

A Critical Economic Evaluation of the Banff

National Park Management Plan

by

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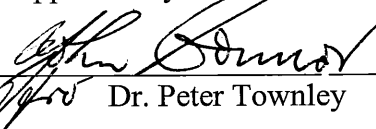
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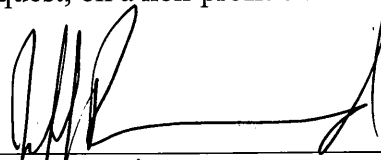
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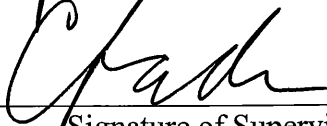
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<u>Table of Contents</u>	<u>Page</u>
List of Tables	ii
List of Figures	iii
Abstract	iv
1. Introduction	1
2. History of Banff National Park Management Policy	4
3. Current Management Policy of Banff National Park	8
4. Sustainable Development and Conservation	17
5. Economic Evaluation of Tourism in Banff National Park	24
6. Examination of Results and Conclusion	42
Bibliography	47

<u>List of Tables</u>	<u>Page</u>
Table 1 – Summary of Data used in Estimating Demand Equation	35
Table 2 – Predicted Number of Visits to Banff National Park	40

List of Figures

Page

Figure 1 – Estimated Demand Curve

35

Abstract

In 1996 the Banff-Bow Valley Commission issued a comprehensive survey of the ecological state of Banff National Park. This study, entitled *Banff-Bow Valley: At the Crossroads*, formed the foundation for the Banff National Park Management Plan. This plan outlines numerous measures that are intended to preserve the ecological integrity of the park's eco-system. However, the plan did not include any discussion of many important economic issues. An additional economic review of this management plan is essential in order to assess the level of benefits society receives from the preservation of the park, compared with the costs.

In order to study the economic aspects of the management plan a review of past and current management policies is presented. This is followed by an establishment of the definitions of sustainable development and conservation, two concepts that are central to the study. The benefits of the plan are evaluated through the use of the travel cost method, which measures the benefit that visitors gain from use of the park resources in monetary terms. This benefit is compared with the costs to society of using these resources.

This study found that the current management plan in place for Banff National Park unnecessarily restricts visits to the park, and that society would experience efficiency gains through an increase in the number of visits that are permitted.

Introduction

In 1885, 26 square kilometres of land surrounding the Banff Hot Springs was set aside to be protected from development [Bella, 1987]. When this natural area was created, the number of visitors it receives could not have been imagined and today it encompasses an area far greater than that originally reserved. This mountain park grew to become the foundation of the Canadian National Park system and is still one of the most widely recognized parks in Canada. The ideas and principles under which the first National Parks Act has guided its development over the last 100 years are still relevant, although the perspective of society has changed and evolved. Behaviour that was once allowed within the boundaries of the park would today be considered entirely unacceptable. But is the level of activity within the park today acceptable by current standards of society? Should activity be limited or is there room for possible expansion of economic activity?

In order to answer these questions, the Banff National Park Management Plan (BNPMP) was developed [BNPMP, 1996]. The plan is a comprehensive evaluation of the ecological condition of the park, and contains proposals to guide the development of the park. The ecology of the plan is not disputed here. Much study has been conducted examining the impact of humans on the ecological stability of the park. There is no question that humans have an influence on the park, and that human activities affect the

future ability of the park to remain in a preserved state. One of the most important studies done towards determining the fate of the park was the 1996 Banff-Bow Valley Study. This study looked extensively at the impact of humans on the biological condition of the park and what the best course of action from a biological perspective is.

One area where this study is deficient, however, is in the analysis of economic considerations. While it is extensive in identifying biological elements which are in trouble, the economic issues are not clearly addressed. The study and the subsequent management plan imposed both assume that society places a value on the park that supercedes any benefit they may gain from consuming the resources that lie within. This approach may or may not lead to an efficient allocation of park resources. However, what if society values the park less than is assumed in the management plan? This leads to an inefficient result, as society would gain by expanding visitation. Or perhaps the value of the park is greater than the one assumed in the study. This too leads to an inefficient result, and the number of visits should be restricted even further than it is. What is the appropriate level of use of this resource, and does the current management plan of Banff National Park lead to an economically efficient outcome?

In order to determine what the sustainable, efficient, level of resource use is, a summary of the historical and current approaches to park management is required. This will provide a framework within which it is possible to develop an answer as to whether or not this plan is economically efficient. As well, it must be clear what is meant when the terms *sustainable development* and *conservation* are used. These are terms that are

not easily articulated and a clear definition of them is required. After establishing definitions for the terms under consideration, an estimation of the efficiency of park management is possible. To do this, benefits and costs to society must be estimated and compared. Only when these are equal can it be said that there is an efficient allocation of the resource. Finally, there must be an evaluation of this estimate in relation to the current management plan, and then comparisons with the management outcomes prescribed by the plan can be made.

History of Banff National Park Management Policy

Banff National Park, established in 1885 following the discovery of natural mineral hot springs on Sulphur Mountain, was Canada's first national park. Originally encompassing 26 square kilometres surrounding the springs, today it encompasses 6,641 square kilometres [Parks Canada Official Visitors Guide, Summer, 1998]. Banff, Jasper, Yoho and Kootenay National Parks, along with three provincial parks in British Columbia, comprise the Mountain Parks United Nations Educational Scientific and Cultural Organisation (UNESCO) World Heritage Site. Today, the park remains Canada's most well known and most highly visited national park.

In the last 45 years, the park has seen phenomenal growth in both population and tourism. In 1950 less than 2,400 people lived in the town of Banff, and paid no more than \$18 to lease a typical residential lot and a mere 459,000 visitors traveled to the park annually [Banff-Bow Valley Study. Summary report, 1996]. Today the town of Banff is home to 7,600 permanent residents, while the Hamlet of Lake Louise is home to 1,500 [BNPMP, 1997]. As well, the park sees 4.7million visitors per year (12,876 per day), [Parks Canada Official Guide, summer, 1998], more visitors per day than the permanent population of the park itself! Since the inception of the national parks system in 1885 there has been continuing debate over what the appropriate level of resource use should be.

The first National Parks Act was introduced in 1911 and since then the appropriate use of the park has been characterized by the principle that "There will be no business there except such as is absolutely necessary for the recreation of the people."¹ However, this objective represents values established in a different time. Sustainability was not likely to be the first concern of legislators at that time, as they could not have predicted the growth in tourism to the park. In her work, *Parks For Profit* Leslie Bella [1987] points out that while the preservation of natural areas may have been the stated goal of the government, in practice the level of activity in the parks was not compatible with this goal.

Indeed, as Bella illustrates, mineral extraction was permitted in any national park - including coal mining - such mining occurred within the boundaries of Banff National Park until after the Second World War [Bella, 1987]. In fact the early history of the park shows that mining was more important to the park economically than tourism. Mining prospered in Banff National Park well into the Twentieth century, despite the efforts of some to prevent it [Bella, 1987]. The town of Anthracite, run by the Canadian Anthracite Company, had a maximum population of 1,500 residents, mostly miners, until 1897 when the mine flooded [Bella, 1987]. However, mining continued at this location until the 1950s, as new coal was uncovered. It was not until natural gas came to Banff, destroying the market for local coal, that mining ceased [Bella, 1987].

