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# CONSERVATION OF ECOLOGICAL AREAS: THE ECONOMIC BOTTOM LINE

Dick Stanley

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Economic Framework Project  
Report 315-e



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# Economic Framework Project

In 1998 the Federal Provincial Parks Council called for the development of a common framework for measuring the economic value of protected areas. The purpose of the framework was to help FPPC members speak with one voice when talking about the economic benefits of protected areas within their jurisdictions. It was proposed that the framework should include not only traditional economic impact measurement (e.g., tourism spending, spending on capital development), but also direct user benefits (e.g., consumer surplus, existence benefits) and societal benefits (e.g., benefits from biodiversity, water production, scientific and educational benefits).

Because knowledge and measurement techniques are not equally developed in each of these areas, it was proposed that the work of developing a framework be done in three separate phases, which could be pursued concurrently or sequentially as resources allowed. The three phases are:

1. A user-friendly computerized model for estimating economic impact at the provincial level.
2. A handbook of user benefits showing how the FPPC members could undertake such studies in their own jurisdictions.
3. A series of up to 10 exploratory pilot studies undertaken with the help of academics, to establish a body of case studies on societal benefits

The work was carried out by a project task force, made up of representatives from Ontario Parks, BC Parks, Quebec Parks, NWT Parks and Parks Saskatchewan, and chaired by Dick Stanley, Director, Strategic Research and Analysis, Department of Canadian Heritage (as representative of Parks Canada). The publications in this series are the results of the work of this task force.

## THE PAPERS:

- 315-e Conservation of Ecological Areas: The Economic Bottom Line
- 315-f La Conservation des aires écologiques: les résultats économiques
- 251-e Benefits of Protected Areas
- 251-f Les avantages des aires protégées
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# Conservation of Ecological Areas: The Economic Bottom Line

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\*\* The opinions expressed in this report are those of the author and do not necessarily reflect the views of the Department of Canadian Heritage.

## Summary

The purpose of this paper is to describe the kinds of benefits that protected areas can provide to society, and to point out some standard ways that these benefits can be measured in economic terms. The paper proposes that making decisions about investing public money to protect an area is essentially the same as making a decision to invest in any enterprise. The expected gains must outweigh the expected costs. When investing public money to create a protected area, the costs are usually estimated readily. The benefits, however, are harder to discern. Therefore, the economic impact of construction, operating, and tourism expenditures is often considered to be the benefit created. In fact, these impacts are not benefits at all, but merely represent the amount of economic activity that has been redistributed from elsewhere. The paper proposes instead the use of a series of other benefits such as the benefits that accrue to users from the use of the recreation facilities in the protected area, the benefits that accrue to citizens from the knowledge of the existence of the protected area, and the benefits of the various ecological services that the protected area provides. These benefits, which are the direct equivalent of the revenues that the entrepreneur uses in his or her investment decisions will result in a much more rational use of resources, and will strengthen the arguments for the creation of protected areas.

# **CONSERVATION OF ECOLOGICAL AREAS: THE ECONOMIC BOTTOM LINE**

## **Introduction**

The purpose of this paper is to compare various approaches to the economic valuation of the protection of ecological areas, in other words, to measure their “economic bottom line”. Now, there are many people who would say that the phrase “economic bottom line” was redundant: the only bottom line is economic, and nothing else really matters. If we are to prosper, all investment must be judged on the economic benefits it creates: jobs, revenue, contribution to gross domestic product. All this other stuff: ecological benefits, social benefits, pristine wilderness, biodiversity, are just luxuries that we indulge in at the expense of productive jobs. It is all very well to conserve ecological areas in times of prosperity, but when there is a large number of people unemployed in Canada, we need the jobs that exploiting these areas will create, or at least, we should not be diverting productive investment toward them.

People who think this can generally be recognized by the chain saws.

This paper begins with quite a different proposition: there is no such thing as economic benefits. There are only ecological, social, cultural, scientific and so on, benefits which can sometimes be measured in economic terms. There is a corollary to the proposition: when someone talks about economic benefits, by which he or she generally means jobs, spending in the local community, increased tax earnings to the government, what is really meant is economic activity which has been redistributed from somewhere else. This economic activity can only be considered a benefit under some very restrictive assumptions.

