materials, including on anything handed out inside parks.

Additionally, there should be changes to the recruitment process to make the body of employees at the National Parks more diverse and representative of the American population as a whole. Data released by the NPS in 2021 showed that the NPS workforce is overwhelmingly male — a disparity that is even more pronounced among park rangers specifically. Additionally, 78.5% of NPS employees in 2020 identified as White (*By the Numbers*, 2021). This release does acknowledge the disparity in race and gender that still exists (as well as the strides that have been made since 1975) but does not mention any current initiatives to address these issues. As a note on feasibility, the NPS made a big push for accessibility of facilities and information from 2012-2020 through an accessibility task force, proving that accessibility and equity for a broader base of visitors has been prioritized in the past and could easily remain a priority moving forward (*What We Do - Accessibility (U.S. National Park Service)*, n.d.).

## **Analysis of Alternatives**

### ***Option 1: Invest in improvements to the National Parks app.***

While the existing NPS mobile application is very helpful, there are a few things missing that could improve the visitor experience for many people. Currently, the app

helps users find places to stay, things to do in the park, information about visitor centers and hours of operation, and also shows any real-time alerts relevant to that particular park (among other things). Screenshots of the application and some of the functionalities it currently provides can be found in the Appendix 1 of this document. One of the most important features of the app is that the materials for specific parks can be downloaded for offline use. This is key, considering that many National Parks have limited (if any) cell service or internet access.

Examples of improvements might be a welcome video from a resident park ranger that highlights the must-see spots in the park. Sample itineraries that provide recommendations on how to prioritize time if a visitor only has five hours/one day/one week in the park might also be helpful. Increasing the resources available in the application may help first time visitors or those who are not sure where to start when visiting a park. In larger parks with more things to do in particular, including a filter feature that allows users to pare activities down by particular qualities will be necessary, especially for those visitors who find the number of activities available in a park overwhelming. Allowing users to filter on things like age group or physical difficulty may improve visitor experience by directing guests towards things they are more likely to enjoy.

**Equity:** These improvements will be highly equitable. As mentioned in the evidence review, the vast majority of American households have access to a smartphone (*Computer and Internet Use in the United States*: 2018, 2021). This means that most people would be able to download the app (which is free) without purchasing any new hardware. The Smithsonian Office of Policy & Analysis report also suggests that improving opportunities to interact with a visitor setting virtually may encourage more diverse groups to visit (*Increasing Museum Visitation by Under Represented Audiences: An Exploratory Study of Art Museum Practices*, 2001). If marketed properly, the NPS might be able to encourage potential visitors to download the application and explore what activities might interest them in parks. In turn, this may encourage a more diverse audience to visit.

**Effectiveness:** This analysis will assume that outside engagement includes virtual engagement, following from the Smithsonian's report on visitation (*Increasing Museum Visitation by Under Represented Audiences: An Exploratory Study of Art Museum Practices*, 2001). Therefore, improvements to virtual engagement through the application that cater to new or more diverse park visitors will markedly increase their level of engagement. By extension, this will also increase their engagement and chance of positive experience in parks. Referring to the Resta study from the evidence review,

people are generally receptive to engaging with virtual resources provided by museums (Resta et al., 2021). Thus, this alternative is considered highly effective.

**Cost:** This alternative is low cost as compared to other alternatives. Since the application already exists, all that is necessary is to develop and implement the improvements described above. General guidance estimates that an application redesign or addition of new features costs between 15-20% of the initial application development costs (Chomko, 2012). Based on conversations with the NPS, the initial application development was a multi-million dollar project (estimated at around 5 million). However, according to the NPS, initial development costs are very high since every government application must have substantial security included in it to prevent any hackers from using a less sensitive application, like the NPS, as a stepping stone to a more sensitive government system (K. Olson, personal communication, 2022). This new security system will not need to be re-created, since it already exists, the new features just need to be implemented within it. To be generous, this analysis will assume that the upgrades will cost 10% of initial development costs (removing 5% from the estimated range above to account for the fact that there will not be costs for security infrastructure). This brings the cost estimate to \$500,000. This calculation does not include general application maintenance costs, since those should already be accounted for in the general NPS budget. There are no hardware costs associated with this alternative, as previously stated. There are minimal costs associated with the development of new content for the application. Based on conversations with the NPS, most projects of this scale are generally planned to require 3 full time equivalent employees: 1 project manager and 2 project coordinators over the course of one year.

