Visitor Perspectives on Alternative Parking Management Strategies: Implications for Meech Lake Parking Access and Visitor Use Management in Gatineau Park

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Abstract

Parks and protected areas often operate under a dual mandate, such that their management aims to conserve the natural environment while providing quality recreational opportunities for visitor enjoyment. Unfortunately, growing visitation trends have created complex managerial challenges when attempting to balance conservation goals with conflicting visitor demands across some of the most highly visited parks across Canada, including Gatineau Park. While even minimal levels of recreational use in an area can impose substantial environmental and social impacts, growing visitor densities at popular destinations in Gatineau Park, including Meech Lake, are likely to continue to strain managerial efforts put forth to restore the ecological integrity of the park and provide desired positive visitor experiences.

This paper, based on a review of existing literature and various case studies, aims to identify parking management options and sustainable transportation alternatives that could be implemented in the Meech Lake sector of Gatineau Park to address parking shortages at Parking Lot 13 during the busy summer season. Four alternative parking and transportation strategies are considered: variable rate parking fees; time-managed entry reservation systems; active modes of transportation; and the exploration of a shuttle bus service expansion. Each approach is examined based on its advantages, limitations and public perceptions. The purpose of this study is to help inform Gatineau Park's managerial team of the most efficient means of managing visitor use of Parking Lot 13 at Meech Lake with minimal pushback from the public to sustain current recreational activities and provide a safe and high-quality visitor experience.

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Introduction

For years, parks and protected areas have operated under a dual mandate, such that their management aims to conserve the natural environment for future generations while providing quality recreational opportunities and visitor enjoyment (Needham et al., 2016a). However, the conflicting priorities, divided public perceptions, and political pressures on the matter continue to create managerial challenges when attempting to put conservation and ecological integrity at the forefront of decision-making in parks around the country (Donohoe & Gilmore, 2012).

Historically, trends suggest that the greatest environmental impacts imposed on a region are observed following minimal recreational use (Eagles & McCool, 2002). Therefore, increased visitor use of an area may not directly increase environmental degradation, but growing visitor densities present a greater diversity of recreational demands and negative visitor behaviours that contribute to the creation of problematic physical and social impacts. This further challenges managerial teams to find innovative means of protecting the environment without necessarily restricting recreational use that may otherwise detract from high-quality, positive visitor experiences.

Nevertheless, countless studies have demonstrated the ecological impacts of visitor recreation in parks and protected areas, which has resulted in an alarming intensification of trampled vegetation, soil and shoreline erosion, litter, wildlife collisions, and unofficial trail development that encroaches on sensitive ecosystems, which can lead to habitat loss and ecosystem fragmentation (Buckley, 2003; Nettles et al., 2023; Leung & Marion, 2000; Manning et al., 2012; Monz et al., 2016). Furthermore, the use of personal vehicles has repeatedly been recorded as the preferred and most common means of transportation to and within parks and protected areas (Daddio et al., 2015; Pildes et al., 2019), contributing a troubling amount of greenhouse gases from car emissions to the environment. In addition to the deterioration of the natural conditions of the physical environment, which often negatively influences a visitor's experience (Carbone, 2006; Creany et al., 2024; Newman et al., 2005), growing visitor densities and personal vehicle use in parks and protected areas are also adding stress to visitors' experiences. Increases in traffic congestion on roadways, limited parking availability and more intra-visitor conflict, often between individuals seeking competing recreational activities, are creating more concerns for the safety of visitors (Dixon et al., 2019; Ferguson et al., 2022).

Addressing these issues requires adaptive and effective management strategies that align with park goals and vision statements. One of the earliest developed park management frameworks for

managerial decision-making was based solely on the notion of carrying capacity (Wagar, 1964). When considering parks and protected areas, carrying capacity refers to the amount and type of use that an area can support without any significant implications on the natural environment (Manning et al., 2012; Shelby & Heberlein, 1987). However, over time, it became clear that issues pertaining to high visitor levels could not be managed through carrying capacity alone. So, alternative management frameworks were developed over the years, with the most recent Visitor Use Management (VUM) framework quickly becoming a manager's framework of choice.

VUM, defined as an "adaptive and proactive process for managing characteristics of visitor use and the natural and managerial setting using a variety of strategies and tools to achieve desired resource conditions and visitor experiences" (IVUMC, 2016, pp. 1-2), demands a thorough understanding of visitor motivations and behaviours for effective management decisions. It consists of four key steps. The first step in developing the framework involves building the foundation to understand why a specific project or plan is needed. The second step is defining the VUM direction, such that goals are clearly defined and a means of tracking these conditions has been specified. The third element is to propose management strategies that appear promising in achieving the set goals. The last step involves implementing, monitoring, and evaluating management strategies and adopting an adaptive management approach. Adapting managers' decision-making according to the VUM framework is expected to help manage some of the most densely visited parks and protected areas across the country, including Gatineau Park.

In accordance with the 2021 updated Master Plan (National Capital Commission [NCC], 2021), Gatineau Park managerial teams are considering new and innovative means of prioritizing conservation in the park, while simultaneously providing the best visitor experience possible and fostering public collaboration and engagement. One action being taken to achieve this involves the development of sustainable and equitable access and transportation to the park – another objective discussed in the Master Plan. Although congestion on park roadways is not an overly significant problem, parking availability, especially during peak visitation times on weekends in July and August, has prompted complaints from visitors seeking to partake in competing recreational activities. Thus, this paper will explore the parking availability in Parking Lot 13 (P13) at Meech Lake in Gatineau Park in Quebec, Canada and how alternative management strategies can help maximize recreational opportunities without impacting visitor experiences.

Background

Gatineau Park

Gatineau Park is a 36,131-hectare conservation park situated between the Ottawa and Gatineau rivers, just a short and convenient trip from the Ottawa-Gatineau urban centre (Del Degan, Massé et Associés Inc., 2010; Figure 1). Of the park's 600,000 independent visitors and 2.6 million total annual visits, 90% are thought to be from the 1.5 million local residents of the Ottawa and Gatineau areas (NCC, 2021a). This continuously growing region will inevitably increase the number of individuals looking to admire the breathtaking beauty of Gatineau Park and who wish to partake in its wide range of year-round recreational activities (NCC, 2017; Weitowitz et al., 2019a).

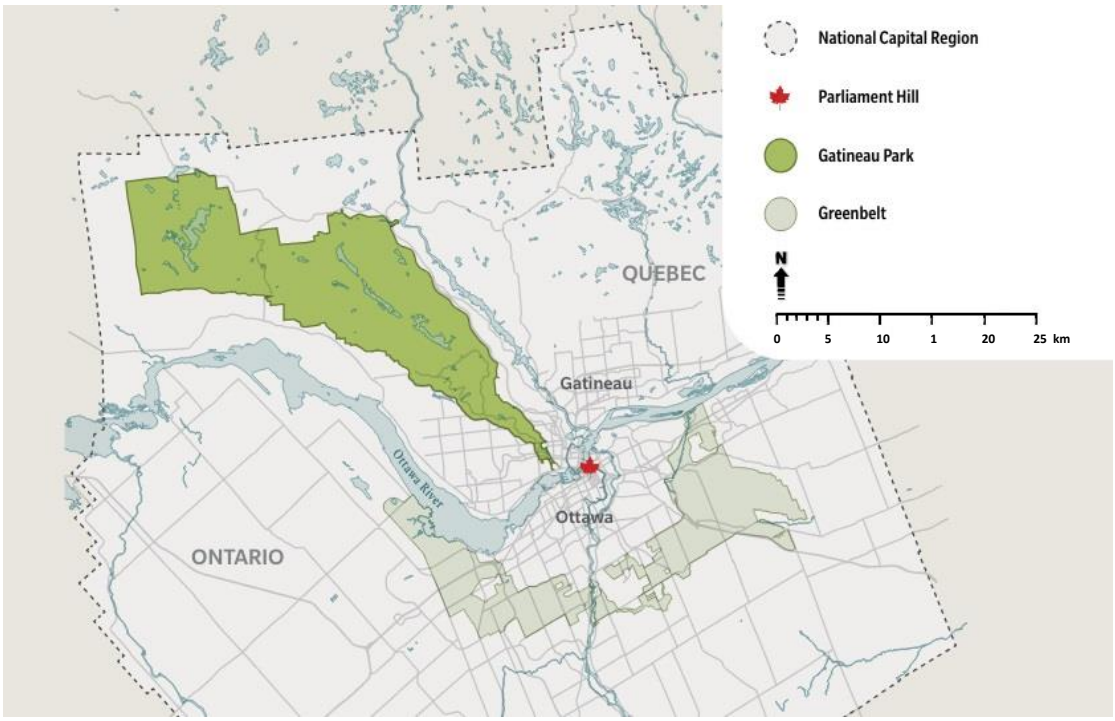

Figure 1: The geographical location of Gatineau Park within the National Capital Region. Adapted from the National Capital Commission's (NCC) 2021 Master Plan (NCC, 2021a).