Despite the stated intentions of the government when creating the parks, many of the policies were either not enforced or simply ignored. The forests of national parks

¹ Banff-Bow Valley Study. 1996. *Banff-Bow Valley: At the Crossroads. A Summary Report* (16).

have not always been as sacrosanct as implied by the legislation. Parkland timber leases were granted since the inception of the national park system. These berths were granted to companies, operating particularly in the mountain parks, in return for a license fee as well as royalties to be paid when the timber was actually harvested. The development of the railways and coal mines fueled a growing demand for this lumber. As awareness of the issue of preservation increased in the 1930's there was a movement to conserve forested land [Bella, 1987].

The export of natural resources has long since been dethroned as the primary source of income in national parks today. Tourism is the only industry that is thriving in today's park system. Yet in a fashion, this too is an exploitation of the resources of the park. No longer are the resources exported; instead the users are imported. Trees are not felled for logging, but are sold to tourists to view for as long as they wish to stay in the park. The tourist, over time, has become the absolute ruler of the park. In the early days of the park system, tourism was restricted (unofficially) to "...wealthy visitors"² and "The working people were discouraged from visiting the tourist town..."³ Since that time, as the importance of natural resources began to diminish, tourism has played an increasingly important role. The number of visitors to the park in 1950 was small compared with use today. Tourists are still exploiting the resources of the park, but no longer are the resources removed for human consumption.

² Leslie Bella. 1987. Parks for Profit (26).

³ Leslie Bella. 1987. Parks for Profit (26).

Today the park, with its extensive facilities and tourist amenities does not resemble an area which is "...dedicated to the people of Canada...and made use of so as to leave them unimpaired for the enjoyment of future generations" [National Parks Act, 1988]. The future of the park ecologically and economically will depend greatly upon the implementation and enforcement of policies adopted in the Banff National Park Management Plan (BNPMP).

Current Management Policy of Banff National Park

In April of 1997, in accordance with the National Parks Act, the BNPMP was released. Drawing heavily upon results from the Banff – Bow Valley Study, commissioned in 1994 and completed in 1996, the plan aims to guide management of the park for the next 15 years.

Currently, all national parks must operate under the guidelines outlined in the National Parks Act (NPA). The underlying theme set forth by this act is that "The National Parks of Canada are hereby dedicated to the people of Canada for their benefit, education and enjoyment, subject to this Act and the regulations, and the National Parks shall be maintained and made use of so as to leave them unimpaired for the enjoyment of future generations."⁴ This statement is supported throughout following sections of the legislation. Section 5, Park Administration, states "Maintenance of ecological integrity through the protection of natural resources shall be the first priority when considering park zoning and visitor use in a management plan."⁵

The management plan for Banff National Park attempts to embrace the sentiment put forward by the NPA. The plan recognizes Banff National Park as "...an important cornerstone of Canadian identity..."⁶ and that in order "...to pass the legacy of Banff

⁴ Government of Canada. 1998. National Parks Act (4).

⁵ Government of Canada. 1998. National Parks Act (4).

⁶ Parks Canada. 1997. *Banff National Park Management Plan* (9).

National Park on to future generations, there must be limits to development"⁷ and that "there is a need to reduce stress on park ecosystems and to restore natural processes."⁸

The system adopted by Parks Canada to fulfill the mandate put forth by the NPA is known as eco-system based management. As described in the BNPMP this is an incorporation of ecological, economic and social concerns when determining policy for the park, while maintaining an awareness that the ecosystem is constantly changing. This approach takes into consideration the human impact on the environment, acknowledging that "Humans are an integral part of the ecosystem."⁹

However, the management plan does not propose that the protection of the ecosystem was the sole consideration in its development. Tourism, the reason for which the park was originally formed, also plays an important role. In 1887 Canadian Pacific, realising the potential for tourism of the Banff hot springs, built the Banff Springs Hotel [Banff-Bow Valley Study. 1996]. The involvement of Canadian Pacific was instrumental in the development of the park, as it was the railway that "... opened the way for tourism and tourism opened the way for the national park, before it would have been established for conservation reasons."¹⁰ Today it is the overwhelming number of tourists that threatens the very existence of the park.

⁷ Parks Canada. 1997. *Banff National Park Management Plan* (9).

⁸ Parks Canada. 1997. *Banff National Park Management Plan* (9).

⁹ Parks Canada. 1997. *Banff National Park Management Plan* (12).

¹⁰ Parks Canada. 1997. *Banff National Park Management Plan* (16).

"Maintaining ecological integrity is important not only for the natural systems it protects but also as the foundation of the park's appeal as a tourist destination."¹¹ That is to say, it is important to protect the area for its own sake, and in addition it is important for the sake of the visitors to the park. This will implicitly support the tourism industry, which is vital to the residents of the park. This desire to facilitate both the protection of the environment and the demands of the tourism industry creates often conflicting goals. It is the underlying goal of the management plan to determine ways in which both tourism and the environment can thrive in Banff National Park. However, economic implications of these dual goals have not been fully considered.

The protection of historical and cultural areas of interest is an objective of the Banff management plan. Seven National Historic Sites are identified in the plan, as well as archeological sites, heritage buildings, structures and objects and landscapes and features of cultural significance. As described in the plan "All these cultural resources are part of an irreplaceable heritage."¹² The management plan indicates that these resources are important and subsequently states the following goal: "To identify, protect and interpret heritage sites, including the park's built heritage."¹³ The existence of these areas, and their identification as important aspects of the park means that the impact economic decisions have on them must be considered. For instance, increasing the number of visitors may reduce the quality of these resources, as well as negatively impact the general ecosystem.

¹¹ Parks Canada. 1997. *Banff National Park Management Plan* (12).

¹² Parks Canada. 1997. *Banff National Park Management Plan* (27).

The existence value of historic and cultural sites is going to be affected by the human use of the park environment. The number of visitors who enter the park is enormous. Whether people are enjoying an extensive visit, or merely passing through en route to other destinations, they will leave evidence of their journey. In 1950 there were less than half a million visitors, while today almost five million people visit every year [Banff-Bow Valley Study.1996]. This tenfold increase in human use in a 50-year period is bound to have had drastic consequences. Environmental bruises can be caused by car exhaust, litter and numerous other human uses and abuses. The impact of these visitors is not strictly felt by the environment. Individual park visitors derive utility from using the park facilities and resources. At the same time, over-use or abuse of the recreational facility by many will reduce individual utility. Potential consequences of the level of park use will be direct and indirect and will be felt both immediately and in the future. When considering the impact of humans in the park, not only must the economic and environmental impact they have today be considered, but also the implications these actions may have in the future.

Visitors to the park must somehow travel to and within the park. The roads and railways within the park are used for more than just travelling to and from a destination. In some instances the roads and railways are the destination, such as the Icefields Parkway. The existence of the Trans-Canada Highway and the Canadian Pacific Railway main line provide complex transportation questions. It is estimated that more than half of the vehicles which enter the park pass through it without even stopping [Banff-Bow Valley Study. 1996]. One consequence of vehicles travelling along the Trans-Canada

¹³ Parks Canada. 1997. *Banff National Park Management Plan* (27).