*Option 2: Create an interactive, scavenger hunt style activity to help direct visitor experience towards meaningful and interesting locations.*

In order to prioritize the improvement of visitor experience most directly, this alternative recommends creating an interactive activity that helps guide visitors through the park, providing them information or recommended activities at each stop. This could be as simple as a checklist that can be downloaded through the app, with links to extra information as visitors reach each stop, or as involved as something like geocaching, where visitors could use a GPS enabled device to lead them to various locations in the park. These hands-on activities will increase learning and thus improve visitor experience (LaChance, 2016).

In creating this activity, it may be important to balance education with activities. Some items might be simple, like stopping into the visitor center. Others could be themed and meant for certain groups, such as a scavenger hunt specifically for first time visitors

or specifically for families with children under 12. Other activities could be more of a ‘bucket list’ style: things that visitors may not necessarily be able to seek out, or things they may have to get lucky to see, such as spotting a particular type of wildlife. This type of activity might be good for repeat visitors. Importantly, the existing application includes some self-guided tour options especially at larger parks. The key to this alternative will be creating an interactive element (such as reflection questions or activities) that add to the existing information available at these stops. This differentiates this alternative from option 1: instead of just delivering more information, this should directly mold what visitors do throughout the day.

**Equity:** This alternative is highly equitable. It prioritizes access, since it can be delivered in a way that is available to all visitors. However, it might not encourage a more diverse group of visitors to engage with the NPS on its own. If designed well, scavenger hunts can be scaled to meet people where they are — whether that is based on reading level, language, physical ability, or other characteristics that might impact the way a visitor interacts with the park. This follows from the literature referenced in the evidence review on language in science education: removing overly technical language decreases frustration and improves the chances of quality learning (Lijek & Fankhauser, 2016). However, there is not much specific evidence that a hands-on, interactive activity would create better experiences specifically for underrepresented visitor groups (although making sure that there are scavenger hunts that are appealing to a diverse group of visitors might help here).

**Effectiveness:** This option is highly effective, as a result of the strong evidence for the effectiveness of hands-on, interactive activities such as scavenger hunts. It follows from the evidence review that interactive activities increase feelings of self-efficacy and retention of information (Gutwill, 2018). From the perspective of visitor experience, a scavenger hunt or similar activity would allow visitors to fully engage with the parks and the people visiting alongside them, by working together to complete the challenges — leading to positive feelings of engagement and experience (LaChance, 2016).

**Cost:** Creating a scavenger hunt for the National Parks would be very expensive. In order to develop activities that are relevant for each park, there would need to be at least one park ranger (or other employee who is similarly familiar with each park) involved in development. While this would not be the full time job of that person, it would likely require a significant investment of their time. For the purpose of this analysis, this will be estimated as roughly 0.25 of a full time equivalent (FTE) employee, since being involved in the development of this scavenger hunt would take time from their other responsibilities. It would also require investment from the visitor

experience/educational development teams — similar to option 1, the NPS believes this will require a three person team: 1 project manager and 2 project coordinators over the course of one year in addition to the park-specific support (K. Olson, personal communication, 2022). In total, this would equal  $(3 + (0.25 * \text{number of parks}) * \text{FTE}$  compensation. This option has some flexibility in cost, as it could start with a smaller pilot program at some of the most visited, larger parks. If it is effective and worth the investment, this could later be expanded to all parks. It is important to note that this option may incur the same application update costs as option 1 (\$500,000). This cost could be avoided or lowered by providing paper copies of the scavenger hunt to visitors, but this would likely substantially decrease effectiveness (but would also incur additional printing and distribution costs).

