
Kluane National Park and Reserve Economic Impact Study

Background Paper No. 5

ECONOMIC BENEFITS FRAMEWORK

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***Background Paper #5
Economic Benefits Framework***

Table of Contents

Table of Contents *i*

List of Tables..... *ii*

List of Figures..... *ii*

1 Introduction ***1***

2 The economic benefits framework ***2***

2.1 Personal benefits ***3***

2.2 Commercial benefits..... ***4***

2.3 Societal benefits ***4***

3 KNPR’s economic benefits..... ***6***

3.1 Personal use benefits ***6***

3.1.1 Kluane NPR direct users..... ***7***

 Haines Junction/Kluane region account register..... ***8***

 Yukon account register ***9***

 Other personal benefits ***9***

 Summary of personal benefits from Kluane NPR..... ***9***

3.1.2 Calculation of a personal consumer surplus value ***10***

3.1.3 Indirect Users..... ***12***

3.2 Non-use personal benefits ***12***

3.3 Commercial benefits..... ***13***

 Haines Junction/Kluane region account register..... ***13***

 Yukon account register ***15***

 Summary of KNPR commercial benefits..... ***16***

3.4 Societal benefits ***16***

 Financial transfers ***16***

 Ecological functions ***17***

 Resource integrity maintenance..... ***17***

 Health, education and scientific benefits..... ***17***

 International responsibilities ***18***

 Quality of life and business location decisions..... ***18***

3.5 Summary of KNPR’s economic benefits..... ***18***

4 References..... ***20***

List of Tables

Table 1 Origin of visitors to KNPR.....	8
Table 2 Fees paid by origin of visitor	8
Table 3 Summary of personal use benefits estimates	9
Table 4 Summary of extracted values.....	10
Table 5 Summary of comparable values.....	11
Table 6 Summary of personal use and non-use benefits estimates.....	13
Table 7 Total visitor spending by category and major origin.....	14
Table 8 Percentage of KNPR spending by area	14
Table 9 Summary of commercial benefits associated with Kluane NPR.....	16
Table 10 Summary of quantitative benefits from Kluane NPR, 2002-03.....	19

List of Figures

Figure 1 Generalized framework for estimating the benefits of parks and protected natural areas.....	3
Figure 2 Benefits, measures of value, and data collection methods	6

Kluane National Park and Reserve Economic Impact Study:

Background Paper #5 Economic Benefits Framework

1 Introduction

This background paper is the fifth of six prepared for the Kluane Economic Impact Study. In addition, a summary report was prepared outlining the findings of the six background papers. The six background papers are:

- 1 Baseline Economic Profile
- 2 Economic Impact Analysis
- 3 Economic History of the Kluane Region
- 4 Community Economic Comparison Analysis
- 5 Economic Benefits Framework (this one)
- 6 Community Interviews

All papers are available in PDF format at <http://www.yukonomics.ca/reports/kluane/>

This background paper contains a discussion of the benefits and values commonly associated with parks and protected areas. The relatively easily quantifiable economic benefits of a national park such as Kluane — the spending by Parks Canada and by visitors to the park — have already been estimated in the economic impact assessment background paper. But there are other benefits and values of Kluane National Park and Reserve, and these also have at least some economic value. Unfortunately, they are notoriously difficult to quantify in economic terms and are always open to dispute. But these benefits are real and important.

Economic benefits are different from economic impacts. Economic impacts occur whenever expenditures are made, whereas economic benefits are not necessarily tied to expenditures. Another background paper described the economic impacts associated with spending attributable to Kluane National Park. Some of this information is used to estimate economic benefits. The differences between impacts and benefits will become clearer through a description of the “Economic Benefits Framework for Parks and Protected Areas.” This framework has been accepted as the Canadian standard by the Canadian Parks Council and its member territorial, provincial and national agencies.

2 The economic benefits framework

There are many concerns about socio-economic analysis which serve to emphasize the need for a commonly agreed upon framework for assessing the benefits derived from parks and protected areas. One of these is the wide variety of benefits and values commonly associated with parks and protected areas but the absence of a systematic reference. In addition to this, confusion about economic analysis related to park benefits arises from common errors and a variety of other reasons:

- much of the quantitative economic analysis has focused on economic impacts, and economic impacts are frequently and erroneously thought to be the same as economic benefits;
- the perspective of assessment and valuation gets confused leading to serious questions of what constitutes a “benefit” and what is a “cost”;
- components included in assessments are inconsistent – for example, quantitative/non-quantitative, use/non-use, direct/indirect, monetary/non-monetary, consumptive/non-consumptive - and how they are all related is unclear or poorly understood and specified;
- frequently the notion of ‘net’ benefits is used - what is ‘gross’ and net of what?
- specification of the subject areas (products, experiences, goods, services, etc.) covered by the assessment is often unclear: frequently they are too broad or undefined;
- some assessments describe “benefits,” others “uses” — are they the same?
- inappropriate methods are unknowingly applied to obtain benefit estimates.

With these points of frequent confusion and the myriad values reported in the literature, there is obvious potential for muddled thinking and the generation of questionable results. A park manager has no way of knowing when total benefits are being assessed or what sub-set of benefits are being assessed — unless (s)he has some experience with this type of analysis or possesses some understanding of the issues involved. A consistent and easily applied framework for economic assessments is therefore necessary for both analysts and managers.

This report applies an economic assessment framework that has allowed researchers, managers, policy analysts and others to view the socio-economic benefits associated with parks and protected areas within a consistent, comparable and comprehensive format.

