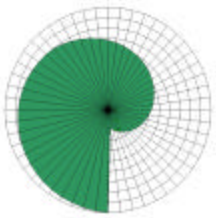

The Alberta GPI Accounts: Parks and Wilderness

Report # 21

by

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September 2001

Pembina Institute
for Appropriate Development

About the Pembina Institute

The Pembina Institute is an independent, citizen-based organization involved in environmental education, research, public policy development and corporate environmental management services. Its mandate is to research, develop, and promote policies and programs that lead to environmental protection, resource conservation, and environmentally sound and sustainable resource management. Incorporated in 1985, the Institute's main office is in Drayton Valley, Alberta with additional offices in Calgary and Ottawa, and research associates in Edmonton, Toronto, Saskatoon, Vancouver and other locations across Canada. The Institute's mission is to implement holistic and practical solutions for a sustainable world.

The Green Economics Program is dedicated to designing and implementing practical, street-smart economic tools that would reorient society back to the original meaning of the word "economy"—the care and management of the wealth of the household. By developing new tools for measuring the true wealth or well-being of nations, we can help guide Canadians and Albertans to a sustainable future.

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About this Report

This is one of 28 reports that provide the background for the Genuine Progress Indicators (GPI) System of Sustainable Well-being Accounts. It explains how we derived the index that was earlier published in *"Sustainability Trends 2000: The Genuine Progress Statement for Alberta, 1961 to 1999."* The research for this report was completed near the end of 2000. The appendices provide further background and explanation of our methodology; additional details can be obtained by contacting the authors. Appendix A includes a list of all GPI background reports.

This report examines the extent of protected areas in Alberta and their value. It attempts to give answers to the following questions:

1) Is the area protected in parks and wilderness in Alberta sufficient to meet Canada's commitment to protection?
2) Is the level of protection of designated areas adequate, for ecosystem health and to provide sufficient habitat to allow species to survive and thrive?
3) How does the area protected compare with the area that has been designated for use for timber harvesting?
4) What is the financial value of Alberta's parks and wilderness as shown by actual expenditures?
5) What is the ecological and intrinsic value of our parks and protected areas and can we express it in monetary terms?

The index, based on the Alberta government's target area for protection, must be interpreted with care. It is of limited value as it measures only the area protected. It does not measure the degree of protection, size of areas protected or the existence of wildlife corridors between them.

Editor's note:
On July 24, 2001, after this report was written, the Alberta government announced five new protected areas, adding 6,970 sq km (1.05% of Alberta) to the province's protected areas system. This brings the total area protected to 12.4% of the province. Of particular note is the Caribou Mountains Wildland Park, adjacent to Wood Buffalo National Park, which covers 5,910 sq km.

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About the Authors

Mary Griffiths joined the Pembina Institute as an Environmental Policy Analyst in May 2000. She brings strong research and policy analysis skills as well as an extensive background and in-depth understanding of a wide range of environmental issues. Mary works with the Energy Watch team on environmental and energy advocacy issues and with the Institute's Green Economics Program on genuine progress indicators for Alberta. She has long been an advocate for the protection of the environment, both in her previous employment and in her volunteer activities. Mary holds a Ph.D. (Medical Geography), University of Exeter, UK and a B.A. (Geography), University of Exeter, UK.

Sara Wilson joined the Pembina Institute in August 2000, as a member of the Green Economics Program. She works on establishing measurements of ecological well-being and community sustainability reflected in genuine progress indicators using time series analysis and valuation methods. Sara aims to promote better physical and economic accounts that will reflect our natural capital, quantitative and qualitative degradation, and the ecological and social costs of losses in ecological integrity. Before joining the Green Economics team, Sara completed the water account and forest account for the Nova Scotia GPI. In addition, she has three years' experience as a forest ecology researcher and three years' experience in environmental education. Sara holds the following degrees: MSc.F. (Mixed Boreal Forest Disturbance Ecology), University of Toronto and B.A. Hon. (International Development Studies and Environmental Geography), University of Toronto.

Mark Anielski is Director of the Green Economics team, and has considerable experience in public policy analysis including natural resource, energy, royalty and fiscal policy issues in both the public (Alberta Government) and private (GPC- Government Policy Consultants) sector. He also serves as Senior Fellow to the U.S. economic policy think-tank Redefining Progress in Oakland, California and authored the 1999 U.S. GPI report with journalist Jonathan Rowe. He currently advises the National Round Table on Economy and the Environment's Sustainable Development Indicator Steering Committee on the development of indicators for measuring sustainability in Canada. Mark teaches business and the environment in the University of Alberta's School of Business. His expertise is varied and broad including accounting for sustainable development, natural resource accounting, public policy analysis, business planning and performance measurement. Mark pioneered the development of natural capital accounts for Alberta's timber, oil, gas, coal and other natural capital as well as having experience in the development of performance measurement systems, land use planning and non-market resource valuation, royalty policy analysis (forestry, oil and gas), and analysis of subsidies for both government and private forestry, energy and financial service industries. He holds a Masters degree in forest economics, plus bachelor degrees in economics and forestry.

Acknowledgements and Disclaimer

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Bill Aris, Data Management Analyst, Strategy and Plans, Parks Canada; Peter Boxall, Associate Professor, Department of Rural Economy, University of Alberta; Roy Finzel, Program Evaluation and Research Coordinator, Program Development and Coordination Branch, Alberta Environment; Darryl Howery, Principal, Applications Management Consulting Ltd.; Archie Landals, Systems Planner, Parks and Protected Areas, Natural Resources Services, Alberta Environment; Peter Lee, National Coordinator, Global Forest Watch Canada and past Alberta Director, World Wildlife Fund Canada; Bonita McFarlane, Senior Human Dimensions Specialist, Canadian Forest Service.

In addition, we thank Kim Sanderson for editing assistance with the project reports. Finally, the Pembina Institute appreciates the vision of Western Economic Diversification in supporting this project – the first of its kind for Alberta, if not internationally.

The contents of this report are the responsibility of the Pembina Institute and do not necessarily reflect the views and opinions of those who are acknowledged above. We have made every effort to ensure the accuracy of the information contained in this document at the time of writing. However, the authors advise that they cannot guarantee that the information provided is complete or accurate and that any person relying on this publication does so at their own risk. Given the broad scope of the project and time constraints, it has not been possible to submit the entire report for peer review. The material should thus be viewed as preliminary and we welcome suggestions for improvements that can be incorporated in any later edition of the work.