Highway is wildlife mortality. Fences along the highway can help reduce the incidents of collisions between vehicles and wildlife, but create other problems with regard to wildlife movement and migration. These problems are a direct result of the huge volume of vehicles motoring through the park. Vehicle traffic has increased at a rate between five and eight percent per annum. This rate of increase is expected to be maintained for a number of years [Banff-Bow Valley Study. 1996]. To balance the economic and ecological aspects of vehicle traffic through the park is not an uncomplicated duty, yet it is imperative that this important question be addressed.

The Town of Banff and the Hamlet of Lake Louise are the two economic centers of the park. The role they play in the development of the park is a vital one today and will continue to be essential in the future. However, the continued development of these towns will have important environmental implications. The needs of the people working and living within the park must be recognized but at the same time some balance must be struck between the level of development that can be pursued and ecological impacts. The town of Banff has long catered to tourists. Visitors arrived via train when the village was in its early development stages and they enjoyed the food, lodging and hospitality services that the town offered. When road construction allowed automobile access, campgrounds and motels were added to the town's tourist industry capital stock [Banff-Bow Valley Study. 1996]. An estimated 80% of all visitors to the park make use of the facilities within the community during their visit. Recent announcements by the Heritage Minister, the Honourable Sheila Copps outlined restrictions to the growth of the town of Banff. Part of these restrictions includes limitations on the number of new developments

and the removal of a number of current developments in order to provide space for a new environmental education center [Edmonton Journal, 1998]. In June 1998, amendments to the Banff National Park Management Plan capped the limit of commercial development at 350,000sq. ft. beyond the current level of development [BNPMP, 1997]. This is a reduction from the previous level of allowable development, which was set at 650,000sq. ft. This step has been taken in order to further the stated goal of environmental protection but is clearly at the cost of economic development.

The Hamlet of Lake Louise faces fewer questions. It receives fewer visitors than the Town of Banff and, since 1979, has had a plan in place that seeks to restrict the number of visitors staying in commercial accommodation and so limit their impact upon the park. In conjunction with Parks Canada the Lake Louise Advisory Board is developing the Lake Louise Development and Use Framework which will outline the future role of Lake Louise as a tourist center and direct the development of the park in general. A stated objective of the Banff National Park Management Plan is that "decisions on growth, development and activities will reflect the integrity of the park and the protection of important cultural resources;"¹⁴ How the Lake Louise Development and Use Framework is developed will be guided by this statement, with the implication that the environment will be considered first and foremost, and economic benefits second. Unlike the Town of Banff, "Lake Louise will not become an independent, self-governing community,"¹⁵ which means that it is under the control of Parks Canada and that all decisions regarding its development must be approved as such. Lake Louise, while not

¹⁴ Parks Canada. 1997. *Banff National Park Management Plan* (60).

¹⁵ Parks Canada. 1997. *Banff National Park Management Plan* (61).

confronted with easy decisions, faces a less difficult future with regard to its development.

The Banff National Park Management Plan asserts that the future of the park lies in the hands of all Canadians. A system of open management where input from citizens is welcomed is to be implemented. A component of this open management technique is an annual Round Table discussion, where all are welcome to participate. The goal of the plan is "To ensure that key policy, land-use and planning decisions are made in a timely and fair manner, are consistent in their approach, and are arrived at in an open and participatory manner."¹⁶ This goal seems consistent with the objective of the National Parks Act as described above, yet it is difficult to predict how effective this method will be. Not all Canadians are equipped with the training and knowledge necessary to contribute to the well being of the park. On the other hand, those with an interest in the park are likely to be better informed about the concerns and issues facing it. This may bias any result achieved, as those who take the time to participate are likely to value the park more than others. Time will tell if the open management of the park is effective.

Given that the number of visitors to the park approaches five million every year, a great deal of activity is taking place within park boundaries. Human activity invariably has an impact on the environment as well as on the utility visitors to, and residents of, the park derive from it. The Banff National Park Management Plan recognizes that Parks Canada is bound to comply with Environment Canada's Greening of Government Operations policy [1995]. This commits Parks Canada to policy actions which "meet or

exceed environmental statutes and regulations; emulate the best practices from the public and private sectors; and develop and implement environmental management systems."¹⁷ To this end the management plan outlines goals which comply with these requirements. These goals focus on becoming a model for others through "...exemplary awareness and practice of environmental stewardship"¹⁸ and "...leadership in demonstrating sound environmental practices."¹⁹ As well, the enforcement of existing regulations, and the assurance that all activities within the park conform to "...principles of environmental stewardship and sustainability"²⁰ are central to the management of the park. To determine which activities and proposals are allowable under these conditions Parks Canada relies on the Environmental Assessment Process for Policy and Program Proposals and the Canadian Environmental Assessment Act. Activities that do not qualify for consideration under these regulations, but may have an impact on the park, must still receive an environmental assessment from Parks Canada before being permitted to proceed. The aim of these policies is to guarantee adequate environmental stewardship and minimise human impact upon the park.

The management of the park must consider zoning of land based upon factors such as the vulnerability of the ecosystem and natural boundaries. There are five levels of protection that can be applied to an area and three environmentally sensitive sights have been identified. The different levels of protection range from Zone 1, reserved for areas

¹⁶ Parks Canada. 1997. *Banff National Park Management Plan* (65).

¹⁷ Parks Canada. 1997. *Banff National Park Management Plan* (72).

¹⁸ Parks Canada. 1997. *Banff National Park Management Plan* (72).

¹⁹ Parks Canada. 1997. *Banff National Park Management Plan* (72).

²⁰ Parks Canada. 1997. *Banff National Park Management Plan* (72).

requiring special protection due to "...unique, threatened or endangered..."²¹ features, to Zone 5, which includes the Town of Banff and the Hamlet of Lake Louise. Zone 5 consists of less than one percent of the park's area. The three environmentally sensitive areas of the park will receive special attention and human activity will be strictly limited in these areas. Using this zoning system enables Parks Canada to determine what level of activity is feasible in an area in order to preserve its state.

The current management plan for Banff National Park is a comprehensive review of many aspects that impact upon the ecological integrity of the park. However, the economic considerations of these policies are often not considered. The possible value of many uses of the park must be investigated. Do the social benefits of protecting the park outweigh the costs associated with foregoing the income that could possibly be generated by certain activities? The expansion of activities within many areas of the park, particularly the Town of Banff would generate revenue for those who rely on the tourist industry within the park for their livelihood. It is important that the implication this management plan has for possible economic growth and development of Banff National Park be considered.

²¹ Parks Canada. 1997. *Banff National Park Management Plan* (77).

Sustainable Development and Conservation

As Turner [1993] identifies, the issue of sustainable development has become the focus of a significant amount of discussion in recent years. It is an issue that affects the entire planet, yet each individual circumstance must be evaluated on its own merits. Banff National Park is one such case. Of major concern is the level of development which can be sustained in Banff National Park. Is it possible to foster economic development in the park while preserving the natural ecosystem, which is the primary attraction of the park? This question is one which is difficult to answer, for sustainable development, as described by the World Commission on Environment and Development (WCED) [1987], "... is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs." But what precisely is sustainability? A definition of sustainable development needs to be established in order to explore this issue.