The Benefits Framework has several key features:

1. it recognizes three distinct groups of beneficiaries;
2. it is non-duplicative between beneficiary groups;
3. it incorporates economic impacts within a benefits framework;
4. it incorporates unquantifiable benefits; and
5. it uses “account registers’ to facilitate valuation from different regional perspectives.

In summary, it allows a manager to see which benefits have been measured and which remain unmeasured. The Framework thus becomes an important planning tool.

The three distinct benefits categories are:

1. Personal benefits
2. Commercial benefits
3. Societal benefits.

The components of each benefit category are summarized in Figure 1 below.¹

¹ More detailed information on the Framework is available from the Department of Canadian Heritage (Parks Canada) report *Benefits of Protected Areas*, prepared by *The Outspan Group*, 2000. This report is also available through the Canadian Parks Council – Report 251 – e.

The account registers do not appear explicitly in Figure 1. Each formulation of the Framework from a different geographical perspective represents one account register, that is, the results of an analysis of park benefits at the local level (or the area immediately around the park) will differ from the analysis of benefits at the further-ranging provincial level. These are the account registers: each is a different geographical perspective for the analysis and will result in different benefit values. Frequently, account registers are not explicitly recognized in analyses, and this omission can lead to significant confusion in determining whose benefits are actually being measured.

Figure 1 Generalized framework for estimating the benefits of parks and protected natural areas

<i>Benefit Category:</i>		
<i>PERSONAL</i>	<i>COMMERCIAL</i>	<i>SOCIETAL</i>
Definition:		
Benefits accruing to stakeholders (users and non-users)	Economic impacts derived from the redistribution of commerce from one area to another	Benefits with “public good” characteristics and societal in scope (everyone enjoys equally)
Benefit Components:		
Use Values <ul style="list-style-type: none"> • direct use • indirect use Non-Use Values <ul style="list-style-type: none"> • option value • existence value • bequest value 	Impacts from spending by stakeholders and by location management for development and operations, from sources outside the area of assessment (as measured by increases in GDP, labour income, employment and tax revenue)	<ul style="list-style-type: none"> • Ecological Functions: primary production, sequestering carbon dioxide, soil formation, herbivory, carnivory, oxygen production, population moderation, nutrient transport, moderation of macro- & microclimate, decomposition, maintenance of genetic diversity, and others • Resource integrity: maintenance of existing benefits; ameliorate effects of human changes • Health effects – physical, mental, spiritual • Worker productivity • Educational benefits • Scientific benefits • International responsibilities/agreements: NAWMP, CBD, RAMSAR, CITES, MAB, etc. • Business location decisions (quality of life/business), community cohesion, and others

2.1 Personal benefits

Direct Use Values: Normally these values are the benefits obtained by users of the protected area from activities that are permitted within the area – the benefits received by recreationists and other on-site users of the protected area. These benefits are reflected in the monies paid to enter and/or use the park as well as any consumer surplus value.

Most often, protected areas do not permit resource exploitation. Consequently, benefits individuals receive from exploitive activities are not viewed as benefits attributable to the area, but are considered as costs to the protected area (i.e. they reduce the natural balance). For example, mining or timber harvesting

values in a protected area should not be considered as benefits to that protected area. Some permitted uses, however, such as First Nation Treaty rights (which may include harvesting of wildlife and home consumption activities managed for sustainability) may be considered benefits attributable to the protected area, although more logically should be attributed to the specific treaty. In order to capture all direct use values, it is important to specify in any analysis of benefits precisely which uses are permitted and which are not allowed².

Indirect Use Values: These use values are not generally recognized in the literature on benefits, and are not calculated in most studies. These use values include such uses as enjoying books, films, videos, presentations, etc., on the protected area which are directly related to the objectives of the protected area. This use requires purposeful activities aimed at enjoying and benefiting from the protected area³.

Non-Use Values: The three categories (option, bequest and existence) of non-use values have been amalgamated in the Framework. While specific studies can be cited on each of these categories, there is a growing belief with research circles that it is virtually impossible to distinguish realistically between these values when interviewing respondents. Option benefits are those obtained by individuals from the knowledge that they will be able to use of protected area in the future, that the option to do so exists. Bequest benefits are those benefits obtained by individuals in knowing that future generations will be able to use and enjoy the protected area. Existence benefits are those realized by individuals from the knowledge that a protected area actually exists. In all cases, these benefits can be received by users and non-users alike (both are generally referred to as stakeholders). The benefits themselves are difficult to quantify and are frequently referred to as “preservation benefits.”

2.2 Commercial benefits

Net Economic Impacts: The commercial benefits of a protected area are calculated through the use of economic impact analysis. These are the benefits which businesses enjoy from the spending (expenditures) of users of the protected area and the area’s management agency on such items as operations, maintenance and development. The spending that is used to calculate these benefits must be clearly attributable to the protected area. Further, only those impacts which are retained with the area being assessed (the account register) are included in the analysis. In addition, only net economic impacts (removing the costs of “imported” goods and services) are used to calculate these benefits. Most often the gross domestic product (GDP) is the measure of commercial benefit. Other measures can include employment and labour income, but within the Framework suggested, the net GDP figure is the one to be included in the total benefit value. This measure of GDP reflects the “value-added” retained within the area of impact (account register).

2.3 Societal benefits

Societal benefits are both quantitative and qualitative. The latter are described in the text; those aspects which are quantifiable are few, but can include a wide range of benefits.

² In addition, it is possible that not all direct use gross benefits can be considered as the total benefits; only if the level of use is sustainable (in which usage in the current time period does not impair future use) can the gross benefits be considered to reflect total benefits. In some cases, where unsustainable use levels are being experienced, a net benefit calculation will be necessary. The costs associated with site rehabilitation or other costs such as lost benefits from crowding may have to be deducted from the gross benefit estimate to generate a sustainable total benefit value.