Recreational Opportunities

Gatineau Park's diverse ecological features and unique terrain provide several opportunities for different recreational activities. During the warmer seasons, visitors can use up to 90 km of mountain bike-designated trails, use over 20 km of paved pathways to go cycling or use the 183 km network of official hiking trails (NCC, 2021a). A 300 km "unofficial" trail network also exists throughout the park,

which visitors have irresponsibly taken upon themselves to create. However, as of 2018, staff at Gatineau Park introduced the Responsible Trail Management project. This is an ongoing, multi-phase project designed to incorporate up to 100 km of these trails into the official trail network and restore the remaining 200 km of unofficial trails to a natural and protected state (NCC, 2023). Furthermore, the park has 14 picnic areas, canoe and kayaking destinations, 6 beaches, 300 campsites, and is home to an extensive range of plant, fish, mammal, bird, amphibian, and reptile species, with approximately 150 being distinguished as species at risk (NCC, 2021a). In the winter, the park remains open and sought after for its 60 km of fat bike trails, 200 km of cross-country skiing trails, 25 km of snowshoe trails, 10 km of winter hiking trails, and Camp Fortune: a privately owned downhill skiing destination (Del Degan, Massé et Associés Inc., 2010; NCC, 2021a). It is also worth noting that several cultural and heritage attractions reside throughout the park, including the Mackenzie King Estate (NCC, 2005).

Meech Lake

Meech Lake is one of 50 lakes situated in Gatineau Park. Visitors flock to this lake for its diverse array of recreational activity opportunities including trailheads to popular trail networks, swimming at public beaches, fishing, picnic areas, and the use of a boat launching ramp for non-motorized watercraft. Unfortunately, this abundance of recreational opportunities has repeatedly led to complaints regarding parking capacities within the Meech Lake sector, specifically at Parking Lot 13, and has been negatively impacting visitor experiences (NCC, 2015; P-O. Dorego, personal communication, May 2, 2024).

Meech Lake has a total of three parking lots surrounding its perimeter (Figure 2):

- Parking Lot 11 (P11) – This lot provides access to O'Brien Beach and the Discovery Trail (part of Trail 36), which includes access to the Carbide Wilson ruins.
- Parking Lot 12 (P12) – This lot is located beside the McCloskey boat launch area for visitors looking to explore the region via non-motorized watercraft (i.e., canoe, kayak, stand-up paddle boards). This parking lot also provides access to trails 2 and 40 and the Western Hut (via trail 2), which is one of the 11 rest shelters situated throughout Gatineau Park.
- Parking Lot 13 (P13) – This lot provides access to Blanchet Beach and the popular Wolf Trail trailhead (Trail 62), which connects to the deeper intertwined trail network throughout the park.

For the purpose of this paper, I will focus exclusively on Parking Lot 13. In the summer months (July-August), especially on weekends, P13 receives the largest proportion of park visitors seeking access to the beach. Daily visitor volumes indicate that the route from the Chelsea entrance to Meech Lake and

its three parking lots is one of the most popular routes in Gatineau Park with an average of over 810 vehicles travelling it per day (NCC, 2015). Additionally, 2024 visitor data, provided by park staff, has noted a daily average of 56 individuals departing from the P13 trailhead to hike the Wolf Trail (Trail 62) with some days even exceeding 280 individuals (H. Bichara, personal communication, July 31, 2024). Between the large number of beach-goers and hikers accessing the Wolf Trail each day, P13 becomes full very quickly, which creates "competition" between beach-goers visiting the beach and hikers who are seeking access to the Wolf Trail and want to park at P13. Although this problem is not uniquely isolated to P13, and similar issues can be witnessed in other lots around the park, due to P13's popularity, it creates a "domino effect" throughout the park because current response measures involve redirecting visitors to alternative areas and staff blocking access to Meech Lake at the Dunlop Road and Meech Lake Road intersection.

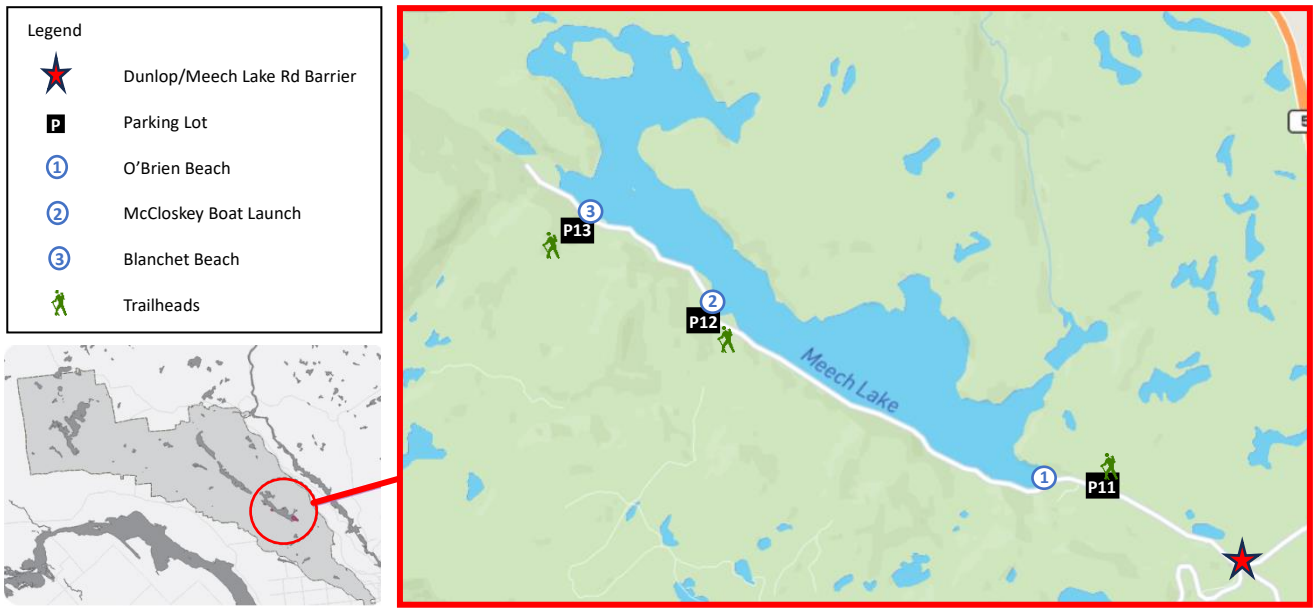

Figure 2: Geographical location of Meech Lake within Gatineau Park and the locations of key recreational opportunities in the area. Adapted from the 2021 Gatineau Park Master Plan (NCC, 2021a) and Avenza Maps (n.d.).

Purpose of Research

Gatineau Park has already taken initiatives to address concerns and feedback regarding visitor experiences by limiting personal vehicular access on the three major parkways in Gatineau Park and by introducing a free shuttle bus service. However, Meech Lake is not currently accessible by the shuttle

and as aforementioned, is facing considerable parking capacity issues. Therefore, the purpose of this paper is to provide a review of plausible parking management strategies that can be implemented at P13 at Meech Lake in Gatineau Park to provide more positive visitor experiences for people seeking different activities.

So, the primary research question addressed in this research study is:

What is the most efficient way to maximize sustainable recreation opportunities without impacting overall visitor experiences at Parking Lot 13 at Meech Lake in Gatineau Park?

To answer the primary research question, a secondary research question was explored:

What are visitor perceptions and responses to alternative transportation systems in parks and protected areas?

Methodological Approach

A multi-faceted case study approach was used to analyze and assess piloted parking and transportation alternatives in parks and protected areas. Advantages, trade-offs, inequities, and public perceptions were reviewed for each alternative. Although conclusions made from case studies cannot always reliably be applied to every situation, they can be effective in providing baseline understandings of concepts needing to be further explored.

Google Scholar, Web of Science, relevant conference agendas, and the University of Ottawa's academic search engine, "Omni", were used to conduct a preliminary search of parking management alternatives, with an emphasis on strategies considered for implementation in parks and protected areas. Four alternatives were identified for consideration of their effectiveness in Gatineau Park and for further analysis of public responses to them. The alternatives were identified as variable rate parking fees, a time-managed entry reservation system (TERS), active modes of transportation, and an expanded shuttle bus service. Next, empirical studies that piloted each of the four alternatives were collected and were chosen for further review based on relevance noted in the abstracts. Preference was given to studies whose publication date was within the last 10 years, study locations in North America, and studies that specifically examined public perceptions. Online and internal documents regarding Gatineau Park were also reviewed through collaboration with staff at the National Capital Commission.