## **The Private Sector View of Benefits**

To understand what is meant by this proposition, let us start with the corollary: what we usually call economic benefits are really only redistributed economic activity.

Consider the case of a private sector entrepreneur who wants to invest in some money making enterprise. He or she has to make a decision as to whether the enterprise will be profitable, in other words, whether it will return a net benefit. The decision can be viewed as a balance.

On one side of the balance, the entrepreneur puts the costs which the enterprise will entail, say 10 million dollars. Against this cost, he estimates, based on some combination of market research, experience, and gut feeling, that he will get 15 million dollars in revenue, or total benefit. On this basis, he proceeds with the enterprise. If things turn out as expected, what has really happened is that the market (which is you and I as consumers) has judged that the 10 million dollars worth of plant, materials, wages and capitalist energy that the entrepreneur has combined into a product is now worth 15 million dollars to us collectively. In other words, 15 million dollars worth of benefits have been created out of 10 million dollars worth of materials. The entrepreneur has added 5 million dollars worth of value.

If, of course, he determines instead that he will only get 8 million dollars in return, he won't make the investment. Or he will lose his shirt.

In deciding to protect an ecological area by, for example, setting up a park, public sector resource managers face a very similar investment decision. Generally they know with some precision how much it will cost: say, 10 million dollars. But what do they put on the benefits side of the balance?

Well, to the extent that they market the park, that is, charge admission, camping fees and the like, they know they will make some revenue: say about 2 million dollars. This is roughly the proportion of costs that Parks Canada made in revenues in the late 1990's. This is the equivalent of the entrepreneur's revenue or benefits. But the park is almost certainly worth more than this: managers do not charge anything like what the experience is worth, and the user fee is usually not the consumers' collective judgement about what the park is worth. So what else can the public sector manager add to the benefits side of the balance to justify the decision to operate the park?

### **Economic Impact: Redistribution, Not Benefit**

Typically, they add economic impact: the number of jobs and the amount of local spending that will take place when the park is in construction and operation. Economic impact occurs because some of the 10 million dollars that the park spends is used to buy local goods and services. The park hires some local people as employees and uses some of the 10 million to pay their salaries. All the employees, locally hired or imported, spend some of their salaries in the local area on the necessities of life. This makes revenue for the local merchants and suppliers. The merchants respend some of this revenue in the local area when they buy goods and services from their local suppliers to supply the park. And so this spending percolates through the local economy, being respent over and over again and generating a whole chain of local benefits. This is the very familiar multiplier effect.

Any spending, by anyone, however, even the entrepreneur of a few minutes ago, has this percolating effect. So why didn't the entrepreneur take this into account when he was faced with expected revenues of only 8 million and decided not to invest? The reason is that he would not get any of this benefit. The local residents and merchants would, but all the money that goes to local people from the entrepreneur is viewed by the entrepreneur as a cost. He gets his return from the value added he creates, not from the amount of money he has to give to other people.

So why should the public sector "entrepreneurs" be able to count this as a benefit, if he cannot? The usual reason given is that the government, federal or provincial, is only investing on behalf of its constituents. Since the local people are constituents of the government, they are the "true" investors. Therefore, when they get a return on their investment in the form of additional jobs or spending, it is legitimate to count it as a benefit.

Now it is true that if a government jurisdiction pours public money into some region of Canada, the people of that region get something they would not otherwise have had. But, that money came from somewhere: in fact, it had to come from somewhere else in the jurisdiction. If the Federal government is doing the spending, then the money came from somewhere else in Canada. If the New Brunswick government is doing the spending, then the money came from somewhere else in New Brunswick. And every dollar the government takes from elsewhere in its jurisdiction is destroying jobs through the exact reverse of the multiplier effect. So, if payments to local people as constituents counts as a positive return on the investment made on their behalf by their government, then losses to other constituents of the same government in other parts of the jurisdiction must reduce that benefit, since they too are "true" investors. And the losses will always more or less equal the gains: immediately, if the jurisdiction is running a balanced budget; later, if the jurisdiction is deficit financing. All the government is doing through its spending and the multiplier effect is redistributing economic activity, not creating new benefits.