³ It should be noted, however, that some studies have estimated the value of various external benefits associated with downstream (off-site) use of unpolluted water and other similar benefits generated by protected areas; these are considered as indirect use benefits. **In this Framework, these are actually considered as societal benefits.** As a consequence, any off-site, downstream or passive use benefits are not included in the personal benefits component, but rather as part of the societal component.

Transfers: These are quantifiable transfers of funds directly or indirectly related to the protected area from visitors from outside the account register as well as from an NGO (such as the World Wildlife Fund or UNESCO) for use in or by the protected area is a benefit within most account registers attributable to the area. Theoretically, any amounts contributed by individuals, businesses or government within the account register should be deducted from the amount of transfer. In practice, however, these amounts are considered negligible and do not warrant the adjustment, especially in less developed areas.

Other Quantifiable Benefits: Usually there will be other quantifiable benefits from the park or protected area which will emerge over the course of the research, benefits which tend to be site specific, i.e. related to the characteristics of the specific protected area. These may include the value of ecological functions such as water purification, habitat, maintenance and stock rearing, education benefits, scientific benefits and many others (see Figure 1 above).

3 KNPR's economic benefits

If we applied the Economic Benefits Framework to KNPR, what value would emerge? Can we generate a quantitative estimate of the economic benefits generated by Kluane National Park and Reserve? What information is missing?

Unfortunately, much of the information required to generate economic values specific to KNPR does not exist. We can use the results of the economic impact analysis in estimating commercial benefits, but we would need to find substitute data for several other benefit components to estimate Kluane National Park and Reserve's economic benefits.

3.1 Personal use benefits

The amount visitors paid to use Kluane National Park and Reserve can be determined from park records. The amount of consumer surplus enjoyed by these visitors, however, cannot be determined from any records: specialized surveys of the users are necessary. In the absence of this kind of survey data, it would be necessary to use some other information or proxy data to supply at least a minimum estimate of these values. Also, in the analysis of personal benefits, information on visitor origin is vital. KNPR has no detailed information on visitor origins.

Within the personal benefit category, there were two types of benefits identified: use and non-use benefits. Use benefits were further subdivided into direct use and indirect use. Non-use benefits had three sub-categories: option, bequest, and existence values. Figure 2 presents a summary of the benefit types and the means of measuring the benefit⁴.

Figure 2 Benefits, measures of value, and data collection methods

<i>Personal benefit</i>	<i>Category</i>	<i>Measure of value</i>	<i>Method of data collection</i>
Use	Direct	1. fees paid for use 2. consumer surplus	1. revenue data from park 2. specialized user surveys
	Indirect	1. amounts paid for off-site products 2. consumer surplus	1. business or consumer surveys 2. specialized household surveys
Non-use	Option	1. amounts paid to maintain option for future use 2. consumer surplus	1. specialized household surveys 2. specialized household surveys
	Bequest	1. amounts paid in support of bequest objective 2. consumer surplus	1. specialized household surveys 2. specialized household surveys
	Existence	1. amounts paid to maintain existence of park 2. consumer surplus	1. specialized household surveys 2. specialized household surveys

As Figure 2 indicates, direct use values are the most straightforward to estimate, even though the most readily available data (park revenues) represent only a part of the total value users derive from this use. Consumer surplus values are difficult and expensive to derive, since they require specialized surveys to obtain this information from park stakeholders (users and non-users). Figure 2 also shows that most data

⁴ More detailed information on the methods used to produce these values can be obtained from the report *The Economic Benefits of Protected Areas, A Guide for Estimating Personal Benefits*, prepared by The Outspan Group for the Canadian Parks Council, 1999.

required to fill the Framework demand economic survey methods which are not easily undertaken, and tend to be quite expensive.

There is a need for public sector agencies responsible for parks and protected areas to undertake primary research into the consumer surplus or non-market values associated with the areas under their jurisdiction. The benefits transfer approach works only when there is some logical basis on which to use the values generated in one area to the study at hand. Most of these studies used in this methodology have not been undertaken by parks organizations, but rather by academics. While this is not necessarily a problem, frequently these academic studies are conducted as students' theses or dissertations and are directed at specific activities or specific problems which may be peripheral to the basic derivation of consumer surplus values. There needs to be a program of primary data collection so that many of these studies can either be "re-calibrated" or updated, since many date back many years.

Figure 2 indicates how these values would be estimated. Park revenues from park users can be determined from park records; however the consumer surplus enjoyed by park users will be based on a calculated value which uses the results of several studies to estimate this value. Section 3.1.2 below provides a detailed description of the process used to derive the estimate of daily consumer surplus — estimated to be \$11.13 per day.

Personal economic benefits are based on the combination of payments and consumer surplus. These values reflect the benefits individuals received from their park experience. Using the account registers allows the calculation of benefits retained within the area of the account register. Personal benefits received by visitors from outside the account register are considered exports, since they are not retained within the account.

3.1.1 Kluane NPR direct users

There are several groups of direct users of Kluane NPR. These include park facility users, such as campers, information centre visitors, picnickers, hikers, and others who physically make use of the park's resources. The amount these visitors paid to use the park can be determined from park records. The amount of consumer surplus enjoyed by these visitors, however, cannot be determined from any records: specialized surveys of the users are necessary. In the absence of this kind of survey data, it will be necessary to use some other information or proxy data to supply at least a minimum estimate of these values.