Contents

Figures and Tables

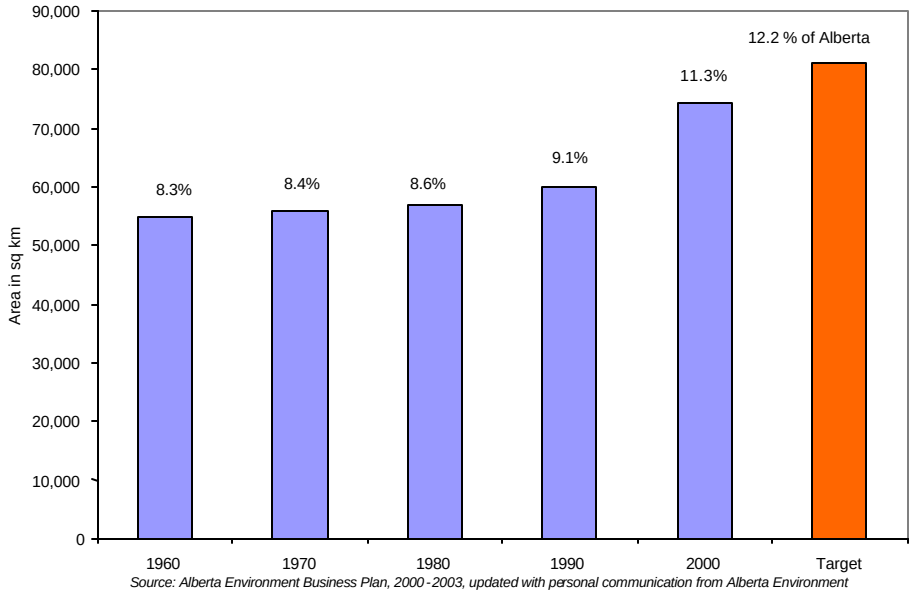
1. Executive Summary

All provinces made a commitment to complete Canada's network of protected areas by the end of the 20th century. To that end, the Alberta Government announced the Alberta Special Places program in 1995, with a target of protecting over 12 percent of the province in parks and wilderness by the year 2000. As of 1995, 8.2 percent of the Alberta land base was already protected in national parks, and a further 1.3 percent in provincial parks. The Special Places program had four goals: preservation of natural heritage; heritage appreciation; outdoor recreation; and tourism/economic development. Partly because these goals sometimes create conflicts, the designation of protected areas was slower than expected. By December 31, 2000, an additional 1.8 percent of provincial land was protected, two-thirds of the original target. Loss of habitat is the major cause of species decline and protecting adequate areas of natural habitat is essential to preserve biodiversity. Even provincial parks and other areas that are nominally protected contain industrial activities such as oil and gas wells.

Noteworthy

- Albertans ranked nature as the most important item in a quality of life survey.
- 93% of Albertans support a protected natural areas network with no provisions for industrial use.
- The Special Places program aimed to increase the protected area of Alberta from 9.5% to 12.2% of the province between 1995 and 2000.
- By the end of December 2000, 68% of the target area had been protected.
- 8.2% of Alberta's land base is protected in national parks and wildlife areas.
- 3.1% of the Alberta land base is protected in provincial parks, natural areas, ecological reserves, wildland parks and wilderness areas.
- An additional 1% of Alberta must still be protected to reach the government's Special Places target. The target, however, is of limited value as many areas are too small or do not have adequate protection.

Area of Alberta Protected, 1960 to 2000



Source: Alberta Environment Business Plan, 2000-2003, updated with personal communication from Alberta Environment

Alberta is still shy of its target for protected areas. Only 11.3 percent of the province is protected, short of the government's 12.2 percent target. Less than 30 percent of the target is met in the Parkland Region and only 42 percent in the Grassland Region—the most settled parts of the

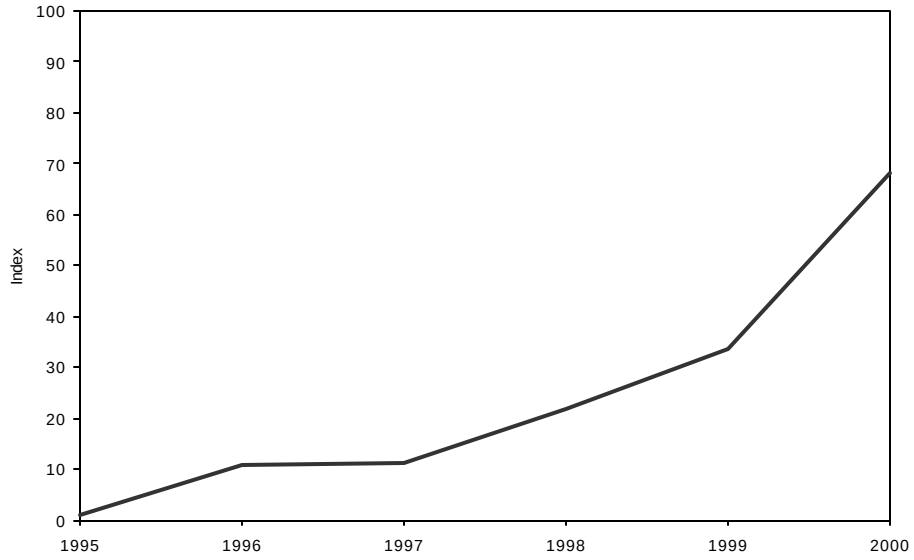
province. Many nominally protected areas are small and others are disturbed by industrial and other human activities.

The lack of properly protected areas of adequate size affects the sustainability of species and is especially critical for large mammals such as the grizzly bear and woodland caribou. While the government has allocated one-third of the province for timber harvesting under Forest Management Agreements, the area the government has protected is only a small fraction of that. Despite the fact that woodland caribou are an endangered species, no large core areas of prime caribou habitat have been protected under the Special Places program.

In the Castle Region of southern Alberta, which contains north-south corridors essential for wildlife moving through the Rockies, the government has not even given proper protected area status. Its designation as a Forest Land Use Zone still allows forestry, energy developments and off-highway vehicle use that fragment habitat and disturb wildlife. We can't put a true price on what has been lost as a result of inadequately protecting our natural landscapes. There are few monetary estimates of the ecological, recreational and other values of protected areas. Alberta parks and recreation areas added an estimated $1-billion to the provincial GDP in 1993/94, or one percent of the GDP. A British Columbia study put a higher price on ecological values than recreational values, suggesting the $1-billion recreational value should be doubled.

The index for protected areas is the target of 18,070 hectares that the government set in 1995 (see figure below). This is 100 on the index, with zero being 1995, when the target was set. The position of 68 on the index indicates that, by the end of December 2000, the government had attained 68 percent of its target. This estimate excludes the Castle Forest Land Use Zone, which has very limited protection. The target has been criticized, as many areas are inadequately protected or too small. A value of $1-billion per year for parks and wilderness is derived from very broad extrapolation based on recreational values. If ecological values of parks and wilderness are included, it might be double that amount. As an index, parks and wilderness ranked at 33 on a scale of 0 to 100 in 1999, where 100 is the best-case scenario. By 2000, the index had increased to 68.

Index of Alberta's Record in Protecting Special Places



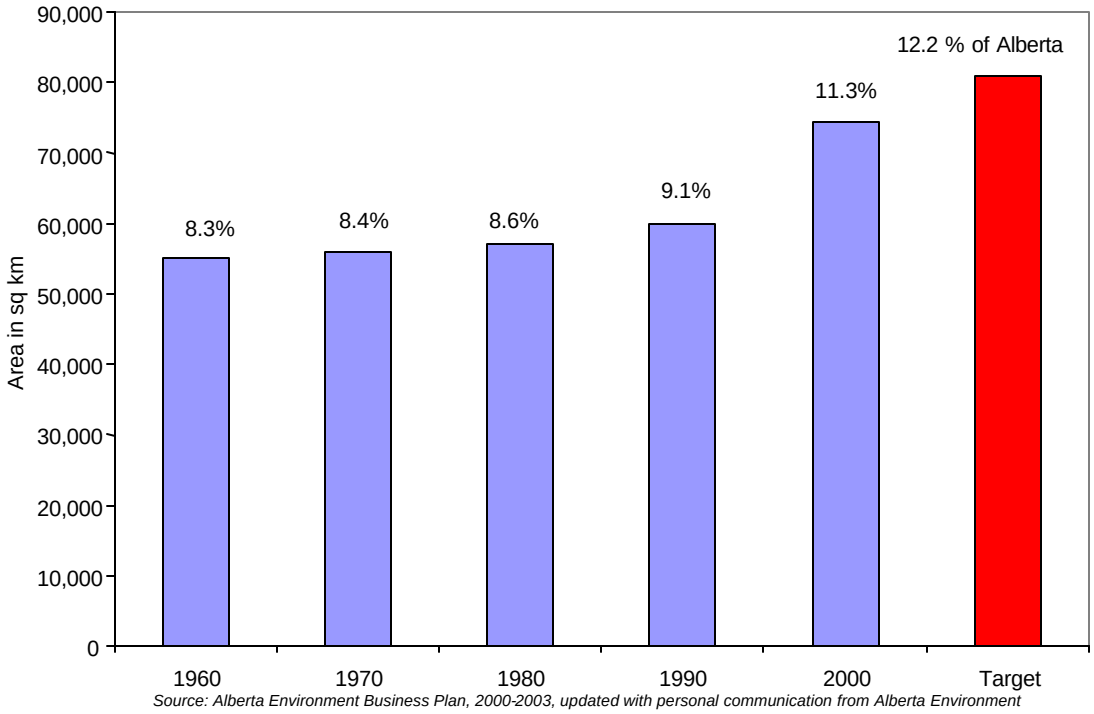
Source: Alberta Environment. For explanation of index, see text.

