Alternative Transportation in Fundy National Park

A comprehensive analysis of Fundy National Park with an eye to shifting transportation behaviour

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Table of Contents

Tables

Alternative Transportation in Fundy National Park
Executive Summary

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Parks Canada has set two ambitious goals for its national parks: to protect the natural environment and to encourage public enjoyment of its parks. Given what we now know about the impacts of particular human use on natural systems, however, finding a balance between these two ideals is not an easy task. Our national parks have traditionally been designed to serve people in cars and other personal vehicles; a system that has taken its toll on the environment on both local and global scales. While we would not know our parks in the way that we do today if it were not for the proliferation of the personal vehicle, Parks Canada would be better equipped to fulfill its mandate by shifting to more sustainable behavior in some of the country's most culturally valued natural areas.

Similar to many other parks, Fundy National Park's attractions are located far from each other, with only road and wilderness between them, making the reduction of personal vehicle use a challenging task. The park experiences significant ecological stress including stress that stems from its road network and use. In this study, I explore six possible transportation strategies that other national parks in North America have used to better protect the natural environment while maintaining adequate public access. Of these strategies, I identify three that have potential for success in Fundy National Park and suggest actions to advance them.

First, to encourage a shift toward non-motorized transportation particularly in the headquarters area, I propose enhancing infrastructure connections with crosswalks, sidewalks and paths. These additions will make walking and bicycling safer, more enjoyable and more convenient for visitors wanting to get from one place to another in the park and could reduce the number of short trips taken.

Public transportation, mentioned in the 2005 Park Management Plan, also has potential to reduce personal vehicle travel in the park. Here, I've laid the groundwork for further study on this matter by presenting how the existing conditions in the park and the types of park visitors seen in Fundy National Park are suited for such a service. I propose several next steps for park planners who will ultimately determine if a public transit service is feasible.

Finally, the availability of information about alternative transportation is crucial to encouraging its use. Knowing the travel conditions for various modes reduces risk and helps to make alternative modes more attractive. By conveying information about how, when , where and why to use these modes through the media that visitors already use, park planners can reach out to a large portion of visitors.

Despite its transportation challenges, Parks Canada is in a unique position to promote more sustainable transportation. A national park's aesthetic setting sets a perfect stage for inspiring change and encouraging more sustainable practices. By providing options for alternative travel, Parks Canada will foster more "up close and personal" park experiences while helping to create an atmosphere of shared environmental stewardship.

1.0
INTRODUCTION AND DEFINITION OF THE PROBLEM

National parks in Canada

National parks hold a special spot in the minds of Canadians and other visitors. They are special places where people go to enjoy being outdoors, to spend time with family and friends and to participate in outdoor activities. Each national park represents one of Canada's many distinct natural regions and is managed with a view to protecting and presenting the country's significant natural and cultural resources so as to leave them unimpaired for future generations (PC, 1997).

Parks Canada, a federal agency, oversees all 42 designated national parks in the nation-wide system, 166 national historic sites, and three national marine conservation areas. While the agency's mandate and guiding principles are the same for all of the land under its authority, its specific goals and objectives for each type of land are slightly different. Here, I use Parks Canada's objective for national parks as a starting point for establishing room for improvement.

To protect for all time representative natural areas of Canadian significance in a system of national parks, to encourage public understanding, appreciation and enjoyment of this natural heritage so as to leave it unimpaired for future generations.

Parks Canada's objective for national parks

(Parks Canada, 1997)

Parks Canada is responsible for balancing two important objectives: protecting natural areas and encouraging public enjoyment of these areas. To some, these two goals may appear incompatible, or at the very least, difficult to achieve simultaneously, given our current understanding of human impact on the natural environment; a natural area can only withstand a limited amount of use before its ecological integrity[1] is

[1] Ecosystems are said to have integrity when their native components are intact, including their abiotic components, biodiversity, and natural processes. Protecting and maintaining ecological integrity is Parks Canada's top priority while managing its parks (Canada National Parks Act, 2000).

"Increasingly, parks are designed as showcases and testing grounds for sustainable facilities, teaching visitors to live lightly on the land"

(Sorviq, 2002, p73)

significantly threatened (PC, 2008c). Consequently, more people visiting and participating in park activities often leads to a greater threat to the natural environment. Some refer to this apparent incongruity of goals as "the park paradox" (Sorviq, 2002) but this line of thinking will likely do more to inhibit than help a park manager or planner. To reframe the implications of these goals and escape the park paradox, we can keep two things in mind:

First, the degree of human-induced threat to ecological integrity is influenced not only by the number of visitors to a park, but *how* visitors use the park. By engaging in activities that minimally impact the environment, visitors will be less likely to contribute to damaging the ecological integrity of a park's natural systems. Therefore, with more sustainable visitor practices, parks can tolerate higher visitor numbers.

Second, the prominent forests, wildlife, and natural beauty of national parks can provide a perfect stage for inspiring visitors to engage in environmentally sustainable behaviour during their stay and perhaps even after their visit. The guiding intuition behind *Engaging Canadians*, Parks Canada's communications strategy, is that the aesthetic experience of a natural place will stir park visitors to adopt practices and behaviours supportive of Parks Canada's conservation values (PC, 2005b). Through this lens, we can interpret more visitors experiencing national parks as more people appreciating and learning to protect the natural environment.

Traditional transportation in national parks

"Travel is a fundamental prerequisite for tourism yet it is the component that in many cases challenges the concept of sustainability the most"

(Kelly et al. 2007, p298)

North Americans have traditionally experienced their national parks from the seat of a car. Our parks have been designed for the freedom personal vehicles offer their owners and we, as a nation, would not know these special places in the way we do without the widespread use of the personal vehicle.

Since the inception of the national parks system, however, we have come to better appreciate the environmental consequences of our driving habits. We now know that the transportation sector is the second largest contributor of greenhouse gases and pollutants that are causing climate change on a global scale (McCulloch et. al., 2009). On a local scale, nitrogen oxides and volatile organic compounds from vehicle emissions react together to form ground level ozone which can disrupt local regular environmental processes (US EPA, 2009; Kline et al. 2008). Additionally, contaminants such as suspended solids, heavy metals, hydrocarbons, and polycyclic aromatic hydrocarbons from road maintenance operations and wear and tear of car components, accumulate on road surfaces (Stengel et. al., 2006). These contaminants affect groundwater quality after they are spread into the surrounding soil by rain and traffic movement (Stengel et. al., 2006; McCulloch et al., 2009).

In addition to limiting potential for environmental protection, complete dependency on the personal vehicle contributes to congestion and parking problems, and limits the mobility of some park users. Moreover, auto-focused transportation networks in national parks do little to permit visitors to explore and experience their parks in alternative and more intimate ways. All of these factors detract from visitor experiences.

Car-based transportation networks clearly do not fulfill Parks Canada's mandate of protecting the natural environment while offering public access. By offering few or no alternatives to personal vehicle travel inside national parks, Parks Canada is reinforcing car-based travel which will continue to take its toll on the natural environment and eventually reduce the attractiveness of its parks.

Cities around the world have been taking notice of similar problems for decades and are now turning to transportation demand management strategies to solve them. These strategies aim to change travel behaviour by encouraging or discouraging certain modes (or times and location of travel) to accomplish a specific goal. They often include improvements to alternative transportation options, incentives and disincentives to use certain modes, and parking and land use management (VTPI, 2009).

Several features of national parks make transportation demand management particularly difficult. Few offer alternatives such as public transit and attractions are far from each other with nothing but roads and open space between them. Finally, primary transportation users are visitors, rather than commuters and residents who travel the same route several times every week. Transportation demand management in a national park requires slightly different considerations than in a city.

Fundy National Park and its planning context

Fundy National Park is located in southern New Brunswick, Canada, next to the gateway community of Alma and about 55km from Moncton, as seen in fig. 1. Formerly home to multiple logging operations, the park was established in 1948 to protect a representative area of the Maritimes Acadian Highlands (PC, 2005b). Today, the park attracts more than 255 000 visitors annually and acts as a vital element in regional tourism (PC, 2009f; PC, 2005b). See page M1 for a map of the park and its attractions.

The park's management is guided by a Park Management Plan, which, under the Canada National Parks Act (2000), is developed with public consultation and reviewed every five years. This is part of a scientific approach to managing park ecosystems based on the need to restore and maintain ecological integrity (MPWGS, 1998). The plans are designed to solidify a

vision for the park and provide a framework for decision-making. They also include a set of goals and actions that address various aspects of the park (PC, 2005b). Fundy National Park's most recent park management plan was developed in 2005.

In recent years, the southern New Brunswick region has effectively reduced their greenhouse gas emissions by 17% and it wants to continue the positive change (PC, 2009c). Proposed actions such as converting to fluorescent lighting and reducing government vehicle emissions are putting Fundy National Park in a leading position on the issue but I argue that engaging visitors in such efforts is an equally important part of the process. Parks Canada sees the role of the public as responsible environmental stewards (MPGCS, 1998), so by encouraging visitors to adjust their transportation behaviour, the agency could fulfill its mandate in several ways.

Fig. 1: Fundy National Park, New Brunswick (data from Service New Brunswick, 1998)

Altering transportation behaviour in Fundy National Park, however, is not a simple task. Visitors currently have few viable alternative ways of getting to

the park; the closest available bus service running along the TransCanada highway is between Saint John and Moncton (Acadian, 2009). Not surprisingly, 99% of visitors arrive by automobile or recreational vehicle, while the remaining 1% arrive by motorcycle (PC, 2007b).

I chose to explore opportunities for reducing personal vehicle travel in Fundy National Park first, because it is highly frequented for the Maritimes[2] and second, both the most recent State of the Parks Report (MPWGS, 1998) and the 2005 Park Management Plan (PC, 2005b) suggest that Fundy National Park experiences significant ecological stress. The Park Management Plan reports that the effects of road maintenance and airborne pollution are significant stressors and specifically acknowledges the negative environmental effects of the park's road system. With such threats to ecological integrity, Fundy National Park may require special attention to improve the state of its environmental systems. The plan calls for a feasibility study of a limited public transit service in the park. In addition to relieving ecological stress, the Plan claims that such a system would also reduce traffic in busy areas, improve visitor flow and circulation, allow certain secondary roads to be maintained to a different standard and promote public transit and its inherent benefits (PC, 2005b). While this study has not yet been carried out (personal communication, Parks Canada employee, March 12, 2009), the public transit mention in the plan indicates an awareness of transportation problems and a desire to resolve it.

"The breathtaking scenery and inspiring natural surroundings in national parks provide the perfect setting for tuning into nature, learning about it, appreciating it, respecting it and pledging to protect it"

(PC, 2008d)

"The park needs to take a more active role in helping people to become more ecologically aware. This is essential to the future of the park"

Public comment regarding Fundy National Park (cited in PC, 2005b)

[2] Fundy National Park visitation rates are second only to Prince Edward Island National Park in 2008-09 in the Maritimes (PC, 2009f).

2.0
HOW TO DETERMINE WHAT IS FEASIBLE FOR FUNDY NATIONAL PARK

Purpose and objectives

Given the negative effects of the car-based transportation network in Fundy National Park, I ask: what strategies may help Parks Canada reduce personal vehicle travel in Fundy National Park while maintaining public access to the park?

My goal is to present options that will help align Fundy National Park's transportation system with both of Parks Canada's objectives simultaneously. I set the following objectives:

- To examine examples of alternative transportation systems in other national parks and cities in North America
- To create an inventory of existing transportation infrastructure and services in Fundy National Park
- To identify opportunities and constraints for shifting transportation behaviour in Fundy National Park
- To explore how each example strategy would apply to Fundy National Park and suggest actions to advance those with potential for success

How to determine what is feasible for Fundy National Park

I began with an extensive review of strategies that other parks and places have used to reduce personal vehicle use within their boundaries. I relied primarily on secondary research, including published reports and official websites.

I then gathered information about Fundy National Park through a site visit, Parks Canada reports and contact with Parks Canada staff. With this information, I mapped and described transportation infrastructure, services, and places frequented by visitors to develop an inventory of existing transportation infrastructure and services.

Following my transportation inventory, I identified opportunities and constraints for shifting personal vehicle trips to walking, cycling, and public transit. To do this, I determined expected modes of travel for common trips within the park by measuring trip distances and slopes. Acknowledging that travel conditions affect the choices people make, trips that can be taken on foot or by bicycle deserve high priority for investment, particularly those with constraints that Parks Canada can control. I also used available visitor information from the park and the province to inform the opportunities and constraints because different types of visitors may tend to make different travel choices.

Next, I applied each of the case examples I studied to the conditions at Fundy National Park to determine strengths and weaknesses of each strategy in the context of this park. *Strong* strategies provide a balance between additional infrastructure requirements and potential for reducing personal vehicle travel. They also take advantage of current opportunities and take constraints into account. The purpose of identifying strengths and weaknesses is to perform a preliminary evaluation of potential strategies for Fundy National Park.

Approach and assumptions

My research is designed to help inform strategies to reduce the negative environmental effects of personal vehicle use in Fundy National Parks while maintaining visitor access. To do this, I had to make choices about certain elements to focus on.

- While I do not focus on financial costs of each strategy, costs are necessary considerations for any decision-making. An evaluation of costs should occur before implementing any of my recommended strategies.

- I concentrate on visitor transportation in the park (rather than Parks Canada employee or local resident transportation). Other

groups of users may have slightly different needs than visitors, but I assume that they will nonetheless benefit from visitor strategies.

- I centre my analysis and recommendations on summer travel. About one half of the park's annual visitation occurs from June to September, which are prime months for walking and bicycling. While I recommend a review of alternative winter modes of transportation, it is beyond the scope of this project.

My recommendations are also based on three primary assumptions:

- I assume that Fundy National Park's land use patterns and attractions will not change significantly in the next 10-20 years. The Park Management Plan confirms that the uses and activities we see now in the park (golf, tennis, trails, camping, etc.) will remain as they are until further review.

- I assume that everyone in the park will have arrived by personal vehicle as either a driver or a passenger, and that no public transportation will be available to transport visitors to the park from locations in the greater region in the near future.

- Finally, I assume that most personal vehicles produce harmful environmental effects. I acknowledge, however, that in the future, some or even most personal vehicles will possibly be powered by alternative fuels that contribute to fewer negative environmental effects. Should this occur, it would not reduce the value of alternative transportation systems but rather, it would provide yet another sustainable option for travel in the park.

3.0
Transportation in national parks

To establish a base of knowledge that Fundy National Park can use to reduce its personal vehicle use, I looked to literature on travel behaviour and visitor experience in North American national parks and to other places for example strategies.

Study objective 1

To examine examples of alternative transportation systems in other national parks and cities in North America

Travel behaviour

Generally, transportation behaviour follows the law of supply and demand: when the price of a particular mode of transportation declines, more people use it more often and conversely, when its price increases, fewer people use it, and less frequently (Litman, 2009b). Changes in perceived prices, measured in terms of finances, time, inconvenience or risk, affect people's choices about routes, destinations, mode of travel and number of trips (Litman, 2009b).

The available alternatives are essential in predicting the degree of influence of a particular price change. When individuals have greater flexibility with time, modes and destinations, they are more likely to change their behaviour in the face of price changes. For this reason, price generally affects recreational trips to a greater degree than commuter trips (Litman et al., 2009b). For example, a recreational cyclist wanting to go for a ride will not likely choose to ride on the streets during rush hour because time costs are high and the recreational cyclist likely has the option of riding at alternative times (because he/she does not have to be somewhere at a specific time). The same concept applies to travel mode decisions. If public transit is convenient or riding a bicycle is feasible, drivers are more likely to shift modes when the financial or time costs of driving increase. Conversely,

when few alternatives exist, high driving costs will do little to affect travel mode choices.