The consumer surplus is estimated at \$11.13 per person per day (see Section 3.1.2 below). Since there is no basis in the calculated value to assume that there would be differences between visitors from different origins, this value will be applied to all visitors equally.

In the analysis of personal benefits, information on visitor origin is vital. KNPR has no detailed information on visitor origins; however, visitor origins were estimated in calculating economic impacts in an earlier chapter. These numbers will be applied here, as shown in Table 1 below.

Table 1 Origin of visitors to KNPR

<i>Visitor origin</i>	<i>No. of visitors</i>	<i>Percent of total</i>
Non-Yukon Canadians	7,548	9.7%
USA	55,854	71.8%
Overseas	12,076	15.5%
Haines Junction	500	0.6%
Other Yukon	1,834	2.4%
Total Yukon	2,334	3.0%
Total visitors	77,812	100%

The total of all fees paid by KNPR users amounted to \$59,109 in 2002-03⁵. If it is assumed that fees paid are proportional to the origin of visitors, then the following fees were paid by individuals from the following origins

Table 2 Fees paid by origin of visitor

<i>Visitor origin</i>	<i>Percent of total</i>	<i>Fees paid</i>
Non-Yukon Canadians	9.7%	\$5,734
USA	71.8%	\$42,440
Overseas	15.5%	\$9,162
Haines Junction	0.6%	\$355
Other Yukon	2.4%	\$1,419
Total Yukon	3.0%	\$1,774
Total visitors	100%	\$59,109

Personal economic benefits are based on the combination of payments and consumer surplus. These values reflect the benefits individuals received from their park experience. Using the account registers allows the calculation of benefits retained within the area of the account register. Personal benefits received by visitors from outside the account register are considered exports, since they are not retained within the account. This means that the personal benefits associated with the use of Kluane NPR by those residing outside the account register cannot be included in the calculation of economic benefits – for this account register.

The account registers used are as follows: Haines Junction; Kluane region; and Yukon. In effect, however the Haines Junction and the Kluane Region account registers will be combined, since the differences between them are so small.

Haines Junction/Kluane region account register

To calculate the personal economic benefits retained within the Haines Junction and Kluane region account, the fees paid and consumer surplus obtained by park visitors from this area must be estimated. Based on the estimated fees paid and the number of visitors from this account register the following estimate of personal benefits can be made:

Fees paid	\$ 355
Consumer surplus (@ \$11.13/person/day)	\$5,565
TOTAL	<u>\$5,920</u>

⁵ Total revenue by the park was \$203,811 but most of this revenue was unrelated to use of the park – e.g. staff housing payments, crown asset disposal, office rental, etc.

Yukon account register

The same calculation is made for all residents of the territory to estimate the personal economic benefits retained within the Yukon account. Based on the estimated fees paid and the number of visitors from the Yukon the following estimate of personal benefits can be made:

Fees paid	\$ 1,774
Consumer surplus (@ \$11.13/person/day)	\$25,977
TOTAL	<u>\$27,751</u>

Other personal benefits

This study is concerned with the benefits received by the local area and the territory from Kluane National Park and Reserve. The analysis of personal benefits above illustrates clearly that the vast majority of personal benefits from Kluane are not retained in the territory. Rather they are exported to other parts of Canada, to the United States and to other countries. Using the same approach to the calculation of personal benefits received by visitors from outside the territory, this estimate would be as follows:

Fees paid ⁶	\$ 57,336
Consumer surplus	\$840,070
TOTAL	<u>\$897,406</u>

In other words, approximately \$900,000 in personal benefits are exported annually from the territory due to Kluane NPR.

Summary of personal benefits from Kluane NPR

Table 6 below summarizes the personal benefits derived from Kluane NPR. The distribution clearly indicates that the vast majority of the personal benefits produced by Kluane NPR are exported. They are retained by individuals who do not live in the area and bring these benefits back with them to the areas in which they reside.

Table 3 Summary of personal use benefits estimates

<i>Benefits source</i>	<i>Account register</i>		
	<i>HJ – Kluane</i>	<i>Yukon</i>	<i>Outside Yukon</i>
Fees paid	\$355	\$1,774	\$57,336
Consumer surplus	\$5,565	\$25,977	\$840,070
Total	\$5,920	\$27,751	\$897,406

⁶ Note that fees paid by non-Yukon visitors are retained by the park. Although they are a part of the benefits received by the visitors these fees are included as a societal benefit (as described in the societal benefits section below).

3.1.2 Calculation of a personal consumer surplus value

There is no information specific to KNPR on the consumer surplus enjoyed by park users. As a consequence, secondary sources of data are needed to calculate an estimate which could be applied to Kluane National Park and Reserve.

A detailed and extensive literature search was undertaken on the internet and in our own library. In the end, the primary source of information was the Environmental Valuation Reference Inventory (EVRI) maintained by Environment Canada. This is a large database with detailed information extracted from many different valuation studies from around the world. Through our subscription to the service, several searches were made and a list of possibly relevant reports and values was generated. From this list a total of ten files were examined in detail. These documents were:

1. Economic Valuation of Wetlands, Anderson, R. and M. Rockel. 1991
2. The Aggregate Value of the non-priced recreation benefits of the Forestry Commission estate, Benson, J.F. and K.G. Willis. 1990
3. Comparison of Recreation Use Values Among Alternative Reservoir Water Level Management Scenarios. Cordell, H.C. and J.C. Bergstrom. 1993
4. Economic Valuation of Recreation Benefits from Danish Forests. Dubgaard, A. 1998
5. Valuing Rural Recreation Benefits: An Empirical Comparison of Two Approaches. Hanley, N. 1989
6. The Economic Significance of the Long Point Marsh, Lake Erie, as a Recreational Resource. Kreutwiser, R. 1981
7. Economic Benefits of Recreation Sites on Irrigation Reservoirs in Southern Alberta. McNaughton, R.B. 1994
8. Estimating Individual Recreation Benefits Under Congestion and Uncertainty. Prince, R. and E. Ahmed. 1989
9. The Economic Value of Recreation in the Seymour River Corridor: A Comparison of Developed and Protected River Reaches Using the Travel Cost Method. Taccogna, G.S. 1993
10. Benefits of Backcountry Canoeing in Ontario Wilderness Parks. Rollins, K. and W. Wistowsky. 1997.