2. The Extent of Alberta's Protected Areas

Albertans value nature highly. In a survey conducted for the Alberta Growth Summit in September 1997, people were asked to identify what they valued most about the quality of life in Alberta. Twenty-six percent stated "Nature." This was the top response, clearly ahead of the next two qualities: "No provincial sales tax" (21 percent) and "Unpolluted air" (15 percent). In a 1994 poll commissioned by World Wildlife Fund Canada, 93 percent of Albertans expressed support for a network of protected areas with no industrial use.[1]

In a province that has only three million people in an area of over 660,000 sq km, or a density of 4.5 persons per square kilometre, one would expect that there would be plenty of land to set aside as parks and wilderness. Indeed, if one excludes the cities of Edmonton and Calgary, the population density is only 1.75 persons per square kilometre. The federal government had designated several major national parks before Alberta took over responsibility for natural resources in 1930. Jasper, Banff and Waterton National Parks protect part of the Rocky Mountains ecosystems, Wood Buffalo National Park lies in the Boreal Forest Natural Region, and Elk Island National Park is located in the Central Parkland. While 8.2 percent of Alberta was protected in national parks and wildlife areas, only 1.3 percent had been designated by the provincial government by the mid-1990s, and natural regions east of the Rockies were inadequately protected.

Figure 1: Area of Alberta Protected, 1960 to 2000



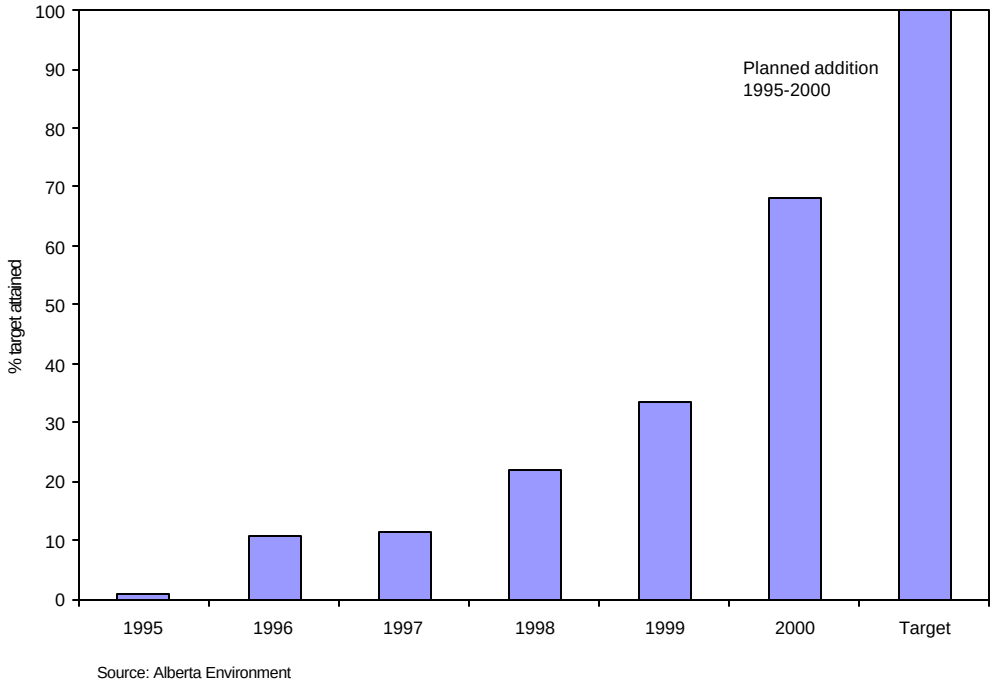
Source: Alberta Environment Business Plan, 2000-2003, updated with personal communication from Alberta Environment

In 1992, Alberta joined all other Canadian provinces and territories in signing a Statement of Commitment to Complete Canada's Network of Protected Areas by the end of the century. The Alberta government's plans for meeting this commitment were revealed in March 1995 when the Special Places policy was announced. Under this policy, the government aimed to secure an

additional 2.7 percent of the province (18,070 sq km) by the year 2000 within a range of managed areas, some of which would be protected. This would potentially increase the total protected area to just over 12 percent of the province. The 12 percent figure is regarded as a minimum for protection, based on a statement in the Brundtland Report.[2]

The Special Places program was to meet four goals: preservation of natural heritage, heritage appreciation, outdoor recreation and tourism/economic development. The program assessed the minimum amount of land needed to represent the biological diversity of the province's six natural regions and 20 natural subregions, and some land has been designated within each subregion. By the end of 1999, 10.2 percent of the province had been protected (including national parks). During the next year a further 6,242 sq km of provincial land were designated and by the end of December 2000, the net amount set aside since 1995 under the Special Places program was 12,288 sq km.[3] This is 68 percent of the government's 1995 target, which it had intended to reach by the year 2000 (see Figures 1 and 2).[4] Together with nationally protected land, 11.3 percent of Alberta was nominally protected, leaving less than one percent still to be designated to attain the government's target.

Figure 2: Alberta's Special Places 2000 Target and Achievement, 1995 to 2000



Source: Alberta Environment

Even though the government is moving toward its target in many regions, the level of protection within designated areas is often inadequate. Over half the total number of sites designated as protected areas under the Special Places program allow for industrial activity. Oil and gas wells, pipelines and other industrial activities are allowed in some provincial parks, natural areas and wildland parks, despite public opinion polls that show Albertans value protected areas highly. As well as the 1994 poll,[5] a 1999 poll found that 91 percent of Albertans supported completing a network of protected areas.[6]

A few examples indicate the level of industrial activity within nominally protected areas. When the Chinchaga Wildland Park in northwest Alberta was designated in December 1999 it had 24

petroleum and natural gas leases and 9 metallic and industrial permits in its 802 sq km area, although several have expired since then. The situation is worse in some parks designated prior to the Special Places program. Lesser Slave Lake Provincial Park, for example, has an average of 1.6 wellsites for every square kilometre, which is five times the density in the Boreal Forest.[7] Crimson Lake Provincial Park, located in the Foothills Forest north of Rocky Mountain House, has over 30 well sites inside the 34 sq km park and a similar number within 2 km of its boundary. Within Lakeland Provincial Park and Recreation Area, 40 percent of the land is leased to the petroleum industry, there is heavy off-highway vehicle use and nearly half of the old-growth white spruce forest has been logged. This is in addition to 500 km of linear disturbance (due to roads and seismic lines) that has halved the effectiveness of the area as wildlife habitat.[8]

The Castle area in southern Alberta, although on the government's list of Special Places, has been excluded from the figure for protected areas given above as it is not adequately protected. Until 1921, the Castle was part of Waterton National Park. It has the richest species diversity of any other similar-sized forest in Alberta, including many species that are considered rare or endangered.[9] The area is extremely important as it contains two of the three north-south routes that enable species to move along the Rockies and across the Canada-U.S. boundary. Its protection is crucial to ensure species connectivity and genetic flow that are essential to the long-term health and survival of species. It is an essential link in the Yellowstone to Yukon project that envisions an intact conservation area from the Greater Yellowstone Ecosystem in the south to the Yukon in the north.