It follows that if a planner or park manager wishes to reduce the number of trips taken by personal vehicle, the first step is to make alternatives available. The next step involves increasing the price of driving and/or reducing the price of alternative modes.

Transportation and visitor experience in national parks

National parks are generally associated with a sense of freedom linked to personal vehicles and many visitors' traditional experiences of national parks have been shaped by the private vehicle (White, 2007). Dilsaver and Wyckoff (1999) suggest that automobile access to parks is a deeply rooted value and argue that most visitors believe that the car affords the most 'efficient' means of exercising a citizen's right to enjoy national parks. To be successful, alternative transportation networks must address this association and cater to alternative deeply held values. Gimmler (2004) notes that many people visit national parks to experience them "up close and personal" but they can only gain such an experience outside of a car. Taking this angle in a park's promotion of alternative transportation, for example, could induce a shift in travel behaviour.

What other parks and places have done to alleviate transportation problems

With similar goals, Parks Canada can look to the U.S. National Park Service for guidance on park management and alternative transportation practices

Looking to American examples

The National Park Service (NPS), the American equivalent to Parks Canada, was established in 1916 to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner by such means as will leave them unimpaired for the enjoyment of future generations" (NPS, 2009d). With similar goals to Parks Canada, I looked to the NPS for guidance on alternative transportation practices.

In 1998, the NPS initiated its Transportation Management Program[3] to provide guidance, funding, preplanning assistance and other services related to alternative transportation in American national parks (NPS, n.d.). The program's top two priorities are improving visitor experience and protecting natural and cultural resources. There is no equivalent program in Canada. To date, the program has achieved several significant actions

[3] Formerly the Alternative Transportation Program

including publishing a Transportation Planning Guidebook for NPS managers, coordination of the transportation scholar program in several parks, and helping to implement multiple alternative transportation systems across the United States (NPS, 2003).

The strategies a park might consider to reduce personal vehicle travel depend on several factors such as visitation (numbers and types of park users), land use and geography (popular trip origins and destinations, topography), existing transportation infrastructure and services, costs, environmental conditions and established park goals and plans. Different parks, cities, towns and districts have taken different approaches. Here, I categorize strategies into those that *discourage the use of personal vehicles*, those that *diversify transportation options* and finally, those that *promote a shift in transportation behaviour*. Ultimately, these will inform possible strategies for Fundy National Park.

Approach: Discouraging personal vehicle use

Restricting vehicles

Banff National Park's Park Management Plan suggests "using transportation as a tool for managing human use by….limiting the type and number of vehicles allowed in certain areas and limiting the infrastructure (e.g. parking spaces, road conditions, speed limits)" (PC, 2007a, p81). This falls in line with many other parks that have instituted vehicle restrictions on either some or all of their roads. Where these restrictions apply, motorized vehicles are prohibited on certain roads for part or all of the day or year. Many of these restrictions are only enforced during the summer months when visitation rates are at their peak. Public transit is often offered in place of personal vehicular access to allow public access to special places. Parks with both high rates of visitation such as Zion National Park (2.7 million visitors per year (NPS, 2009e)) and low rates of visitation such as Devils Postpile National Monument (134 000 visitors per year (NPS, 2009e)) use vehicle restrictions to reduce personal vehicle use.

"[Use] transportation as a tool for managing human use"

Park Management Plan, Banff National Park, (PC, 2007a, p81)

The reasons for instituting vehicle restrictions generally include motivations such as prevention of vehicle congestion, reduced environmental impacts from road use, and increased control over the number of visitors permitted at a site. Some vehicle restrictions have been put in place because of safety concerns. In Sequoia National Park, vehicles longer than 20 feet are encouraged to take alternate routes to the primary road with 130 curves and 12 switchbacks along a very steep grade (NPS, 1999). This particular restriction is voluntary because of recommendations from the business community that was concerned about the reduction of traffic and its effects on business (NPS, 1999). In Great Smoky Mountains National Park, vehicle restrictions apply only on two mornings per week in the summers to allow

cyclists to enjoy the popular Cades Cove Loop Road without having to deal with motorized traffic (NPS, 1999). In a Canadian example, Yoho National Park in British Columbia closes the only road to Lake O'Hara to day-users in the summer and provides a mandatory shuttle service to the scenic lake. Campers and overnight visitors to roofed accommodations at the lake, however, receive exemption from the restriction and permission to drive their vehicles on the road (PC, 2009g). The park's goals when closing the road were to protect the sensitive area and maintain a wilderness experience for visitors by limiting the number of people going to the lake (PC, 2009g).

Vehicle restrictions reduce personal vehicle travel dramatically, sometimes up to 100%. They are instituted by the park agency and are generally found on closed loops or dead-end roads, where vehicle restrictions tend to disrupt motorized traffic circulation the least. While the implementation of a restriction is not expensive, providing an alternative mode, such as a shuttle, for visitors to enjoy the area can be costly. Vehicle restrictions offer strong incentives to use alternative transportation systems.

Increasing the cost of personal vehicle use

While drivers are willing to absorb the costs of maintenance, taxes, insurance, etc., they are generally less tolerant of increases in gas prices, parking costs and other per-use fees (Litman et al., 2009b). Controlling some of the costs of operating a vehicle inside park boundaries is within the power of policy makers, making it a legitimate option for shifting travel choices within park boundaries. Entrance fees and parking prices are potential places of influence but they must be supported by viable alternatives to gain acceptance and exert the greatest impact.

Mandatory entrance fees, a feature of most North American parks, are designed to support and maintain park facilities and enhance visitor experiences (PC, 2009a). With this fee structure already in place, requesting an additional fee from only those visitors bringing a motorized vehicle into the park does not require any additional infrastructure. Litman et al. (2009b) suggest that increases in parking prices or road tolls prompt up to a 60% shift from automobile travel to alternative modes. They note that the Federal Competition Bureau recorded a 25% shift in motorist behaviour when gas prices increased by 15% in 2001 (cited in Litman et al., 2009b). Further, road tolls and congestion pricing systems in places such as London and Stockholm have demonstrated that drivers are indeed influenced by increases in out-of-pocket driving costs (Litman, 2006; Stockholmsforsoket, 2006; VTPI, 2008). In both London and Stockholm, however, the availability of public transportation is considered important to the success of the congestion pricing system.

Entrance fees at national parks may have different implications than what we observe in other places that employ pricing schemes to deter drivers. For instance, the existence of entrance fees indicates that users accept the notion of paying a direct fee to use the facilities in the park, a concept that is not present in most North American cities[4]. Because park users are already accustomed to paying a fee to enter park boundaries, an additional few dollars may be less of a deterrent than if it were the first and only fee, limiting its effectiveness as a strategy to deter drivers. Additionally, parks planners want people to visit and do not want to deter people from coming to the park at all (whereas in London and Stockholm, planners' goals would be satisfied if road users decided not to use the roads at all by car or by alternative modes).

At this point, no parks in Canada charge an extra fee to enter the park with a vehicle. Some American parks have different fees for visitors entering with a vehicle and for those entering by other modes of transport. For example, in the high season, visitors arriving at Acadia National Park by personal vehicle must pay $20 to enter the park while pedestrians, cyclists and motorcyclists only pay $5. Precisely how much this price difference influences travel decisions is unknown but a portion of the fees collected are used to support the park's public transit service (NPS, 2006a).

Parking prices are even more influential to travel decisions than other out-of-pocket prices such as fuel and road tolls (Litman, 2009b). This is true not only in urban centres but in tourist areas as well (Kelly et. al., 2007). Few national parks, however, use this strategy. In Canada, the only national parks that collect parking fees are those with no entrance fees such as Bruce Peninsula National Park and St. Lawrence Islands National Park (PC, 2008a; PC, 2008e). The infrequent use of this strategy is likely related to the existence of entrance fees (and low tolerance for multiple per-use fees) and the required infrastructure and labour to collect parking fees.

While increasing the costs of driving a personal vehicle tends to reduce personal vehicle travel, it is not always accepted by the public. To justify the additional costs, they should correspond with new infrastructure or services in a way that users see how their fees are being spent.

[4] Rather than paying per use, residents of cities, towns, provinces and states generally pay for roads and public services through taxes. In addition to taxes, European cities, such as Stockholm and London, are turning to "per use" fees to manage the demand for roads.

Approach: Diversifying Transportation Options

Developing pedestrian and bicyclist infrastructure

Improving pedestrian and bicycle infrastructure is a common method for parks and other administrative bodies to encourage a shift toward more active transportation, particularly for short trips. Some parks have used this strategy to reduce congestion problems while enhancing the environment and promoting healthy lifestyles. The NPS supports the use of active transportation but notes that walking and bicycling will not become popular until they are safe, enjoyable and convenient (NPS, 1999).

The NPS Guidebook (1999) points out that before adding bicycle or pedestrian lanes and infrastructure, adequate safety studies must be performed. The addition of a bicycle lane is often not the only modification required to ensure the safety of users. Adjustments to vehicular travel, such as speed limit reductions, may also be required. If this cannot be achieved, a bicycle lane could inadvertently encourage cycling in unsafe conditions.

"For [bicycling and walking] to gain popularity they must be safe, enjoyable and convenient"

(NPS, 1999)

Litman et al, (2009a) highlight factors that give an area high potential for pedestrian and cyclist travel: high number of local attractions, short trip distances, high proportions of young, elderly, good travel conditions and few steep slopes. Areas conforming to these conditions should be prioritized for non-motorized improvements.

The NPS Guidebook (1999) suggests enhancing prioritized areas through better signage, strong and clear linkages between points of interest, and increased visibility for all road and sidewalk users. For pedestrians, safe crosswalks, well-maintained sidewalks, and adequate furnishings, such as benches to punctuate pedestrian routes and make walking an attractive option. Conversely, hazards such as insufficient time to cross a road, uneven sidewalks, lack of visible crosswalks and inappropriately placed curb ramps are cited as the most common deterrents to walking, particularly for older adults (Lockette, Willis and Edwards, 2005). For cyclists, bicycle storage facilities, designated lanes and trails, well maintained and wide shoulders, the availability of bicycle accessories and equipment rentals, and finally, connectivity between travel modes such as bike racks at trailheads and permission to bring bicycles on board buses or shuttles encourage this mode of travel (NPS, 1999). Most parks with shuttles or public transit have actively worked to incorporate multi-modal trips by allowing bicycles on buses or providing bicycle racks. Acadia National Park goes even further and offers a free "Bicycle Express" shuttle for cyclists and their bikes between one of the park towns and a popular cycling trail network (Island Explorer, n.d.).

In addition to improving infrastructure, the park (or a business within the park) could provide bicycle rentals for visitors who wish to ride but do not

have a bicycle with them. Rental bicycles offer an opportunity to intimately explore the park without the hassle of transporting a bicycle for the duration of a visitor's trip.

Active transportation can be considered a better, more intimate way for visitors to experience the park. Grand Canyon National Park has long-term plans to develop 45 miles of active transportation paths within its boundaries while promoting the importance of silence and solitude in experiencing the canyon view (NPS, 2002; Ewan and Ewan, 2002). Because the notion of experiencing the park "up close and personal" is appealing to many park visitors, it could play an important role in promoting non-motorized transport.

Bike sharing

Bicycle sharing programs are becoming increasingly popular in cities around the world (Holtzman, 2008). Designed to allow users to pick up a bicycle at one designated location and ride it to another, the purpose of the system is to provide a bicycle service equivalent to public transit. Most city systems charge a single fee for a day, a month, or a year and most existing programs already use or are shifting to credit card payment and electronic swipe cards to identify users and prevent theft and vandalism, which is one of the most common problems with such a system (Holtzman, 2008). Paris, France has one of the world's most extensive programs with more than 15 000 bikes available at stations all over the city (Holtzman, 2008). Lyon, France has also established a successful program where 96% of people who used the bikes in the program's first year had not used bikes in the city centre before and 7% of bike-share trips replaced car trips. Overall, car traffic has dropped about 4% in Lyon since the program began in 2005 (Holtzman, 2008). Closer to home, the city of Montreal, Quebec launched the most significant bike-sharing program in Canada, "BIXI", in the summer of 2008 and has since won a Gold Edison Award for best product of 2009 in the Energy & Sustainability category (BIXI Montreal, 2009). Washington D.C. also recently started its own program sponsored through an advertising contract with Clear Channel Communications (Holtzman, 2008).

To date, however, few national parks have engaged in such a program. This could be partly because city bike sharing programs are designed to compliment an existing multi-modal transportation system with bike sharing stations most commonly found at transit stops and sometimes next to car-sharing stations (Holtzman, 2008). Target users are usually short-trip commuters, rather than recreational cyclists, as indicated by fee structures where the first 30 minutes are covered by the rider's single fee. Trips longer than 30 minutes cost an extra fee. While the needs of a national park visitor may be different than a city bike share user, some park planners believe that certain features of a shared bike system could be adapted to suit a park's needs.

Glacier National Park in Montana started a shared bike program, or 'shared fleet'[5], for its employees in 2003 (NPS, 2009a). The introduction of employee bike sharing was designed to reduce short motorized vehicle trips taken for meetings, campground monitoring and bike patrol. The bikes can also be used for employee recreation (Law, 2004). With $9000 from the Glacier Fund, the park's non-profit arm, the park purchased the required bikes, helmets, locks, keys, headlights, and several racks to start its program. The bikes were made to be long-lasting and sturdy, requiring only one tune-up per year. They are stored in a garage during the off-season. At last count, the park had 27 bicycles (NPS, 2009a) and had plans to eventually extend its program to include visitor-use of the bikes (Law, 2004).

Fig. 2: White Bikes at De Hoge Veluwe National Park, Netherlands

(http://www.flickr.com/photos/65409933@N00/73776972/)

European cities and countries have been participating in bike sharing for longer than North American locations. Not surprisingly, one national park in the Netherlands, Hoge Veluwe National Park, has been operating a bike share program for more than 30 years and is now well-known for its successful "White Bicycle" program. The park, which does not receive subsidies from the Dutch government and is financially dependent on paying visitors, owns 1700 bikes including children's bikes, tandem bikes and bikes for people with disabilities (De Hoge Veluwe NP, n.d). Because the bikes are often all in use on busy days, the park also offers blue bikes that visitors can rent for a fee and ride exclusively for the day (De Hoge Veluwe NP, n.d). The rows of shared bicycles shown in figure 2 speak to their popularity.

To this point, no national parks in North America have implemented a bike share program for visitors, but the NPS is showing interest in experimenting with such a system. The Transportation Research Board reports that the Western Transportation Institute is conducting a two-year study on bike sharing programs in national parks and national wildlife refuges (TRB, 2009). The aim is to make recommendations to agencies interested in implementing a bike sharing program by the project's end date of June 2010.

Providing public transit service

National Parks in the United States are frequently turning to shuttles and public transit to enhance visitor experience and solve their transportation-related problems such as congestion, air pollution, lack of sufficient parking

[5] Paul DeMaio, a recognized writer on bike sharing systems, distinguishes between public bike-sharing, private bike fleets, and private bicycle rental programs. A bike sharing system has unattended stations, is primarily used for short trips in transit, and can be used by anyone. Private bike fleets are used by a closed group for work or school purposes only, have unattended stations and are usually provided by an employer for its employees. Private bike rental programs have attended stations and are used primarily for recreation (DeMaio, 2009).

and reduced mobility. According to a 2007 inventory of alternative transportation systems on federal land under the NPS, about 60 of their 360 parks offer some type of bus service (NPS, 2007; NPS, 2009e). In Canada, only a handful of parks, such as Banff and Yoho National Parks, offer similar services. Public transit and shuttle services in national parks in North America range from single routes and stations to multiple routes and stations; from mandatory to optional; from van transit to full-sized buses; and from regular scheduled stops to guided tours.