Information was extracted from these publications that could be of use for the calculation of a personal consumer surplus value applicable to the Kluane National Park and Reserve. Table 4 provides a summary of this information.

Table 4 Summary of extracted values

<i>No.</i>	<i>Type of benefit</i>	<i>Country</i>	<i>Year of data</i>	<i>Description</i>
1	wetland recreation	USA	1984	4 composite values: \$6, \$25, \$76, \$70 per acre of wetland per year
2	Forest recreation	UK	1988	Consumer Surplus of 2 pounds per visit per person
3	Reservoir recreation	USA	1989	WTP \$41.70 per person per annum
4	Forest recreation	Denmark	1994	WTP for 1 year access to forest: 128DKK per person
5	Forest recreation	UK	1987	Consumer surplus of 1.7 pounds per trip
6	Wetland recreation	Canada	1978	consumer surplus for user parties: \$34.85

<i>No.</i>	<i>Type of benefit</i>	<i>Country</i>	<i>Year of data</i>	<i>Description</i>
7	Reservoir recreation	Canada	1992	WTP (campers & day users): Park Lake - \$6.37/day; Little Bow - \$10.90/day; Kinbrook - \$12.04/day
8	Hiking in national forest	USA	1984	WTP of \$8.01 per person per day
9	River corridor recreation	Canada	1992	Consumer surplus per party per visit: upper river - \$5.26; lower river - \$1.25
10	Wilderness canoeing	Canada	1993	Consumer surplus per person/trip day - \$66.40

Note: No. refers to the report number listed above.

When the results presented in Table 4 and the information of their derivation were examined in detail, a number of conclusions were made which resulted in the elimination of several of the reports from consideration as sources to be used in this study. There were various reasons for exclusion, some more obvious than others. The reasons in summary form include the following:

- Reference No. 1 was eliminated because of the manner in which benefits were reported – values per acre of wetland per year. This measure was not consistent with per person per day or per trip.
- Reference No. 3 was eliminated because of the nature of the benefit actually measured – values under different water management alternatives. It was unclear if the values would be comparable to other benefit estimates.
- Reference No. 6 was eliminated due to the age of the estimate (1978) and the very poor methodology used to derive the estimate reported.
- Reference No. 8 was not used further due to the very specific nature of the result reported. It was specific to day trip hikers in George Washington National Forest in Virginia; its applicability to Kluane was considered too remote.

Six studies therefore were used to generate an initial estimate of consumer surplus potentially applicable to Kluane National Park and Reserve. Table 5 summarizes the values (adjusted for inflation and exchange rates) to those reported and produces a simple mean value.

Table 5 Summary of comparable values

<i>No.</i>	<i>Benefit type & country</i>	<i>Canadian \$ equivalent</i>
2	Forest recreation (UK)	\$6.51
4	Forest recreation (Denmark)	\$28.21
5	Forest recreation (UK)	\$5.53
7	Reservoir recreation (Canada)	\$11.53
9	River corridor recreation (Canada)	\$3.85
10	Wilderness canoeing (Canada)	\$77.02
Average value		\$22.11

Note: No. refers to the report number listed above.

The outstanding feature of Table 5 is the fact that study number 10 has a value which is almost three times the next largest value and is over twenty (20) times the value of the smallest value. With such a

large absolute and relative difference it is believed prudent to eliminate the value for wilderness canoeing from the mean value to be. With its elimination the average consumer surplus value falls to \$11.13.

3.1.3 Indirect Users

Indirect users of Kluane NPR are more difficult to identify and it is therefore more difficult to ascribe benefit values to this group. As illustrated in Figure 2 above, the methods of collecting the value information entail specialized surveys, steps which have not been taken for Kluane National Park and Reserve (and indeed generally for most parks or protected areas). Further, there are no references to these values in the literature. As a result, it will be impossible to ascribe any value to this use.

3.2 Non-use personal benefits

Although there are three categories (option, bequest, existence) of benefits usually specified as comprising non-use values, most recent research has concluded that it is virtually impossible to differentiate between these benefits. As a result, the non-use benefits are usually termed “preservation benefits” now. This term will be used in the remainder of this section

Since non-users are difficult to identify, it is difficult to determine how many non-users there are, as well as to place values on these benefits. Specialized household surveys are required not only to identify these stakeholders but also to generate realistic estimates of the values involved. These expensive types of surveys have not been undertaken for this study of Kluane NPR.

There are two problems associated with deriving estimates of these values: one is the fact that we do not know the number of non-users (i.e. persons who enjoy preservation benefits from Kluane NPR) and the extent to which they gain preservation benefits from the park; and the other is that, although we have an estimate of the number of park users, these individuals have not been surveyed for their preservation values associated with Kluane NPR. The best that can be currently accomplished is a very crude estimate, based on other parks, recreation activities and areas from prior studies. There is no fully applicable source of non-use benefits for national parks.