The Castle area is subject to heavy pressures from logging, all-terrain vehicle use and the energy industry. It contains more than 60 sour gas wells and huge areas of clearcuts with very high road densities.[10] The Natural Resources Conservation Board recognized that these industrial and recreational pressures were affecting the sustainability of the area and recommended in 1993 that the Waterton-Castle area should be protected as a wildland park.[11] The government, however, created only the Castle Special Management Area Forest Land Use Zone that does not automatically provide any legislated protection to restrict industrial uses or access by off-highway vehicles. It covers 1,040 sq km, but without adequate protection it will be difficult to undertake habitat management to maximize fish and wildlife populations, as envisaged by the Natural Resources Conservation Board. Indeed, Forest Land Use Zones are not included in the Alberta government's list of Parks and Protected Area Land Descriptions.[12] They were also not recognized as a protected category in the government's Bill 15, Natural Heritage Act, 1999 that was intended to provide updated legislation for protected areas.

Alberta's six natural regions can be divided into 20 natural subregions with distinctive characteristics (see the map in Figure 3). The Special Places program recognized the importance of protecting areas within each subregion.[13] However, the proportion of each region that was targeted for protection for natural history themes was often quite small, ranging from less than two percent of the Foothills Natural Region to between four and five percent for natural regions located on the Canadian Shield. Even these fairly modest targets have not been achieved in some regions. Significant areas of the Alpine and Subalpine regions of the Rocky Mountains were historically protected and new areas were added in 1995 when the Special Places Program started; protected area coverage of the Montane region was later extended. The government target for the Canadian Shield has now been reached, as a result of designations made in six areas that were protected in 1998. By contrast, the more populated areas of the province are inadequately protected. Only 27 percent of the target area has been protected in the Parkland Natural Region and only 42 percent of the target for the Grassland Natural Region. In two subregions the proportion is even lower, with only 21 percent of the target attained in the Foothills Parkland and 23 percent in the Foothills Fescue Grassland (see Figure 4).

Figure 3: Alberta Natural Regions [14]

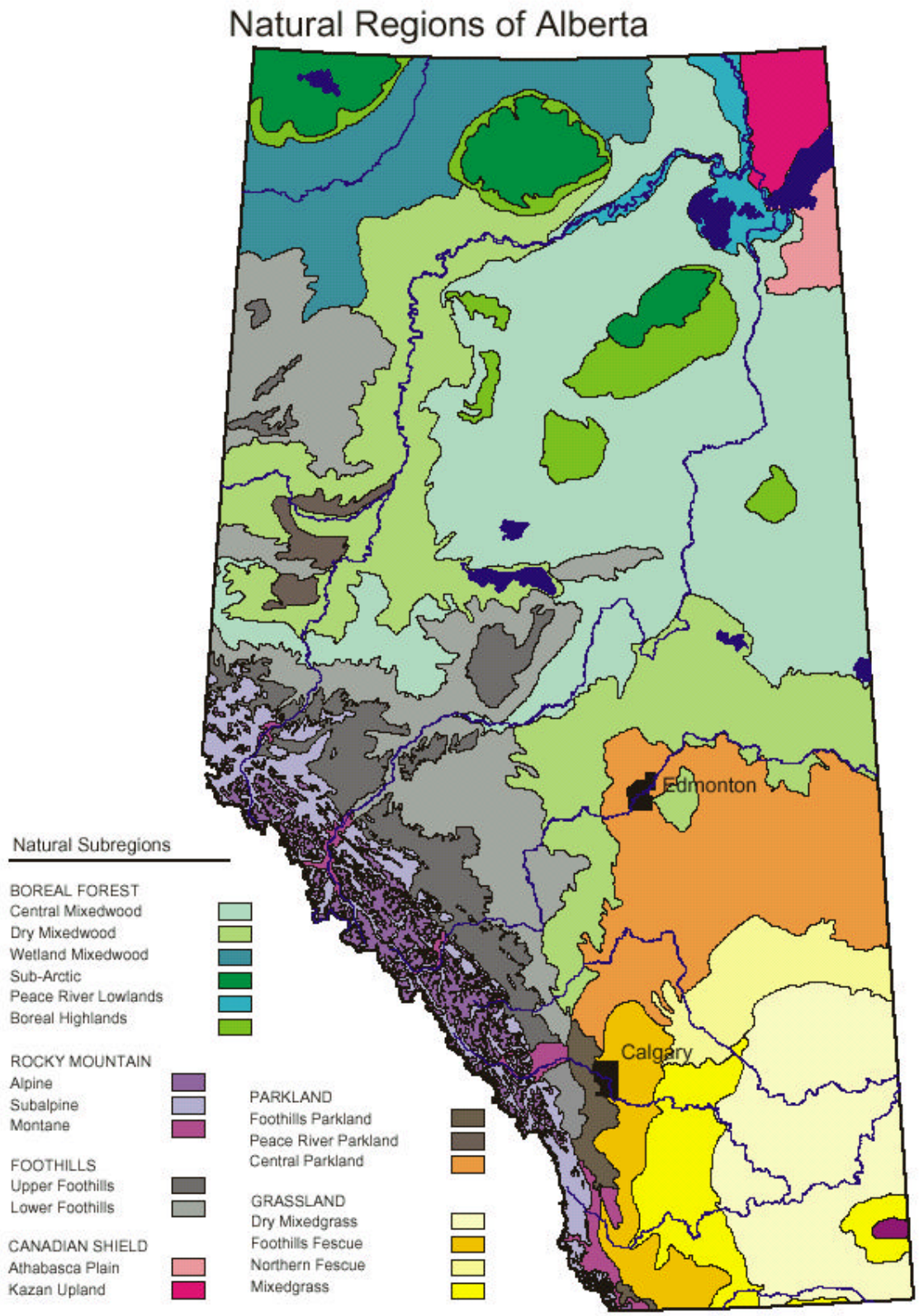
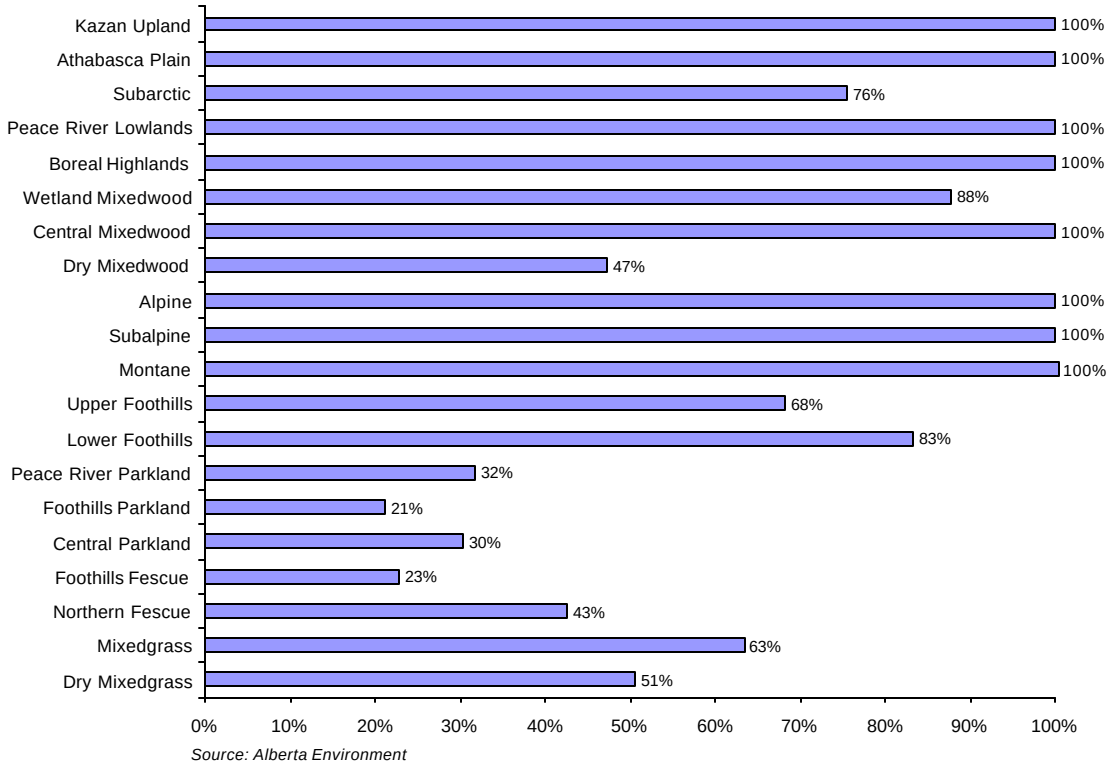