Variable Rate Parking Fees

Much of the literature surrounding variable rate parking fees fails to demonstrate the implementation of variable rate pricing in parks and protected areas. Nevertheless, due to Gatineau Park's unique proximity to the Ottawa-Gatineau urban centers, which supplies the park with 90% of its visitors who would likely be accustomed to the daily demand of paid parking, studies that examined public perceptions of variable rate parking fees implemented in urban settings were still considered for review.

Time-Managed Entry Reservation Systems

Several relevant case studies examining the implementation of a TERS were examined in this paper. Three case studies that surveyed park visitors, spanning three different U.S. national parks of varying size, geographical location, visitation levels and available recreational opportunities, were analyzed to determine if the findings were similar across all parks despite their differences. Similar findings would increase their reliability in transferring the case study findings to Gatineau Park, whereas conflicting conclusions may indicate that other park-specific factors may influence the results. Nvivo 14 was used to code the findings of the three studies based on positive and negative sentiments and themes.

Active Modes of Transportation

There is considerably less literature published in North America that examines cases of active modes of transportation, specifically in parks and protected areas, compared to studies completed in Europe. Therefore, when conducting the literature review to examine the advantages, challenges and perceptions of active transportation systems to and within parks and protected areas, some international cases were also considered in the review.

Shuttle Bus Expansion

To determine if there is a need and current support for further shuttle bus expansion in Gatineau Park, a review of the new weekday shuttle bus system was conducted. Ridership was measured by the number of visitors that boarded the shuttle bus each day. A Levene's test was calculated to assess the equality of variances across the two groups, followed by a Welch's t-test to see if the mean weekday shuttle bus ridership differed significantly from the weekend shuttle ridership as an indication of the new shuttle's success. If the analysis indicates that the weekday shuttle ridership is equivalent to or greater than weekend shuttle ridership, then there is the possibility for discussions to expand the shuttle services to Meech Lake.

Results

In this section, I will review applications of alternative transportation and parking management strategies to address possible solutions that could be implemented in Gatineau Park to address the parking capacity issues for P13 at Meech Lake.

Alternative 1 – Variable Rate Parking Fees

Variable rate parking fees, sometimes referred to as differential or dynamic pricing, refers to the establishment of different hourly parking prices that fluctuate based on characteristics such as location, length of stay, time of day, day of the week, month, or during special events (Fabusuyi & Hampshire, 2018). During peak visitation hours, visitors could expect to see the highest parking rates being charged at the lot. Outside of these times, the hourly parking rate would resemble a lower, likely more anticipated, parking fee. Conceptually, it aims to increase parking availability by orchestrating the redistribution of visitors to other less busy parking lots, beaches, trailheads, or areas of interest, and incentivize visitors to visit Blanchet Beach or the Wolf Trail via P13 during off-peak hours by capitalizing on the lower parking fees. Further, variable rate parking fees may also encourage visitors to willingly choose alternative modes of transportation to and within the park, which not only aids in the overall goal of improving the parking availability in P13, but also supports Gatineau Park's goal that states: "By 2035, access to Gatineau Park and travel within its boundaries will be less reliant on the automobile in favour of more efficient modes of transportation having less impact on natural ecosystems, while enhancing the overall Gatineau Park visitor experience" (NCC, 2015, p. 3).

Currently, Gatineau Park already has a small-scale variation of parking fees in place at P13 at Meech Lake. P13 is one of the few parking lots in Gatineau Park that charges fees during the summer season from approximately mid-June to the Labour Day weekend. Meanwhile, most of the other lots are free year-round. However, P13 does not capitalize on charging off-peak and on-peak fees as a means of managing parking availability, nor does literature indicate that this form of variable rate pricing has been observed or implemented in other parks and protected areas.

Despite there being limited literature exemplifying variable rate parking fees in parks and protected areas, research considering differential pricing for street parking in urban centres and business districts has been observed frequently (Fabusuyi & Hampshire, 2018; Glasnapp et al., 2014; Pierce & Shoup, 2013). However, the conditions and motives for parking in urban centres and business districts are vastly different than those of individuals visiting a conservation park. Yet, Gatineau Park's unique

proximity to the Ottawa-Gatineau urban centres, where 90% of visitors originate from and paid parking is a necessary part of daily life, leave room to assume that public perceptions of variable parking rates in urban settings may still provide reasonable insights into understanding public perceptions of variable rate pricing fees for Gatineau Park.

Glasnapp et al. (2014) surveyed individuals following the recent implementation of a time-of-day based variable parking rate scheme to understand how likely the time-of-day pricing scheme would affect their parking behaviours. The large majority of respondents indicated that they were somewhat or extremely likely to change their parking behaviours following implementation of the system, but 32% of respondents still claimed that they were unlikely to change their parking patterns. The most common reasons for failing to adapt parking choices were a result of one's inflexible schedules, frequency of travel to the area, and convenience.

Furthermore, there has been conflicting findings regarding whether the implementation of a variable rate parking scheme indeed increases parking availability or whether existing literature conclusions are skewed or prematurely decided (Chatman & Manville, 2014; Millard-Ball et al., 2013). However, other studies that have examined the changes in parking availability under a differential pricing scheme in the short and long term suggest that it is difficult to notice considerable improvements to parking availability in the short term, but substantial increases in parking spot availability are noted the longer that the system is consistently in place and visitor behaviours have time to change (Inci, 2015).

An advantage of variable rate parking is the possibility for revenue generation. Due to the popularity of P13, the current parking fees help generate revenue for the park. Obviously, increasing parking fees during peak hours will help generate even more for the park. However, Worth et al. (2008) caution managers not to focus too heavily on the possibility of greater revenue generation. The necessary costs associated with the implementation of the pricing system, such as the equipment, technology, maintenance and enforcement staff, may create a longer-standing deficit than anticipated. Although increased revenue is desirable, it should not be the primary goal of variable rate parking fees.

Alternative 2 -Time-Managed Entry Reservation System

A TERS is a permit or "ticket" reservation system that requires park visitors to organize and book their visits in advance. In recent years, variations of a TERS have been piloted or implemented across several national parks, including Bruce Peninsula National Park in Canada and Glacier National Park, Zion National Park, Yosemite National Park, and Shenandoah National Park in the United States (Burke, 2023,

Miller et al., 2023; National Park Service [NPS], 2023; Parks Canada, 2024; P. Heintzman, personal communication, May 13, 2024). The three U.S. National Parks piloting a TERS that are reviewed in this section are Acadia, Arches, and Rocky Mountain National Parks. The specifics of the system can vary slightly by design, but generally, a TERS establishes a fixed number of reservations per hour based on the average length of stay observed by visitors to the park. The reservation system may apply to the whole park or target a specific popular destination within it. A certain percentage of reservation time slots are made available online up to several months in advance, while the remaining percentage is only made available within the last 24-48 hours, which helps accommodate individuals seeking more spontaneity in their trip, or those whose lifestyles don't allow them to develop plans until the last minute. The system allows managers to better control the number of personal vehicles and the number of visitors in the park during peak hours.

Challenges surrounding the TERS is that it is difficult to enforce vehicle turnover rates. Many recent TERS systems piloted and implemented in parks require you to reserve an arrival time, but once you have access to the park, you are welcome to stay as long as you please. Since reservation times are made based on average visit length, there may be a backlog for the next wave of permit holders if people stay beyond the expected visit length. Therefore, it is possible that parking shortages could still persist. For example, in the pilot study at Cadillac Mountain in Acadia National Park, sunrise and sunset reservations were in highest demand, so visitors began to "cheat" the system by reserving an earlier time, but staying far longer than they typically would to still utilize their reservation to be present at sunset that other visitors have also already booked (Stanley, 2023). Further, technological barriers may be troublesome for certain visitors as older populations may not be as technologically savvy and it may be a barrier to their accessibility.

In all three investigated case studies, researchers distributed surveys online, on-site, or a combination thereof, to collect feedback on visitor experiences under the piloted TERS, understand what factors are valued most in a positive visitor experience, and compare satisfaction ratings for returning visitors. The findings from the visitor perspective and attitude surveys conducted across Acadia, Arches and Rocky Mountain National Parks shared similar positive and negative sentiments on many of the same visitor experience indicators (Table 1). Overall, across all case studies, the majority of visitors were in support of continued implementation of a TERS.

Table 1: Summary of the primary study objectives and key findings from three different case studies examining visitor perceptions, attitudes and responses to a piloted time-managed entry reservation system in Acadia National Park (n = 1,501), Arches National Park (n = 939) and Rocky Mountain National Park (n = 9,684).