Of the 92 American parks with annual visitation rates similar to Fundy National Park's[6], twelve offer land-based public transit or a shuttle service. Some parks such as Scotts Bluff National Monument and Devil's Postpile National Monument have instituted their own services to transport visitors in the park (NPS, 2006b; NPS, 2009b). Others, such as Little Bighorn Battlefield National Monument[7] and Organ Pipe Cactus National Monument offer guided bus or van tours (NPS, 2009c; NPS, 2009f). The rest of the parks, however, take advantage of established public transit services in the region. Some have additional bus services and others are serviced by extensions of the existing transit system. The availability of local or regional transit services opens the park to a host of new visitors by attracting those who use this type of transportation already.

"The [bus] service makes me enjoy my vacation even more. I really appreciate not having to drive after driving all day to get here."

Park visitor (unknown park) cited in (NPS, 2003, p9)

Motivations

The Federal Lands Alternative Transportation Systems Study reports that the primary reason for initiating alternative transportation systems in American national parks was visitor experience enhancement (Cambridge Systematics Inc., 2004). Visitors may have access to simplified travel, interpretive opportunities and a better overall way to see park features when provided with an alternative to personal vehicle travel, (Cambridge Systematics Inc., 2004). Secondary concerns included resource protection and noise and air pollution reduction. If visitor enhancement is often a primary concern, despite a park's dedication to environmental protection, park planners may be even more willing to operate or permit a transit service if the service were to enhance visitor experience.

Users

Many park shuttle services are geared primarily toward tourists and are offered on a seasonal basis (often May to October[8]). Others, however, tend to benefit from an additional mode of transport that can service employees and local residents, particularly the youth, the elderly. Local residents

[6] Fundy National Park saw 255 456 visitors in 2008-09 (PC, 2009f).

[7] Guided bus tours at Little Bighorn National Monument are offered through a concessionaire .

[8] Parks with winter attractions such as skiing, may see another peak season during the winter months.

comprise more than 20% of riders on the shuttle in Acadia National Park (US DOT, 2003).

Funding

Parks with transit service vary in their funding schemes. Some transportation services are offered to visitors free of fares. Services that do not charge fees see greater ridership as shown by the Acadia Island Explorer with its dramatic increase in ridership after fares were eliminated (US DOT, 2003). Considering the significant capital and operating costs, however, fare recovery can be an important financial resource that can help fund the system. The Canadian Urban Transit Association estimates a 39% cost recovery from fares for transit systems serving a population of less than 50 000 (Shirocca Consulting and The Van Horne Institute, 2008). In municipal situations, the rest of the costs are usually covered by tax revenues, but given that shuttle users in national parks do not pay taxes directly to the park, this is not a revenue option for a park agency. Parks do, however, collect entrance fees, which could be used to financially support such a project. A Bow Valley (Alberta) study suggests looking to other possible income generators such as advertising, municipal contributions, federal/provincial grants, gas taxes and private sector contributions from benefitting businesses (Shirocca Consulting and The Van Horne Institute, 2008). Some of the more extensive and successful national park transit systems such as Acadia National Park and Banff National Park have benefitted significantly from advertising and partnering with the private sector (Shirocca, 2008; US DOT, 2003).

Fig. 3: Island Explorer transit system in Acadia National Park, Maine

The system is well recognized for its success at attracting visitors, reducing emissions and enhancing visitor and resident mobility.

(www.acadiagatewaycenter.com)

Emissions

Public transit and shuttles can give the park more control over the emissions produced within its boundaries. First, by shifting trips within its boundaries from personal vehicles to public transit, park planners may see less overall emissions. Within the first three years of its operation, the Acadian National Park Island Explorer, shown in figure 3, had reduced carbon monoxide emissions by 33% and volatile organic compounds by 25%, while also significantly lowering noise levels (US DOT, 2003). Second, by exploring the option of operating its vehicles on alternative fuel such as biodiesel, park planners may better control the amount of emissions produced. The Town of Banff recently purchased bio-diesel/electric hybrid buses that produce about 20% fewer greenhouse gases than regular diesel (Town of Banff, 2008). The NPS supports the use of alternative fuels as a strategy for not only reducing harmful emissions but also to engage visitors in a discussion about environmental stewardship (NPS, 1999).

Support for other modes

A bus service can support other alternative modes of transportation. For example, it can provide a one-way trip for visitors wishing to avoid walking or cycling the uphill part of their journey. Many national park shuttle

services also permit the transportation of bicycles on buses to encourage multi-modal trips.

Ridership

With the high costs of instituting a public transit system in a national park, sufficient ridership is essential. Without it, transit vehicles will simply act as one more emissions producer in addition to the multitude of vehicles remaining on the roads. Park planners must do everything they can to increase ridership and convert personal vehicle trips to bus trips. Low fares, adequate service, and ensuring convenience, will enhance the attractiveness of public transit and ensure its competitiveness with the car.

Acadia National Park strongly believes that its fare-free service has boosted ridership and helped make the Island Explorer an accepted and popular summertime activity. When the park got rid of bus fares, ridership went up by 600% (US DOT, 2003). Banff National Park has taken an approach where marketing plays an important role in attracting riders. Each of its buses are "wrapped in authentic Banff National Park wildlife imagery", making typical transit buses unique to the park (Town of Banff, 2008, par 1). Figure 4 presents the 'bear' bus in Banff. Electronic fare boxes issue random coupons and prizes to riders. Interior "ads" tell stories about the park as a means to educate and entertain passengers and riding the bus is described as part of the park experience (Town of Banff, 2008; Town of Banff, 2009). Banff too, has been successful in raising its ridership: since revamping its system in 2008, ridership has nearly doubled while fares have remained the same (Town of Banff, 2009).

Fig. 4: Banff's Roam transit system

Wrapped in wildlife imagery, ROAM buses in the Town of Banff visually attract visitors.

(Town of Banff, 2009)

Regardless of the approach to transit service, generating ridership and demand is crucial to the sustainability of the system and therefore, must be carefully considered.

Local Support

The NPS emphasizes that the implementation of a new transit service requires continued local engagement and support (NPS, 1999). This does not inhibit park staff from conducting studies and generating concepts whenever they see fit. Acadia National Park had prepared a transit concept well before its local communities expressed interest in transportation issues. In fact, Acadia National Park prides itself on having been prepared before local communities approached the park (US DOT, 2003).

Approach: Promoting a shift in transportation behaviour

Improving visitor information

Communicating with visitors is an important part of the solution according to the NPS Transportation Planning Guidelines (NPS, 1999). Visitors must

have adequate access to information about available options to walk, ride a bicycle or use public transit so that they can make informed choices about what to do and how to travel while in a national park.

Effective communication strategies take advantage of media that visitors already use. Billboards and visitor information radio channels provide support for visitors in the area, and websites, brochures and regional travel guides help visitors plan in advance for alternative mode use. Some parks offer "car-free" advice on how to get around the park without a car.

National Parks have two main reasons to ensure that their visitors have access to adequate information. First, many visitors will be travelling to the park for the first time and require information both before and during their trip to allow them to make the travel choices they want. By having access to transportation information before a trip, park visitors can arrive prepared (NPS, 1999). For example, if the park agency offers a clear delineation of which routes are suitable for different levels of cyclists, they might encourage visitors to bring a bicycle on their trip. Park maps also figure prominently in recreation decisions. Simple park maps usually show distances from one location to another, but they often do not show grades, or describe the travel conditions in the park. Choosing alternative forms of transportation then comes with greater risk: visitors may find steeper hills than they expected or they may find themselves riding in unsafe conditions.

Second, the park can explicitly describe the benefits of choosing alternative modes and its connection with the park's goals and principles. Visitors can be reminded that exploring the park by self-propelled transport can be rewarding and helps support sustainable practices that can preserve the park's natural environment for future generations.

Marketing a destination as one suitable for bicycle touring may boost overall visitor numbers while promoting sustainable tourism. Additionally, attracting more cyclists to an area tends to benefit local communities and businesses. For example, with the development and promotion of Quebec's "Route Verte"[9] from 2000 to 2006, the number of bicycle tourists rose significantly and this group of tourists went from spending $95 million per year to $145 million per year in 2006 (Eastwind Cycle, 2009). Many hotel, bed and breakfast and campground owners believe that the key to increasing the number of bicycle tourists is simply making the right information available (Eastwind Cycle, 2009). They suggest producing a map showing bicycle paths and routes that the province can promote to tourists.

[9] Route Verte is a province-wide marked network of bikeways including bike paths, designated roadways and paved shoulders (Velo Quebec, 2008)

Summary of example strategies

Table 1: Summary of strategies for discouraging personal vehicle use

Strategy	Key points
Restricting vehicles	• Helps alleviate safety concerns for all types of traffic • Controls amount of visitors entering a certain area • Manages vehicle restrictions according to multiple options: e.g. by vehicle type, by time • Reduces vehicle travel and environmental impacts of vehicle travel significantly • Is most effective on dead-end roads or closed loops • Provides complimentary alternative forms of transportation (e.g. shuttle, cyclist access)
Increasing the cost of personal vehicle use	• Shifts automobile travel to alternative modes in cities • Sometimes requires additional infrastructure (additional parking fees may require additional infrastructure while additional entrance fees may not) • May not prompt such dramatic shifts as pricing schemes in cities • Financially supports alternative transportation systems • Ideally corresponds with additional infrastructure or services

Table 2: Summary of strategies to diversify transportation options

Strategy	Key points
Developing pedestrian and bicyclist infrastructure and services	• Contributes to creating a safer, more enjoyable and more convenient walking and bicycling environment • Should occur in areas that have high potential for pedestrian and cyclist travel based on trip distances, users, and grades • Should not occur where bicycling and walking conditions are not safe for the average user • Enhances the pedestrian and bicyclist environment • Provides opportunities to combine walking with other modes of transportation • Promotes walking and bicycling as a more intimate way of experiencing the park
Bike sharing	• Sometimes shifts some motorized trips to bicycling trips when it compliments an existing multi-modal transportation network • Presents risk of theft and vandalism • Shifts short commuter trips • Requires sturdy and long-lasting bicycles

Providing public transit service	• Addresses problems of congestion, noise and air pollution, lack of parking and reduced mobility while enhancing visitor experience • Has multiple options: mandatory/voluntary, small/large vehicles, seasonal/all-year-round, boarding fares/free to use • Has potential to enhances visitor experience(a primary concern for many parks) • Has potential to help protect the natural environment • Provides an additional venue for park interpretation • Offers benefits to local residents as well as tourists • Has several funding options: e.g. fares, entrance fees, private sector partnerships, municipal contributions, advertising, etc. • Provides better control over emissions within the park, especially when alternative fuels are used • Supports other alternative modes • Requires sufficient ridership to be cost effective and environmentally beneficial • Works best with local support

Table 3: Summary of strategies to improve information

Strategy	Key points
Improving visitor information	• Enhances visitor experience by allowing safe and informed choices about how to travel while in the park • Comes in many forms: website information, brochures at hotels, state/provincial/local travel guides, visitor information radio channels, billboards, “Car-free” guides • Can promote a more rewarding, “up close and personal” park experience and • Can describe links to sustainability and preserving the park for future generations • May attract a broader range of park visitors • Takes advantage of media that visitors already use

4.0
Transportation infrastructure and services in Fundy National Park

The existing transportation infrastructure and services in the park create a starting point for alternative transportation. They form the basis for indentifying opportunities and constraints for shifting to alternative transportation in the park. The map on page M2 presents the infrastructure and services available in the park.

Study objective 2

To create an inventory of existing transportation infrastructure and services in Fundy National Park

Existing motorized transportation infrastructure and services

Highway 114

Highway 114, shown in fig. 5, is the core thoroughfare through the park that all visitors to the park are likely to use at some point during their stay. It is the only road access to the park. 7.6km (of about 20km) of the highway are under construction until October 2010. When the upgrades are complete, the 7.6km will have been resurfaced, widened and realigned with enhanced fish culverts (PC, 2009e). The new road surface is designed to create better and safer access to the park for drivers, but Parks Canada is missing an opportunity to enhance the bicycling environment by not including a paved shoulder in the reconstruction. The combination of no shoulders along most of the highway through the park, high speed motorized traffic (80km/hr), and steep grades make Highway 114 unsuitable for bicyclists. Though some cyclists may enjoy the challenge these conditions present, the main thoroughfare cannot be described as infrastructure that supports bicycle use in the park.

Fig. 5: Highway 114

The narrow lanes with no shoulders do not make Highway 114 a safe, enjoyable or convenient place to ride.

Point Wolfe and Herring Cove Roads

Fig. 6: Point Wolfe Road

This road is more attractive to bicyclists than Highway 114 because of its lower traffic volume and speeds, and scenic value.

Point Wolfe Road connects the headquarters area with Herring Cove Road and Point Wolfe Campground. The end of Point Wolfe Road features several trailheads and viewpoints, a picnic area and a covered bridge. Herring Cove Road provides access to a view point, popular picnic place, waterfall, and Herring Cove Beach. With lower speed limits[10] and less traffic, both Point Wolfe Road and Herring Cove road are different in character from Highway 114 and more amenable for bicyclists, as illustrated in fig. 6.

Unpaved roads: Laverty Road, Hastings Road (Shepody, Forty-Five Road lie on the park borders)

Laverty Road is the most used unpaved road in the park because it leads to several popular trail heads. Typical of an unpaved road, its surface is uneven and is not suitable for most cyclists. Few pedestrians use this road either because of its length and distance from other destinations. Hastings road permits traffic in only one direction and is not used very often. Shepody and Forty-Five Road, which frame the northern and eastern borders of the park, do not take visitors to any popular destinations and are not often used.

Parking

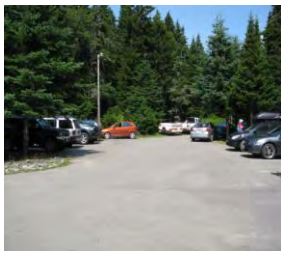


Fig. 7 and 8: Parking lot at Point Wolfe

The Point Wolfe parking lot is just one of the parking lots that reach capacity on sunny summer days.

The park features an abundance of parking for motorized vehicles. At the entrance to every popular destination lies a set of car parking spaces: some paved, such as Herring Cove parking lot shown in figs. 7 and 8, and some unpaved. Parking lots at the most popular attractions fill up, particularly on busy weekends (personal communication, Parks Canada employee, August 15, 2009), which sometimes leads to parking on the side of the road, which is takes away from the park's beauty, affects the safety of road users and causes environmental damage (US DOT, 2003).

Gas station

The Irving Gas Station next to the park entrance in the Town of Alma is the only gas station nearby. It offers basic automobile maintenance and equipment for purchase.

Bus service

Chartered buses bring some visitors to the park, particularly those arriving in Saint John by cruise ship (Boudreau, 2008). No public buses currently service the park.

[10] Speed limits are generally 60km/hr on both Point Wolfe Road and Herring Cove road

Existing pedestrian infrastructure and services

Paved pedestrian infrastructure: sidewalks and crosswalks

Most visible pedestrian infrastructure lies in the headquarters area. Fig. 9 shows the sidewalk on one side of the road that connects the Visitor Information Centre to the Town of Alma. At the park entrance in Alma, a crosswalk joins the parking lot on the north side of the road and the viewpoint and beach on the south. Heading south from the Visitor Information Centre, a path leads visitors to the amphitheatre and further down a small hill where they can safely cross the road at a crosswalk to access the pool. In the Point Wolfe area, a crosswalk helps ensure pedestrian safety in a location with poor driver visibility (a covered bridge restricts driver ability to see crossing pedestrians).