Figure 4: Progress in Protecting Alberta's Natural Regions through Special Places 2000



Source: Alberta Environment

Even when targets are reached, many of the areas are not large enough to ensure the maintenance of ecological integrity and they lack corridors to adjacent protected areas that would enable the easy movement of species. One reason corridors are needed is the decline in woodlands in the settled part of the province. Woodlands on agricultural land decreased by about 80 percent between 1931 and 1986,[15] which means there is less cover for wildlife to move through agricultural areas.

An Alberta government report cited the Canadian Environmental Advisory Council which pointed out that large carnivores and migratory birds need large protected areas: "Large wilderness areas in the order of 4,000 sq km and larger are recommended for complete biodiversity and wilderness protection."[16] Only four of the 76 areas designated between 1995 and 2000 are stand-alone sites that exceed 500 sq km (including two that exceeded 1,000 sq km, the newly designated Marguerite River Wildland Park and the Birch Mountains Wildland Park). Four other areas that exceed 500 sq km (in Kakwa, the Bow Valley, the Spray Valley and the Elbow Sheep area of Kananaskis) link up with existing protected areas to create a larger contiguous protected area in the Rocky Mountains. However, at the other extreme, one-quarter (20) of the stand-alone sites are under 10 sq km in size. Thus, many areas the government has protected may not be large enough to protect the full biodiversity found within a region.

The woodland caribou is an endangered species, as indicated in *GPI Report 22, Fish and Wildlife*. While five of the protected sites (Kawka, Chinchaga, Stony Mountain, Birch Mountains and Marguerite River) overlap caribou ranges, not one additional area of core caribou habitat has been

set aside since provincial biologists warned that the species was in trouble in 1973. The need for protected areas of adequate size is imperative, given the fragmentation of forest habitat, described in *GPI Report 20, Forests*.

It is appropriate here to briefly compare the area that is protected with the extensive areas that are allocated for economic development. The relatively small amount of protected land is compared with the area of Alberta allocated for forestry in Table 1. Between 1995 and December 2000, an additional 1.8 percent of Alberta was designated, but even then only 3.1 percent of provincial lands were protected, compared with 32 percent of the province's area (or 60 percent of the Green Area) that has been granted in Forest Management Area agreements, mostly in the last 12 years. Additional forested lands have been allocated under timber permits so within the forested area of the province, most of the land has been designated for timber harvesting. Other allocations for surface rights access cause as much fragmentation of the forested area as the timber harvesting rights.

Table 1: Provincially Protected Areas in Alberta in Comparison with Forest Management Areas Leased to the Forest Industry, 2000

	Number	Area (sq km)	Percentage of Alberta's land base
Provincial Parks	65	1,679	0.25
Wildland Parks	20	579	0.87
Willmore Wilderness Park	1	4597	0.69
Provincial Recreation Areas	282	775	0.12
Ecological Reserves	16	294	0.04
Wilderness Areas	3	1,010	0.15
Natural Areas	151	1,297	0.20
All Provincially Protected Areas	**538**	**15,448**	**2.33**
Forest Management Agreements (FMAs)			
Current FMAs	15	182,881	27.59
Reserved FMAs	2	7,543	1.14
Proposed FMAs	5	19,647	2.96
Total FMAs	**22**	**210,071**	**31.69**

Source: Alberta Environment[17]

Alberta's record in designating protected areas has been strongly criticized by the World Wildlife Fund. In 1997/8 and 1998/9, the WWF gave Alberta an "F" under its Endangered Spaces program, which evaluated the progress of provinces in protecting natural habitats. Despite adding new protected areas in the last year, the figures show that Alberta is still short of its target. The situation would be far worse if not for the protection afforded by the national parks.

The above review has focused on provincial efforts to increase the extent of protected areas in Alberta because the federal government has already protected 8.2 percent of the province. However, despite their extent, national parks in the Rocky Mountains are coming under increasing pressure from human activities. This pressure is especially felt in the valley floors, which provide important wildlife habitat as well as being the focus for settlement, roads and recreation activities. As humans encroach on wildlife habitat, wildlife is either driven away or

animals come into conflict with humans. Sometimes humans are the victims, but more often it is wildlife, when animals are killed on highways or railways, or problem wildlife have to be removed or destroyed.

The example of Banff clearly illustrates how pressure has increased in the last 40 years. In 1960/61, 390,000 vehicles entered Banff National Park from the east gate. By 1996, this number had risen to 2.6 million, an increase of 6.5 times. In 1999/2000, 4.7 million vehicles entered the park through all gates. Vehicles don't just drive through; many people stay and drive around or undertake activities in the park. Preliminary data from a study in summer and fall 2000 indicated that 72 percent of independent travellers (driving their own vehicle or a rental car) stay at least one night in the park, with an average stay of 5.4 nights.[18] This type of increase in human activity poses a serious threat to the park and is clearly not sustainable. More detailed analysis of this problem is outside the scope of this report, but it has been studied by the federal government. A management plan has been developed, which includes measures to protect and restore wildlife habitat and reduce conflicts with humans.[19] It is too early to say how successful this plan will be and whether Banff and the other mountain parks can be restored and managed in a sustainable manner.