The reason the economic impact argument is compelling, however, is that the economic activity that is being redistributed is all being redistributed to one place and can be seen, while the economic activity that is lost from elsewhere is very diffuse. 10 million dollars poured into a

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small community of 500 people who happen to have the good fortune to live beside an ecological area of importance will have a very large effect: \$20,000 per head. The loss, spread over 20 million Canadian taxpayers is half a dollar per head. It is well worthwhile for the 500 to lobby furiously for the expenditure and to extol its benefits to anyone who will listen, a politician looking for votes, for example. It is not worth it for the losers to get involved over a matter of 50 cents. So we have a proliferation of economic impact studies which purport to quantify an economic benefit, when really all they are saying is "My name is Paul and I am here to tell you that you should rob Peter for me".

### **Tourism: A Mixed Blessing**

If public sector managers cannot use economic impact, they generally fall back on tourism. Can tourism spending tip the balance? The protected and developed ecological area will attract visitors who will come and spend money, not only on park fees, but on food, transport, accommodation and souvenirs. They are spending their own money, not tax dollars, so surely they count.

Well, no, not really. Tourists come from somewhere too. And wherever they come from, they would have spent their money there if they hadn't come here. So again tourists are merely a redistribution of economic activity. If Paul is here visiting you, he is not visiting Peter.

Tourism is a bit more complicated however. If people who would have visited some other part of Canada to come to the park, all that is happening is redistribution. If people from the United States visit the park instead of visiting some other part of Canada, all that is happening is redistribution. But, if people came from the United States to visit the park who would otherwise not have come to Canada at all, that could count as a net benefit. Furthermore, if people stay in Canada to visit the park, when they would otherwise have gone south for their vacation, that would be a net benefit too. From the point of view of the taxpayer/entrepreneurs of Canada, it is okay to rob the American Peter to pay the Canadian Paul. It is still redistribution, but it is fair game as long as it does not hurt other Canadians. Of course, that is just because there is no North American jurisdiction. The Tourism Departments of Maine, New Hampshire, Vermont, New York, and Pennsylvania are plenty steamed. They view it as theft. The same thing would apply to a New Brunswick operated park robbing tourists from Quebec or Nova Scotia. From the point of view of the New Brunswick taxpayers, it is justified to consider that tourism spending a benefit.

That is what is meant by the statement at the beginning of this paper that redistribution of economic activity can only be considered a benefit under very restrictive assumptions.

## Real Benefits

So far, this is what can be counted: a few paltry revenues, and the few tourists from outside the jurisdiction who would not have come to Canada without the existence of the protected area. It hardly seems enough to tip the balance.

Remember however the first proposition: "There are only benefits, ecological, social, cultural, scientific, etc. which can sometimes be expressed in economic terms". This is where we see the real economic "bottom line". There is a whole range of benefits of conservation of ecological areas which has appeared in the literature, and some of these benefits can be measured in economic terms, and so added to the balance.

There are lots of lists of benefits, classified in different ways, that identify the ecological, social, scientific, cultural and other benefits that are created by an ecological area, especially when it is conserved and some form of managed access is provided to it. Peter Whiting (1) recently developed such a list for Parks Canada, shown as Appendix 1. In this list are benefits produced by both direct and indirect use, by the sheer existence of the protected area, and by a variety of other uses to which the area can be put. Whiting has put the redistributive economic effects of ecological area operations into a special category called Business Benefits, and he stresses that they are only benefits under a very limited set of assumptions by calling them "economic impact of spending *originating outside the area*" (italics mine). Stanley (2) developed, some time ago, a benefits framework which identified much the same values, but clearly stuck those redistributive effects in a different column. See Appendix 2.

Recently as well, the IUCN undertook two parallel initiatives to articulate the benefits of protected ecological areas, one called Economic Assessment of Protected Areas (3), and the other called Economic Valuation of Wetlands (4). Stanley (2) has argued that the first, on protected areas (see Appendix 3), is badly flawed because it does not differentiate between redistributive effects and real benefits, but it does point to some very interesting and correct economic benefits that protected areas can produce. Tourism and Operating Costs are the redistributive items that are not clearly dealt with, but the other items are what is of interest. These benefits (and costs) have been picked by the authors because they have direct market equivalents that can be used to estimate their value, and so, in the authors' view, will be highly credible in defending protected areas from pressures to develop them. An example will suffice to make this clear. In Australia, a very dry country, the majority of the population of the country gets its water from watersheds which happen to be protected in National Parks. These parks constitute natural dams, reservoirs and filtration plants, which would have to be replaced by vast capital works at great expense if the natural processes inherent in the parks were not left to work by themselves. Now many places in the world have built dams, reservoirs and filtration plants to provide a water supply to their populations, and water is sold to people through municipal and other governments. It is therefore fairly easy thing to determine what a public supply of water costs and what the public is willing to pay for it. Applying this to the Australian situation, it is possible to estimate credibly the benefits that the Australian National Parks produce for free: a clear benefit expressed in economic terms.