Several secondary sources could be used, however, the most straightforward one is probably the best. A Colorado study⁷ on the value of protecting rivers reported many different findings about preservation benefits and stated succinctly that when preservation values were included in the estimation of benefits, “the benefit estimate is more than 5 times the estimate for recreation use values alone⁸”. This finding will be applied in this study since it provides a relatively simple and well researched basis for estimating preservation values. It creates a value based on use values, it does not introduce other site specific biases, nor does it relate the value to specific recreational activities. If we apply this approach, the biggest question is whether or not the factor of five (5) times use values is applicable to Kluane NPR.

If it is assumed (arbitrarily and in order to err on the side of conservatism) that this factor of five overstates the preservation benefits for Kluane National Park and Reserve, and a factor of four (4) is used, then a crude estimate of the total use and non-use benefits associated with KNPR can be generated. Assuming this factor applies equally to all account registers; estimates can be generated for each account. This is not a particularly satisfactory way of estimating these values, but is considered the best in the circumstances.

A summary of total personal benefits which incorporates these non-use value estimates is presented in Table 6.

⁷ L.D. Sanders, R.G. Walsh and J.B. Loomis. “Toward Empirical Estimation of the Total Value of Protecting Rivers” in Water Resources Research, Volume 26, No. 7, pp. 1345-1357, July, 1990.

⁸ Ibid, page 1350.

Table 6 Summary of personal use and non-use benefits estimates

<i>Benefits source</i>	<i>Account register</i>		
	<i>HJ – Kluane</i>	<i>Yukon</i>	<i>Outside Yukon</i>
Use benefits	\$5,920	\$27,751	\$897,406
Non-use benefits	\$17,760	\$83,253	\$2,692,218
Total personal benefits	\$23,680	\$111,004	\$3,589,624

Note: The values shown should be viewed as probable order of magnitude estimates rather than precise values.

Based on the methods used to estimate personal benefits in this study (benefits transfer), it can be seen that almost all personal benefits associated with Kluane NPR are exported to other areas of the country and the world. This is an expected result given the relatively high level of use of the park by persons from foreign countries. They take the benefits associated with their visit to the park with them.

3.3 Commercial benefits

The results of the economic impact analysis reported in Background Paper No. 2 provide the bulk of the information required to estimate commercial benefits. The economic impact analysis requires some adjustments to reflect the account registers being used (i.e. which impacts to include as benefits). The information is available, however, to calculate these benefits for Kluane NPR.

Economic impact measures the contribution which spending makes upon the economy within the account register being considered. Economic benefits are based on these impacts; they are the impacts which occur because of spending by persons or organizations outside the account register which would not have occurred within the account register without the presence of Kluane NPR. This means that the spending associated with the use of the park by those residing within the account register cannot be included in the calculation of economic benefits; this spending would have taken place in the area even in the absence of the park. But in the case of KNPR, it is not only outside visitor spending that is included: virtually all funds used for operations and development of the park also come from outside the territory. Clearly these funds would not come to the area without the existence of the national park. The impacts associated with these benefits, therefore, can be included as economic benefits in the estimation of overall park benefits.

The account registers used are as follows: Haines Junction; Kluane region; and Yukon. In effect, however, since the differences between them are so small, the Haines Junction and the Kluane region account registers will be combined.

Haines Junction/Kluane region account register

To calculate the commercial economic benefits for Haines Junction, the impacts associated with spending on park visits by residents of Haines Junction and Kluane region must be deducted from the visitor spending impacts calculated earlier. Park statistics do not identify the number of park visits from the local area. However, it has been calculated that there were 2,334 Yukon residents identified as visits, and it would not be unreasonable to assume that 500 of these visits were made to Kluane NPR by residents of Haines Junction and the Kluane region. As a result, the impacts calculated earlier need to be adjusted for the overestimate associated with this spending. Or put in another way, the direct impacts associated with visitors from outside the Haines Junction and Kluane region represent the economic benefit retained in the Haines Junction/Kluane region account register.

Table 7 below summarizes the estimated visitor spending associated with visits to Kluane NPR. The economic impacts associated with spending by residents of Haines Junction and Kluane region (the first column) are not used in the calculation of commercial benefits within this account register.

Table 7 Total visitor spending by category and major origin

<i>Spending category</i>	<i>Visitor origin/residence</i>			<i>Total used to calculate benefits</i>
	<i>Haines Junction and Kluane region residents</i>	<i>Other Yukon residents</i>	<i>Other Canadians and foreigners</i>	
Transportation	\$4,100	\$15,039	\$1,181,934	\$1,196,973
Accommodation	\$2,100	\$7,703	\$908,868	\$916,571
Groceries/alcohol	\$699	\$2,568	\$362,982	\$365,550
Restaurants	\$1,801	\$6,602	\$378,509	\$385,111
Recreation/entertainment	\$699	\$2,568	\$182,939	\$185,507
Other spending	\$600	\$2,200	\$145,975	\$148,176
Total	\$10,000	\$36,680	\$3,161,207	\$3,197,887

Note: The Haines Junction and Kluane region residents' column is not used to calculate economic benefits within this account register.

The economic impacts associated with the applicable spending are calculated as:

Direct GDP	\$419,488
Direct Labour Income	\$338,331
Direct Employment (FTE)	11.0
Tax Revenues	\$ 41,282

In addition to the visitor spending impacts, there are the impacts associated with park operations and development, including salaries to staff. Table 8 below shows spending on goods, service and materials, and where these expenditures occurred. KNPR wages and salaries, totalling \$1,286,022, are not included in the table.