3. The Value of Alberta's Parks and Wilderness

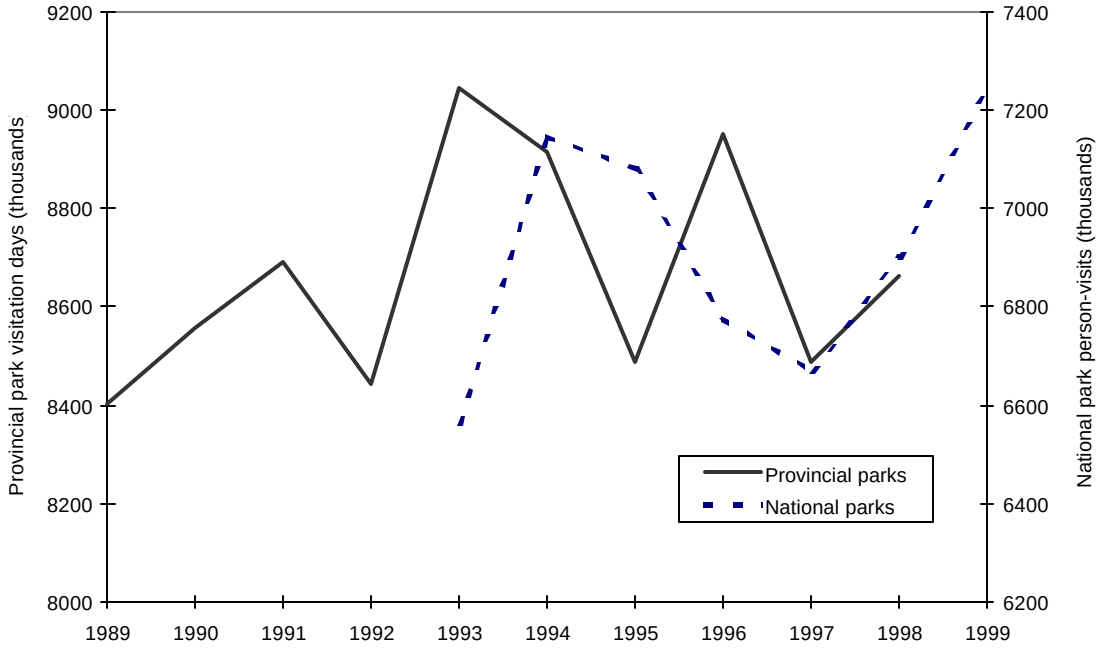
Protected areas have many functions:

- They provide habitat that is essential for retaining the abundance and biological diversity of native species and are particularly important for protecting the habitat of rare and endangered plants and animal species.
- They allow the management of environmentally sensitive areas, including wetlands, watersheds and critical wildlife areas, and they help protect water quality.
- They provide opportunities for natural history interpretation.
- For many people, they are the focus for a wide range of recreational activities. The permitted activities depend on the nature of the designation, ranging from hunting, fishing, horseback riding and boating in some locations, to backpacking or enjoying nature in others. The range of permitted activities is, in general, greater in recreational areas and provincial parks than in wilderness areas and ecological reserves. People may put a value on parks and wilderness because of the recreational opportunities they offer, but these areas also have an "intrinsic" value for people who may rarely visit them, but feel richer through knowing that the areas still exist.

Although the recreational value of protected areas may seem the most obvious benefit, a study in British Columbia by McDaniels and Roessler indicated that people place a higher value on ecological protection than on recreation.[20] People were asked the maximum amount of provincial tax revenues from the forest industry they would recommend the provincial government should forgo annually as a result of reduced forest harvest, in order to double wilderness preservation from 6 percent to 12 percent of the provincial land base. They were asked to show their preferences with respect to ecological values, human demand-related values and human spiritual values. Respondents were on average willing to forgo more tax revenues to obtain ecological values than either of the human-related values. Despite this, most studies focus on the human demand values of protected areas and wilderness. This may be because they are easier to quantify.

The Alberta government uses park visitation as the performance measure for the provincial parks and recreation areas. The number of visitor days increased from about 6.5 million in 1987[21] to over 8 million in 1990. Between 1991 and 1998, the number of visitor days fluctuated between 8.4 million and 9 million and always exceeded the government target of over 8 million visitors per year, as shown in Figure 5, which also shows figures for the national parks.[22] Provincial figures are for visitor days while the national parks figures are for the number of visits, which is less than the number of visitor days (as some people stay more than one day). These recorded visits do not include the number of visits to other types of protected area such as wilderness areas, wildland parks, ecological reserves and natural areas, nor do they give any idea of the monetary value that visitors put on their experience of the parks.

Figure 5: Visitors to Alberta's Provincial Parks and Recreation Areas and National Parks, 1991 to 1999



Source: Alberta Environment and Canadian Heritage, Parks Canada

Various attempts have been made to put an economic value on wilderness and protected areas, but they are usually indirect measures, as access to nature is mainly free. A related report by Environment Canada entitled *The Importance of Nature to Canadians: The Economic Significance of Nature-Related Activities*[23] is described in more detail in *GPI Report 22, Fish and Wildlife*. This document puts a financial value on recreational activities associated with fish and wildlife, some of which take place in protected areas. A few other studies provide more specific measurement of the direct value of parks and protected areas.

Of most direct relevance to Alberta are the studies undertaken in adjacent provinces. A Saskatchewan study reviewed a random sample of 1,250 Saskatchewan residents and found that 58 percent of respondents were satisfied with the current level of wilderness and habitat protection but that 42 percent wanted more, with water quality, air quality and protection of wildlife habitat being the main reasons. The estimated economic value, or willingness to pay for current wilderness protection, was $61 per year.[24]

A study by government departments in British Columbia found that the average household would be willing to pay $119 annually in increased taxes to double wilderness preservation.[25] As the average household in Alberta has 2.7 people, this would give an equivalent of $44 per person, which is less than the Saskatchewan figure. However, if only adult members of a household are considered to be able to pay, the value per person would be relatively close to the Saskatchewan figure. Thus, assuming adult Albertans place a similar value on protection of wilderness as British Columbia and Saskatchewan, they might be willing to pay about $60 per year for wilderness protection.

A few studies have been conducted among campers or park visitors to estimate the "consumer surplus" or recreation benefits associated with particular parks; two of these have been in Alberta. A travel cost model was used to put a value on camping at 33 forest recreation areas in the Rocky-Clearwater Forest of Central Alberta in 1994 and found an estimated value per trip of almost $53.[26] Aggregating this for the total number of trips gave an estimated total annual benefit of camping at the forest recreation areas of almost $750,000. A 1995 study of camping trips in the Foothills Model Forest just east of Jasper National Park, found a consumer surplus of about $58 per trip.[27] The total value for the services provided at the campground sites for 1995 was nearly $440,000. Most of the camping trips were for one or two days, but it is possible that the daily value may be higher for campgrounds or parks that people visit for longer stays. A study of four parks in the Canadian Shield area of Ontario found that the estimated consumer surplus per person per day ranged from $69 to over $400, with the highest value being for the most remote park.[28] It is not known whether there would be a similar differential in Alberta between the value of easy-access short-stay campgrounds and more remote wilderness locations, but it seems likely. Only if a comprehensive survey were conducted at all campgrounds and parks in Alberta, would it be possible to provide a reasonable estimate of their recreational value in monetary terms.

In the absence of a detailed valuation based on consumer surveys, we have to use an alternative assessment. It appears that there is only one study that attempts to measure the monetary value for the whole of Alberta—a paper prepared by Steve Dobson and John Thompson for Alberta Environmental Protection entitled *Parks and Protected Areas: Their Contribution to the Alberta Economy*.[29] In this discussion paper, the authors acknowledge that their economic study was only a partial assessment of the true contribution that parks and protected areas make to Alberta. They recognize the wide range of ecological values provided by parks and protected areas and the contribution they make to the quality of life in Alberta, but pointed out that those values are rarely quantified in economic terms. Also their study was confined to national and provincial parks and recreation areas, thus ignoring the economic contribution of other forms of protected areas, as no visitation figures are available for those sites.