Wade Locke, an economist at Memorial University in St. John's produced a preliminary assessment of this list at Gros Morne National Park (5). He examined each of the categories the IUCN proposed, and tried to determine if such benefits are produced by Gros Morne park, and how to go about measuring them (Appendix 4). He found a number of different types of potential benefits that could be measured in economic terms.

The second IUCN paper (Appendix 5) is a more satisfactory benefits framework than the first, because it is more comprehensive and does not mention redistributive effects at all. This list contains all the major benefits that have been identified in the literature. It has categories such

as use benefits (direct and indirect), non-use benefits, and some of the commercial benefits that the previous IUCN guideline identified.

### **Measuring the Benefits**

How can the benefits identified in these frameworks be measured in economic terms?

Use benefits are produced when someone uses a protected area for recreational purposes. Most campers or canoeists will admit, when questioned, that the true value of the benefits they experience in the wilds far exceed the paltry admission price they pay. There are two main ways in which this true benefit has been measured: revealed preference and contingent valuation. For an overview and evaluation of these techniques, see (6). Revealed preference consists of observing the spending behaviour of people as they visit parks, and imputing that spending to their experience. For example, if I spend hundreds of dollars to travel a great distance to canoe in Quetico park, I obviously think that the experience was worth the money. Just because you live nearer to the park, and have to spend much less to get the same experience doesn't mean that you get anything less out of it than I do. All it means is that you got some consumer surplus that I did not. We can measure how much people actually spend to enjoy a benefit, impute those expenditures to others who, through fortunate circumstances, did not have to pay the full costs, and so derive an economic measure of the total benefits received. The other main method, contingent valuation is a very fancy name for asking people directly what they would be willing to pay to do something, or what compensation they would be willing to accept to forego the possibility of doing it.

Walsh (7) has extensively documented studies in which contingent valuation was used to measure the economic benefits of recreational experiences. Coopers and Lybrand (8) recently updated these values and adjusted them to Canada when they studied the value of use benefits for British Columbia parks. Table 1 and 2 are adapted from the Coopers and Lybrand report. Table 1 lists some of the values Walsh found. To get the numbers in Table 2, Coopers and Lybrand used a weighted average of the values of each activity for day users and for campers and used Walsh's value directly for boaters. They adjusted the U.S. dollars to Canadian equivalents for 1993. The values are quite impressive. They estimated that BC Parks system as a whole produced a user benefit of \$716 million in 1993. This amount is made up of the amount they paid in revenues, and the amount of consumer surplus that they received that they did not have to pay for. So use benefits can certainly be put into the balance to help boost the economic bottom line.

**Table 1. Walsh's Estimates of Benefits of a Day of Activity**

Activity	Benefit to Visitor of One Day of that Activity in Dollar Terms (1993 \$U.S.)
Picnic	17.33
Beach	17.33
Swimming	22.97
Fishing	30.62
Bicycling	18.82
Long Hike	29.08
Short Hike	18.82
Use Visitor Centre	22.2
Attend Visitor Program	22.02
Not Identified	18.82
Boating	31.56

**Table 2. Use Benefits Produced by B.C. Parks, 1993**

Activity Grouping	Weighted Average User Day Benefit in Dollar Terms (Cdn \$, 1993)	Number of User Days (millions)	Total Benefit (\$millions)
<b>Day Users</b>	30.9	19.7	609
<b>Campers</b>	33.17	2.6	86
<b>Boaters</b>	49.84	0.4	21
<b>Total</b>			<b>716</b>