Case Study	Study Objectives	Primary Findings
Acadia National Park (Stanley, 2023)	1. Identify what attributes are considered most important to visitor experiences. Specifically, examine factors that the reservation aimed to improve. 2. Compare visitor experiences with the reservation system among first-time and repeat visitors.	• The majority of respondents (58%) reported no issues obtaining a permit; 42% had issues. • Of those who had issues, 42% indicated their preferred time was unavailable; 31% stated that poor cell service made it difficult to show their permit. • It was extremely important (58%) or important (39%) to be able to explore at one's own pace; 99% were satisfied or extremely satisfied. • It was extremely important (60%) or important (33%) to have an unobstructed view of scenery; 96% were satisfied or extremely satisfied. • It was extremely important (48%) or important (44%) to be able to find a parking spot; 93% were satisfied or extremely satisfied. • Of returning visitors, 40% said their experience improved compared to their last. Parking availability, congestion and less crowding were noted as reasons. • Of returning visitors, 43% said their experience was the same; 13% said it could improve. • First-time and returning visitors shared similar views. Parking availability and safety were most important to visitor experiences.
Arches National Park (Freimund & Wheeler, 2023)	1. Determine how a timed-entry reservation system can enhance or lessen the visitor experience. 2. Identify the most important values that influence a visitor's satisfaction with the system and their visit. 3. Identify whether people who visited Arches National Park after the timed-entry system summer pilot study did so intentionally and determine how their experiences compared to those who visited during the system's trial.	**Summer survey findings (During TERS pilot study; *n* = 537):** • Over half of respondents (57%) were highly supportive of the TERS. Experiences were either somewhat (27%) or much better (30%); 38% stated their experience was as they expected. • The majority (84%) expressed support for use of the system during future visits. • The majority of visitors (89%) were successful reserving a ticket. In this subset, 98% acquired their desired day and 86% acquired their desired time; 4% did not get a ticket. • The majority of visitors (56%) stated that access to the visitor center was excellent. • Only 50% thought that the ease of obtaining a ticket was excellent. • Most respondents (70%) indicated that communication of the system needed work. • Return visitors noted better parking, traffic congestion, trail crowding, and less visitors along roadways. However, wait times to enter the park were troublesome for 31%. • Visitors somewhat or strongly agreed that a TERS is favourable to manage congestion in emergency situations (83%); when ecological impacts from visitors are ruining future generations' opportunities (78%); or to improve parking availability (76%). • A smaller proportion of visitors (65%) valued solitude as a reason for TERS.

Table 1: Continued.

		Fall Survey Findings (Post-TERS pilot study; *n* = 402): • Temperature (80%) and vacation time (64%) were reasons for fall visits, not the TERS trial. • Wait times entering the park were better than the summer, but trail crowding was worse. • Like summer respondents, visitors somewhat or strongly agreed that a TERS was favourable to improve congestion during emergencies (72%); when ecological impacts are ruining future generations' opportunities (66%); or to improve parking (46%). • Again, maintaining solitude was the least favourable reason to support the TERS (56%). • Personal opinions of reservation systems, ease of ticket acquisition, information availability and visitor center access were the largest influences on positive TERS experiences.
Rocky Mountain National Park (Creany et al., 2024)	1. Determine which aspects influence the quality of visitor experiences in general, as well as which aspects are important to consider in order to support the implementation of a TERS. 2. Identify the importance of environmental conditions to positive visitor experiences. 3. Examine how transportation options influence perceptions of congestion on roads, at scenic lookouts, entrance stations, and in parking lots. 4. Compare visitor experiences with visitor expectations.	• Facility conditions and solitude were very important to positive TERS experiences. • Impacts and behaviours from other visitors warranted negative experiences with the TERS. • Ecological conditions were rated very important to visitor experiences. • Transportation aspects were ranked more modestly in terms of importance to the visitor experience. However, of these conditions, preferred time, traffic congestion, and parking availability were the most important. • A minority (20.6%) indicated that traffic was somewhat or far more than expected; 10.1 % indicated it greatly impacted their experience. • In a subset of returning visitors, 76% suggested that their experiences were the same (30.9%), somewhat (24.1%), or much better (21%). • Crowding in emergency situations, better park upkeep and ecological conservation were shared reasons for the support of a TERS. • Most important predictors influencing visitors' positive or negative sentiments towards TERS were their personal opinions of reservation systems, preferred time availability, ease of permit acquisition, improved parking, and traffic expectations. • Interestingly, although still noted as important, there was not statistically significant evidence that a TERS was effective in relieving crowding, preserving solitude, or improving parking.

Cross-Case Theme Analysis

Across all three cases, the large majority of visitor perceptions and experiences were positive and demonstrated an overall support for future use of a TERS. The most common and consistent positive perceptions demonstrated across all three case studies included:

- *Visitor Safety:* A sense of enhanced visitor safety under the TERS was often reported with a high level of satisfaction and a high level of importance. Visitor safety on roadways, in parking lots, and in the event of responding to an emergency situation were all perceived as improved, as a significant benefit, and as a supporting factor for the implementation of the TERS.
- *Trip Planning:* Repeated reports across the studies suggest that the alleviated stress from being able to plan ahead and have assured access to the park was a major influential factor in supporting the system. Further, the flexible design of the permit release system, such that there is still a reserved percentage of permits released 48 hours in advance of each day, also yielded positive responses from visitors who seek greater spontaneity. Overall, those who were able to plan further ahead experienced fewer issues and offered more positive experiences with the system altogether.
- *Overall Experience:* Over half of all visitors surveyed across all case studies reported that their overall experience visiting the park was somewhat or much better with the presence of the TERS. Interestingly, there were still 43%, 38% and 30.9% of returning visitors from Acadia, Arches and Rocky Mountain National Parks, respectively, that reported that their overall experience was about the same as they expected it to be. Although surprising, the larger majority of visitors still praised the TERS for an overall improved experience and supported its future implementation.
- *Parking:* Parking availability was generally ranked of equal or even greater importance than perceived visitor safety. Most visitors reported being satisfied or very satisfied with the improved parking availability and lower levels of congestion in parking lots with the TERS in place.

Across all three cases, the most common negative visitor attitudes were based on disappointments regarding:

- *Preferred Time:* One of the most common complaints among visitors regarding the TERS was not being able to reserve their preferred time. Specifically, visitors complained that they were not able to reserve access to the park as early as they initially had hoped. However, visitors were often still able to gain access to the parks on their preferred day. Fortunately, nearly all of these visitors reported that they still had a positive park experience at their alternative time and for

the small proportion of visitors who failed to secure a reservation, it typically did not discourage them from visiting the parks altogether. Therefore, the system was effective in redistributing visitor densities across different times, as it is designed to do.

- *Communication:* The ease of obtaining a reservation prior to entering a park and the quality of the information systems available to ensure visitors are knowledgeable surrounding the logistics of the reservation systems were major issues that yielded many negative responses. To some extent, it is the responsibility of the visitor to plan and research enough in advance to understand what needs to be considered before one's trip. However, managers must also make sure that the public is well-informed through proper advertising and that the associated websites are user-friendly and straightforward. Furthermore, for parks that have limited cell phone service, this too must be well documented, so visitors can prepare accordingly.
- *Congestion:* Interestingly, there was varied feedback on congestion observed in the park or at targeted destination points where the TERS was piloted. Some individuals in the studies reported improved congestion levels in the park or better levels of congestion than initially anticipated upon arrival, but several others complained about the congestion at entrance points causing longer wait times because permits needed to be confirmed or unprepared visitors needed additional assistance and instruction.
- *Other:* Measures that are somewhat beyond park managers' control, such as weather changes and technology-related limitations, were also noted as a drawback of the TERS. Visitors who experienced inclement weather during their reserved visit time were more likely to share negative attitudes towards the TERS. Additionally, the technology needed to obtain a permit was also highlighted in a negative light. Access to a printer, cell phone service used to recall the proof of permits and different generations having different comfort levels with technology were all limitations to support of the system.

Alternative 3 - Active Modes of Transportation

Another alternative to possibly reduce parking shortages at P13 and improve visitor experiences at Meech Lake is through active modes of transportation to and within the park. Active transportation is generally referred to as any form of self-propelled mode of transportation that uses physical activity to initiate travel, such as walking, running, bicycling or inline skating (Baas et al., 2018). Fortunately, active modes of transportation have several advantages as an alternative transportation method. First, active modes of transportation are better for the environment. There are no atmospheric emissions produced like those seen in personal vehicle use, fewer wildlife collisions and minimal noise pollution that could

otherwise disturb other visitors (Orsi, 2015). Several studies have estimated several thousands of kilograms of carbon emissions being offset per day that would otherwise be released into the atmosphere through vehicular use and a 40%-60% increase in bicycle path usage following the implementation and promotion of bike-sharing services (Shaheen et al., 2010; Sherwood & Murphy, 2014). Actively commuting to the park can also offer an enhanced visitor experience by being able to immerse oneself more in the natural setting and experience the park in a new way (Orsi, 2015). Equally as important, active modes of transportation offer the opportunity to help improve one's physical, psychological and spiritual wellbeing (Needham et al., 2016b). It can also provide an option for individuals who don't drive or can't afford a vehicle to still travel to the park (Orsi, 2015).