Fig. 9: Sidewalk connecting Visitor Information Centre and Alma

The sidewalk makes walking between the park and town safer, more enjoyable and more convenient than walking on the road.

Unpaved pedestrian infrastructure: trails

Hiking trails, such as the Coastal Trail shown in fig. 10, are located all over the park and are one of the most commonly used type of 'pedestrian' infrastructure in the park. Though generally used for recreation and not considered utilitarian, a well-connected trail system can reduce the need for visitors to drive a vehicle from one place to the next. In Fundy National Park, at least one trail extends from each of the three primary campgrounds, allowing visitors to begin hikes without having to go very far. Experienced hikers might be attracted to the "Fundy Circuit", which consists of several trails and unpaved roads that connect nicely to form a loop around the park[11]. This degree of connectivity is helpful for promoting foot-powered transportation but some trails and destinations, such as the popular Dickson Falls trail are currently isolated from the trail network, as highlighted in fig. 13. The Park Management Plan (2005b) suggests no further trail development until at least 2010 but park planners could foster the demonstrated interest in hiking by introducing better trail connections.

Fig. 10: Coastal trail

Hiking, a popular recreational activity, can also serve as a means of getting from one place to the next.

Rest stations

Many trail heads have rest stations including picnic tables, washrooms or pit toilets. Rest stations are important features of pedestrian infrastructure, particularly for visitors with difficulty walking and who might tend to stay on paved infrastructure. Frequent benches along a sidewalk can encourage walking, particularly for the elderly. At the present time, benches are absent along paved pedestrian infrastructure.

[11] Parks Canada suggests taking 3 days to complete the 48km loop.

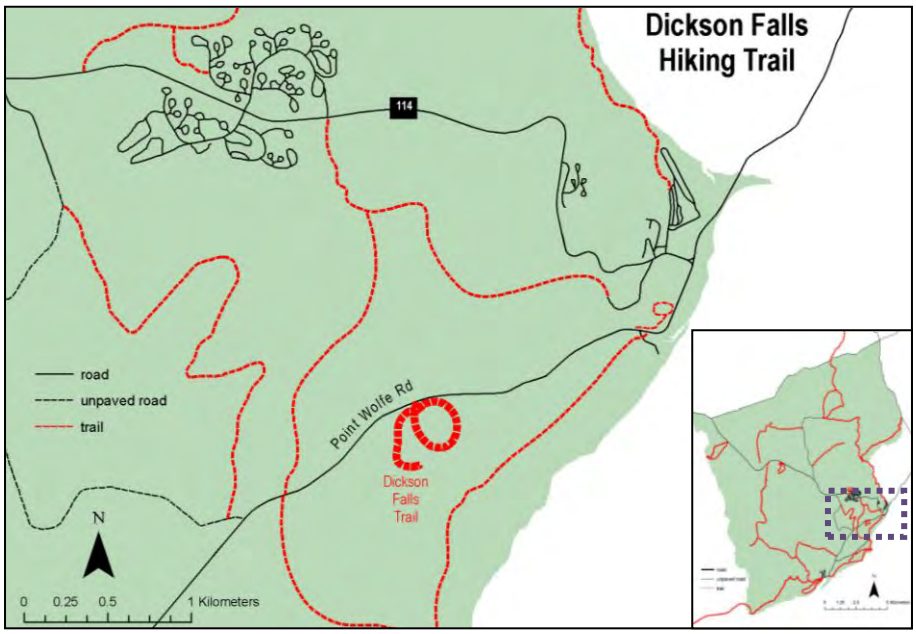


Figure 11: Dickson Falls hiking trail. An example of poor trail connectivity; Dickson falls does not connect with other trails and is only accessible by road

Existing bicyclist infrastructure and services

Highway 114

The park roads service cyclists as well as motorists. Highway 114 is not necessarily appropriate for anyone but experienced cyclists. The high volume of traffic travelling at 80 km/hr with no shoulders on the road makes safe cycling alongside moving vehicular traffic challenging. The steep slopes can also be dangerous for cyclists because they will travel even slower going up and can travel faster than they should going down. The experienced cyclist, however, may enjoy the challenge.

Point Wolfe and Herring Cove Roads

Park managers consider these roads opportunities for short-medium bicycle touring opportunities because of their scenic value (FNP, 2005b). Neither road has a paved shoulder but these roads see less traffic travelling at slower speeds than Highway 114. While beginner cyclists may not feel comfortable on these roads, intermediate cyclists would enjoy the scenery. The end of Point Wolfe Road parallels Hueston Brook, which creates a pleasant riding atmosphere.

Bicycle racks and lanes

The park has limited bicycle storage facilities with only one bicycle rack at both the administration building and visitor information centre, shown in

fig. 12, and two bicycle racks at Chignecto North Campground. Each bicycle rack comfortably holds five to six bicycles, bringing the total formal bicycle storage spaces in the park to between 20 and 24. None of the three paved roads within the park have bicycle lanes or paved shoulders that cyclists might use, except the stretch of Highway 114 from Alma to the Visitor Information Centre. Cyclists must therefore ride in the same lane as motorized traffic everywhere in the park besides designated mountain bike tails.

Fig. 12: Bicycle rack at the Visitor Information Centre near Alma

Located near the visitor information centre, this rack contains 6 of the 20-24 bicycle parking spaces in the park.

Bicycle services

The Irving Gas Station in the Town of Alma serves as the only service station for bicyclists. There, cyclists can fill their tires with air but they are limited in terms of supplies and equipment they can purchase. The general store sells a small selection of tubes and tools a cyclist can use but with such a small number of options, many cyclists will leave disappointed[12]. No bicycle mechanics are on staff.

Neither the park nor any businesses in the Town of Alma rent bicycles by the hour or by the day. East Wind Cycle in Sussex, NB operates bicycle tours in the region but does not visit Fundy National Park on any of their regular tours (Eastwind Cycle, n.d.).

Mountain biking paths

The park features six designated mountain biking trails such as the trail in fig. 13. While some may appear to be short cuts, they are not designed as utilitarian paths and are instead maintained as challenging recreational paths. Further, the unpaved mountain bike trails demand different kinds of bicycle tires than a road, so few people combine the two types of cycling in the same trip. In the strictest sense, mountain biking is an alternative form of transportation but because it is limited to designated trails, it is not considered an important alternative to the personal vehicle for utilitarian trips.

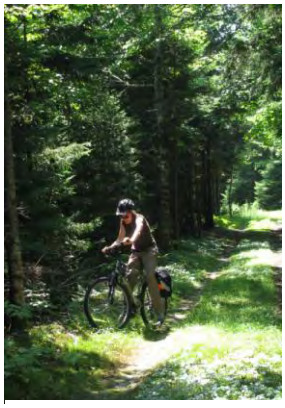


Fig.13: Maple Grove mountain biking trail

Mountain biking trails are challenging and few riders choose to combine trail cycling with road cycling.

[12] Common bicycle repair equipment and accessories might include tubes in a variety of sizes, allen keys, pumps, lights and reflectors. The Irving Gas Station in Alma offers a limited supply of some of these items and a compressed air machine for inflating tires.

5.0
Opportunities and constraints for shifting transportation behaviour in Fundy National Park

I begin by exploring the factors that typically influence travel decisions. I then use this information to examine the implications of park features on transportation, and ultimately, to describe strengths and weaknesses of each strategy used in other parks and places applied to Fundy National Park.

Study objective 3

To identify opportunities and constraints for shifting transportation behaviour in Fundy National Park

Factors that typically influence travel behaviour in national parks:

- Costs of using the park
- Visitor characteristics
- Current modes of travel to the park
- Transportation services
- Trip distances and grades
- Travel conditions
- Climate
- Visitor attitudes
- Communications material[13] (Litman et al., 2009)

[13] Litman et al. (2009) do not explicitly discuss current modes of travel and communications material as factors that influence demand for alternative transportation but I have included them here in the context of national parks. I have not included their considerations of land use patterns and density, and time and geographic scope because they do not directly apply to the national park context. Finally, though Litman et al. discuss these factors in terms of pedestrian and cyclist patterns, the factors listed above can also inform estimates of public transit demand.

See appendix 1 for a basic framework for assessing opportunities and constraints for shifting to walking, bicycling and public transportation that emerge from these factors.

Costs of using the park

Visitors currently pay a mandatory entrance fee of $7.80 per day to use the facilities in the park. This fee goes toward supporting park facilities and enhancing visitor experience. Users must pay additional fees to use the campgrounds and roofed accommodations and purchase firewood. The park does not charge additional fees for bringing a vehicle into the park. The frequency of complaints about this matter (PC, 2007b) suggests that visitors perceive these costs to be too high.

Parks Canada has frozen its fees until April 1, 2011 to help the tourism industry and local economies (PC, 2009a). As an agency of the federal government, Parks Canada must rigorously review any proposed changes to user fees by carrying out an impact assessment and consulting users. The House of Commons has to pass a resolution before the new fees are authorized (User Fee Act, 2004). While this is not a simple process, new fees to support alternative transportation would support Parks Canada's mandate and may warrant this approach.

Visitor characteristics

Visitation trends at Fundy National Park and in Atlantic Canada provide insight into shifting transportation demands. In 2002/03, the park hosted 335 000 visitors. In the years that followed, annual visitation dropped slowly to just under 250 000 in 2007-08 and then back up to 255 000 in 2008-09, as illustrated in fig. 14. This parallels falling tourist numbers in New Brunswick over the same period (Boudreau, 2008).

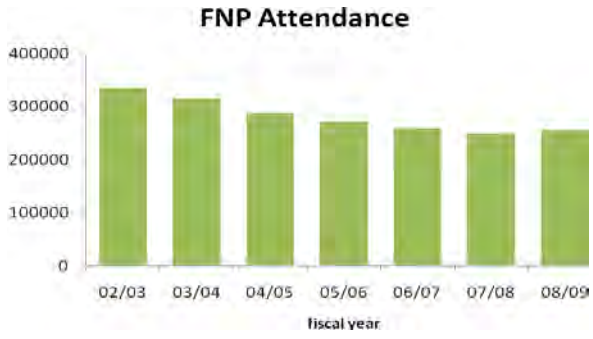


Fig. 14: Fundy National Park attendance (PC, 2009e)

Visitation rates peak during the summer months, with about 50% of visitors arriving between June and September (PC, 2007b). About 2839 visitors are in the park on an average summer day[14]. Walking and bicycling are most feasible during these months. The high visitation rates during the summer may also influence when a public transit service would be most effective.

Fundy National Park has seen fewer American travelers and, proportionately more Atlantic Canadians in recent years. Several factors account for this trend including the tightening of U.S.-Canada border controls, the rise of the Canadian dollar, and increasing gas prices (Boudreau, 2008). In the larger region, Atlantic Canada has recently seen an increase in overnight visitors from the United Kingdom, who most likely do not arrive with their own private vehicle (Boudreau, 2008). By creating a wider variety of transportation options, the park could reach out to this type of user.

Average visitor age and ability are shifting as North America's population changes: the proportion of parties consisting of adults with no children increased significantly from 1998-06 from 26% to 49% respectively (PC, 2007b; PC, 2001). In 2005, 53% of out-of-province visitors to the Fundy Coast Drive Region were over the age of fifty[15] (Tourism New Brunswick (2005), cited in Boudreau, 2008). Further, the 2006 Fundy National Park visitor survey indicated that a minimum 5% of respondents were travelling with a person with a disability[16] and Parks Canada predicts an increase in this number as the Canadian, American, and European populations age (PC, 2007b).

Older populations are commonly cited as carrying different transportation demands. In a city, public transportation can help seniors remain mobile and independent but in the context of a national park, this may not be an important factor. Without alternative means of accessing the park, seniors will arrive either as a driver (implying they are confident enough to drive) or as a passenger (implying they are in a group with at least one driver). Older visitors with very limited ability will likely travel with a caregiver and want to spend more time sightseeing from a vehicle than on foot.

[14] 133 283 visitors came to the park in June-September, 2006. 133 283 visitors/122 days =1092 visitors entered the park every day. Each visitor stayed an average of 2.6 days so, 1092*2.6 days =2839 visitors were in the park every day.

[15] Visitors to the Fundy Coastal Drive Region have been shown to be similar to visitors to Fundy National Park; therefore, comparisons are appropriate.

[16] Parks Canada suspects that this percentage is an underestimate because a visitor who experiences difficulty with stairs may not self-identify as a 'person with a disability'.

Current modes of travel to the park

89% of visitors currently travel to the park in their own vehicle or a rented car, truck, van or camper van; therefore, most visitors to the park have access to a personal automobile (PC, 2007b). Alternative modes of transportation must compete with the convenience of these personal vehicles.

Ten percent of visitors travel to the park in a recreational vehicle (PC, 2007b); a proportion that has risen since 1999 based on the growing proportion of 2 and 3-way campsites occupied (Boudreau, 2008). Recreational vehicle users are generally attracted to this form of travel because they enjoy having their own beds at night and they tend to value self-sufficiency (Hardy, 2008) but they see disadvantages in the high costs of gas and the difficulty of manoeuvring (Hardy, 2008). The availability of alternative transportation within the park might be appealing to this group of visitors because it would reduce their fuel expenses and obviate the need to maneuver their large vehicles on short excursions through the park.

The remaining 1% of visitors to Fundy National park arrives by motorcycle and the park has no record of visitors arriving by bicycle (PC, 2007b).

Transportation services

The park and the Town of Alma offer limited transportation services for all modes. No transit agencies service the park besides those operating chartered buses. This lack of services constrains Fundy National Park in its efforts to reduce personal vehicle travel by encouraging the use of alternative modes because alternative transportation systems are generally most effective when they are integrated with other alternatives. For example, many visitors who would take advantage of a public transit service within park boundaries may not have the opportunity to get to the park at all without a bus to get them there.

Fig. 15: PC Go See Program

The program used school buses to transport students from universities and colleges to the park (PC 2008b).

In 2008, Parks Canada initiated a pilot program to give youth more opportunity to experience Fundy National Park. Fig. 15 shows the school buses that were used. The PC Go See Program shuttled five groups of students (167 students in total) from universities and colleges in Fredericton and Sussex to the park for trips ranging from one to three days in duration. The project was considered a success with most participants claiming they would use the service again if it were available and the park has plans to continue the project in the future (PC, 2008b; PC, 2009b). The availability of alternative transportation within park boundaries would support such a service.

Neither the Town of Alma nor the park offer bicycle rentals or bicycle repairs. Visitors without a bicycle in the park do not even have the option of choosing this mode and cyclists with a bicycle are limited in the services to

which they have access. To promote cycling, park planners should work to ensure the availability of cyclist support services.

The park offers guided beach walks that are quite popular with visitors (PC, 2007b). By offering this activity, Parks Canada is promoting the use of alternative transportation and could possibly use these as an opportunity to connect with other activities.

Travel conditions

Walking

Visitors can feel relatively safe walking from the headquarters area to the Town of Alma with the sidewalk that stretches between the two areas. This route is well lit at night for those wishing to travel after dark. The sidewalk ends, however, at the Visitor Information Centre and does not reach to the golf course, playgrounds, or tennis courts. Visitors walking to this popular area must cross the busy Highway 114 without a designated path. Here lies an opportunity to better connect popular destinations with pedestrian infrastructure.