The most interesting and significant non-use benefit is existence benefit. This is the benefit that, for example, all citizens of Canada receive because of the existence of a system of National Parks, whether they use them or not. People are happier that they live in a country that has preserved significant parts of their natural heritage and that the heritage will be there for future generations to appreciate. Public opinion surveys (9,10) confirm that far more Canadians take great pride in their National Parks system than will ever visit them and that National Parks are an important reason they feel an attachment to Canada. This pride and satisfaction has an economic value. Kimberly Rollins of Guelph University undertook a study, partially funded by Parks Canada, (11) in which she conducted a contingent valuation study of the amount Canadians would be willing to pay to see the establishment of four National Parks in the north. She estimated the worth to Canadians of those parks at between one and two billion dollars. Lest this number appear exaggerated, the reader should put it in this context. If there are about 10 million Canadian households, and if only half of them are interested in paying for the establishment of the parks, and they were asked to contribute from year to year in a door to door campaign over their working lifetimes, say 30 years, then an annual donation from each of \$10 would add up to \$1.5 billion after the 30 years. How much do households contribute annually to the Cancer Society or the Heart Fund? How much do they contribute to

Greenpeace, a much more controversial and less popular cause, or to the World Wildlife Fund? \$1.5 billion is not a hard number which can be taken to the bank, but it does indicate that existence benefits represent a significant value which can be expressed, more or less well, in economic terms.

Contingent valuation has been used in the United States to determine the amount that oil companies must pay in compensation for oil spills (see, for example, 12). In the case of the Nestucca oil spill in Washington State in 1988, Rowe et al estimated that the residents of Oregon, Washington and British Columbia put a value of \$3,000 on each bird that had to be cleaned up. A panel of distinguished social scientists put together by the National Oceanographic and Atmospheric Administration and led by Robert Solow, the so called NOAA panel (13), did an extensive review of contingent valuation methodologies, and judged that they were a legitimate technique for assigning economic values to hitherto intangible environmental benefits. This has had some considerable effect in the courts in the United States, in enabling them to reach hard, dollars and cents judgements on compensation for environmental damage. It would therefore be fair to add the economic value of existence benefits to our balance.

This paper has already provided an example of the measurement of commercial benefits in the Australian water production story. These were amply documented by the IUCN, and by Wade Locke, so we can add these benefits to the balance as well.

Many of the other benefits that the IUCN, Peter Whiting or others have documented can be estimated in economic terms, more or less well. They can therefore legitimately be included in the balance to help us construct an economic bottom line. Most important, they confirm in empirical, economically quantified terms, what most ecological area managers and planners knew already: that the benefits of ecological areas are substantial. This is the real economic bottom line.

## **Conclusion**

This paper does not advocate that every time a public service manager wants to establish or operate a park or establish a protection program for an ecological area that he or she should conduct a whole series of contingent valuation studies to estimate consumer surplus, or existence values, or measure the extent of all possible ecological services such as water production. A few exemplary case studies will suffice to illustrate the point and provide the evidence that planners need to make their case. There may be occasions when the preservation decision is so controversial that special studies will have to be done, but in general, a recognition that these benefits have substantial economic value, and this value has been unambiguously demonstrated throughout North America in situations not dissimilar to the ones protected area managers face every day should be sufficient to establish a credible bottom line.