In order to facilitate the use of active modes of transportation, there needs to be the necessary infrastructure in place to indicate to visitors that it is an encouraged option. First and foremost, facilities where visitors can safely lock and store their bicycle or other equipment used for active transportation need to be developed (Villwock-Witte, 2015). For example, bike racks or gated enclosures need to be built, otherwise visitors will not want to actively commute if they fear that their equipment will be damaged or stolen. Fortunately, this type of infrastructure would be relatively small and take up far less space than the development of additional parking lots or spaces for vehicles.

Road infrastructure must also be maintained and inviting to visitors who are considering actively commuting to the park. Features such as road quality, traffic direction and shoulder width can all vastly influence an individual's perspective of personal safety and one's desire to actively travel in an area. For instance, in a review highlighting key elements that promote active transportation in natural areas, Villwock-Witte (2015) examined conditions across Yellowstone National Park, Saratoga National Historic Park and Acadia National Park, which all varied in their road infrastructure features. Yellowstone consisted of busy roads with two-way traffic and a nearly non-existent shoulder for bicyclists. In Saratoga, the shoulders were far more accommodating to bicyclists who only had to compete with one-way traffic. Lastly, in Acadia National Park, there are spacious designated routes through the park where cars are prohibited. As one would imagine, Acadia's roadways are frequented by families of bicyclists and other active commuters, whereas Yellowstone sees the least amount of visitors using active modes of transportation among these parks.

Additionally, parks can encourage active modes of transportation by implementing bike rental services or a bike-sharing program. Shaheen et al. (2010) studied different bike-sharing strategies that have been tried throughout Europe and North America. Bike-sharing programs have a lengthier history in

European cities while programs in North America have been less successful in previous years and have only recently begun to gain traction. The biggest issue reported with bike-sharing services, specifically those that are free or of minimal cost, which is ironically the most desirable to visitors, is bike theft. This problem has been especially true in bike-sharing programs implemented in urban settings (Sherwood & Murphy, 2014), but less of an observed issue in successful bike-sharing programs implemented in parks. Villwock-Witte & Leidekker (2015) noted only one bike as stolen in their study examining bike-sharing in parks and it was able to be recovered. Shaheen et al. (2010) also highlighted challenges surrounding convenience and comfort. For simplicity and maintenance's sake, rental and shared bikes are generally single gear, heavier and bulkier to withstand wear and tear from different users. They also usually have limited customizability options, such as seat and handlebar adjustment. Further, there is essentially no cargo or storage space.

These rental and sharing services could be orchestrated with neighbouring communities that may choose to operate a small rental business within or near the park. For instance, bike rental locations could be considered at Camp Fortune, the Chelsea Visitor Center or the Champlain Lookout. Since these locations are already established stops situated on some of Gatineau Park's shuttle bus routes, it is convenient for visitors to shuttle to the rental location and then actively transport themselves through the park. Camp Fortune, however, is a privately owned recreation center that may present unique challenges in establishing a rental service. Further, the location of the Visitor Center requires visitors to use a route that is travelled by a large number of vehicles, may prove to be difficult for individuals of varying fitness levels, and may still face parking shortages on busy days. So, the Champlain Lookout may be the most desirable rental service location situated on the shuttle bus route, as it also provides access to recreational trails that join with the Wolf Trail. Alternative locations that may be suitable for a bike rental service are P9 (near the Dunlop Road and Meech Lake Road intersection) or P10 (located on Dunlop Road headed towards Camp Fortune). These two parking lots are both approximately a 20 minute bicycle ride to P13 and are still located relatively close to shuttle bus stops.

Alternative Access Routes to the Wolf Trail & Tawadina Lookout

Another simple means of encouraging active transportation in Gatineau Park, while simultaneously improving parking availability and visitor experiences at P13, is the promotion of alternative routes that can be used to access the Wolf Trail (Trail 62) and the infamous Tawadina Lookout. It is effective at redistributing hikers to different park locations, thus reducing the number of personal hiker vehicles at P13, and is inexpensive, straightforward and quick to initiate.

The Wolf Trail (Trail 62) is a popular 8.3 km loop whose trailhead starts at P13 and follows a steep climb to the Tawadina Lookout (NCC, 2024b). Fortunately, Gatineau Park's official trail network is interconnected through various trails within the interior of the park. Therefore, with proper knowledge and simple planning, visitors wanting to hike the Wolf Trail and visit the Tawadina Lookout can easily access these destinations by alternate, arguably less physically demanding routes. For instance, two possible alternative routes include departures from P12 (Trail 40) or departures from the Champlain Lookout parking lot (Trail 1 or 1b; Figure 3). The P12 alternative departs from the Trail 40 trailhead at Meech Lake and conjoins with Trail 1, which later intercepts the Wolf Trail a short distance from the lookout. This out-and-back alternative is approximately 10 km round-trip and has slightly less elevation to climb than the Wolf Trail (NCC, 2024b). The Champlain Lookout alternative allows visitors to park a vehicle at the Champlain parking lot, which is considerably larger than the lots in the Meech Lake sector, or use the shuttle bus equipped with bicycle racks to disembark at the stop located there before departing on Trail 1 or 1b. Similar to the P12 alternative, Trail 1 will intercept the Wolf Trail near the Tawadina Lookout, is a 10 km trek round-trip and is a considerably easier route with minimal changes in elevation gain (NCC, 2024b). Both of these alternative routes are multi-purpose trails, so visitors can hike or bike the routes until they intercept the Wolf Trail, which is designated for hikers only.

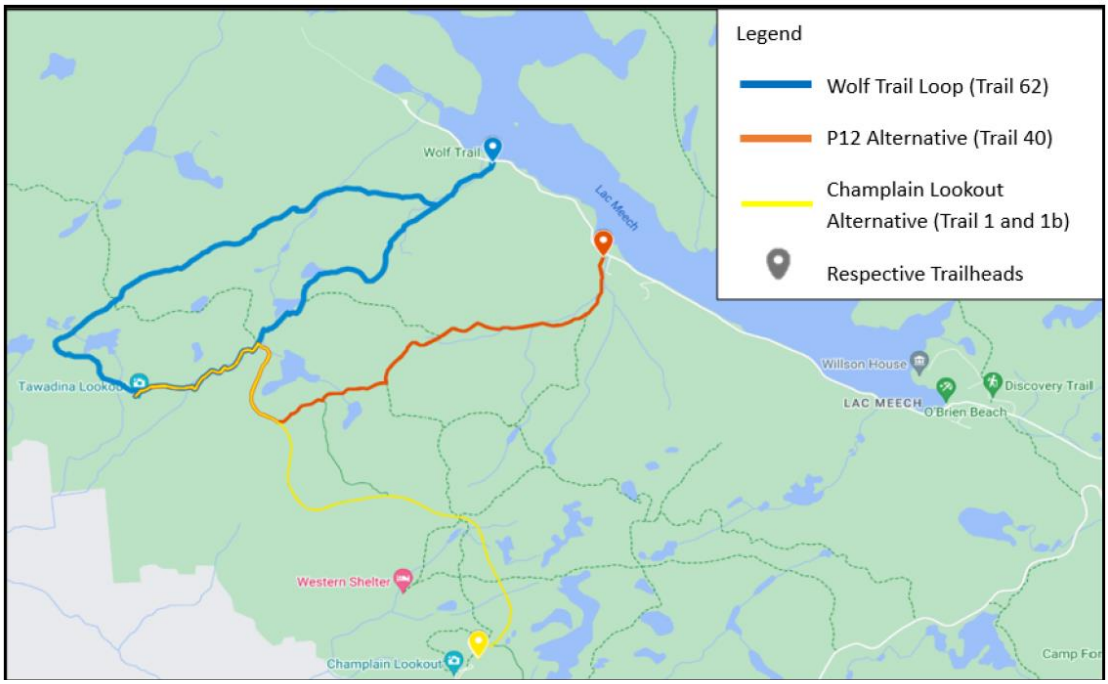

Figure 3: Map highlighting the Wolf Trail (Trail 62) to the Tawadina Lookout compared to two alternate routes originating from Meech Lake's Parking Lot 12 (via Trail 40) and the Champlain Lookout parking lot (via Trail 1 or 1b). Derived from the NCC summer trails map (NCC, 2024b).