Sustainable development is not easily defined. The number of variations of this definition is vast, with answers ranging from those "... rejecting even the sustainable utilisation of nature's assets"²² to the view that open markets will efficiently allocate resources over time. The WCED defines sustainable development as "...development that meets the needs of the present without compromising the ability of future generations to

²² Turner, R.K. 1993. "Sustainability Principles and Practice." in *Sustainable Environmental Economics and Management: Principles and Practices*. R.K. Turner ed. (3).

meet their own needs."²³ The level of development that satisfies the definition of the WCED is difficult to determine due to the number of variables affecting the issue, and the vague nature of the definition. A question that arises from this definition is; what level of use will allow future generations access to resources, and still meet the needs of the present generation. It is not a simple task to assign costs and benefits to many of the factors involved in such a decision. One may decide today that expansion of a hotel is necessary in order to accommodate more and more visitors, yet this development directly impacts a visitors' ability to enjoy the resource.

One of two key properties identified by the WCED is closely related to this report. That is "...the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."²⁴ Can development occur that does not impair the ability of the ecosystem to function as it would have prior to the development? Will future technological advances enable developments to occur that previously would have been harmful, but now are acceptable within the definition of sustainable development? One must have a clear definition of sustainable development, therefore, in order to satisfactorily answer these questions.

Perman, Ma and McGilvary [1996] discuss the difficulties of defining sustainable development, arguing that sustainability is a concept which does not possess a single meaning or definition. They further identify five conceptualisations of sustainable development, which are:

²³ World Commission on Environment and Development. 1987. *Our Common Future* (42).

²⁴ World Commission on Environment and Development. 1987. *Our Common Future* (43).

- 1) a) A sustainable state is one in which utility is non-declining through time.
b) A sustainable state is one in which consumption is non-declining through time.
- 2) A sustainable state is one in which resources are managed so as to maintain production opportunities for the future.
- 3) A sustainable state is one in which the natural capital stock is non-declining through time.
- 4) A sustainable state is one in which resources are managed so as to maintain a sustainable yield of resource services.
- 5) A sustainable state is one which satisfies minimum conditions of ecosystem stability and resilience through time.

Sustainability is not limited to these five examples, but they are an excellent basis for discussion. Each one identifies a separate belief of what sustainability means, and implies a manner in which to achieve it. Perhaps the most relevant concept when considering Banff National Park is the fifth one. The park's ecological state is of the utmost importance when determining the appropriate level of economic development.

What level of economic development is sustainable in the park? Sustainable development shall be defined, as it applies to Banff National Park for the purpose of this research, as the ability of the park to meet the needs of current and future generations, within the confines of available technology without hindering the continued natural development of the parks ecosystem [WCED 1987]. This definition implies that a level of

conservation must be determined concurrently with the level of sustainable development. In order to determine what the level of sustainable development is that does not interfere with the natural development of the ecosystem within Banff National Park, a clear definition of conservation must be applied. This definition must encompass the idea of sustaining the ecosystem's natural equilibrium state and it must clearly state the goals of conservation.

Much like sustainable development, conservation is not a static concept. The need for conservation changes with time and it must be evaluated within a dynamic framework. Banff National Park is an ecosystem and "Natural ecosystems exist because organisms in them use only the resources they need, and often they use them efficiently."²⁵ This statement identifies a key concept; the ecosystem of Banff National Park only exists as a result of the organisms, including humans, which reside within it. In order for this ecosystem to thrive all organisms must adapt. In order for the non-human residents to adapt, the human relationship with the park must consider the needs of these organisms, both plant and animal, and consume the resources at a level which will sustain the parks natural equilibrium.

The free market is an excellent mechanism for identifying the value of goods and services, but it is not infallible. The true social cost of producing goods and services is often not conveyed through the price mechanism. Activities which alter the environment or have adverse affects upon it will be undervalued through the market system. Conversely, if an activity has side effects which extend beyond personal gain and better

society, it will be undervalued in the free market. The park has a certain intrinsic value which, if left to market forces, would be exploited beyond the park's capacity to maintain a balanced ecosystem. One must only look at the exploitation of resources in available areas to witness the consequences of unregulated resource extraction. A highly visible example of this is the scarred landscape left after clear cutting has taken place. Conservation of the park would seek to limit this exploitation of the park, perhaps to the point where economic activity becomes severely limited or even prohibited. It is the role of the conservationist to determine what level, if any, of human exploitation is appropriate within an ecosystem. Just as with sustainable development, there are many differing viewpoints on what constitutes conservation. While it is not certain what level of development if any is suitable for the park, it is clear that market forces should not be left to regulate the level of economic activity within the park.

G. Tyler Miller [1992] identifies two types of conservationists, which shows not only that there are differing opinions of what constitutes conservation, but that even conservationists are divided on the issue of the appropriate level of resource use. He identifies the preservationists, who believe in "protecting large areas of public lands from mining, timbering and other forms of economic development and environmental degradation."²⁶ The other group are the scientific conservationists, who place value on public land as "...resources to be used now to enhance economic growth and national strength."²⁷

²⁵ Chiras, Daniel D. 1994. *Environmental Science: Action for a Sustainable Future* (10).

²⁶ Miller, G. Tyler. 1992. *Environmental Science: Sustaining the Earth* (336).

The Resource Conservation and Recovery Act of The United States defines resource conservation as a "...reduction of the amounts of solid waste that are generated, reduction of overall resource consumption, and utilization of recovered resources."²⁸ It is important to note that this definition states that one aspect of conservation is reduction in the overall level of resource consumption. This does not preclude the use of resources in the future as some definitions, notably those used by extreme preservationists would. On the other hand, it does offer some level of protection against the use of resources based solely on market demand.

In 1910 an advisor to Theodore Roosevelt, Gifford Pinchot [1910] put forth a definition of conservation that is still relevant today. Pinchot defines conservation as the "...foresighted utilisation, preservation and/or renewal of forests, waters, land and minerals for the greatest good of the greatest number for the longest time."²⁹ This is an effective definition of conservation. It encompasses the ideas of determining the level of use that is appropriate, limiting use in situations where it is not appropriate and is forward looking in its concern for future generations. One drawback to this definition is a failure to recognize what level of foresighted utilisation is appropriate.

The definition of conservation needed then must be composed of a number of ideas. Conservation must reduce the level of resources of the park and within the park which are consumed, it must allow for the foresighted utilisation of park resources and it

²⁷ Miller, G. Tyler. 1992. *Environmental Science: Sustaining the Earth* (336).

²⁸ Resource Conservation and Recovery Act of the United States. 1976. Title 42, Ch. 82.6903.

²⁹ Pinchot, Gifford. 1910. *The Fight For Conservation* (45).

must preserve the natural state of the parks ecosystem for future generations. This definition allows for discussion of the sustainable future development of Banff National Park under the condition that unregulated economic development is not a viable option.

The concepts of sustainability and conservation are not ones which are mutually exclusive. What level of sustainable development can be achieved while still managing to conserve the resource? The two ideas are intertwined and any discussion involving one must consider the implications for the other. An application of these definitions as they are established above, to a discussion of the current management plan of Banff National Park, will allow for the opportunity to evaluate this plan in an economic context. Should conservation be the overriding priority of park management or is there a level of development that is sustainable?