## References

1. Whiting, Peter. 1996. *Benefits of Protected Areas*. Report presented to Parks Canada. Department of Canadian Heritage, Strategic Research and Analysis Branch, Ottawa.
2. Stanley, D. 1997. *Measuring the Benefits of Protected Areas: A Critical Perspective on the IUCN Guidelines*. Paper presented at the Northeast Recreation Research Symposium, April 1997, Boulton Landing. USDA Forest Service, Northeastern Forest Experimental Station. Radnor Pennsylvania.
3. IUCN. 1996. *Economic Assessment of Protected Areas: A Park Manager's Guide and Guidelines for Assessment*. IUCN Commission for National Parks and Protected Areas. Gland, Switzerland.
4. Barbier, E., Acerman, M, and Knowler, D. 1997. *Economic Valuation of Wetlands: A Guide for Policy Makers and Planners*. Prepared for the Ramsar Convention Bureau. University of York, Institute of Hydrology and the IUCN, Gland, Switzerland.
5. Locke, Wade. 1997. *Societal Benefits of Protected Areas: The Gros Morne National Park Case Study*. Report presented to Parks Canada. Department of Canadian Heritage, Strategic Research and Analysis Branch, Ottawa.
6. Smith, K.V. 1993. "Nonmarket Valuation of Environmental Resources: An Interpretive Appraisal". *Land Economics*. vol 69, no. 1, pages 1-26. February 1993.
7. Walsh, Richard G. et al. 1992. "Benefit Transfer of Outdoor Recreation Demand Studies 1968-1988". *Water Resources Research*, vol 28 no.3, pages 707-713. March 1992.
8. Coopers and Lybrand Consulting 1995 *Economic Benefits of National Parks*. Report presented to British Columbia Ministry of the Environment, Lands and Parks. Victoria, B.C.
9. EKOS. 1996. *Rethinking Government Project 1996-1*. EKOS Research Associates. Ottawa.
10. Environics. 1996. *Focus Canada 1996-1*. (Omnibus Survey) Environics Research, Toronto.
11. Gunning-Trent, Caroline and Rollins, Kimberly. 1995. *Measuring the Existence Values of National Parks in the Northwest Territories*. Unpublished Thesis presented to the Faculty of Graduate Studies, University of Guelph, Guelph.
12. Rowe, R.D., Schulze, W., Shaw, W.D., Chestnut, L.D. and D. Schenk. 1991. *Contingent Valuation of Natural Resource Damage Due to the Nestucca Oil Spill*. Final Report presented to the British Columbia Ministry of Environment, Victoria.
13. NOAA. 1993. *Report of the NOAA Panel on Contingent Evaluation*. National Oceanic and Atmospheric Administration, U.S. Department of Commerce. Federal Register, January 15, 1993.

## Appendix 1

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## Benefits of Protected Areas as Identified by Whiting

<b>Personal Benefits</b>
Use Benefits -direct -indirect -future
<b>Non-Use Benefits</b>
-option -existence
<b>Business Benefits</b>
Economic impact of spending originating outside of the area
<b>Societal Benefits</b>
Health
Resource Integrity
Business Location
Worker Productivity
Ecological Functions -Natural Services -Water Production -Mitigation of Natural Disasters -Fish Spawning and Breeding
Educational Benefits
Scientific Benefits
International Responsibilities

Appendix 2

**Benefits of Protected Areas as Identified by Stanley**

	<b>True Incremental Benefits</b>	<b>Redistributed Economic Effects</b>
<b>Direct Use of Area for Primary Purpose</b> (protection, understanding, and enjoyment of resource)	Paid Use (= revenues)  Unpaid Use (=consumer surplus)	
<b>Indirect Use of Area for Primary Purpose</b>	Indirect Use (books, TV) Existence Benefits Option Benefits Bequest Benefits	
<b>Use for Collateral Purposes</b>	Natural Services Water Production Ecological Functions Health Effects	Tourism Spending  Protected Area Operations Spending (economic impact)
<b>Externalities</b>	Worker Productivity Biodiversity Scientific, Educational Benefits Amenity Benefits	

## Appendix 3

### **Economic Benefits and Costs of Protected Areas which have Direct Market Equivalents as Identified by the IUCN**

#### **BENEFITS**

1. Tourism
2. Natural Services
3. Water Production
4. Mitigation of Natural Disasters
5. Fish Breeding
6. Hunting and Gathering
7. Commercial Activities

#### **COSTS**

8. Operating Costs
9. Natural Damage
10. Displaced Economic Activities

Appendix 4

**Detailed Benefits of Gros Morne National Park**

Category of Benefits	Examples	Measurement Suggestions
<b>PERSONAL BENEFITS</b>		
<b>Use Values</b>		
direct	domestic timber, snaring, fishing	transfer market values; ensure that these uses do not conflict with other uses
indirect	hiking, boating, cross-country skiing, kayaking, and swimming	actual payments associated with activity combined with estimation of consumer surplus (revealed market information or contingent-valuation/stated-preference surveys)
future	direct and indirect uses enjoyed by future generations	estimate future use value based on present use value; social discount rate required
<b>Non-Use Values</b>		
option	willingness to pay to preserve the option of enjoying personal use of Gros Morne National Park in the future	contingent-valuation/stated-preference survey required for nonmarket valuation
existence	value to Canadians associated with knowing that Gros Morne National Park is a world heritage site and will remain so into the future	contingent-valuation/stated-preference survey required for nonmarket valuation
bequest	value to Canadians associated with knowing that Gros Morne National Park is available for future generations to enjoy	contingent-valuation/stated-preference survey required for nonmarket valuation
<b>BUSINESS BENEFITS</b>		
<b>Economic Benefits</b>	tourism spending from non-residents of Canada (maybe even smaller regional issues) on camping, co-op bookstore	values can be derived from economic impact studies performed previously (care taken to determine the true benefits — not redistribution); also ensure that there is no double counting associated with personal benefits