Alternative 4 – Shuttle Bus Expansion

Two years ago, in the Spring of 2022, Gatineau Park introduced its free weekend shuttle bus service that operates from mid-May to the end of September. The shuttle bus also runs on an adjusted schedule in the fall in October. It originates from the downtown Ottawa-Gatineau regions and the Chelsea Visitor Centre and services numerous popular stops across Gatineau Park (NCC, 2024c). Visitors ride for free and can board and deboard the shuttle at any of the stops throughout the park providing there is space, as it operates on a first come, first serve basis (NCC, 2024c). The shuttle services stops approximately every 30 minutes.

This year, also starting mid-May 2024 and operating until the end of September before a new fall schedule is released, Gatineau Park introduced a new weekday shuttle bus system in an effort to increase sustainable and accessible transportation options and expand their shuttle services. The weekday shuttle operates on all weekdays during this time, except for Wednesdays when the three major parkways remain open to personal vehicular use (Figure 4). However, the weekday shuttle does not operate as frequently as the weekend shuttle and only enters the parkways a total of three times from the Visitor Center. In addition, the weekday shuttle only services select stops within the park between Pink Lake and the Champlain Lookout and ends its services at 2:00 pm (NCC, 2024c).

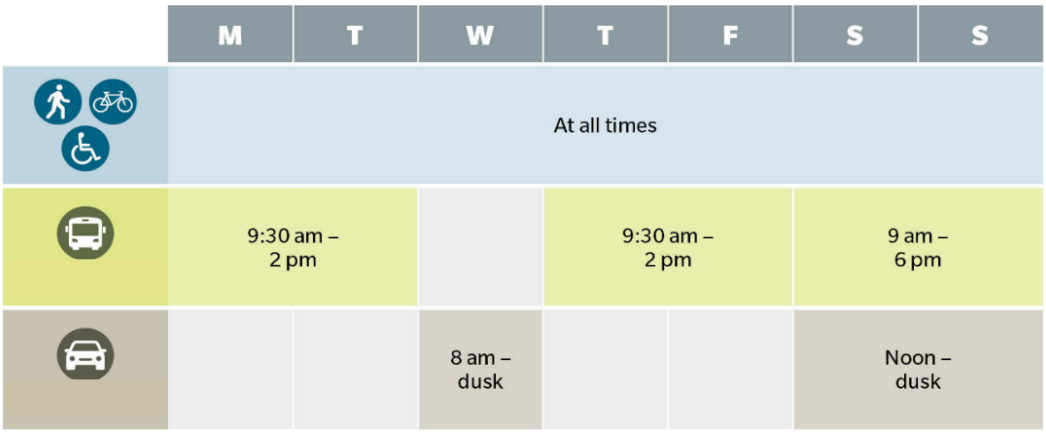

Figure 4: A schedule demonstrating the Gatineau Park parkway accessibility options via different modes of transportation for 2024. Derived from NCC (2024c).

Currently, neither the weekend, nor weekday, shuttle buses service any stops in the Meech Lake sector of the park. Meech Lake Road is managed by the municipality of Chelsea, which currently prohibits the operation of heavy vehicles down Meech Lake Road (NCC, 2015). Some exceptions exist to

allow school buses to transport large groups for educational purposes or to permit trucks necessary for maintenance or renovation purposes, specifically at the Prime Minister's private summer cottage located at the end of the road on Harrington Lake. These exceptions are carefully considered due to the narrow and poor road conditions along Meech Lake for which the public continues to demand repairs to make it safer for park visitors sharing the road with vehicles (NCC, 2021b). Given these current circumstances, a shuttle bus would only be permitted to travel as far as P11. Unless, perhaps, there was sufficient support for a frequent passenger van that could shuttle hikers from the other lots to P13 for access to the Wolf Trail. Although this is a small proportion of the total visitors seeking recreational activities in this sector, it would still reduce a large number of hiker vehicles in the P13 lot, making it more accessible to beachgoers. Therefore, a comparison of weekend and weekday shuttle bus ridership was analyzed to consider the success of the newly launched weekday shuttle and whether there is enough evidence to enter into discussions with the city of Chelsea to expand shuttle services down Meech Lake Road.

The weekend and weekday shuttle bus ridership were both determined by counting the number of individuals who boarded shuttle buses per day between May 18, 2024 and August 27, 2024. Unfortunately, due to heavy rainfall that damaged several Gatineau Park roadways and trails, the NCC was forced to temporarily cancel their shuttle bus services from August 9, 2024 to August 22, 2024 while they made necessary repairs to the roads (NCC, 2024d). As a result, there is no ridership data during this timeframe. A Levene's test was conducted to test for equality of variances and accommodate for the different sample sizes between the weekend and weekday services. The test suggested that there was a significant difference in variances $F(1,69) = 63.87$, $p = 2.34 \times 10^{-11}$. Therefore, a Welch's t-test was conducted to compare the mean ridership per day to indicate if there was a significant difference between the average sum of individuals boarding the weekend shuttle bus and the average sum of individuals boarding the weekday shuttle bus. The results indicated that there was a significant difference in ridership between weekend ($M = 661.1$, $SD = 274.1$) and weekday shuttle buses ($M = 42.6$, $SD = 33.8$), $t(25) = 11.5$, $p = 1.93 \times 10^{-11}$. Since $p < 0.05$, this suggests that the average sum of riders per day on the weekend shuttle bus is significantly greater than the average sum of riders per day on the weekday end shuttle bus. These findings can also be observed when comparing the total number of individuals boarding the shuttle buses per stop during each month of the summer season. The weekend shuttle bus has considerably more individuals boarding the bus at nearly all stop locations throughout the entire summer season compared to the weekday shuttle bus (Figure 5).

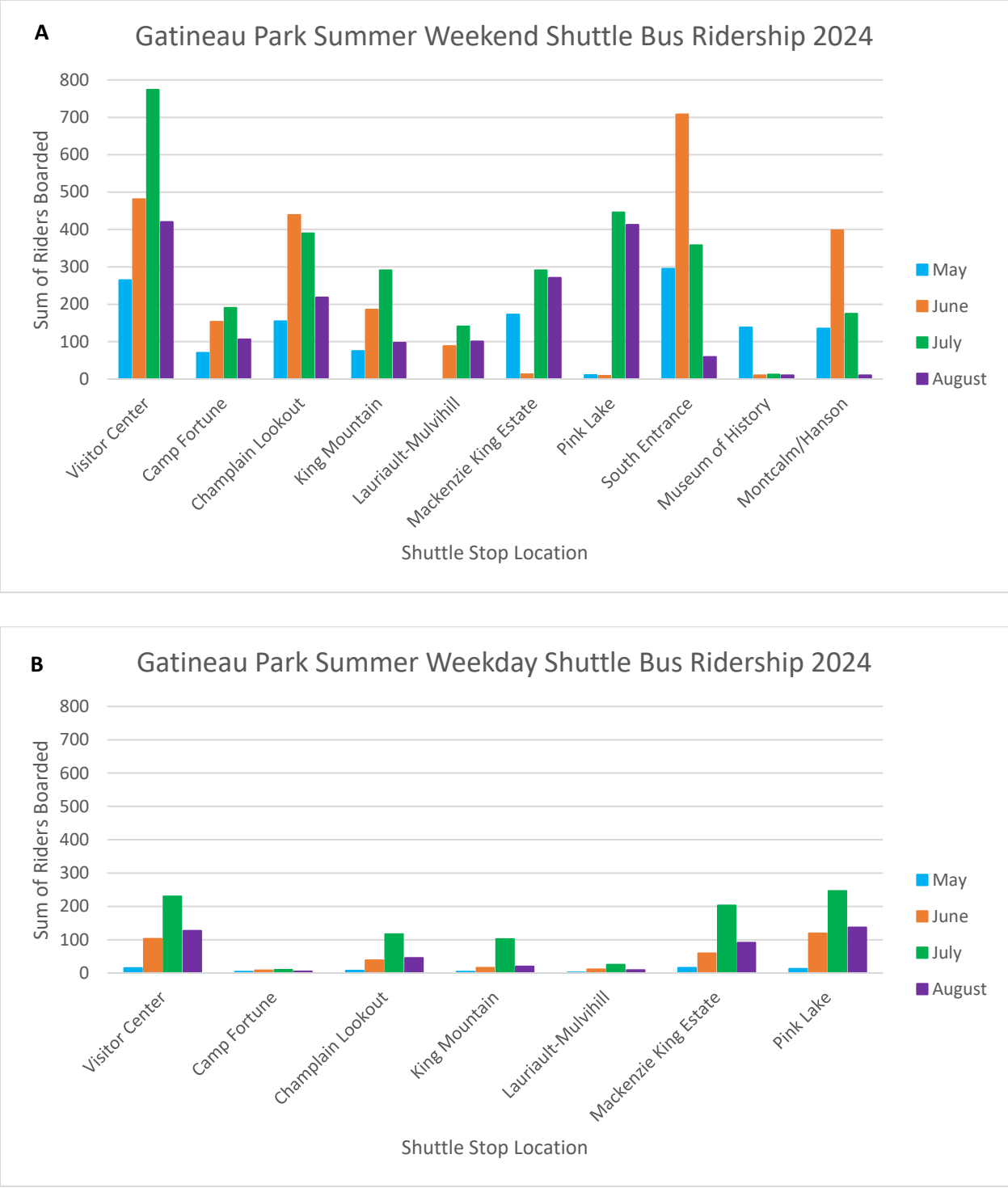

Figure 5: The 2024 southbound weekend shuttle bus ridership based on the total number of individuals boarding per stop per month (A) compared to the 2024 weekday shuttle bus ridership based on the total number of individuals boarding per stop per month (B) between May 18 – August 27.