Cycling

Without designated bicycle lanes or paved shoulders on any of the main roads, cyclists wishing to use the roads must travel alongside motorized traffic. Fig. 16 shows a cyclist riding on Highway 118 with little infrastructure support to ensure her safety. Most popular destinations are also located far apart from each other with grades greater than 5% between them. Mountain bike trails are also challenging and not designed for utilitarian purposes. The Headquarters area is the only area suitable to the beginner bicyclist.

Fig 16: Cyclist on Highway 114

Fast-moving vehicles pass cyclists at 80km/hr at near proximities; Highway 114 is not suitable for most cyclists.

Intermediate level cyclists might enjoy Point Wolfe and Herring Cove Roads. While Hueston Creek is unnoticeable by car, its proximity to the road makes for a pleasant cycling experience. These roads also do not experience high levels of motorized traffic, making them ideal for moderately experienced cyclists, even without a paved shoulder. The park management plan recognizes these two roads as enjoyable touring routes for cyclists but makes little effort to advertize these routes to cyclists through brochures and maps.

Finally, the province of New Brunswick requires that all cyclists riding on a highway wear a helmet (Motor Vehicle Act, 2009, section 177(1)). The mandatory helmet law is not common to all provinces and states and many visitors will not be familiar with this rule. Information about this rule should be made available to visitors before arriving so that cyclists can be prepared to follow the law in the New Brunswick.

Fig. 17 & 18: Parking lots at Herring Cove (top) and Wolfe Lake (bottom)

These parking lots are located at key points of a possible transit route, and are spacious enough to allow for a bus to maneuver.

Public transit

Any public transit system would use the existing roads but may have trouble on the unpaved roads. Laverty Road, for example, accumulates multiple potholes and puddles that demand slow speeds and special driver attention. Travelling along this road many times per day would take its toll on the vehicle.

Public transit requires not only roads to travel on, but also places for riders to wait for the bus (e.g. stops, platforms, shelters). Many existing parking lots lend themselves well as transit stops. The parking lots at most of the primary destinations (e.g. Bennett Lake, Wolfe Lake and the ends of Point Wolfe and Herring Cove Roads) have enough space for a shuttle to enter and loop around to exit[17]. Figs. 17 and 18 show two of these suitable parking lots that have loops to ease bus maneuvering.

Trip distances and grades (See Appendices 1, 2 and 3)

Popular places to go

Fundy National Park offers many opportunities for outdoor recreation such as camping at three frontcountry campgrounds, backcountry camping, hiking, mountain biking, outdoor theatre shows, tennis, a children's playground, swimming, picnicking and golf. The headquarters area is home to a concentration of activities.

The pink circles on the map in fig. 19 show popular trip origins and destinations based on 2006 visitor surveys and park employee professional opinions. Most common destinations within the park are situated along one of the park's three main roads, Highway 114, Point Wolfe Road, or Herring Cove Road, making for easy vehicular access. The Park Management Plan indicates that many of these activities, such as backcountry camping and the hiking trail system, satisfy visitor needs at the present time but some activities, such as picnicking locations and boating will be reviewed. Transportation plans should consider proposed changes in activities within the park.

Trip distances

Litman et al. (2009) suggests that most trips over 5km will be taken by motorized transport; trips under 5km will be taken by motorized transport or bicycle; and trips under 2km can be taken by motorized transport, bicycle or on foot. While Litman et al. (2009) calculated these values for commuters in urban areas (rather than recreational trips), we can still use them in the Fundy National Park context to estimate expected modes of transportation for trips between park attractions. Appendix 2 shows trip distances for all

[17] The park or transit operator must confirm the suitability of particular parking lots for bus facilities.

trips between popular destinations and demonstrates that most walkable and bikeable trips, according to Litman et al.'s criteria, are found in the headquarters area. Recreational cyclists will likely choose to travel longer distances so they are not included in this particularly analysis.

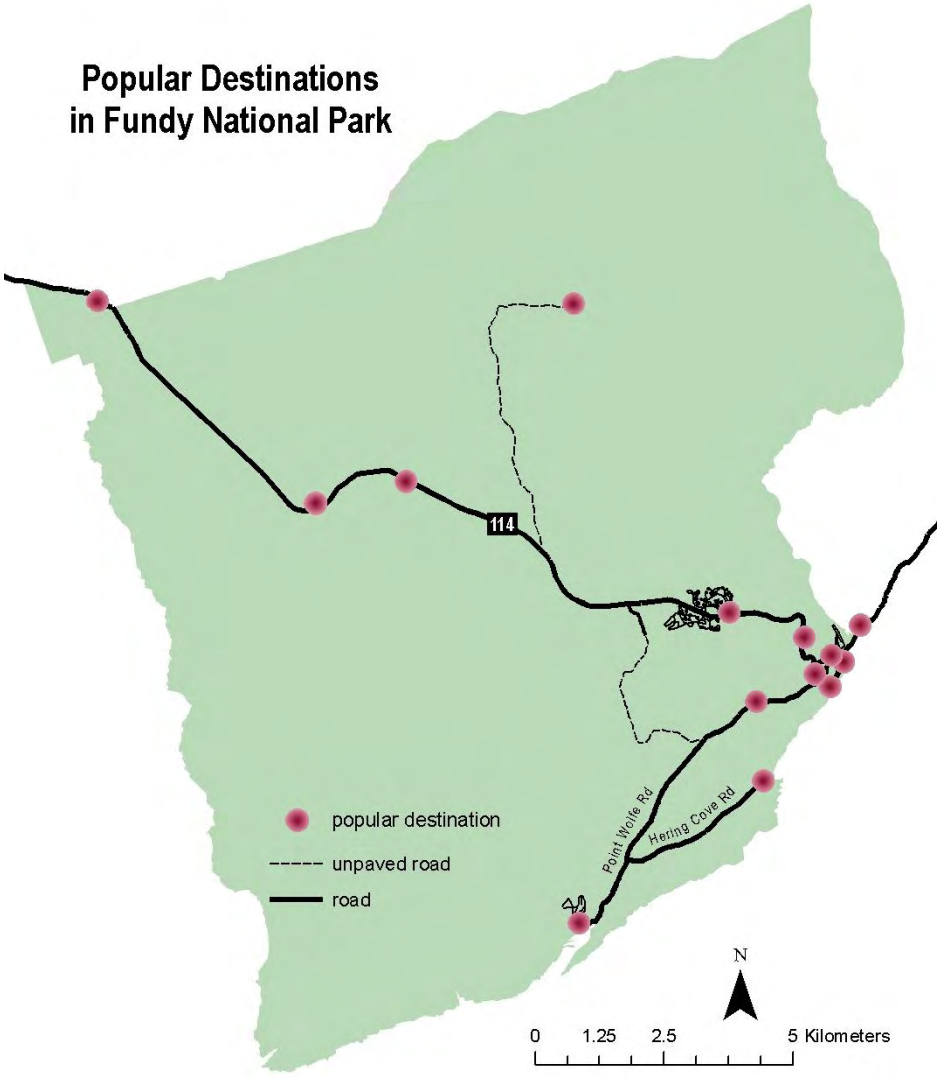


Fig. 19: Popular destinations in Fundy National Park. Most popular destinations lie primarily along one of the three main roads in the park (data from Service New Brunswick, 1998)

Grades

In addition to distance, the steep grades in Fundy National Park will also affect a person's choice of travel modes. Steep grades deter people from walking and cycling, particularly in the uphill direction. The additional consideration of grades confirms that most walking and cycling trips will take place near the headquarters, shown in fig. 20.

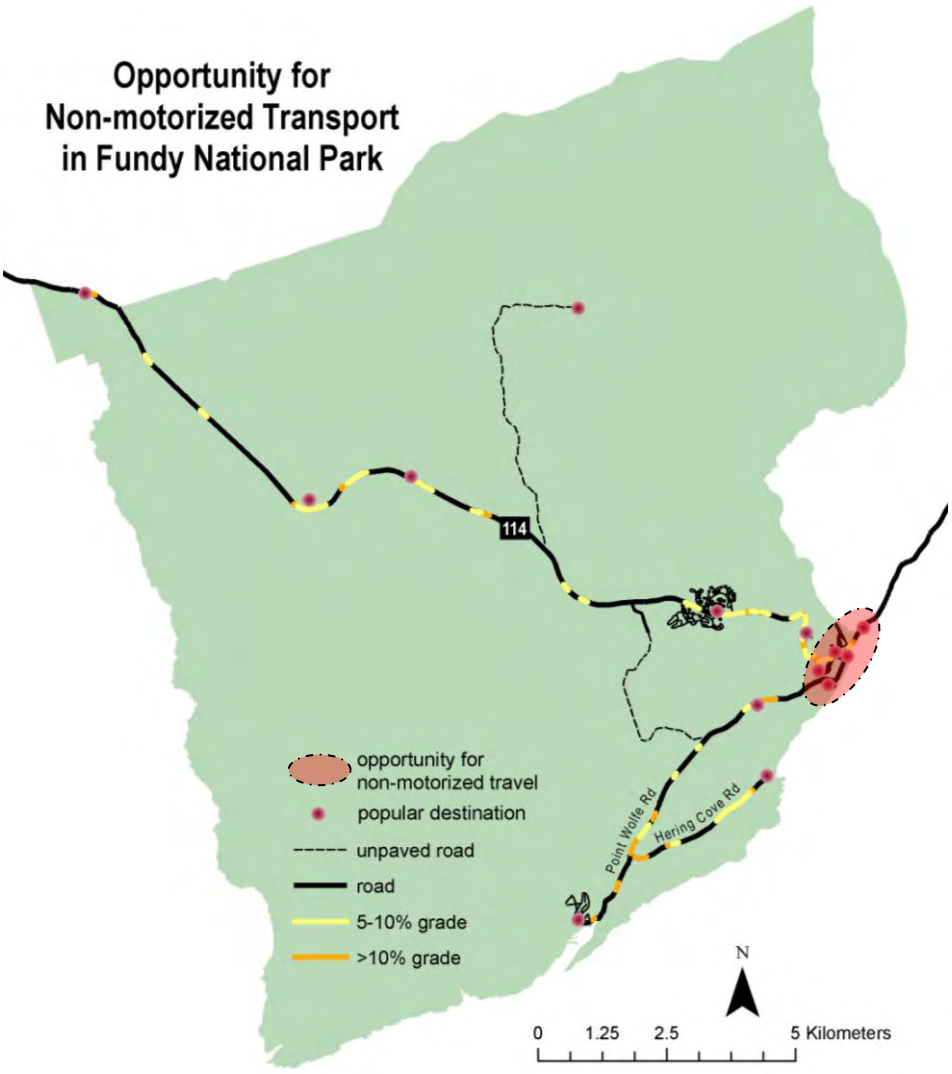


Fig. 20: Opportunity for non-motorized transport in Fundy National Park. The combination of trip distances, grades and travelling conditions indicate that opportunities are located in the Headquarters area (data from Service New

In June-September, Fundy National Park is likely to see:

52 days with at least 0.2mm of rain (46.2% of summer days)

Average temperatures of 13-17 degrees Celsius

(Environment Canada, 2009)

Climate

In peak visitation months, June-September, Fundy National Park sees about 52 days of rain and average temperatures of about 13-17 degrees Celsius (Environment Canada, 2009). Walking and cycling is difficult to encourage on rainy days (about 46% of summer days in Fundy National Park).

Visitor attitudes toward alternative transportation

Because most visitors come to Fundy National Park, in part, to spend time in the natural environment (PC, 2007b) and do not have strict time schedules, we might guess that they would be more willing than city commuters to walk or ride a bicycle. Parks Canada, however, has little data to confirm this willingness.

The idea of a public transit or shuttle service is not new to the park. A private shuttle service, the Fundy Flyer, moved supplies and passengers between Moncton and Fundy National Park in the 1980s (personal communication, Parks Canada employee, August 14, 2009). The service ended in the late 1980s when the driver retired.

Talk of a possible shuttle service had resurfaced by 2001 and the park's visitor survey of that year asked if visitors would use a public transit system if it were available. 28% of respondents claimed they would "very likely" use the service (PC, 2001). While these results indicate an initial interest in public transportation, only 36 people responded to the survey and no further information, such as willingness to pay fares and schedule preferences, was gathered on the topic. Moreover, attitudes may have changed since 2001, particularly with rising concern about environmental issues and increasing gas prices. Further study is required to gather visitor attitudes toward public transit.

Public transit service *to* the park might influence the proportion of visitors willing and motivated to use a bus service in the park. With no such service at the present time, proportionately fewer visitors might have reason or motivation to use a public transportation service because virtually every visitor in the park has access to a personal vehicle.

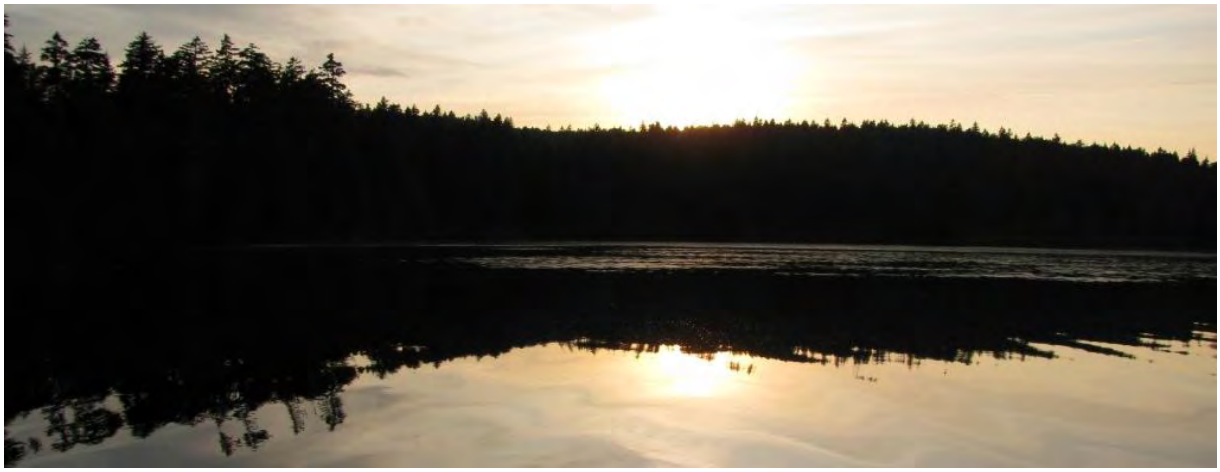
Communications material

The 2006 visitor survey reveals that before their trips, visitors used the Parks Canada website, previous knowledge of the park, the New Brunswick travel guide, and word of mouth to gather information about the park (PC, 2007b). While at the park, visitors primarily used the free Fundy National Park Map and the Salt and Fir brochure to get their information and decide what to do during their stay. The Salt and Fir brochure is a free 36 page 8.5x11 inch brochure that visitors receive when they pay their entrance fee or for overnight accommodation. An excellent source of information, it describes the history of the area, current park activities, the tides of the Bay of Fundy, and some interesting stories about the park. The park map also contains information about activities in the park but does not provide any insight into on-road travel conditions, such as steep hills or the presence/absence of paved shoulders on the main roads, which might be more influential to a pedestrian or cyclist than a car driver.