***Option 3: Increase the number of ways to engage with the National Parks before/without visiting.***

Many National Parks are not situated in such a way that they can be visited very frequently by visitors who are not local. Therefore, it is important to create avenues for engagement before visiting a National Park, either to help visitors decide how to spend their time or even what park to visit on their next vacation. This might look like commissioning a podcast, documentary, or a series of YouTube videos about the NPS and the parks it oversees. As a smaller lift, the NPS could partner with social media personalities/influencers who are already creating content within parks. Any materials that can help potential visitors learn about what the parks have to offer will help build interest and curiosity, providing visitors with a better experience when they eventually visit (*Increasing Museum Visitation by Under Represented Audiences: An Exploratory Study of Art Museum Practices*, 2001).

**Equity:** Similar to options 1 and 2, this alternative is highly equitable from an accessibility standpoint since there is no cost to visitors (potential or otherwise) to interact with these materials, and accessing them only requires the use of smartphones/laptops/etc that they likely already have. Unlike option 2, however, this alternative might actually increase the diversity of the visitors who come to parks. The previously mentioned Smithsonian report highlighted the importance of marketing in advance of a person's visit. Exposing them to a positive view of the site before they visit increases the likelihood that they will actually visit, and also improves the chances that they will have a positive experience during their visit since they have been primed for

the information they are seeing (*Increasing Museum Visitation by Under Represented Audiences: An Exploratory Study of Art Museum Practices*, 2001).

**Effectiveness:** This alternative has high effectiveness for the people who choose to engage with the content. Research has shown that auditory materials (such as podcasts or videos) have higher retention and engagement than reading or visual materials alone (Pattison et al., 2016). Podcasts have also been increasing in popularity, and would lend themselves well to marketing. However, these materials would not be consumed by visitors (prospective or otherwise) without adequate marketing, and they would not necessarily be good resources to use while visiting the park (ie, a ranger could share information about the podcast, but in an area with minimal cell service, visitors might not be able to look it up until they leave the park, at which point they might have forgotten). They could be embedded within the app to be downloadable, but otherwise might not have a huge impact on visitor experience while in parks.

**Cost:** For the sake of costing, this analysis will focus on a podcast series and short form videos created by the NPS (posted on YouTube or something similar). Podcasts are typically free to host on platforms such as Spotify or Anchor, and therefore the only costs to produce the podcast would be the employee time and equipment. For decent audio quality, this analysis will generously estimate \$200 for a set of new microphones, \$100 for a subscription to an editing service for one year, \$400 to ship recording equipment to various guests throughout a year, and 2 full time equivalent employees to manage, host, and produce the podcast. For short form videos, such as those to be posted on YouTube or other forms of social media, this analysis will estimate \$10,000 of up front costs for equipment and 2 full time equivalent employees to produce, script and edit. The costs of equipment are based on 2020 estimates for gear of mid-range quality (Williamson, 2020). This brings the total cost to: \$10,700 + 4 FTE. Similar to option 2, costs could be reduced by producing a smaller number of videos/podcasts about specific parks, and then expanding over time if they are well received. It is also possible that a media department or something similar within the NPS already has some audio/video equipment, which could also help lower costs.

## OUTCOMES MATRIX

The outcomes matrix below synthesizes the estimated ranking of each of the selected criteria: equity, effectiveness, and cost. Here, green corresponds to a more desirable ranking of the criterion, red is less desirable, and yellow is in between. For example, high equity is green, since the desirable outcome is the highest equity possible. High cost is red, since ideally costs would be kept lower. Since effectiveness is difficult to quantify, this criteria is ranked from highest to lowest between the given alternatives.