Discussion

To recap, Parking Lot 13 is a relatively small parking lot along Meech Lake that often reaches capacity, especially during the summer months of July and August, due to the large number of visitors seeking access to Blanchet Beach, the Wolf Trail and other recreational opportunities available at Meech Lake. Simply expanding parking lot capacity is undesirable, costly, and detracts from park conservation goals. Informing visitors of larger capacity parking lots nearby and of alternative trailheads that connect to the Wolf Trail is certainly part of the solution to help redirect visitor traffic, but will not disguise the fact that more direct management strategies are needed to address the parking availability issues impacting visitor experiences at Meech Lake.

Alternative 1 - Variable Rate Parking Fees

In the urban context, research participants in previous studies noted their lack of schedule flexibility and regular responsibilities, such as their work schedules, as a reason why they were unlikely to change their parking habits and benefit from lower parking rates. In a park setting, schedule flexibility can also prove to be a barrier to the successful execution of a variable rate parking scheme because it raises concerns surrounding racial, ethnic, and socioeconomic inequalities. Individuals and families belonging to lower income households and minority groups already usually face challenges when accessing prime recreational opportunities (Milman, 2019; Needham et al., 2016b). For instance, the marginality theory states that people belonging to different races generally face greater economic barriers that limit how they use parks and how often they are able to visit parks (Needham et al., 2016b). Many of these individuals often possess jobs, if not multiple, that operate outside of the stereotypical Monday-Friday, 9 am-5 pm work hours. Therefore, the only time that their schedule may permit them to visit the park may be during peak hours on a busy Saturday afternoon in July. Additionally, if these populations cannot afford a car, they must rely on public transit that is often unreliable, inconvenient, and further limits their ability to visit Gatineau Park at alternative times.

Visit frequency was also highlighted in previous studies as a reason why individuals would be unlikely to change their parking behaviours following the introduction of a variable rate parking plan. They explained that they travel to the area so infrequently that they do not mind paying whatever associated fee is necessary because it is essentially a “one-time payment” and therefore they do not consider it a major loss. In the context of Gatineau Park, these perspectives may be shared among first-

time visitors and out of town tourists who understand that a parking fee is part of their one visit and they will simply budget and plan accordingly. Attitudes such as these may inhibit the effectiveness of a variable rate parking scheme at P13. However, not to discredit these perspectives, but first-time visitors and out of town tourists are a considerably small proportion of the average Gatineau Park visitor population since the majority of park visitors are often returning visitors (NCC, 2017). Therefore, depending on the frequency of their visits, a variable rate parking plan may still indeed incentivize most visitors to adjust their visit times.

Visitors' receptivity to a "one-time payment" during their infrequent visits to Gatineau Park is also a demonstration of different visitor groups' willingness to pay (WTP) for the exchange of convenience. In a study by Weitowitz et al. (2019b), the popularity and observed preferences of different parking options in a conservation park were examined. They determined that parking lots in the park with parking fees were actually used more by visitors than parking lots without fees. This finding is not entirely surprising considering this trend can be seen in P13 at Meech Lake, which, despite it being one of the few lots in the park that charges a fee, is still one of the more popular lots that regularly faces parking shortages and reaches maximum capacity. Perceptions of increased safety, saving time, preventing the need to travel additional distance on foot and avoiding poor parking behaviours demonstrated by other visitors have all been demonstrated to increase peoples' WTP for parking, despite alternative and cheaper options (Kang et al., 2024; Guo & McDonnell, 2013). Furthermore, parking lots with fees may also create the allusion for visitors that they will have a higher-quality experience because an associated cost would, in theory, suggest better site maintenance, cleaner facilities and more resources (Schwartz & Lin, 2006), further increasing visitors' WTP.

Alternative 2 – Time-Managed Entry Reservation System

Time-managed entry reservation systems are becoming increasingly more permanent following successful pilot studies across national parks (Burke, 2023, Miller et al., 2023; NPS, 2023; Parks Canada, 2024). Visitor responses and perceptions of these managerial systems are the product of one's internal hierarchy of personal values, beliefs and norms that generate visitor motivations and behaviours (Needham et al., 2016b; Rossi et al., 2015; Figure 6).

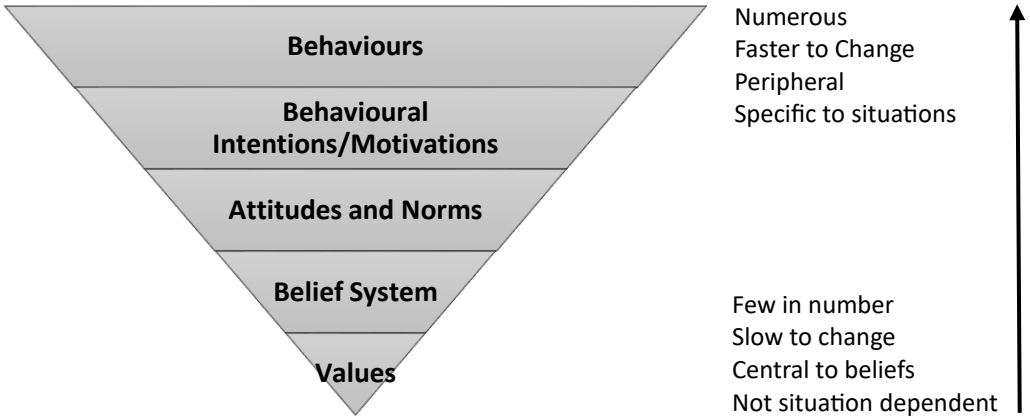

Figure 6: A hierarchy model of human thought and action influencing behaviours and decision-making during recreation. Adapted from Vaske & Donnelly (1999).

Visitor norms are a set of standards that people use to dictate what they believe is acceptable (Needham et al., 2016b). They help distinguish if an experience, behaviour or condition is good or bad. Therefore, visitor norms inspire expectations and motivations, which determine a visitor's satisfaction with an overall experience. For instance, if a visitor is in need of an escape from life's daily stressors, they may believe that hiking in Gatineau Park will provide an opportunity for solitude in pristine natural conditions. If they feel that their experience met or exceeded their expectations, then they are more likely to report a positive experience and seek similar experiences in the future (Figure 7). However, if a visitor feels that their expectations of their visit were not met or their experience was poorer than expected, then they are more likely to report a negative experience.

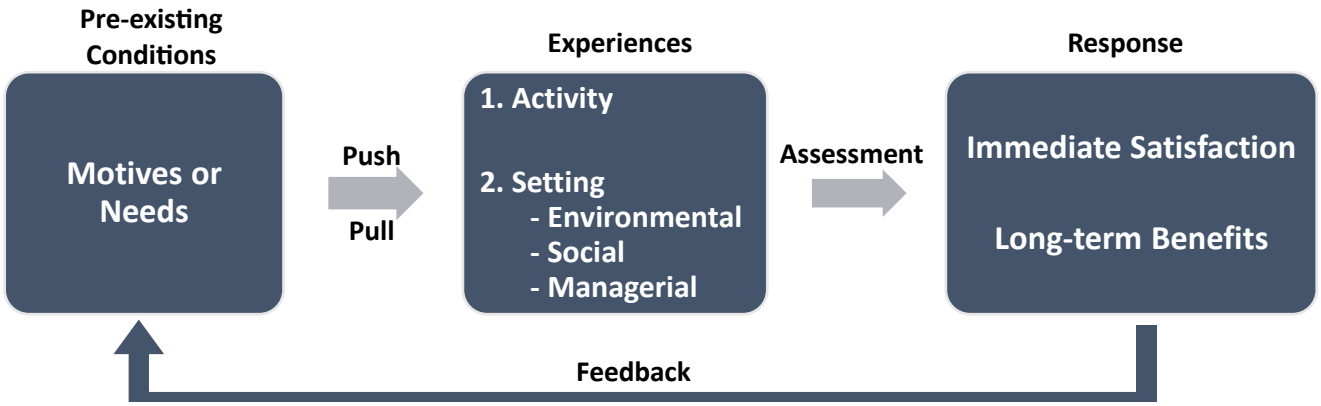

Figure 7: A conceptual representation of the behavioural approach to recreation. Derived from Mannell (1999).