Economic Evaluation of Tourism in Banff National Park

As stated, tourism is the only source of revenue for Banff National Park [Banff-Bow Valley Study. Technical Report, 1996]. The Banff-Bow Valley Study: At The Crossroads thoroughly outlines the impacts of tourism on the ecological welfare of the park. Economic welfare is not considered as extensively however.

Tourism, and who constitutes a tourist, are concepts which, like sustainable development, are difficult to define. Tourism is a concept which is subject to constant change [Lundberg, Krishnamoorthy and Stavenga. 1997] but is a term which "...encompasses travelers away from home and the businesses and people who serve them..."³⁰ This definition of the term can be narrowed for current purposes to one specific to tourism economics. While there are other implications and dimensions to tourism, the current concern is with the economic implications of tourism. "Tourism economics measures the amount of travel and its economic consequences, direct, indirect and induced."³¹ In addition, tourism can be seen as an industry which capitalises on the existence value of a location. This is rational when considering that if Banff National Park did not exist in a preserved state, the incentive to travel there would not be as great, as there are many other areas one can visit that are not preserved.

³⁰ Lundberg, Krishnamoorthy and Stavenga. 1995. *Tourism Economics* (4).

³¹ Lundberg, Krishnamoorthy and Stavenga. 1995. *Tourism Economics* (4).

Different regions and countries have varying standards to determine who qualifies as a tourist. Some regions and countries define a tourist simply as one who crosses a border, while the United States Census Bureau defines a tourist as someone who "...goes to a place at least a 100 miles away from home and returns."³² In Canada, the definition is similar, but slightly modified. Statistics Canada defines a traveler as "Any person who completes a trip"³³ and a trip as "...travel...to a Canadian destination of at least 80 km one way from home."³⁴ Trips that do not originate within Canada, are made for commuting to or from work or school and those who operate buses, trains etc. are not included [Statistics Canada. Travel Survey, 1998]. This definition does not include trips to Canada which originate outside of the country. The difference between the United States Census Bureau and Statistics Canada definitions is minor yet important. The city of Calgary, a market of nearly one million people, [Statistics Canada, 1998] is only 130 km, or 78 miles, from Banff [Banff/Lake Louise Tourism Bureau, 1998]. The definition of the United States Census Bureau would not recognize visitors from Calgary as tourists, yet ignoring such a large market would underestimate the impact of tourist activity. For this reason, the definition of Statistics Canada is a more appropriate definition of a tourist in this instance. A limited number of small towns will be excluded from this definition, most notably Canmore, a town just outside the park with a population of fewer than 10,000 [Banff-Bow Valley Study. 1996]. However, the impact of these towns is acutely less pronounced than that of Calgary.

³² Lundberg, Krishnamoorthy and Stavenga. 1995. *Tourism Economics* (5).

³³ Statistics Canada. 1998. *Canadian Travel Survey* (68).

³⁴ Statistics Canada. 1998. *Canadian Travel Survey* (68).

Banff National Park relies on tourism for its economic viability, but tourists inevitably consume resources. These resources are the very things the park is intended to protect as established in the National Parks Act. Can these resources be consumed and protected at the same time? Is there a sustainable level of tourism which allows the ecological integrity of the park to remain intact? If so, what level of tourism is optimal? It is difficult to identify this level, because it is difficult to quantify the broad spectrum of goods and services that tourists consume. Tourists consume lodging and food, and recreation that occurs on private lands such as skiing. But they also consume nature, and the amount of nature one consumes is not easily measured.

Recreational resources in national parks, such as hiking trails, can be treated as quasi-public goods. The government provides access to these resources and to a certain extent they exhibit non-rivalrous and non-exclusive traits. One person's use of a hiking trail will not diminish another person's ability to consume the good, and no one can prevent another from consumption. However there is a threshold at which the total utility an individual gains will begin to diminish. This decrease in utility could be caused by too many people on the hiking trail or a decrease in air quality as a result of increased motor vehicle traffic or a number of other circumstances. Summing the individual utility functions for all individuals would give the total utility society receives from the use of the resource. The point where the optimal level of consumption occurs is where the utility of the last unit consumed is equal to the additional costs of providing that unit. In a market with no externalities this would mean the marginal social benefit equals the marginal private cost.

It is not likely however that there will be no externalities in a market for a resource. In this case, environmental degradation is the primary source of external costs. Each user will cause damage to the resource, possibly diminishing the utility of others. The level of damage caused by total consumption of additional units of the park resource is the marginal social cost (MSC) of a visit. There must be a level of consumption which will maximize total social benefit (TSB). This is the point where marginal social benefit (MSB) = MSC. At this point the level of consumption will maximize the utility society gains from this resource. It is easy to see how this applies to Banff National Park. With millions of visitors in a year, there will be a point where the marginal benefits to society begin to be outweighed by the additional costs. So what level of provision of the resource will arrive at the socially optimal allotment of visits and how can we determine this?

Determining the marginal benefit of a particular individual is not difficult. Simply asking them would provide their additional willingness to pay, or marginal benefit. This method is fine when considering small numbers of people. However, Banff National Park has millions of visitors every year. Determining individual marginal benefit curves for each of these visitors is certainly not a feasible option. How then can we determine the marginal social benefit, or demand function?

The amount consumers are willing to pay for recreation at a site is a market valuation of the benefit they gain from it. That is, the marginal benefit a visitor receives from a trip to a site is equal to the value that individual is willing to pay for that trip. As

the cost of visiting a site increases, the number of people who will be willing to pay for that trip will decrease, assuming that the resource is a normal good. The preferred method for estimating demand for recreation sites, and thus the benefit derived from the site, is the travel cost method [Loomis and Walsh, 1997]. This method is valuable because it takes into account direct out-of-pocket costs and time costs of travel. There are two variations of the travel cost method. The individual observation method, which requires that individuals make more than one trip to a site and that the frequency of these visits is recorded. This method may provide greater accuracy in estimation of coefficients of a demand equation [Loomis and Walsh, 1997]. Banff National Park does not fit these criteria. There is no method in place that accurately measures the number of visits any one individual makes to Banff National Park. The method that is used if individual observation is not applicable is the zonal method. The zonal method measures how often someone from a defined area, such as within a postal zone or country, visits a site. It is not possible to tell how many trips any particular individual may have made, only the number of trips made from that area. This method has the advantage, in this case, of flexibility, which gives it broader applicability, and it is also less susceptible to errors [Loomis and Walsh, 1997]. However, due to the large number of differing locations from which visitors arrive at the park, a simplified travel cost method will be used.

To apply the travel cost method, it must be further broken down into two segments, costs of travel (i.e., cost of gasoline, depreciation of vehicles) and time costs. Time costs are further broken down to travel time and on-site time costs. There are three techniques for determining the cost of travel for visitors to a site. The first is to use

marginal costs only. In the case of those who travel by car, this is the cost of gasoline. For those coming from further afield (ie., from outside North America) this would be the cost of arriving at a destination in the most efficient manner. The second method is to include the full costs of travel; in the case of the automobile these are things such as the regular maintenance, insurance and other costs. The third technique is to use the perceived costs of travel. Bateman et. al. [1993] conclude that the most effective determinant of visits is the first method listed above, and this marginal cost method will be employed here. The rate at which government employees are compensated for travel will be used as the cost per kilometre for this study.