	Equity	Effectiveness	Cost
<b>Invest in improvements to the NPS app.</b>	High	Middle	Middle \$500,000 + 3 FTE
<b>Create an interactive activity to direct visitors through the park.</b>	Medium	Highest	Highest \$500,000 + ((3 + (0.25 * # of parks)) * FTE)
<b>Increase opportunities to engage before visiting.</b>	High	Lowest	Lowest \$10,700 + 4 FTE

## RECOMMENDATION

Based on the analysis above, **the NPS should implement option one: improving the information and activities available in the NPS mobile application.** This option will significantly improve visitor experience for those physically in the parks, while also balancing cost (as it is more reasonable to fund than option 2). The mobile app is already an equitable offering — as it can be downloaded for free by anyone with a smartphone. Minor tweaks to improve the accessibility of information as well as the breadth of offerings will help this app cater to a wider variety of visitors, making it more useful and user friendly. This in turn will increase the ease of planning and executing visits to parks, improving the visitor experience. Additionally, this alternative fits nicely into the existing visitor experience/interpretation team and therefore would not require any new hires, just the dedication of time to make these improvements.

While prioritizing the visitor experience of people in the parks is most important, this alternative has the added bonus of being available to anyone regardless of location. Therefore, it may also provide important information about the NPS and its service units to people who are considering visiting a park for the first time (or picking a new park to visit) — at no extra cost or burden to the NPS.

# IMPLEMENTATION

This implementation strategy should make use of forward mapping and begin with the objective in mind, rather than the problem (Elmore, 1979). The overarching goal is to improve the visitor experience via the mobile application, and every decision should consider whether it helps make progress toward that goal.

There are a variety of people/groups who should be involved in this project. They may include:

- Members of the Visitor Futures team
- Application developers/contractors
- Park Rangers
- Focus groups of potential users (first time park guests, returning/repeat visitors, varying age groups, groups of varying socioeconomic status, race, or knowledge of the NPS)

Primary responsibility for this project should remain under the Visitor Futures team, since they are already working on other improvements to the visitor experience. Their expertise and input will be valuable for increasing the effectiveness of the app improvements, and can help incorporate other initiatives while preventing redundancy.

The developers or contractors that currently maintain the application should be involved from the start of this process. They will be able to provide feedback on technical questions or limitations quickly, without causing delays to the project. This will allow the team to move forward on features that are possible and useful, promoting efficiency.

Park rangers or other employees working in specific parks should be included in the life cycle of this project. They can help identify features of park activities, such as the physical difficulty of certain hikes, in a way that someone unfamiliar with the park would not be able to. It may be most efficient to first engage rangers at a smaller number of parks (perhaps the top 10 most visited), implement these improvements, and then assess their effectiveness. Then, these features can be rolled out to all parks.

Finally, focus groups of potential application users/park visitors will help test the new features before they are fully implemented. Having people outside of the NPS provide immediate feedback will help hone the ideas in development, make them more useful for the average visitor, and increase the chances that their rollout is successful.

Along with this, the NPS should build in various mechanisms to measure the effectiveness and impact of the application when used by visitors. An example of this might be having a pop up survey of a few questions to ask about user satisfaction, or a simple thumbs-up/thumbs-down poll for particular features.

There are a variety of barriers to consider during this process. The largest and most unpredictable barrier is cost. Theoretically, costs should be relatively low since the app already exists, and all that is necessary is to add the new features. However, there may be unexpected costs for computationally expensive features, or those associated with the security necessary for a government-maintained application. Based on the assumptions in this analysis, these new features should fit within the existing security measures without substantial extra cost, but it will be important to talk with the developers to make sure this holds true throughout. Of course, making sure that time is set aside for this project when considering all of the other work that team members and park employees are working on may be difficult. However, keeping this under the Visitor Future team's responsibilities will hopefully integrate it into other work easily.

Addressing some of these barriers may be made easier by consulting other similar applications. For example, Parks Canada also has an application maintained by the government that could provide a source of ideas (*Parks Canada – National App*, n.d.). There may even be people working at Parks Canada who are willing to discuss their process and improvements. Similarly, there are a variety of privately operated applications relevant to the National Parks in America. These might include REI's National Park Service Trail Guide (*App of the Day: National Park Trail Guide*, n.d.) or Chimani's Guide to the National Parks (*Chimani: National Park Mobile App Guides & Maps for Hiking, Camping, Auto Touring, and RVing | Chimani*, n.d.). These examples have similar features to the existing NPS app, but may help the team brainstorm new options or ways to reimagine existing features. Additionally, investigating 'competitors' to see what makes their apps effective is one of the most highly recommended strategies for improving a mobile application (*Editors, Forbes Technology Council*, 2019).