These individual values, beliefs, norms and expectations among visitors that influence their behaviours and perceptions are what make park managers' decisions so difficult, as it is often difficult to please everyone. However, across all case studies, there was an overall positive support for TERS implementation, specifically to improve visitor safety, parking availability, visitor experiences and easier, stress-free trip planning. There was also a general consensus that preferred time availability, lack of congestion improvement, inadequate system communication and weather impacts were the greatest concerns surrounding a TERS. Therefore, the case studies demonstrate that the majority of park visitors actually share similar sets of visitor norms that would produce comparable positive and negative attitudes towards a TERS, which is promising for decision-makers seeking effective and acceptable management alternatives.

Alternative 3 – Active Modes of Transportation

Active modes of transportation have numerous advantages for the park and its visitors. However, despite the environmental, social and health benefits, less than 10% of visitors to Meech Lake Road travel by bicycle, or other active means (NCC, 2015). In theory, active modes of transportation may appear to be the most simplistic and effective means of addressing the parking shortages and stressors that are experienced at P13, but realistically, it is simply not feasible. The single greatest limiting factor that prevents active modes of transportation from being an efficient means of maximizing recreational activities at Meech Lake, while simultaneously preventing poor visitor experiences, is the demand for recreational activities offered at Meech Lake. Picnickers will often bring coolers, umbrellas, and chairs and are likely to be accompanied by young children or elderly family members. Similarly, beachgoers will be accompanied by bulky bags, towels, beach chairs, umbrellas, flotation devices, games and perhaps fishing gear. Thus, it is considerably challenging to actively commute to this region of the park when accompanied by this type of equipment and the use of a personal vehicle is not only more convenient, but almost necessary. Consequently, this leaves active transportation as a viable alternative for only a small proportion of visitors to P13 at Meech Lake.

Alternative 4 – Expanded Shuttle Bus System

The Gatineau Park weekday shuttle bus system was launched for the first time this year in mid-May. It operated during its regular schedule every Monday, Tuesday, Thursday and Friday until heavy rainfall caused considerable damage to the parkways in Gatineau Park, forcing the NCC to cancel the

shuttle services and close the roads on August 9, 2024 (NCC, 2024d). As of August 22, 2024, parkway and shuttle bus use has since been restored. An analysis of the number of individuals boarding the shuttle buses per day indicates that the weekday shuttle bus ridership was significantly lower than anticipated compared to the weekend shuttle bus ridership. Perhaps, there was insufficient communication of the launch of the new weekday shuttle bus system, whether it was a result of the resources and platforms used to advertise, or more time was needed to advertise before the spring and summer season. Communication surrounding system information was also a common complaint in the TERS pilot studies.

Furthermore, based on ridership count findings and complaints posted to online public forums, the weekday shuttle should probably have a schedule that more closely resembles the weekend shuttle schedule. Specifically, it should include stops located outside of Gatineau Park to make it more feasible for visitors to get to the park and not just within it. Understandably, weekends are also generally busier, so there will likely naturally be more ridership on them.

So, the overall findings of the weekday shuttle bus ridership are still somewhat premature to make any concrete conclusions without extrapolating too far beyond the given data. However, it appears that as of right now, the current data on the weekday shuttle bus services does not offer strong enough support for further expansion of a shuttle to operate in the direction of Meech Lake Road. Further, without primary shuttle access on Meech Lake Road, it is likely redundant to attempt to enter into discussions with the municipality of Chelsea to add a small-scale shuttle van from other lots along Meech Lake Road to P13. Therefore, adaptive management actions should be considered to first increase the weekday shuttle bus schedule, continue the ongoing promotion of the new shuttle, and conduct a public consultation survey in the future to compare changes in the results collected from this year's Gatineau Park shuttle bus survey.

Additionally, regardless if there had been greater support for shuttle bus expansion, there needs to be some sort of revenue generation within the park or another reliable means of financing the service that sustains the free shuttle. It is well documented that shuttle bus usage in parks is maximized and more desirable when it remains a free service (Mace et al., 2013; Shiftan et al., 2006). Also, similarly to active modes of transportation, expanding the shuttle service would mostly only apply to the hiker populations who are accompanied by less bulky gear.

General Implications

Although all explored parking access and transportation alternatives have their own unique set of benefits, drawbacks, and influences on visitor attitudes, it is important to note that all alternatives have the potential to reduce the number of cars in P13 and improve the visitor experience. However, it is important to note that each of the alternatives will likely not solve the underlying imbalance in demand of the recreational activities offered at Meech Lake. So, despite the effectiveness of these alternatives in redistributing visitor densities throughout different times of the day, or encouraging the use of alternative, sustainable transportation methods, the total daily number of visitors to the sector may still be similar. Thus, there will still be dire need for close monitoring of the ecological impacts being observed in this highly sought after recreational area in order to continue work towards park conservation goals and maintaining ecological integrity.

Regardless of the alternative management strategy considered to be the most efficient means of maximizing sustainable recreation opportunities without impacting overall visitor experiences at Meech Lake, adequate communication of any new system and how it works is critical for visitors to reliably plan their trip, be willing to pay any associated fee and have general support for the system. Furthermore, public perceptions and attitudes are substantially more positive when they are well informed as to where the money from associated fees are going (Carbone, 2006). Therefore, redistribution of revenue back to the park also needs to be clearly and openly communicated. When visitors can understand that fees are going back to the park for matters such as conservation and restoration efforts, facility maintenance, improved interpretation programs, continued free transit, and other services that will ultimately contribute to better visitor experiences, they are willing to pay more and be more accepting and openminded regarding managerial changes (Shoup, 1995).

Conclusions and Limitations

Despite best efforts, this research faced limitations and assumptions that could influence and alter the findings of this paper. First and foremost, time was arguably the biggest limitation, specifically in regards to data that could be collected for the shuttle bus services. Due to the time it takes to collect, analyze, format and organize raw data obtained on ridership counts, and the condensed timeframe of this study (May 2024-August 2024), data was only able to be used from May 18 – August 27. Although July and August often observe the most visitors to P13 at Meech Lake, frequent hiker visits generally

continue well into the fall contributing to the high visitation rates observed during the Fall Rhapsody at Gatineau Park. Thus, an accurate representation of the shuttle bus usage has likely not been observed and more visitors will continue to use the fall shuttle. Additionally, the temporary shuttle cancellations following the inclement weather in August further limited the amount of data that was able to be collected during this already short timeframe.

Secondly, assumptions had to be made in order to best interpret existing literature that could be applied to Gatineau Park. Specifically, when considering public perceptions of variable rate parking schemes, assumptions were made that due to Gatineau Park's close proximity to urban centres, and its visitor population largely originating from these urban areas, that visitors would share similar perspectives on variable rate parking in Gatineau Park because they are used to parking habits in urban life. Hence, literature from urban centers and business districts was used due to the lack of variable rate pricing schemes being used in parks and protected areas. However, although this may be applicable to some individuals, others may have entirely opposing opinions and feel that it does not belong in Gatineau Park because their motivation to visit the park is to escape the city and they don't want the pesky hassles of urban life – like paid parking schemes – to be a part of it.

Finally, the NCC launched an online survey at the end of June that provides visitors with the opportunity to provide their feedback and satisfaction with the weekend and weekday shuttle bus services in Gatineau Park. Once again, due to study time constraints, the unexpected cancellations, and the time required to collect and organize responses, survey results were unable to be provided for analysis. Additionally, the NCC is a federal corporation and therefore may not have been able to share survey results at this time as a means to conserve their internal resources and respect participant privacy.

In summary, variable rate parking fees are promising, but findings are conflicting since they are mostly only observed in urban settings and studies suggest that it may not be enough of an incentive to change visitor behaviours as they are still willing to pay for convenience. A TERS is warmly received by the majority of park visitors, permits the transport of bulky equipment and is still effective at redistributing visitor densities. However, the specific logistics of its design needs to be further examined. Active modes of transportation are appropriate for some visitors, but are generally unrealistic and unfeasible given the recreational activities at Meech Lake and the natural topography of Gatineau Park. Lastly, the shuttle bus expansion currently does not have enough support or evidence and still faces major knowledge gaps due to its newness and the limitations of this study.

In conclusion, considering advantages, trade-offs and public perceptions, a TERS is arguably the most efficient means of supporting the different recreational activities available from P13 at Meech Lake in Gatineau Park while minimizing the impacts on visitor experiences. Although, regardless of the chosen managerial approach, communication, continued public engagement and, as the VUM framework suggests, long-term monitoring and adaptive management responses are critical to the successful implementation of any managerial decision.

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