Table 8 Percentage of KNPR spending by area

<i>Area of Spending</i>	<i>Spending per Area</i>	<i>Percentage of Spending</i>
Haines Junction	\$216,590	29.3%
Kluane region	\$ 8,228	1.1%
Rest of Yukon	\$355,344	48.1%
Rest of Canada	\$142,763	19.3%
USA	\$ 16,557	2.2%
Rest of world	\$0	0%
Total	\$739,483	100%

The economic impacts associated with the spending by the park in Haines Junction and Kluane region are summarized as follows:

Direct GDP	\$1,390,396
Direct Labour Income	\$1,343,653
Direct Employment (FTE)	28.9
Tax Revenues	\$ 6,481

In summary, the commercial economic benefits to the Haines Junction and Kluane region from the spending of visitors and the park are as follows:

Direct GDP	\$1,809,884
Direct Labour Income	\$1,681,984
Direct Employment (FTE)	40.9
Tax Revenues	\$ 47,763

These values represent the commercial benefits to the Haines Junction/Kluane region attributable to the existence of Kluane NPR.

Yukon account register

In a similar manner the commercial economic benefits to the territory as a whole can be calculated. In this account register, only the spending of visitors from outside the territory can be used to calculate economic impacts. The numbers shown in Table 7 above summarizes the estimated visitor spending associated with visits to Kluane NPR. The economic impacts associated with spending by all residents of the Yukon are not included in the calculation of commercial benefits within this account register.

The economic impacts associated with the applicable spending have been calculated to be:

Direct and Indirect GDP	\$557,442
Direct and Indirect Labour Income	\$421,870
Direct and Indirect Employment	12.8 FTE
Tax Revenues	\$ 40,811

Again, as for the Haines Junction/Kluane Region register, there are also the impacts associated with park operations and development. Total spending by KNPR within the territory (the first three rows of Table 8 above) plus \$1,286,022 paid in wages and salaries in the Yukon is used to calculate benefits.

The economic impacts associated with the spending by the KNPR in the Yukon Territory are summarized as follows:

Direct and Indirect GDP	\$2,067,602
Direct and Indirect Labour Income	\$1,773,780
Direct and Indirect Employment (FTE)	44.3
Tax Revenues	\$ 14,871

In summary, the commercial economic benefits to the Haines Junction and Kluane region from the spending of visitors and the parks are as follows:

Direct and Indirect GDP	\$2,625,043
Direct and Indirect Labour Income	\$2,195,650
Direct and Indirect Employment (FTE)	57.1
Tax Revenues	\$55,682

These values are the total commercial benefits to Yukon attributable to Kluane NPR.

Summary of KNPR commercial benefits

Table 9 below presents a summary of the commercial benefits associated with spending attributable to Kluane NPR. This summary table indicates that over half of the commercial benefits received in the territory are felt in the Haines Junction-Kluane region. It also indicates that a high percentage of the commercial benefits are received as income to labour. The region around the park enjoys approximately 41 person-years of employment due to the park, while the Yukon enjoys just over 57 person-years.

Table 9 Summary of commercial benefits associated with Kluane NPR

<i>Benefit measure</i>	<i>Account register</i>	
	<i>Haines Junction-Kluane region</i>	<i>Yukon</i>
Gross Domestic Product	\$1,809,884	\$2,625,043
Labour income	\$1,681,984	\$2,195,650
Employment (FTE)	40.9	57.1
Tax revenue	\$47,763	\$55,682

Note: Tax revenue includes only taxes on products and services (e.g. GST, excise taxes, and property taxes, licences, and fees). Income tax is not included in the model.

The measure of the gross domestic product for each account register is the measure added to the personal benefits to generate a sub-total economic benefit estimate.

3.4 Societal benefits

As Figure 1 indicated, societal benefits are the most comprehensive and yet the most difficult to estimate. They encompass many social values and public goods. Generally, we do not have the capability to quantify many of these benefits. The types of benefits included as societal benefits include:

- Financial transfers
- Ecological functions/ecosystem services
- Resource integrity maintenance
- Health, education and scientific benefits
- International responsibilities
- Quality of life and business location decisions

Most readers of this report will acknowledge that these benefits exist and are real. However, quantifying these benefits in monetary terms is difficult, to say the least. In fact, economics has yet to create the methodologies to place values on many of these benefits. Our understanding of the sources of value exceeds our ability to place values on them.

Financial transfers

Revenue received by Kluane NPR from park users amounted to \$59,109, as reported earlier. Of this amount, \$1,419 has been accounted for as part of the personal benefits received by Yukon residents, and \$355 by residents of Haines Junction – Kluane region. The remaining amount - \$57,355 – reflects part of the personal benefits received by non-Yukon residents, but an amount they actually paid. Using our account registers the financial transfers can be summarized as follows:

	<u>HJ - Kluane</u>	<u>Yukon</u>
Financial Transfer	\$58,754	\$57,335

From the perspective of Haines Junction – Kluane region, a transfer of \$58,754 can be considered as a societal benefit resulting from the fees paid by persons from outside the area. From a Yukon perspective, the financial transfer is \$57,335. This \$57,355 then can be considered as a transfer of funds to the Yukon because of the park. This amount is considered as a societal benefit since it is funding transferred to the park from outside the Yukon.

It is not known to what extent other sources of funds were used for programs and activities related to Kluane National Park and Reserve from other sources outside the Yukon, such as WWF, UNESCO, other NGOs or other organizations. If there were such funds being spent, then those specifically related to KNPR could be viewed as a financial transfer that could be included in this benefit component.