Dobson and Thompson's study used data on expenditures by visitors to provincial parks and recreation areas in 1992/93[30] and the money government spent on park operations. They showed that provincial parks and recreation areas contributed $176-million to Alberta's Gross Domestic Product in 1993/94. The economic contribution of the national parks was far greater, at $882-million, for a combined total of about $1,060-million. Of this, direct and indirect spending by parks visitors accounted for $975-million or just over one percent of GDP. Dobson and Thompson then divided this sum by the total protected areas, which showed that the parks on average generated $191 per hectare in 1993. The value for the provincial parks was far higher (at $938 per hectare) than for the national parks (at $155 per hectare) due to the relatively small size and intense recreational use of the provincial areas. By comparison, agriculture and forestry contribute, on average, $210 and $415 per hectare of land and comparable amounts of employment per unit area. Dobson and Thompson thus concluded that, "Parks and other protected areas do contribute to the provincial economy. Depending on the circumstances, parks and protected areas can contribute as much to the provincial economy per unit of land as other types of resource development, such as agriculture or forestry."[31]

Dobson and Thompson acknowledge that their figures did not include sites with no visitation estimates. "However, even if there were no activity on these sites, the $975-million in GDP spread over all 6.5 million hectares of protected areas in Alberta still suggests an average value of $150 per hectare per year for tourism and recreation, and average employment of 34 person-years per 100 km."[32]

This situation may have changed slightly, due to the increase in the number of protected areas under the Special Places program and the fact that many of the new sites are suited to less intensive recreation than is found in the provincial parks and recreation areas. Assuming that the public expenditure associated with parks and protected areas has remained constant at the 1993 level but is expressed in 1998 dollars ($975-million becomes $1075-million[*]) and that the expenditure is spread over the current area of parks and protected areas (7.4 million hectares), the current economic value of all protected areas in Alberta would be $145 per hectare, in 1998 dollars.

These Alberta values appear high compared with other provinces where, according to studies cited by Dobson and Thompson, the GDP per hectare ranges from $45 (Saskatchewan, 1988) to $66 (Ontario, 1992), with British Columbia at $61-62 (1993-94). However, as Dobson and Thompson point out, the land base for Alberta parks and recreation areas is far smaller and the parks are more focused toward intensive recreational activities than in the other provinces.

If it is assumed that the human-demand value (as expressed by public expenditure) is the same as the ecological value of protected areas (which may underestimate the ecological value, given the B.C. valuations found by McDaniels and Roessler above) the total value of protected areas could be twice the value calculated by Dobson and Thompson. Thus the estimated $1075-million that the public spends on parks (Dobson and Thompson's 1993 figure, expressed in 1998$) could perhaps be doubled. In that case the aggregate value of parks and protected areas in Alberta would be as much as $2-billion per year.

We recognize that this economic valuation is open to debate and more work should be done to collect current data and estimate the ecological and recreational values of parks and protected areas in Alberta.

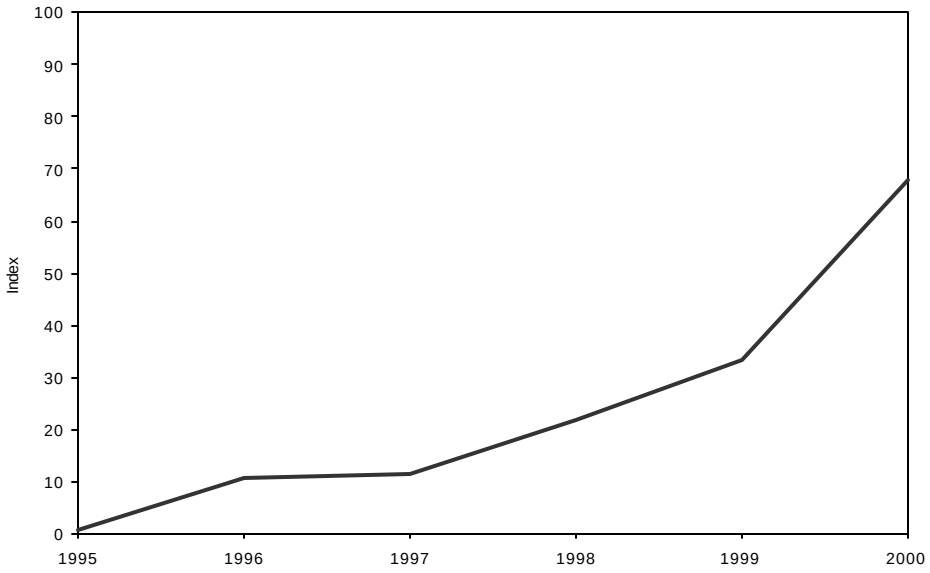
Even if such data can be compiled, it may still not include the less tangible but very real benefits to human health and well-being from a range of outdoor activities that take place in parks and protected areas and the spiritual benefit of just knowing that these places still exist.

[*] Expenditures are adjusted to 1998 constant dollars, using the Alberta Implicit Price Index for Personal Expenditures on Consumer Goods and Services.

4. The Parks and Protected Areas Index

The index for parks and protected areas is based on the Alberta government's Special Places program (see Figure 6). It has as its target the goal the government set in 1995, which was to protect an additional 18,070 sq km of Alberta by the year 2000. Thus zero was the starting point of the program in 1995. The index is based on the net additional area added to the program each year, so where a newly designated area under Special Places incorporated an existing protected area, only the net increase in area is included.[†] As explained previously, the Castle Forest Land Use Zone has been excluded, as it does not have proper protected area status. It can be argued that this index shows greater progress than is actually the case, due mainly to the false assumption that the index is based on a measure of significance.

Figure 6: Index for Area Protected under Alberta's Special Places Program, 1995 to 2000



Source: Alberta Environment. For explanation of index, see text .

Another possible approach to indexing the performance of protected spaces is to create a composite index of the percentage of target area that has been achieved for each of Alberta's natural regions. Giving each natural region equal weighting, we averaged the percentage of target area achieved to date, at the end of 2000, across all natural regions and derived a figure of 55.6. This means that on average, 55.6 percent of all natural regions have met their preservation targets. This is lower than the 68 out of 100 point index we calculated if using aggregate area; thus we could argue that the index we are using is very liberal.

[†] Information on the net increase in area was obtained from a draft document from Alberta Environment: *Fact Sheet – Special Designated Sites (by Natural Region).* This document notes that Willmore Wilderness Park is not included in the program totals, because although it obtained enhanced legislative protection under the Special Places program there was no net increase in area.

In reality, the measure is based on government targets that are far below what conservationists and scientists have recommended for protected areas. It has been suggested that the index should instead measure progress related to the government's achievement with respect to protecting environmentally significant areas (which cover 27 percent of the province, as mapped by the Alberta government), or related to the to the number of natural subregions adequately protected (using the World Wildlife Fund's national analysis of enduring features as a basis).[33] Creating indices based on these alternatives is beyond the scope of the current project, but could be done in the future. However, in either case, progress would be substantially less than the 55.6 or 68 points out of 100 estimated above.

Appendix A. List of Alberta GPI Background Reports

A series of Alberta GPI background reports accompanies the *Alberta Sustainability Trends 2000* report and this report. These documents are being released in late 2001 and early 2002 and will be available on the Pembina Institute's website at www.pembina.org.