*Summary of opportunities and constraints for shifting travel behaviour in Fundy National Park (***Appendix 1 describes how to identify opportunites and constraints in any national park)**

Table 4: Summary of opportunities and constraints for shifting travel behaviour in Fundy National Park

Influencing factor	Opportunities	Constraints
Costs of using the park	• Existing entrance fees indicate visitor tolerance of per-use fees	• Existing entrance fees may reduce the effectiveness of a new transportation fee • The park currently has no infrastructure for collecting parking fees
Visitor characteristics	• Visitation rates are highest in June-September • Atlantic Canada is seeing proportionately more visitors from the U.K. (arriving to the region without a vehicle)	• The park is frequented by an aging population (may not wish/be able to walk or bicycle younger visitors) • Falling visitation rates 2002-2009 • Currently no way for U.K. visitors to get to the park without renting a vehicle
Current modes of travel to park	• 10% of visitors arrive by RV – these visitors may not want to manoeuvre their large vehicles for short distances	• All visitors arrive by personal vehicle of some kind
Transportation services	• PC Go See program • Guided beach walks are popular	• No bicycle rentals or repairs • No public transportation to the park
Trip distance and grades	• Popular destinations in Headquarters area are close together (<5km) and are not separated by steep grades	• Popular destinations outside headquarters area are far apart (>5km) and are separated by steep grades (>10%)
Travel conditions	• Some of headquarters area supports non-motorized modes with sidewalks, crosswalks and paths • Trail connections exist (e.g. Fundy Circuit) • Point Wolfe Road and Herring Cove Road are good bicycle touring opportunities for intermediate and advanced cyclists • Some parking lots would lend themselves to transit stops and require little redesign	• Some weak hiking and walking connections (e.g. Third Vault Falls, Dickson Falls, golf/ tennis/ playground area) • Unpaved roads are challenging for a bus or bicycle • High volume and speed traffic on Highway 114 • Some destinations would require minimal redesign to accommodate bus stops
Climate	• Just over half of summer days see no rain • Peak visitation months are warm (13-17 degrees Celsius)	• Almost half of summer days see at least some rain
Visitor attitudes and motivations for visiting the park	• Spending time in a natural/outdoor setting was one of the top two most cited reasons for visiting the park • Recreational opportunities was the third most commonly cited reasons for visiting the park • In 2001, 28% of visitor survey respondents (n=36) were willing to use public transportation in the park if it were available	• Without transit connections to the park, many visitors who would commonly use buses may not have easy access to the park
Communications material	• Visitors use the official website and the New Brunswick travel guide most often before their trip and the Park Map and Salt and Fir brochure during their trip to decide what to do, making these the obvious means of communicating with visitors	



6.0
Strengths and weaknesses of strategies aiming to shift personal vehicle travel in Fundy National Park

Study objective 4

To explore how each example strategy would apply to Fundy National Park, and suggest actions to advance those with potential for success

Here, I use the transportation inventory I developed in section 4.0 and the opportunities and constraints identified in section 5.0 to determine if a strategy is appropriate for Fundy National Park in the near future. Strong strategies provide a balance between additional infrastructure requirements and potential for reducing personal vehicle travel. They make use of current opportunities and take constraints into account. This examination sets the groundwork for the actions I propose to advance those strategies with potential for success.

Common strategies that other parks and cities have used include:

Approach: Discouraging the use of personal vehicles
- Restricting vehicles
- Raising the cost of using a personal vehicle in the park

Approach: Diversifying transportation options
- Developing pedestrian and bicyclist infrastructure
- Bike sharing
- Providing public transportation

Approach: Promoting a shift in transportation behaviour
- Improving visitor information

Table 5: Strengths and weaknesses of restricting vehicles

Approach: Discouraging the use of personal vehicles ***Strategy: Restricting vehicles***	
Strengths	**Weaknesses**
• Pedestrians and cyclists would be at a lower risk of conflict with vehicles. • Vehicular emissions and road wear and tear could be reduced up to 100%.	• Fundy National Park road layout and location of attractions is different from most other national parks that have instituted vehicle restrictions; other parks have used vehicle restrictions on dead end roads with only day uses at the end. • Restrictions on highway 114, a thoroughfare, would severely interrupt through traffic. • If restrictions applied to Point Wolfe Road, car campers at Point Wolfe Campground would require alternative means of bringing their gear to the campground or exemption from the restrictions. Visitors would also require additional parking at the head of Point Wolfe Road. • The closure of Herring Cove Road would require parking at its head but there is currently no parking at this location. • Some parks that use this strategy have identified the area surrounding the restricted road as a particularly sensitive habitat but Fundy shows no indication that the area around Point Wolfe Road or Herring Cove Road is especially sensitive.

What restricting vehicles would mean for Fundy National Park

Point Wolfe and Herring Cove Roads are primary vehicle restriction options; however, with the popularity of Point Wolfe Campground and the attractions at Herring Cove, alternative transportation must replace vehicular access. With or without restrictions and alternative transportation, Point Wolfe campers have to carry their gear to the campground. If the option of the convenience of the personal vehicle is removed, these campers might choose to visit the Headquarters Campground or Chignecto North, which are already in high demand and occasionally reach capacity (personal communication, Parks Canada employee August 15, 2009). The Park could open the campground at Wolfe Lake, but it was just recently closed after a review coming out of the Park Management Plan. Point Wolfe campers could be granted exemption from the restrictions but further study would be required to evaluate what proportion of road users would be granted exemption. A high proportion of exemptions would defeat the purpose of the restriction. Finally, with no alternative way of getting to the park, every visitor currently arrives in a personal vehicle of some sort. All of these vehicles would demand parking space at the head of the restricted road, which would likely require more parking than what the park currently offers. Vehicle restrictions are not likely appropriate for Fundy National park at this time.

Table 6: Strengths and weaknesses of raising the costs of using a personal vehicle in the park

Approach: Discouraging the use of personal vehicles ***Strategy: Raising the costs of using a personal vehicle in the park***	
Strengths	**Weaknesses**
• Extra revenue could financially support the implementation of alternative transportation strategies.	• With no alternative to the personal vehicle at the present time, virtually all visitors must bring a vehicle into the park. Extra fees may be seen as unfair when few alternatives exist. • Any changes in fees must be approved by Parliament; therefore, are not completely within the control of park managers. • Fundy National Park visitors already complain about the high costs of visiting the park.

What raising the costs of using a personal vehicle would mean for Fundy National Park

While the extra revenue generated from higher fees could be used to support expensive alternative transportation infrastructure and operating development, visitors would likely consider additional fees unjustified in the absence of alternative options. Furthermore, even if alternatives were available, an additional vehicle fee would likely have less of an effect than if it were the only fee. Road pricing may not have as big of an impact in the park as it has had in London and Stockholm. This strategy is not appropriate for Fundy National Park for the near future.

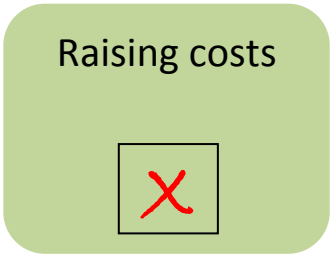


Table 7: Strengths and weaknesses of developing pedestrian ad bicyclist infrastructure

Approach: Diversifying transportation options ***Strategy: Developing pedestrian and bicyclist infrastructure***	
Strengths	**Weaknesses**
• Further development of pedestrian and bicyclist infrastructure could build on existing infrastructure (e.g. crosswalks near the pool, park entrance and Point Wolfe lookout; sidewalks near park entrance) to enhance pedestrian and cyclist connections between popular destinations. • Most of the trips appropriate for walking and cycling are located in the headquarters area; further development of pedestrian and cyclist infrastructure here will make these modes safer, more enjoyable and more convenient. • Extensions of some existing trails might encourage hikers to hike to the places they want to go instead of driving to distant trailheads. • Walking and bicycling provide an 'up close and personal' way of experiencing the park and the scenery. • Point Wolfe Road and Herring Cove Road have potential for bicycle touring. • Investing in infrastructure to support these summer activities would benefit a large proportion of visitors. • Improvement of pedestrian and bicyclist infrastructure falls in line with recommendations in the Park Management Plan.	• Many of the trips visitors want to take are longer than the expected maximum distance of 2-5km that a pedestrian or cyclist will travel. Further, many of these common trips feature steep slopes that deter pedestrians and cyclists. • Steep slopes lie between many trip origins and destinations - in these cases, visitors may be willing to walk or cycle down but not up and without an alternate way of going up, they will take a vehicle in both directions. • Adding paved shoulders to Highway 114 would still place cyclists alongside high-speed traffic.

What developing pedestrian and bicyclist infrastructure would mean for Fundy National Park

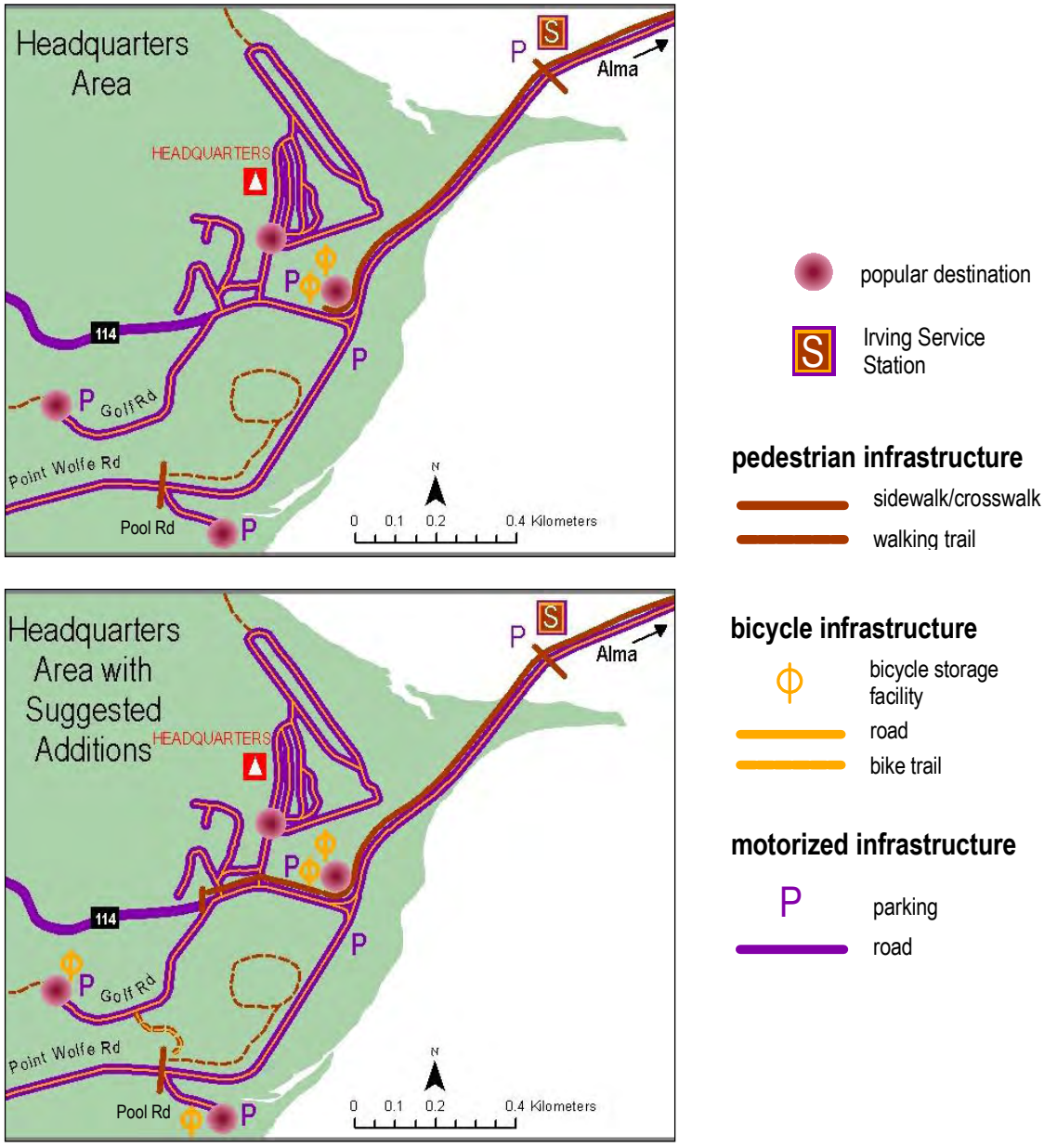
Most feasible walking and bicycling trips are located near the headquarters area, so park planners should prioritize this area for immediate road-side infrastructure development. Other areas may be worth considering but they would likely only service a small proportion of visitors. Some simple infrastructure such as crosswalks, and extensions of some existing paths and sidewalks connecting popular destinations would enhance the safety, enjoyment and convenience of pedestrians and cyclists, and thus make them more attractive travel options for short trips.

Developing non-motorized infrastructure

Figs. 21 and 22 present several new infrastructure suggestions to enhance the pedestrian and bicycling infrastructure in the headquarters area. To simplify the discussion about the suggested infrastructure, I have labelled the road from Highway 114 to the golf course/tennis courts/playground "Golf Rd" and the road extending south from Point Wolf Road shown below "Pool Rd" (these names are not used by Parks Canada). Suggested additions include:

- Extension of sidewalk next to Highway 114
- Crosswalk across Highway 114 to Golf Rd
- Walking and bicycling path to make a stronger connection between Golf Rd and Pool Rd
- Bicycle storage facilities at the end of Golf Rd and Pool Rd

Fig. 21 and 22: Transportation infrastructure in headquarters area at present (top) and with suggested additions (bottom) (data from Service New Brunswick, 1998)



Enhancing trail connections would also permit visitors to walk from one place to the next in a safe, enjoyable and convenient way. The 2005 Park Management Plan suggests no further trail development until at least 2010, but if a new trail connection will reduce the number of personal vehicle trips taken in the park, it would be worth considering. I present ideal connections in fig. 23 with the recognition that trails would have to be suitable to the terrain and further study is warranted before the implementation of these new trails.