Category of Benefits	Examples	Measurement Suggestions
<b>SOCIETAL BENEFITS</b>		
<b>Ecological Integrity</b>		
<i>ecological processes</i>		
primary productivity	energy captured by the 'base' of the food web	published values for different land uses; determine the total energy capture and compare to adjacent or other land use — literature survey required
energy flow	energy flows through the food web	determine the upper level carnivore biomass in the park versus alternative land uses — literature survey required
fixing of nutrients	fixing nutrients calcium, carbon, nitrogen, phosphorus	amount fixed by forest/land use multiplied by the area within that forest/land use and compare to adjacent or other land use — literature survey required
cycling of nutrients	cycling of nutrients within a system	nutrient leaching/losses from commercial versus natural forests — literature survey required
soil formation	biological activity which creates productive soils	soil productivity of natural versus commercial forests — literature survey required
<i>watershed protection</i>		
groundwater recharge	annual groundwater recharge	estimate groundwater recharge and compare to alternative land uses; data to be obtained from government sources — soil types, land uses/cover and annual rainfall
water quality	filtration as water moves through soils	using soil types and scientific data to estimate the amounts of pollutants that can be filtered by the park — literature survey required
erosion/flood control	prevention of erosion and flood control	estimate erosion/runoff and compare to alternative land uses; data to be obtained from government sources — soil types, land uses/cover and annual rainfall
<i>biodiversity</i>		

Category of Benefits	Examples	Measurement Suggestions
community structure	natural species composition	examples of plant/animal species and relative abundance; current list needs to be updated
rare species protection	protection of species which are rare or found only within the area	itemize rare species — compare to species lists for alternative land uses outside park; more research needed to identify threatened species
genetic conservation	complexity/diversity within species	genetic conservation improves fitness and allows for continued survival in the face of stress; more research needed for measurement
keystone species	interaction between species/services provided by one species to others	use examples to demonstrate the importance of some 'key' species in Gros Morne National Park — Woodland caribou a likely candidate for keystone species
<b>Health and Worker Productivity Effects</b>		
health	activities such as hiking and cross-country skiing contribute to reduced hospitalization	trail counter combined with length of trails and transferred estimations of the health care savings — overestimate of the contribution provided by Gros Morne National Park specifically; benefits may overlap with personal
productivity	recreational activities also contribute to reduced absenteeism and improved productivity	visitor information and transfer of benefit values — overestimation of the contribution provided by Gros Morne National Park specifically; benefits may overlap with personal
<b>Education and Scientific Benefits</b>		
education	interpretive program and educational visits	numbers of visitors — estimate willingness to pay for educational services; benefits may overlap with non-use personal benefits
scientific	ongoing research within Gros Morne National Park is encouraged; particularly that which leads to a better understanding of the functioning of the ecosystem and the determination of species richness, abundance, and so on	numbers/types of research projects; a significant finding has been the verification of the theory of plate tectonics

Category of Benefits	Examples	Measurement Suggestions
<b>Business Location</b>		
quality of life, community cohesion	proximity to Gros Morne National Park important to location decision for business and quality of life	number of doctors per capita; also survey local businesses to determine this impact — may conflict with productivity and health effects

Appendix 5

**Benefits of Wetlands  
as Identified by IUCN**

Use Values			Non-Use Values
Direct Use	Indirect Use	Option and Quasi-Option	Existence
-fish	-nutrient retention	-potential future uses	-biodiversity
-agriculture	-flood control	-future value of information	-culture, heritage
-fuelwood	-storm protection		-bequest values
-recreation	-groundwater discharge		
-transport	-external ecosystem support		
-wildlife harvesting	-micro-climate stabilization		
-peat / energy	-shoreline stabilization		