Alberta GPI Background Reports and Sustainability Indicators

GPI Background Reports	GPI Accounts Covered by Report
1. Economy, GDP, and Trade	• Economic growth (GDP) • Economic diversity • Trade
2. Personal Consumption Expenditures, Disposable Income and Savings	• Disposable income • Personal expenditures • Taxes • Savings rate
3. Money, Debt, Assets and Net Worth	• Household debt
4. Income Inequality, Poverty and Living Wages	• Income distribution • Poverty
5. Household and Public Infrastructure	• Public infrastructure • Household infrastructure
6. Employment	• Weekly wage rate • Unemployment • Underemployment
7. Transportation	• Transportation expenditures
8. Time Use	• Paid work time • Household work • Parenting and eldercare • Free time • Volunteerism • Commuting time
9. Human Health and Wellness	• Life expectancy • Premature mortality • Infant mortality • Obesity
10. Suicide	• Suicide
11. Substance Abuse; Alcohol, Drugs and Tobacco	• Drug use (youth)
12. Auto Crashes and Injuries	• Auto crashes
13. Family Breakdown	• Divorce
14. Crime	• Crime
15. Gambling	• Problem gambling
16. Democracy	• Voter participation
17. Intellectual Capital and Educational Attainment	• Educational attainment
18. Energy (Oil, Gas, Coal and Renewable)	• Oil and gas reserve life • Oilsands reserve life
19. Agriculture	• Agricultural sustainability
20. Forests	• Timber sustainability • Forest fragmentation

GPI Background Reports	**GPI Accounts Covered by Report**
21. Parks and Wilderness	• Parks and wilderness
22. Fish and Wildlife	• Fish and wildlife
23. Wetlands and Peatlands	• Wetlands • Peatlands
24. Water Resource and Quality	• Water quality
25. Energy Use Intensity, Greenhouse Gas Emissions and Air Quality	• Energy use intensity • Air quality-related emissions • Greenhouse gas emissions
26. Carbon Budget	• Carbon budget deficit
27. Municipal and Hazardous Waste	• Hazardous waste • Landfill waste
28. Ecological Footprint	• Ecological footprint

Appendix B. Protected Area Data

Cumulative Area Protected from start of Special Places Program in 1995 and the Index, where 100 is the government target of 18,070 sq km protected

Year	Cumulative Area Protected (sq km)	Index
Pre 1995		0
1995	157	1
1996	1,929	11
1997	2,062	11
1998	3,961	22
1999	6,046	33
2000	12,288	68
Target	18,070	100

Endnotes

[1] World Wildlife Fund Canada, 1994. Dunvegan Poll. Calgary.
[2] Brundtland, G. H., 1987. *Our Common Future*, Report of the World Commission on Environment and Development, chaired by Gro Brundtland, Oxford University Press, p.166.
[3] Net figure supplied by A. Landals, Alberta Environment, personal communication. The Castle Forest Land Use Zone is not included in this figure. The net figure is less than the figure of 16,578 sq km that can be calculated from the Alberta Government Special Places website: http://www.gov.ab.ca/env/parks/sp_places/sites.html, as those figures include some land that was already protected prior to 1995, but included in new designations.
[4] Figure 2 based on from data from *Fact Sheet - Special Places Designated Sites (by Natural Region)*, from A. Landals, Alberta Environment.
[5] World Wildlife Fund Canada. 1994. Dunvegan Poll. Calgary.
[6] World Wildlife Fund Canada. 1999. Market Facts of Canada, November 17-21 survey, Toronto.
[7] Alberta Environmental Protection. 1998. *The Final Frontier: Protecting Landscape and Biological Diversity Within Alberta's Boreal Forest Natural Region.*
[8] Alberta Environmental Protection. 1998. *The Final Frontier: Protecting Landscape and Biological Diversity Within Alberta's Boreal Forest Natural Region.*
[9] Sawyer, M. 2000. "The Castle Wilderness from Sanctuary to Siege," *Encompass*, Vol 5, No. 1, Oct/Nov. 2000, pp.4-8.
[10] Sawyer, M. 2000. "The Castle Wilderness from Sanctuary to Siege," *Encompass*, Vol 5, No. 1, Oct/Nov. 2000, p 5.
[11] Natural Resources Conservation Board. December 20, 1993. Decision on Application # 9201, *Vacation Alberta Corporation Recreational and Tourism Development, Westcastle-Pincher Creek Area.*
[12] Alberta Environment website, *Alberta's Parks and Protected Areas*, Land Descriptions at http://www.gov.ab.ca/env/parks/lrm/
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[14] Map from Alberta Environment.
[15] Thomas, R. 1998. *The Final Frontier: Protecting Landscape and Biological Diversity within Alberta's Boreal Forest Natural Region* Alberta Environmental Protection.
[16] Alberta Environmental Protection, 1994. *Report #3: Alberta Protected Areas System Analysis.*

[17] Alberta Environment. 2000. *Parks and Protected Areas: Land Descriptions* at www.gov.ab.ca/env/parks/lrm/ was the source for the protected areas data. The Forest Management Areas data were provided by Alberta Environment in November 2000.
[18] Kemp, A. Parks Canada, personal communication.
[19] Parks Canada. 1997. Banff National Park Management Plan Summary, http://www.worldweb.com/parkscanada-banff/mp_texte.html
[20] McDaniels, T. L. and C. Roessler, 1998. "Multiattribute Elicitation of Wilderness Preservation Benefits: A Constructive Approach," *Ecological Economics* 27, pp. 299-312.
[21] Dobson, S. and J. Thompson. 1996. *Parks and Protected Areas: Their Contribution to the Alberta Economy*. A Discussion Paper prepared for Alberta Environmental Protection.
[22] Alberta Environment. 1999. *Visitation Statistics, Provincial Parks and Recreation Areas, 1998/99.* National Park data is from the Parks Canada website at http://parkscanada.pch.gc.ca/library/DownloadDocument/documents_e.htm
[23] Environment Canada. 2000. *The Importance of Nature to Canadians: The Economic Significance of Nature-related Activities,* Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians.
[24] Loewen, K.G. and S.N. Kulshreshtha, 1995. *Recreation and Wilderness: Participation and Economic Significance in Saskatchewan*. Prince Albert Model Forest Association Inc., Prince Albert, Saskatchewan. Work cited by B. L. McFarlane, Canadian Forest Service, Northern Forestry Centre, Edmonton, personal communication.
[25] Study conducted by the British Columbia Ministries of Forestry and Environment, Lands and Parks, 1995, cited in Daniels, T. L. and C. Roessler, 1998. "Multiattribute Elicitation of Wilderness Preservation Benefits: A Constructive Approach," *Ecological Economics* 27, pp. 299-312.
[26] Boxall, P.C., B. L. McFarlane and M. Gartrell. 1996. "An Aggregate Travel Cost Approach to Valuing Forest Recreation at Managed Sites," *The Forestry Chronicle,* Vol. 72(6): 615-621.
[27] McFarlane, B.L. and P.C. Boxall. 1998. *An Overview and Nonmarket Valuation of Camping in the Foothills Model Forest,* Information Report NOR-X-358, Canadian Forest Service, Northern Forestry Centre, Edmonton.
[28] Boxall, P.C., J. Englin and D.O. Watson. 1999. *Valuing Wilderness Recreation: A Demand Systems Approach in the Canadian Shield,* Information Report NOR-X-361, Canadian Forest Service, Northern Forestry Centre, Edmonton.
[29] Dobson, S. and J. Thompson. 1996. *Parks and Protected Areas: Their Contribution to the Alberta Economy*. A Discussion Paper prepared for Alberta Environmental Protection.
[30] Alberta Environmental Protection. 1994. *Impact of Provincial Parks and Recreational Areas on the Alberta Economy*, Internal paper.
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[32] Dobson, S. and J. Thompson. 1996. *Parks and Protected Areas: Their Contribution to the Alberta Economy*. A Discussion Paper prepared for Alberta Environmental Protection, p.21.
[33] Lee, P., National Coordinator Global Forest Watch Canada and formerly, Conservation and Education Manager, Recreation and Protected Areas Manager, Alberta Environment and Regional Director – Alberta, World Wildlife Fund Canada, personal communication. See also G. MacCrimmon and T. Marr-Laing, *Patchwork Policy, Fragmented Forests: In-situ Oil Sands, Industrial Development, and the Ecological Integrity of Alberta's Boreal Forest,* Pembina Institute, May, 2000. Appendix 1: WWF: 'Top 50' Key Landscape Areas of Interest.