The time costs in this model are the time costs of travel and the time spent on-site. To determine the value of these, the value of one hour of time must be estimated. To determine these time costs, a method similar to that used by Liston-Heyes and Heyes [1996] will be followed.³⁵ The gross annual income of the region will be divided by the number of members in the household, which will be divided by 1,786 hours (the average number of hours worked in one week multiplied by 52 weeks). This will provide the average hourly wage of a particular region.

Using the marginal cost technique as prescribed above, the next step is to determine the specific travel costs for visitors from different areas. Visitation data from

³⁵ This is a modification of the method used by Liston-Heyes and Heyes. Their method used average household income per year divided by the number of members in the household divided by 1786 hours. It can easily be seen that by simply multiplying the average household income and the number of members in a households by the number of households, the numbers arrived at will be total income and population respectively.

1995 identified four categories of visitors to the park. These are, visitors from within Alberta, visitors within Canada excluding Alberta, visitors from the United States and off-shore visitors. Due to the distance and area covered by these groupings, it is useful for the data to be broken down further. Data from 1990 and 1991 classifies visitors into a larger number of categories, illustrating how many visitors arrive from various regions within Canada, the United States and internationally. It is assumed that the visitor to the park only accrues benefits from the visit to the park itself. This effectively eliminates the problem of dealing with visitors who attain utility through the travel itself. Also, the costs are only assumed to be a measure of willingness to pay for the journey to the park, not returning. This assumption is validated upon further analysis. There are a number of reasons why a person may benefit from returning to their home, so the cost of returning from the recreation site is not included in the determination of its benefits.

Using the zonal travel cost method will result in the creation of a trip generation function of the form:

$$V_h / N_h = f(C_h, W_h) \quad (1)$$

where

V_h = Visits from zone h

N_h = Population of zone h

C_h = Costs of visit for zone h

W_h = Other variables explaining visits from zone h

Total costs (C_h) for this function equal:

$$C_h = C/km(D_h) + TTC_h(H_h) \quad (2)$$

where

C/km = The cost per kilometer (=\$0.30/km)

D_h = The distance from zone h to the site

TTC_h = The opportunity cost of one hour travel time for zone h

H_h = The number of hours spent travelling by visitors from zone h

There are many explanatory variables of demand that cannot be included in the estimation. As recognized by Bateman [1993] and Heyes and Heyes [1996], due to the extensive data needed for many of these variables and the prohibitive cost of obtaining it, many of them are often omitted from studies. For instance, to include the availability of alternate sites would require a travel cost estimation for each alternate site, and the studies are likely to exhibit a high degree of multi collinearity. This would be time consuming and in this case not practical, as visits originate from all over the world. Clearly many of these visitors have alternate sites to which they can travel. Making this assumption leads to a trip generation function that is simply

$$V_h / N_h = (C_h) \quad (3)$$

After establishing what information is necessary to determine the demand equation, the next step is to identify what data is to be used.

There are four regions that will be used to establish the demand function under this method. The first region encompasses Calgary, the second is Alberta and British Columbia, the third Saskatchewan and lastly Manitoba. While there are visitors from outside these regions, such as those from the rest of Canada, those from the United States and those from outside of North America, costs and benefits cannot easily be estimated for these and precludes them from the model. First, because of the distances involved in travelling from many of these locations, and the variety of possible trip origins and modes of travel, it is difficult, if not impossible to determine costs of travel. Also, it is possible that those travelling such a great distance, often at great time costs, travel for more than the benefit they receive from the park. For example, a family from the Maritimes may drive to Banff National Park for a summer holiday. However, this drive would take a number of days in each direction, and the benefits would not be accrued strictly at the park. Perhaps the family derives pleasure from the opportunity to visit friends or relatives or from the prospect of experiencing many different areas of the country or many other reasons. This would result in a bias in the demand function, as the travel cost method assumes that benefits gained by visiting the site are the only benefits one considers when choosing a recreation site.

For all zones the distances are measured to the town of Banff. The first region will be the distance from Banff to Calgary, or 130 km. The distance used in the second zone will be the average distance of Edmonton and Vancouver, the two largest markets in the zone. For Saskatchewan a similar approach will be taken, using the average distance of Regina and Saskatoon. For Manitoba, the distance from Winnipeg to the park will be

used. The travel time used to calculate costs will be determined by dividing these distances by 80km/h. This rate of travel accounts for differing speed limits as they are not uniform from region to region or even within a region (for example, the posted limit within a national park is 90 km/hr while the posted limit from Edmonton to Banff can reach as high as 110 km/hr).

After establishing the per kilometer cost of travel, the difficulty of determining the time costs associated with visits from each region remains, namely, the opportunity cost of travel time and the opportunity cost of on-site time. Bateman [1993] shows that the best measure of this is to use the full wage rate as the measure for opportunity cost. This may overstate the opportunity cost and some argue that a lesser fraction is desirable; however this study will use the average hourly wage rate for the particular region multiplied by the length of travel time. The method used to determine the hourly wage rate will be the one described above. For on-site opportunity costs it can be argued that "...if the length of time spent on-site were a constant for all visits to a particular site, then such costs could effectively be ignored as they would imply only an increase in absolute visit costs but not in marginal costs."³⁶ Because there is no method of determining what the total time spent on-site is per visit (outside of surveying), it will be assumed that all visits are a constant length.

³⁶ Bateman, Ian J. 1993. "Valuation of the Environment, Methods and Techniques: Revealed Preference Methods." in *Sustainable Environmental Economics and Management*. R.K. Turner ed. (211)

What remains then is to plot the data and determine the demand equation. Table 2 outlines the variables and Figure 1 is the estimated demand curve. An estimation of equation (3) yields the following demand function:

$$y = 98.69x^{-0.4662}$$

Variable y is the average cost per trip and x is the number of trips per person (V_h/N_h). Conversely, the equation written in terms of number of trips as a function of cost is $x = (98.69/y)^{2.145}$. This is a representation of the number of trips one person will take in one year, when the cost per trip is equal to a given value. The derivative of this function is $dx/dy = 2.145(98.69/y)^{1.145} (98.69/y^2)$, which represents the change in the value of a x for a change in the value of y . If the average cost per trip increases by one unit (one dollar) the number of trips taken will decrease by 0.0180 trips per person. With both the marginal cost and marginal benefit having been determined we can determine the optimal level of use in the park.

$$MSB = 98.69x^{-0.4662}$$

The calculation of the cost function for Banff National Park can be broken down into two separate components. These are the actual costs to Parks Canada of maintaining the parks services and secondly the cost to society of allowing tourism. The first is relatively easy to assess. The cost to Parks Canada is merely the amount it spends on maintaining the level of services such as hiking trails and interpretive centers currently enjoyed by visitors. It is the social costs of access to the park's resources which are difficult to estimate.