Ecological functions

As a natural area, Kluane National Park and Reserve maintains and sustains ecological functions or ecosystem services. These functions and services have a value for all society. The types of functions and services which produce value were briefly outlined in Figure 1, the generalized framework of economic benefits, and include such things as: primary production, sequestering carbon dioxide, soil formation, herbivory, carnivory, oxygen production, population moderation, nutrient transport, moderation of macro- and microclimate, decomposition, maintenance of genetic diversity, and others. There are several sources in the literature describing these functions/services.⁹

Ecological functions, however, are not predicated on the establishment of a national park; they occur with or without any designation. To attribute these benefits to KNPR therefore is not entirely just. However to the extent the national park maintains these functions and services, they can be considered within the next component of societal benefits: maintenance of resource integrity.

Resource integrity maintenance

Certain activities (recreation, sightseeing, photography, etc.) which were undertaken before park establishment, when undertaken in a sustainable manner and in harmony with other activities which fulfil the mandate of the national park or are allowed by treaty (e.g. traditional uses), produce benefits for the participants or users. These benefits which were produced previous to park establishment are maintained by the park. The integrity of the resources is maintained as is the level of benefit which was previously produced. At the same time, incompatible uses are not allowed —mining, forestry, agriculture, etc — thus further maintaining resource integrity. Clearly the extent to which this value is being generated in Kluane National Park and Reserve is impossible to estimate in quantitative terms.

Health, education and scientific benefits

The estimation of health, education and scientific benefits from Kluane National Park and Reserve is difficult to achieve. Some studies of human health have calculated preliminary numbers on the reduced cost of health care when the population is more fit. Recreational activities in KNPR would contribute to visitors' health and presumably thereby have an effect upon the health costs incurred in their area of residence, but to use these numbers requires a too large leap of faith. No estimate of the health benefits to society will be produced by this study.

⁹See, for example, Mosquin, T., P.G. Whiting, D.E McAllister, *Canada's Biodiversity: The Variety of Life, Its Status, Economic Benefits, Conservation Costs and Unmet Needs*, Canadian Museum of Nature, 1995; Costanza, *et. al.* "The Value of the World's Ecosystem Services and Natural Capital" in *Nature*, May 1997; and D. Pimentel, *et. al.*, "Economic and Environmental Benefits of Biodiversity" in *BioScience*, Vol. 47 No. 11. (December, 1997)

In a similar vein, society is better off when the population is better educated. It can be said that visitors to Kluane National Park and Reserve enhance their education by experiencing the park and reading and understanding the information available on the park. The extent to which this enhanced education of park visitors produces a measurable benefit to society is not yet calculable.

Similarly, society is improved with scientific discoveries and advances. Scientific research has occurred at KNPR, and therefore it could be stated that science has advanced because of the park. But, once again, the extent to which this scientific progress produces a measurable benefit to society is not yet calculable.

International responsibilities

Canada participates actively in many international conventions and agreements concerning natural resources, wildlife habitat, biodiversity and the protection of areas of natural significance. One of the means of meeting these international responsibilities is through national parks. Kluane National Park and Reserve, along with Alaska's Wrangell-St. Elias and Glacier National Park, and British Columbia's Tatshenshini Alsek Park, forms the largest international protected area in the world. This combined area is a designated World Heritage Site under UNESCO. By participating in the World Heritage Convention, Canada enjoys a reputation as a responsible partner in natural resource conservation. This reputation has value. The Yukon and Canada benefit from such participation.

There is currently no information on the magnitude of this benefit, nor on the specific methods one might apply to determine such values. Its existence, however, is acknowledged.

Quality of life and business location decisions

The intangible benefits of living and working in the area of a national park can be significant. The quality of life for many is substantially enhanced by the existence of national parks, and Kluane in particular. This is true for not only those who live and work in the area of Kluane NPR but for all Yukoners and Canadians.

Business surveys have found that the location of a business can frequently be influenced by the quality of life and the availability of varied experiences for staff members. Questions of commercial efficiency are a large part of the decision, but where these efficiencies are equal, the location which affords employees a higher quality of life is the preferred location. Areas with large natural areas and cultural diversity frequently are viewed as potential sources of a higher quality of life and are therefore preferred. The extent to which KNPR has influenced businesses to locate in the Kluane region, the Yukon or Canada has yet to be determined. But it is clear that national parks such as Kluane are all part of an effort to improve the quality of life for Canadians and society in general.

No estimate of any value derived from this societal benefit can be made here.

3.5 Summary of KNPR's economic benefits

Table 10 below presents a summary of the quantified economic benefits derived from Kluane NPR in 2002-03. While the numbers are impressive, they tell only a part of the story of the value of the park.

Table 10 Summary of quantitative benefits from Kluane NPR, 2002-03

<i>Benefit category</i>	<i>Account register</i>	
	<i>HJ – Kluane</i>	<i>Yukon</i>
Personal benefits	\$5,920	\$27,751
Commercial benefits	\$1,809,884	\$2,625,043
Societal benefits	\$58,754	\$57,335
Total benefits	\$1,874,558	\$2,710,129

Table 10 indicates several things:

1. Personal benefits derived from Kluane National Park and Reserve are small in relation to the commercial and societal benefits retained in the area for both account registers. This is a function of the small population in the area and their relatively small use of the park compared to others from outside the region or territory.
2. The commercial value of Kluane National Park and Reserve to the region and the territory is significant.
3. The societal benefits are inadequately quantified and do not reflect the societal value which the park generates to these account registers. Further research needs to be undertaken to not only quantify some of the values left unquantified (and not included) but to expand the list of societal benefits specific to KNPR.

4 References

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