- Connect Chignecto North Campground with Third Vault Falls trail
- Connect Third Vault Falls with Upper Salmon River trail
- Connect Tippen Lot with Dickson Falls trail
- Connect Dickson Falls with the Coastal trail

Fig. 23: Existing and proposed new trails (data from Service New Brunswick, 1998)

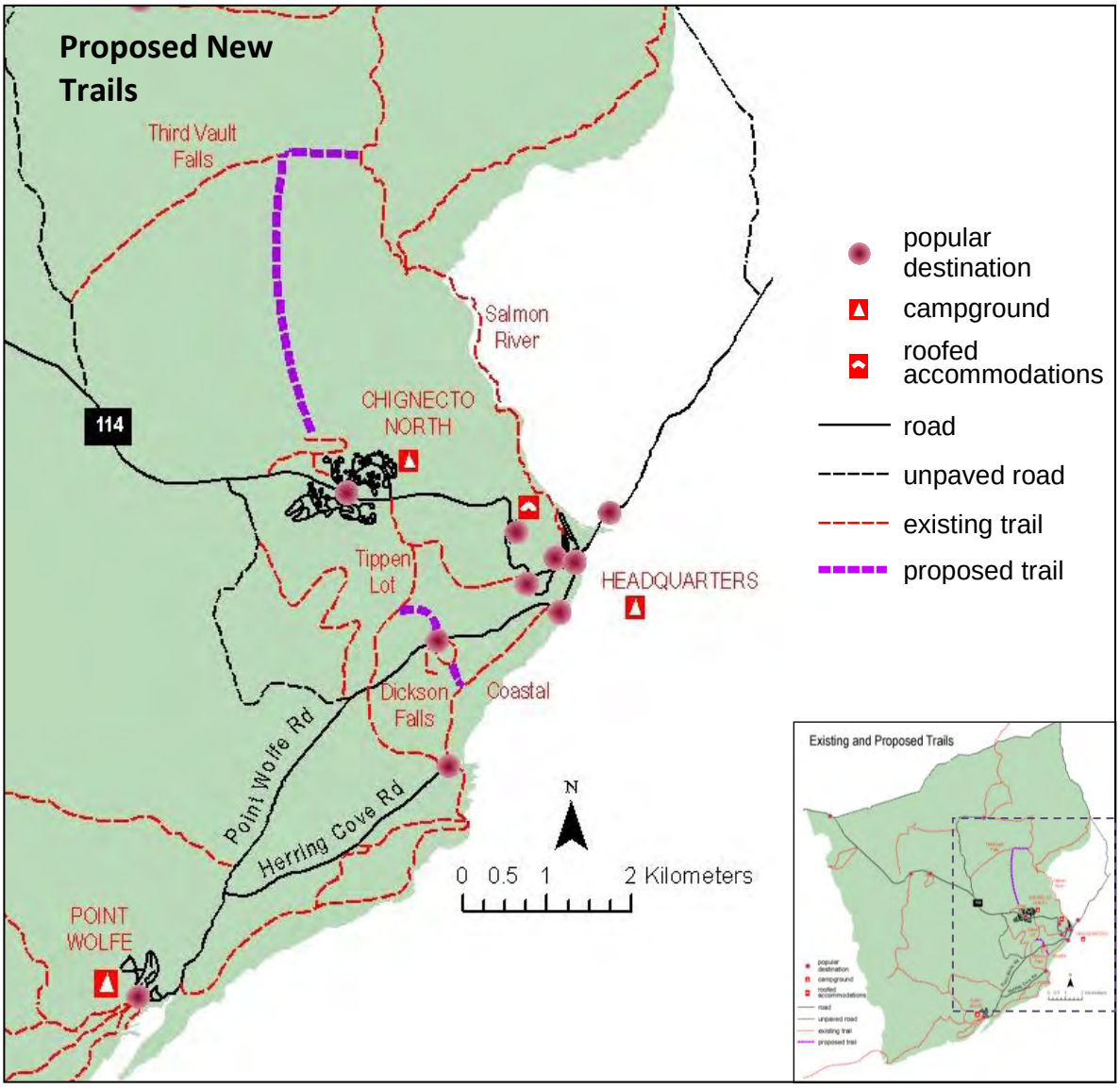


Table 8: Strengths and weaknesses of initiating a bike sharing system

Approach: Diversifying transportation options ***Strategy: Initiating a bike sharing system***	
Strengths	**Weaknesses**
• Publicly accessible bicycles would offer a new mode of transportation.	• Few opportunities for bicycling on roads lie outside the headquarters area. • Most of the trips that are bicyclable are also walkable; while cycling should be encouraged, it may not be the most appropriate mode to prioritize (especially considering the older visitor population). • Bike Sharing generally demands significant infrastructure that can be costly; it warrants a significant ridership. • The strategy has not yet been tried with visitors in a North American national park. • Public bicycles are prone to vandalism and theft; security considerations must be considered. • Few other modes of travel currently exist that might enhance the effectiveness of bike sharing.

What initiating a bike sharing system would mean for Fundy National Park

Bike sharing is a new and popular strategy to reduce personal vehicle travel but it is most suited to cities with an array of other transportation options such as public transit, car sharing, and taxis. In Fundy National Park's case, most people would ride a bicycle at least partly for recreational purposes (rather than simply utilitarian purposes). Recreational use in national parks with few other options for alternative transportation does not suit the model as well. Furthermore, Fundy National Park offers few bicycling opportunities for the average cyclist. The headquarters area is the only exception, but in this area, most trips that can be taken by bicycle can also be taken on foot. Experienced cyclists who come to the park to challenge themselves on the steep topography will likely bring their own bicycles with them and have no need for public bicycles. Rather than setting up an expensive bike sharing system, offering bicycle rentals might be a more appropriate option. Bike sharing is not appropriate for Fundy National Park.

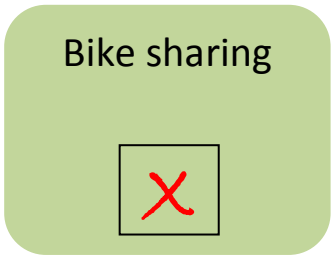


Table 9: Strengths and weaknesses of researching and providing public transportation to diversify transportation options

Approach: Diversifying transportation options ***Strategy: Researching and providing public transportation***	
Strengths	**Weaknesses**
• Many recreational vehicle drivers do not like maneuvering their large RV, particularly for short trips, making public transit an appealing option. • Public transit can provide another opportunity for sharing knowledge of the park with visitors (an objective in the *Engaging Canadians* strategy). • Most popular destinations lie in a linear pattern along one of only three roads, making routing relatively simple. • Both visitors and park planners have shown initial interest in public transit service. • Having one way rides would benefit hikers wanting to hike trails that do not start and end at the same place (for example, the Coastal trail and Maple Grove mountain biking trail). • One way rides would benefit hikers and cyclists wanting to travel one way by non-motorized transport but take advantage of motorized transport the other way (for example, because of steep grades). • Public transit service within park boundaries would encourage the development of outside links to the park (public transit to the park) and ultimately open the park to a wider variety of users.	• Public transit development costs a significant amount of money. • Visitors already complain about the high costs of visiting the park so they may not support additional entrance fees or fares. • Unpaved Laverty Road may not be suitable for a bus, but it is the only way to get to some popular hiking trails such as Laverty Falls and Moosehorn. • 82% of visitors arrive by personal vehicle, making personal vehicle travel an available and convenient choice for travel within the park. A public transit service must be competitive with this. • Personal vehicle travel is deeply associated with the national park experience. • A public transit service within the park would not connect with outside systems at this time.

What providing public transportation would mean for Fundy National Park

On one hand, a public transit service in Fundy National Park could be associated with many benefits. It would support other alternative modes by providing one-way trips, and it could attract recreational vehicle drivers wanting to avoid maneuvering their large vehicle more than necessary. The park's road structure and attractions currently lie in an almost linear pattern, making transit routing relatively simple. Furthermore, public transit would provide one more avenue with which to engage park visitors in learning about and preserving the park's natural features.

On the other hand, a public transit service requires significant investment and warrants adequate demand to support it. The system must be both economically and environmentally sustainable. Economically, few riders could mean lower revenues, which would put the system's economic sustainability at risk. Its environmental sustainability could be called into question if large, emissions-producing buses run along the park's roads carrying only one or two people. Before investing in a public transit service, park planners should estimate ridership and compare it with economic and environmental costs.

Nevertheless, the high proportion of recreational vehicle users, steep grades/possibilities for one-way non-motorized travel and initial visitor and park staff interest suggest a possible high demand for public transportation making further research worthwhile.

Demand

For the purposes of illustrating potential ridership, I use the results from the 2001 survey question that asked how likely a respondent would be to use a public transit service in the park if it were available. We should keep in mind, however, that the results are based on only 36 visitor opinions collected nine years ago.

If the 28% of the 2001 survey respondents were to use the service, about 794 people would ride the bus every day from June to September[18]. This percentage, however, is rather high, considering that cities such as Toronto and Montreal only see a transit modal share of 34-35% (Statistics Canada, 2006b; Statistics Canada, 2006c). Spielberg et al. (1987) suggest that about one third of survey respondents who say they will change their behavior actually make the change when presented the opportunity to do so. If this is the case and 1/3 of the people who said they would ride the bus actually do ride, a public bus in Fundy National park would service about 265 people every day. If each person took two trips on the bus while in the park, then the bus would support 530 rides.

At this point, we know there is at least a small demand for public transit in the park but a more extensive and updated survey would yield more accurate results. A more focused visitor survey could provide more information not only about general willingness to use public transit in the park but also about willingness to pay fares and the importance of frequency. This type of information could be used to design an attractive transit service that would maximize ridership.

Prior to initiating a public transit service, parks and towns usually conduct parking studies (e.g. number of spaces and vehicles, turnover rates) and level of service studies (e.g. traffic speed and volume, average delay). These types of studies are beyond the scope of this project but, along with visitor surveys, the information gathered would help estimate the demand for public transit and estimated ridership.

Costs

With estimates for ridership under different operating scenarios, planners can investigate funding options, capital and operating costs, and different models of owning/operating the system to determine what type of model is financially appropriate for the park. Generally, parks and towns use one of three approaches to owning/operating a transit system: 1) the park agency owns and operates the system; 2) the park agency owns the system but contracts a private operator to operate the service; 3) the park has a contract with a private owner and operator to run the entire system. Most parks and small towns with few resources prefer the third option (NPS, 1999). Fundy National Park may be best suited for the third model. For further discussion on the advantages and disadvantages of each model, park planners can consult the NPS Transportation Planning Guidebook (NPS, 1999) and the Banff, Lake Louise and Canmore Regional Transportation Authority Feasibility Study (Shirocca Consulting and The Van Horne Institute, 2008).

[18] 794 riders was generated using summer visitor numbers from 2006, length of stay (PC, 2007b), and the 28% of people who claimed they would be very likely to use a public transit service

Partnerships

Engaging the public and the Town of Alma early in the planning stages will not only allow Parks Canada to evaluate demand and garner wider public opinion and but to also begin forming partnerships and developing constructive relationships. Many other parks with experience planning a public transit service claim that positive relationships with gateway communities are essential to the success of any transportation plan and that it is best to foster these early.

Partnerships with other organizations will also be key to public transit success in a national park. One of the first organizations to consult is Acadian Bus Lines for several reasons. First, they have expertise in transportation in the region, so they have knowledge to learn from. Second, if Parks Canada were to choose to contract the service to another owner and operator, Acadian Bus Lines may be one operator to approach. Finally, the current absence of alternative options of getting to the park means that the park does not draw visitors who might frequently use alternative modes of transportation. Bus service to the park and within the park would ideally be introduced simultaneously to compliment and support each other.

Parks Canada may also wish to approach other members of the private sector including local restaurants and hotels, as well as larger corporations for financial support in return for advertising.

Design elements

Design elements should enter the discussion early in the planning process because this could drastically influence the budget. Fortunately, many of the key destinations already have parking lots that would likely allow for a bus to enter and turn around. Some parking spaces might need to be converted to rider waiting space but places such as Wolfe Lake, the Visitor information centre, and Herring Cove already have 'loops' that a bus could use to turn around in. Some destinations, however, only have small, unpaved parking lots that may require slight modification to meet the demands of a transit service. Other design elements such as bus stops, shelters and waiting areas that go along with public transit must also be considered.

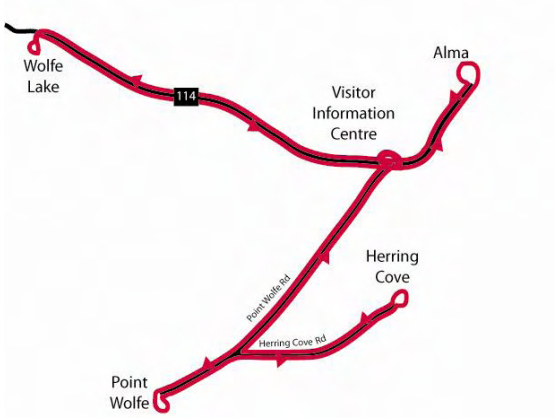
Alternative fuels

One of the primary reasons for considering a public transit service is to provide a more environmentally-friendly option for travel. Many parks use clean fuels to power their vehicles such as biodiesel or electricity. Different fuels come with different advantages and disadvantages so park planners should research the best option for Fundy National Park. Planners can begin this research by turning to Glacier National Park's Alternative Fuels Study (NPS, 2004).

Routing

With three paved roads in the park, planners have a few options for routing, each with its own implications for frequency of service. Providing more buses costs more money but allows for higher frequencies, which may attract more riders. I present two scenarios here with frequencies calculated with the assumption that a bus travels at half the speed of a car when taking stops into account.

Fig. 24: One route scenario for public transit service



Required buses	Frequency
1 bus	1 hr, 48 min
2 buses	58 min
3 buses	41 min
4 buses	33 min
5 buses	28 min

Fig. 25: Two-route scenario for public transit service

Required buses	Frequency
1 bus	1 hr, 4 min
2 buses	36 min
3 buses	27 min

Required buses	Frequency
1 bus	44 minutes
2 buses	22 minutes

Approval

If a public transit service seems feasible after all of this research, park planners can move forward to have their plans and request for spending approved. If they propose changes to entrance fees, Parks Canada must carry out an impact assessment and have it approved through a resolution passed by the House of Commons.

Table 10: Strengths and weaknesses of improving visitor information

Approach: *Promoting a shift in transportation behaviour* ***Strategy: Improving visitor information***	
Strengths	**Weaknesses**
• Visitors often try to find information about their destinations prior to travelling: Fundy visitors tend to use the website and the New Brunswick Tourism Guide. • While in the park, visitors use the Park Map and the Salt and Fir brochure to plan their activities. • Visitors also use the Visitor Information Centre to make decisions about where to go in the park and how to get there.	• Informing visitors about the possibilities for alternative transportation does not make them safer, more enjoyable and more convenient, which is what they must become in order for people to choose them consistently.

What improving visitor information would mean for Fundy National Park

Improving the available information about alternative transportation requires little investment. The park already reaches out to visitors through multiple forms of media and park managers already know which media visitors use most. Adding a section titled "how to get around the park" to any of the common sources of information (e.g. website, Salt and Fir) could help advise visitors about alternative options, however many or few there may be. Providing information about these opportunities will not only allow visitors to come prepared (bring a bicycle and helmet, for example) but it might also attract new visitors. Not all visitors would necessarily think to bring a helmet if they are coming from a province or state that does not require the use of bicycle helmets.

First-time visitors may not know how close the swimming pool is to the Headquarters campground so they may hop in the car the first time they make the trip. If they know more about the conditions of the roads and trails, they can choose their routes appropriately (e.g. intermediate cyclists may enjoy Point Wolfe Road, and beginner cyclists would appreciate the short distances around the headquarters area). Park planners can use the transportation inventory I have generated to include this type of information on either the existing park map or a new "How to get around the park" map.

Further, many people come to the park to enjoy the natural environment in an "up close and personal" way. By promoting this simple message, visitors may be more willing to get out of their cars and walk or bicycle because it will enhance their experience in the park.