Region	Visits*	Population**	Vis./Pop.
A	2767327	768702	3.600
B	992673	5981000	0.166
C	80000	1006000	0.080
D	40000	1113000	0.036
Total	3880000		

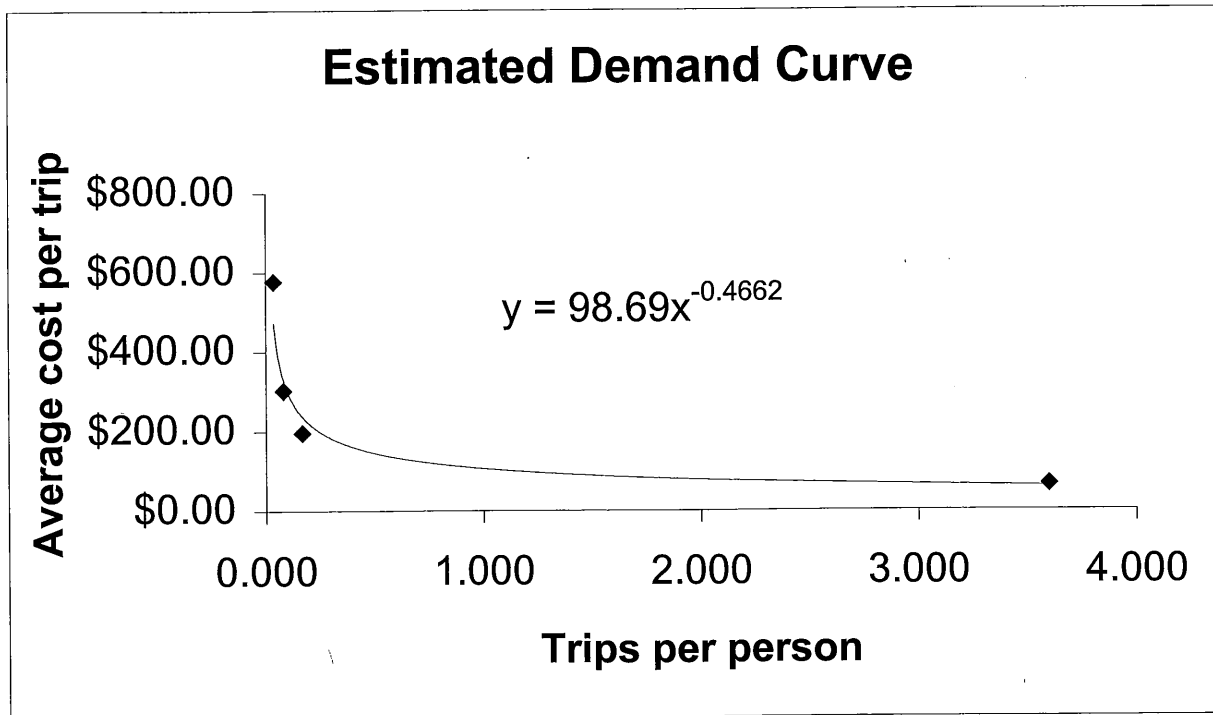
Costs								Average
Region	Cost/km	Distance***	Avg.hr wage*	Travel Time	Time Costs	Fees/day	Average Cost/Visit	
A	\$0.30	130	\$12.47	1.63	\$20.26	\$5.00	\$64.26	
B	\$0.30	436	\$11.01	5.45	\$60.00	\$5.00	\$195.80	
C	\$0.30	704.5	\$9.75	8.81	\$85.86	\$5.00	\$302.21	
D	\$0.30	1310	\$10.88	16.38	\$178.16	\$5.00	\$576.16	

* from Banff-Bow Valley Study: At The Crossroads. Technical Report.

** from Statistics Canada

*** from <http://www.indo.com/distance> except Region A, from Banff- Lake Louise Tourism Bureau

Figure 1



Estimating the cost to society of tourism presents difficulties. There are methods that can be used to determine the value of the land in the free market but how can we determine the value of something such as wildlife or scenery? There are two common methods of determining the value of these, the replacement cost technique and contingent valuation methods. The contingent valuation method requires that people be surveyed and asked what price they would place on a resource, in this instance the park. This method is often criticised for the emphasis it places on personal subjectivity [Brown, 1995]. The other method is the replacement cost technique. This method uses established market values to determine the replacement cost of resources. However, this approach is limited by two concerns. First, not all developments can be replaced or restored to the state they were prior to use, and also by the fact that it often exaggerates the true value of the land [Brown, 1995]. Restoration of a site may cost a great deal more than the value of the land. The method of choice in this situation is unclear; the replacement cost technique demonstrates a number of deficiencies, but will be used here because the costs associated with performing a contingent valuation study are beyond the scope of this work. How then can the value of the land to users today and in the future be estimated?

Talbot Page [1991] argues that it is not, in fact, necessary to determine specific valuations of those using the park in the future, as their preferences will be a result of the environment which we provide for them. He argues that what is needed for today is what he refers to as a two-tiered valuation system. The first tier under this system would establish general principles not related to the specific preferences of individuals. This tier would be instilled with normative ideas, where it is sufficient to realise that it is likely

that future generations would value some level of resource availability. This would establish the framework under which decisions are made in the second tier, where there is a greater degree of microeconomic decision making. This method would act to ensure intergenerational equity because the object of reference is the resource, not any particular individual [Page, 1991]. This means that the level of the resource is considered, not the level of utility that individuals derive from it. In order to achieve this what must be concluded is what is a fair determination of the resources. Page argues that the purest form of intergenerational equity would be to provide an "...equal division of resource capacity across generational time. This division is reached by keeping the resource base intact."³⁷ The implication of this argument is that when valuing the resource today, users consider the implications for future generations and that any value placed on the resource includes this belief.

To answer the question of sustainable resource use in the park, we must look at whether or not current use of the park is at a sustainable level, given the value people place on it today. Using the demand equation developed earlier, and an estimation of the current social cost functions, we must determine what level of use is appropriate to achieve intergenerational equity. Despite determining that intergenerational equity means maintaining a constant resource base, it is unclear as to what level that resource base should be. We are still left with the task of establishing an estimate of the current cost to society of tourism in the park. This, however, will be an easier task than establishing the specific costs to future generations.

³⁷ Page. 1991. "Sustainability and the Problem of Valuation." in *Ecological Economics: the Science and Management of Sustainability*. Robert Costanza ed. (69).

The cost to Parks Canada of providing the park facilities is a cost which is assumed to rise at the same rate as demand. That is, the fixed costs are directly related to the demand for facilities and will increase or decrease in proportion to demand. Total costs to Parks Canada for 1990-91 were 18.125 million dollars while total visitors during this period were 4.0 million [Banff-Bow Valley Study. Technical Report, 1996]. This is an expenditure per visitor of \$4.53. As it has been previously established, the land has no value other than the intrinsic value of it being there, as the only industry permitted is that of tourism. The costs to society then are purely the loss of inherent value associated with nature; what is the value of having the resource, of having the protected area? It must be noted that the park has value to even those who do not use it, and this non-use value must be considered as well. There is a difficulty associated with establishing what the intrinsic value is because it will differ for every individual, much like the demand for recreation. To ask every person in society what they would be willing to donate to preserve the state of the park is an enormous task, which is beyond this study.