# IMAGE SOURCES

Half Dome Cover Photo:

<https://images.unsplash.com/photo-1429516387459-9891b7b96c78?ixlib=rb-1.2.1&ixid=MnwxMjA3fDB8MHxzZWFrY2h8MXx8eW9zZW1pdGUiMjBoYWxmJTIwZG9tZXxlbnwwfHwwfHw%3D&w=1000&q=80>

Batten School Logo:

[https://res.cloudinary.com/uva-batten-school/image/upload/v1568062266/Batten%20Website%20Master/2019-09/bat\\_rgb\\_ko\\_large.png](https://res.cloudinary.com/uva-batten-school/image/upload/v1568062266/Batten%20Website%20Master/2019-09/bat_rgb_ko_large.png)

NPS logo:

[https://upload.wikimedia.org/wikipedia/commons/thumb/9/97/Logo\\_of\\_the\\_United\\_States\\_National\\_Park\\_Service.svg/1200px-Logo\\_of\\_the\\_United\\_States\\_National\\_Park\\_Service.svg.png](https://upload.wikimedia.org/wikipedia/commons/thumb/9/97/Logo_of_the_United_States_National_Park_Service.svg/1200px-Logo_of_the_United_States_National_Park_Service.svg.png)

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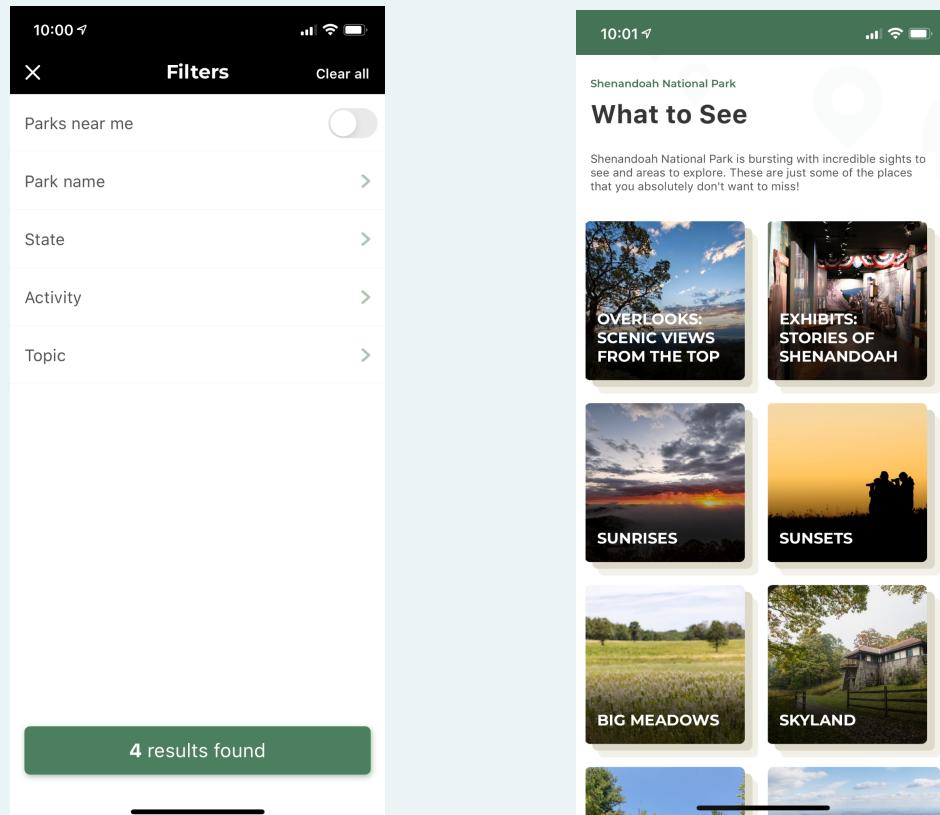
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# APPENDIX 1

The screenshots below are from the National Park Service official mobile application as it currently exists.