7.0
Summary of possibilities and actions for Fundy National Park

Short-term (one year)

Improve visitor information

Table 11: Suggested actions to improve visitor information

ACTION	OUTCOME
Add a page to *Salt and Fir* about non-motorized forms of transportation. The information should do the following: • Describe things to know about walking and cycling in the park. (e.g. estimated walking times to destinations around the park headquarters; bicycle helmet law) • Remind visitors that non-motorized modes of travel can be the source of a more "up close and personal" park experience" • Explain environmental benefits of non-motorized travel and their link to Parks Canada's mandate • Point out interesting roadside ecology	Inform visitors of feasibility and benefits of trips by foot or bicycle
Include cycling information on existing Park Map to indicate infrastructure and services along with travel conditions (e.g. location of steep hills, shoulders, beginner/ intermediate touring routes)	Lower risk for cyclists to enable them a safer, more enjoyable and more convenient walk or ride
Include information about cycling conditions in the park on the Fundy National Park official website and in the New Brunswick travel brochure	Provide visitors with information they require to come prepared to participate in non-motorized activities Attract cyclists to the park
Update the information in all media as necessary	Provide visitors with up-to-date information

Medium-term (two-five years)

Develop pedestrian and bicyclist infrastructure in headquarters area

Table 12: Suggested actions to develop infrastructure in headquarters area

ACTION	OUTCOME
Enhance pedestrian and bicyclist infrastructure in headquarters area: • Extension of sidewalk next to Highway 114 • Crosswalk across Highway 114 to Golf Road • Walking and bicycling path to make a stronger connection between Golf Road and the pool • Bicycle storage facilities at the end of Golf Road and the pool	Create safer, more enjoyable and more convenient pedestrian and cyclist connections between popular destinations

Develop pedestrian and bicycle infrastructure outside of headquarters area

Table 13: Suggested actions to develop infrastructure outside of the headquarters area

ACTION	OUTCOME
Better connect hiking trails between campgrounds and attractions: • Connect Chignecto North Campground with Third Vault Falls trail • Connect Third Vault Falls with Upper Salmon River trail • Connect Tippen Lot with Dickson Falls • Connect Dickson Falls with the Coastal trail	Better on-foot connections between activity areas to encourage hiking directly from a campground or attraction rather than driving
Install bicycle storage facilities at popular destinations along Point Wolfe and Herring Cove Roads.	Infrastructure to support Point Wolfe and Herring Cove Roads as bicycle touring routes

Further explore public transit

Table 14: Suggested actions to further explore public transit

Estimate demand

ACTION	OUTCOME
Carry out visitor surveys	Estimate potential public transit ridership Generate strategies to increase ridership
Perform parking studies (#spaces and vehicles parked in that area at a specific time, turnover rates)	Estimate demand for alternative transportation
Execute level of service studies (traffic speed and volume, average delay, etc.)	Estimate demand for alternative transportation

Investigate finances

ACTION	OUTCOME
Look into funding opportunities	Estimate incoming funds
Research capital and operating costs	Estimate outgoing costs
Explore various owning/operating models	Determine which model is best suited to Fundy National Park

Foster partnerships

ACTION	OUTCOME
Engage the Town of Alma	Evaluate demand Garner public opinion about such a service
Consult bus operators in region	Learn from expertise Encourage initiation of bus service Fundy National Park
Approach private sector	Gain financial support in return for advertizing

Consider design requirements

ACTION	OUTCOME
Explore physical capabilities of current parking lots and suitability to transit needs	Inform costs and physical plans
Consider storage options	Inform costs and physical plans

Explore options for alternative fuels

ACTION	OUTCOME
Research alternative fuels	Learn how to minimize environmental effects of a public transit system

Determine appropriate routing, stops, and frequencies

ACTION	OUTCOME
Consider options for frequencies and bus stop locations	Inform costs and design requirements

To revisit in the long-term (10 years)

Strategies to discourage personal vehicle use are not appropriate at this time because of the lack of alternatives. As the park develops more viable alternatives, vehicle restrictions (on Herring Cove and Point Wolfe Roads), and “per-use” fees (vehicle entrance fees, parking fees) could be used to further induce a shift. Park planners can revisit these strategies in later years.

8.0
Final notes

As the guardian of the country's national parks, Parks Canada sits in a difficult but unique position. Its two goals of preserving the natural environment and encouraging public enjoyment of its parks are honourable but not always complementary given the impacts of human behaviour on natural systems in twenty-first century Canada. Finding a balance between the two has been a constant challenge and source of debate since the inception of the national parks system. I argue that targeting transportation patterns and behaviour can help the agency harmonize the two goals.

On the environmental side of the dilemma, Parks Canada takes prime responsibility for preserving these special places but acknowledges that the public must play an equally important role as environmental stewards. Our general rising concern for the natural environment in recent times, coupled with the natural setting of a national park, lend themselves well to fostering environmental stewardship among visitors. Every small trip a visitor takes is an opportunity to play a part in the overarching goal. By providing alternative, more sustainable options for travel, Parks Canada would better enable the public to actively support environmental conservation.

On the public access side of the dilemma, offering a diverse set of safe, enjoyable and convenient ways of getting around the park will enhance visitor experience and perhaps open the park to a new set of users. More sustainable modes such as walking and bicycling constitute "up close and personal" ways of experiencing the park, and public transportation might offer a relief from long distance driving or maneuvering large recreational vehicles. Furthermore, with fewer visitors driving and parking their vehicles, the park could better avoid congestion and parking problems that detract from positive visitor experience.

By encouraging visitors to consider and adjust how they move around in a national park, Parks Canada stands a better chance at keeping its natural systems intact and attractive for future generations while giving today's visitors a better park experience. Finally, because national parks hold such a special place in the minds of many visitors, they set the stage to inspire sustainable practices both within park boundaries and beyond, to preserve not only national parks but also the rest of the country's systems for all time.

9.0
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All photographs were taken by Lauralee Sim unless otherwise noted.

Appendix 1
Identifying opportunities and constraints for shifting travel behaviour in a national park

Several factors typically influence travel decisions in national parks. Presented below are Litman et al.'s (2009) factors that affect demand for non-motorized transportation as well as factors specific to the national park context. The table describes common opportunities and constraints for shifting personal vehicle travel behaviour that stem from these factors. This guide to identifying opportunities and constraints could be applied to any national park.

- Current costs of using the park
- Visitor characteristics
- Current modes of travel to the park
- Transportation services
- Trip distances and grades
- Travel conditions
- Climate
- Visitor attitudes
- Communications material

Influencing factor	Opportunities exist where…	Constraints exist where…
Costs of using the park	•Entrance fees exist (indicates that users are already tolerant of per-use fees) •Entrance fees do not exist (a new transportation fee might be more effective if it is the only fee users have to pay) •Infrastructure for collecting parking fees exists	•Entrance fees do not exist (users may not already be tolerant of per-use fees) •Entrance fees exist (a new transportation fee is less effective when it is not the only fee users have to pay) •No infrastructure for collecting parking fees exists
Visitor characteristics (gathered from visitor surveys)	•Visitors are younger (<65) (non-motorized transportation) •The park sees high visitation rates	•Visitors are older (>65) (non-motorized transportation) •The park sees low visitation rates
Current modes of travel to park (gathered from visitor surveys)	•Visitors arrive by bus or other alternative transportation •Visitors arrive by RV	•Visitors arrive by personal vehicle
Transportation services (gathered from site examination)	•Services support pedestrians and cyclists (bicycle repairs, bicycle rentals, guided walks) •Public transportation to the park is available	•Few services support pedestrians and cyclists •No public transportation to the park available
Trip distance and grades (gathered from site examination)	•Popular destinations lie close together (<5km) •Popular destinations are not separated by steep grades (<10%)	•Popular destinations lie far apart (>5km) •Popular destinations are separated by steep grades (>10%)
Travel conditions (gathered from site examination)	•Pedestrian and cyclist infrastructure is safe, enjoyable and convenient •Trails are well-connected to each other and other park attractions •Paved roads connect attractions (easy for buses to travel on)	•Pedestrian and cyclist infrastructure is not safe, enjoyable and convenient •Trails are not well-connected to each other and other park attractions •Unpaved roads connect attractions (difficult for buses to travel on)

Climate (gathered from Environment Canada)	•The region is warm and sees little rain	•The region is cold and sees plenty of rain
Visitor attitudes and motivations for visiting the park (gathered from visitor surveys)	•Visitors are willing to use public transportation in the park (possibly indicated by surveys) •Public transit services the park •Visitors' main reasons for visiting include spending time in the natural environment or taking advantage of outdoor recreational opportunities	•Visitors are unwilling to ride public transportation in the park (possibly indicated by surveys) •Public transit does not service the park
Communications material (gathered from general park information)	•Visitors consistently use the same media for park information	•Visitors do not consistently use the same media for park information

Appendix 2

Predicted modes of travel for common trips in Fundy National Park based on trip distance

Expected modes of travel based on Litman et. al., 2009

0-2km	foot, bicycle or motorized vehicle
2-5km	bicycle or motorized vehicle
>5km	motorized vehicle

Origin/Destination	Point Wolfe (parking lot)	Herring Cove	Dickson Falls	Swimming pool	Alma (park entrance)	Visitor Infor-mation Centre	Head-quarters Camp-ground	Golf/ tennis/ playgroun d	Roofed accom-modations	Chignecto North Camp-ground	Laverty Falls (parking lot)	Caribou Plain	Bennet Lake	Wolfe Lake
Point Wolfe (parking lot)	0	5	6	7.4	8.8	8	8.2	8.8	9.5	11.7	22	18.7	20.5	27.1
Herring Cove	5	0	7.2	8.6	10	9.2	9.4	10	10.7	12.9	23.3	19.9	21.7	28.3
Dickson Falls	6	7.2	0	1.4	2.8	2	2.2	2.8	3.5	5.7	16	12.7	14.5	21.1
Swimming pool	7.4	8.6	1.4	0	1.6	0.8	1	1.6	2.3	4.5	14.8	10.5	13.3	19.9
Alma (park entrance)	8.8	10	2.8	1.6	0	0.8	1	1.4	2.3	4.5	14.6	11.3	13.1	19.7
Visitor Information Centre	8	9.2	2	0.8	0.8	0	0.2	0.8	1.5	3.7	14	10.7	12.5	19.1
Headquarters Campground	8.2	9.4	2.2	1	1	0.2	0	0.6	1.3	3.5	13.8	10.5	12.3	18.9
Golf/tennis/playgroun d	8.8	10	2.8	1.6	1.4	0.8	0.6	0	1.7	3.9	14.2	10.9	12.7	19.3
Roofed accommodations	9.5	10.7	3.5	2.3	2.3	1.5	1.3	1.7	0	2.2	12.5	9.2	11	17.6
Chignecto North campground	11.7	12.9	5.7	4.5	4.5	3.7	3.5	3.9	2.2	0	10.3	7	8.8	15.4
Laverty Falls (parking lot)	22	23.2	16	14.8	14.6	14	13.8	14.2	12.5	10.3	0	9.5	11.3	17.9
Caribou Plain	18.7	19.9	12.7	10.5	11.3	10.7	10.5	10.9	9.2	7	9.5	0	1.8	8.4
Bennett Lake	20.5	21.7	14.5	13.3	13.1	12.5	12.3	12.7	11	8.8	11.3	1.8	0	6.6
Wolfe Lake	27.1	28.3	21.1	19.9	19.7	19.1	18.9	19.3	17.6	15.4	17.9	8.4	6.6	0

Map 1
Fundy National Park

Dobson
Haley Brook
Dobson Link
BROAD River
FORTY-FIVE River
Forty-Five Rd
Laverty Falls
Laverty Brook
Moosehorn
Shepody Rd
Bruin Lake
Wolfe Lake
Tracey Lake
Tracey Lake
Laverty Lake
The Forks
Laverty Rd
Upper Vault Brook
Black Hole
East Branch
Bennett Lake
Third Vault Falls
Upper Salmon River
UPPER SALMON River
Caribou Plain
114
Kinnie Brook
Kinnie Brook
CHIGNECTO NORTH
Alma
Bennett Brook
Bennett Brook
CHIGNECTO SOUTH
Tippen Lot
Whitetail
Hastings Rd
Rat Tail Brook
Maple Grove
Headquarters Area
POINT WOLFE River
Foster Brook
Dickson Falls
Coastal
Herring Cove
Point Wolfe Rd
Hueston Brook
Marven Lake
Chambers Lake
Marven Lake
Foster Brook
Herring Cove Rd
Matthews Head
Mile Brook
GOOSE River
Point Wolfe
Coastal
Goose River
Coppermine
Bay of Fundy
Fundy Footpath

0 0.5 1 2 Kilometers

campground
backcountry camping
roofed accomodations
visitor information centre
picnic area
viewpoint
swimming
tennis
golf
playground
outdoor theatre
boating
hiking trail
mountain bike trail
road
unpaved road

Point Wolfe

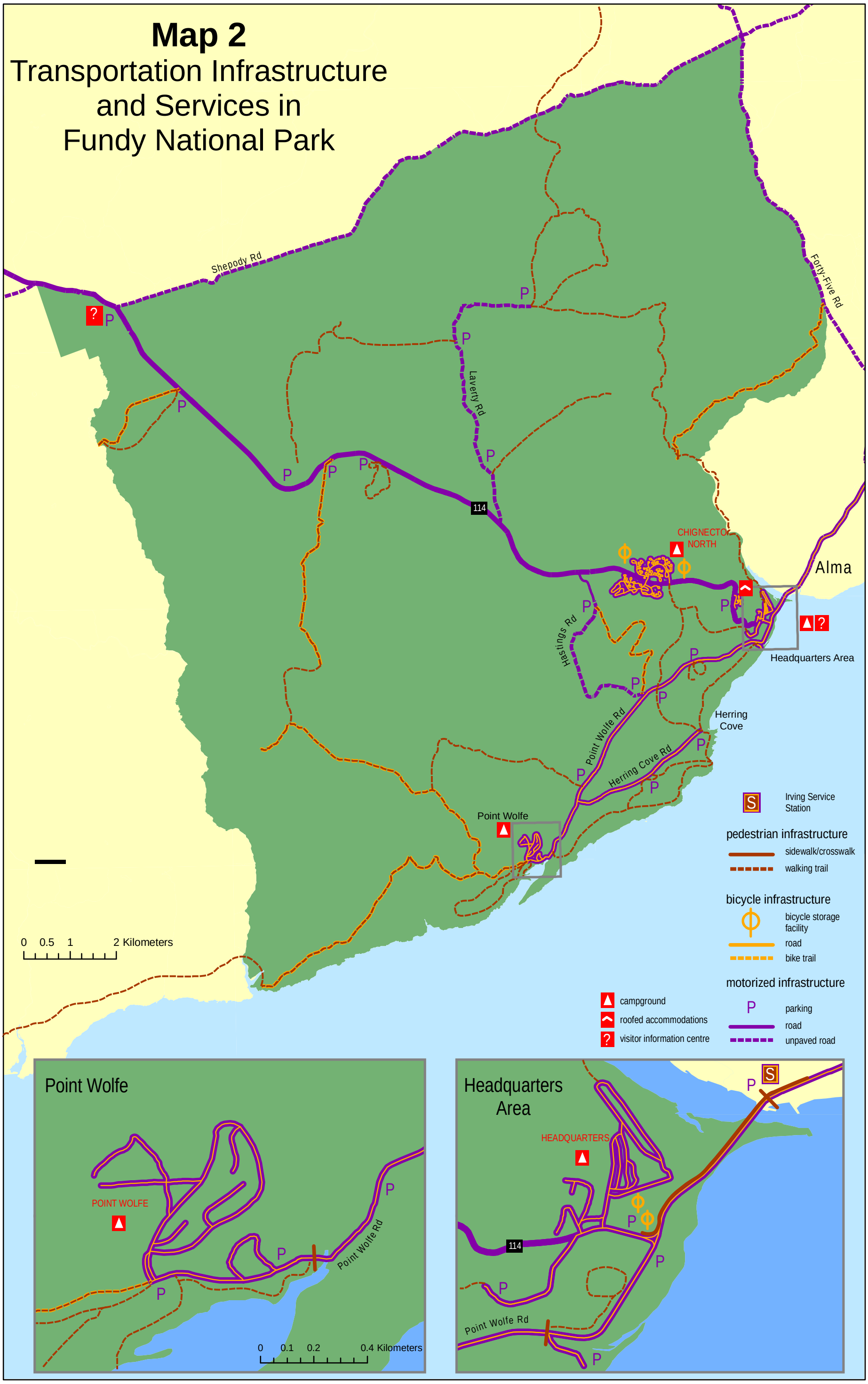
POINT WOLFE
Point Wolfe Rd
0 0.1 0.2 0.4 Kilometers

Headquarters Area

HEADQUARTERS
114
Point Wolfe Rd
0 0.1 0.2 0.4 Kilometers

Service New Brunswick, 1998
Parks Canada, 2009d

Map 2
Transportation Infrastructure and Services in Fundy National Park



Service New Brunswick, 1998
Parks Canada, 2009d