While original research is not possible, valuations can be estimated using the results of studies of similar situations. A study by Rollins and Lyke [1998] asked Canadians, using a mail survey, how much they would be willing to pay for the creation of new national parks. It will be assumed for the purpose of this research that the value people place on the creation of new parks is similar to that which they would pay to preserve a park, and therefore this data can be used to estimate the cost to society of the loss of Banff National Park. The average value placed on the creation of a single new

national park by respondents was \$99.68. Conversely, by assuming that this value is the loss one would experience from the loss of a park, it can be said that this is the marginal social cost of one more person using the park. This results in a linear cost function, with the form:

$$MC = f(X) = MSC(X) + MPC(X) \quad (4)$$

where

MC = marginal cost per visit

X = number of visitors to the park in a one year period

MSC = marginal social cost

MPC = marginal private cost

The marginal private cost of operating the park in 1991 was \$4.53. The marginal social cost of this function is a constant equal to \$99.68. The marginal cost will be the sum of the marginal social cost and marginal private cost, which is \$104.21. By equating the marginal cost and the marginal social benefit, the result we arrive at is the number of visitors that is socially optimal. This is the point where the travel cost of a visit (or marginal benefit) of a trip is equal to the marginal cost per visit. The system to satisfy is then,

$$MSB = MC$$

$$98.69x^{-0.4662} = 104.21$$

$$x = 0.8898.$$

To interpret this result it must be remembered that x is equal to the number of trips someone from each zone would take if given the costs and benefits of the trip. It is helpful to rearrange the trip generation function so that total visits are a function of visits per total population,

$$V_h = 0.8898(N_h). \quad (5)$$

Using equation 5, the number of visits generated in each zone can be estimated. A brief summary of the results is shown in the following table.

Table 2.

<u>Zone</u>	<u>Population</u>	<u>Visits/Person</u>	<u>Total Visits</u>
A	768702	.8898	683991
B	5981000	.8898	5321894
C	1006000	.8898	895139
D	1113000	.8898	990347
Total	8868702		7891371

From the above table, it can be seen that when visits per person is estimated to be 0.8898, the total number of trips made from area A, which has a population of 768,702, will be 683,991. This result can be transferred to all regions by simply multiplying the population by the number of visits per person. Summing the number of visits for each region will result in the total number of visits that are sustainable, which is 7,891,371 visits per year.

From these results we can determine whether or not current use of the park is sustainable. As stated, the sustainable level of visits will be where the marginal social benefit is equal to the marginal cost per visit. This level is sustainable from an economic point of view. That is to say, when society places the economic value of the resource at a particular level, the number of visits at that point is the sustainable level. It is worth noting again, that it can be assumed, as Page does, that people in society generally consider the desires of future generations when appraising what current value to place on the resource.

Examination of Results and Conclusion

What does this result mean? From an economic standpoint, almost 8 million visits to Banff National Park per year are sustainable. The assumptions under which this argument is made must be restated, and an evaluation of the results within the context of the current management plan must follow.

First, this study was conducted subject to a number of simplifying assumptions, which may limit its applicability. The value which society places upon the resource of the national park, or protected area was assumed to be the same as that which society would be willing to pay to create new protected areas. It is assumed under that the loss of a currently protected resource would harm an individual at a similar, if not the same rate. The difficulties with contingent valuation methods have previously been discussed, and the possible over or understatement of an individual's valuation considered. At the present time however, this is the most effective method of determining society's valuation of non-market goods.

The second assumption that was made is that when choosing the value an individual places on the resource, the individual implicitly considers the value of the resource to future generations. Within a static model that measures the value of the resource today, this is sufficient, but over time the value assigned for future users will not be constant. This value may change for a variety of reasons, such as unprotected areas becoming scarcer, thereby limiting the amount of space which is available as intact

wilderness. An increase in the value society places on the resource, for whatever reason, will decrease the number of visits that are sustainable. On the other hand, a decrease in the value society places on the resource, despite the reason, would cause an increase in the number of sustainable visits. Another aspect that is implicit in the valuation of the resource by individuals is that the degradation occurring to the park from visitors, and its current ecological state are acceptable. There is a possibility that the current acceptable degradation rate is not appropriate. Information is imperfect and as most people are not trained to examine the health of an ecosystem. As well there are a variety of other reasons that market distortion may occur.

This study is also limited in its scope as a result of considering only the single variable to determine benefits; the cost of travel to the park. It is possible that upon closer consideration of other variables such as availability of other sites,³⁸ socio-economic variables such as income or education and others could impact the demand for visits. A more detailed analysis of these could result in changes to demand. However Rollins and Lyke [1998] have shown that many of these variables, including those that on the surface would seem likely to effect demand, such as income, are not statistically significant. Including other variables may effect the result however, and this should be kept in mind.

What then does this result mean? On its own, this number means little, but evaluated within the framework of the current management plan, as outlined, it

³⁸ There are three national parks, which border Banff, although only Jasper National Park currently has similar difficulties with visitor management.

can be seen that at this particular valuation of the resource by society, visits are being unnecessarily restricted. The management plan currently in place limits further commercial development and recommends curbing the number of visitors. This result comes from an over valuation of the cost to society of people visiting the park. The park can survive, ecologically, in a state accepted by society today, at a much higher level of resource use. This does not mean that the park can survive intact as a natural protected area and remain ecologically vibrant, only that it can survive in a state acceptable to society.

The current management plan, and the extensive study it is based upon, assumes that society wishes to preserve natural areas in order to have them for the future. This may be the case, as over time, societies valuation of the resource may change, but the direction and magnitude of this shift is difficult to predict. Perhaps - although it seems unlikely - individuals in a future time period will not value the resource as highly as we believe they will today. This will mean that the sustainable number of visits will increase, although actual demand for visits may decrease. An unwarranted restriction on visits today would leave an area that is undesired by society, resulting in an inefficient allocation of the resource. With reference to the definition of sustainability set forth earlier, what if technological developments mean that the resource can be preserved, while the number of visits can increase past the currently sustainable level as determined here? Again, restrictions on the number of visitors is currently unwarranted. However, predictions of the future are never certain and the possible implications of technology on the resource cannot be usefully debated in this setting. Changing attitudes and appraisals

of this resource must be dealt with as the situation warrants and cannot be effectively estimated here.

In the context of the management plan, what does the result that has been arrived at here indicate? The management plan outlined a number of areas which are impacted through human use. These include the impact on nature, historical areas and humans and the resulting developments required to sustain human consumption of the resource. The plan highlights a number of proposals to protect the ecological integrity of the park, which are all based on the assumption that it is ideal for park visitations to be restricted. The results indicated in this study would mean that many of these arrangements are not necessary nor are they desirable. One area that the plan does recommend changes to, that can be beneficial regardless of the results obtained, is the idea of open management. This method of managing the park would allow for the input of all Canadians in the preservation and maintenance of the park. Through this system perhaps the preferences of Canadians will be revealed and a more accurate estimation of how they value the resource will develop, although whether that will result in greater or lesser costs to society is not known.

It is of utmost importance that it be remembered that this study has used as its focus the idea of obtaining an estimation of how Canadians value the resource of the park, not whether the park can be maintained as a sustainable ecosystem. The question is whether use of the park can be sustained at the level that society currently values it. The answer to this is "yes," - under the conditions set forth and assumptions made, it can, and

in fact can be expanded greatly. By restricting access and development of the park, society suffers. Therefore gains to economic efficiency representing society's evaluation of the resource can be made by allowing access to increase and revising the current management plan.

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Chapter N - 14. An Act Respecting National Parks.