*Screenshots 1 & 2: Menu Options*



The above images show 2 menu options users will see soon after opening the app or selecting a park. The left screenshot shows the existing filter options for finding a park. The right screenshot shows potential menu items for Shenandoah National Park.

## Screenshots 3 & 4: Accessibility & Alerts

The image displays two side-by-side screenshots from a mobile application interface.

**Left Screenshot (Accessibility Features):**

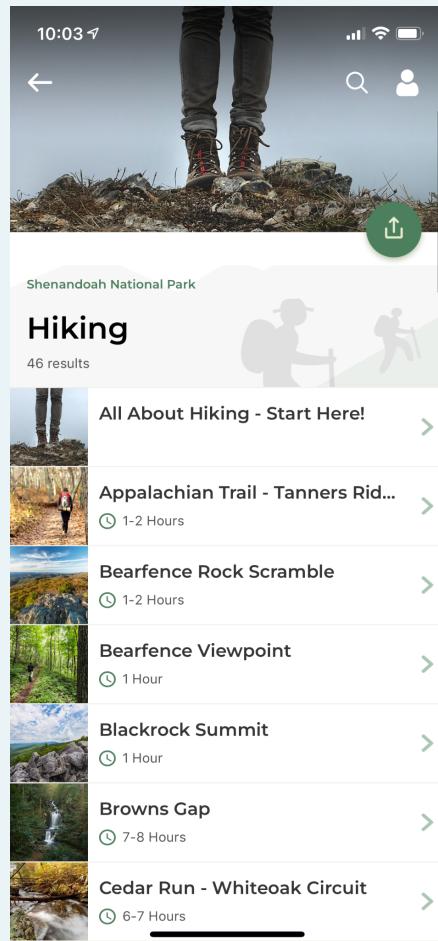
- Header: 10:01 ⓘ, battery level, search icon, user profile icon.
- Section: AMENITIES
- List:
  - Assistive Listening Systems
  - Automated External Defibrillator (AED)
  - Benches/Seating
  - Captioned Media
  - Cellular Signal
  - Fire Extinguisher
  - First Aid Kit Available
  - Gifts/Souvenirs/Books
  - Historical/Interpretive Information/Exhibits
  - Information - Ranger/Staff Member Present
  - Parking - Auto
  - Recycling
  - Restroom - Accessible
  - Scenic View/Photo Spot
  - Tactile Exhibit
  - Theater/Auditorium

**Right Screenshot (Real-time Alerts):**

- Header: 10:00 ⓘ, battery level, search icon, user profile icon.
- Section: Alerts
- Text: Shenandoah National Park
- Section: Caution
- Alert: South River & Dundo Picnic Grounds and Campground Water Alert
  - Water testing at South River and Dundo Picnic Grounds and Dundo Campground shows water may contain microbial contamination. Water should NOT be consumed or used for washing dishes and hands without boiling it first
- Text: more
- Section: Information
- Alert: Ongoing Waterline Construction at Big Meadows Campground
  - Sections of the waterline at Big Meadows Campground are being replaced. Impacted campsites will not be reservable Mondays - Thursdays, but may be available as first-come, first-served sites.

These screenshots show accessibility & alert features. The left screenshot is a list of features available at one of the Shenandoah National Park visitor centers (including the accessibility of exhibits and facilities). The right screenshot shows real time alerts for the Shenandoah.

*Screenshot 5: Hiking Activities*



This screenshot shows the ‘Hiking’ menu in Shenandoah National Park. Users can find routes as well as the estimated time it will take to complete a hike. Clicking on each hike will then provide more information.

The source for all images in this appendix is: National Park Service. (2022). *National Park Service* (Version 1.2.5) [Mobile app]. App Store.