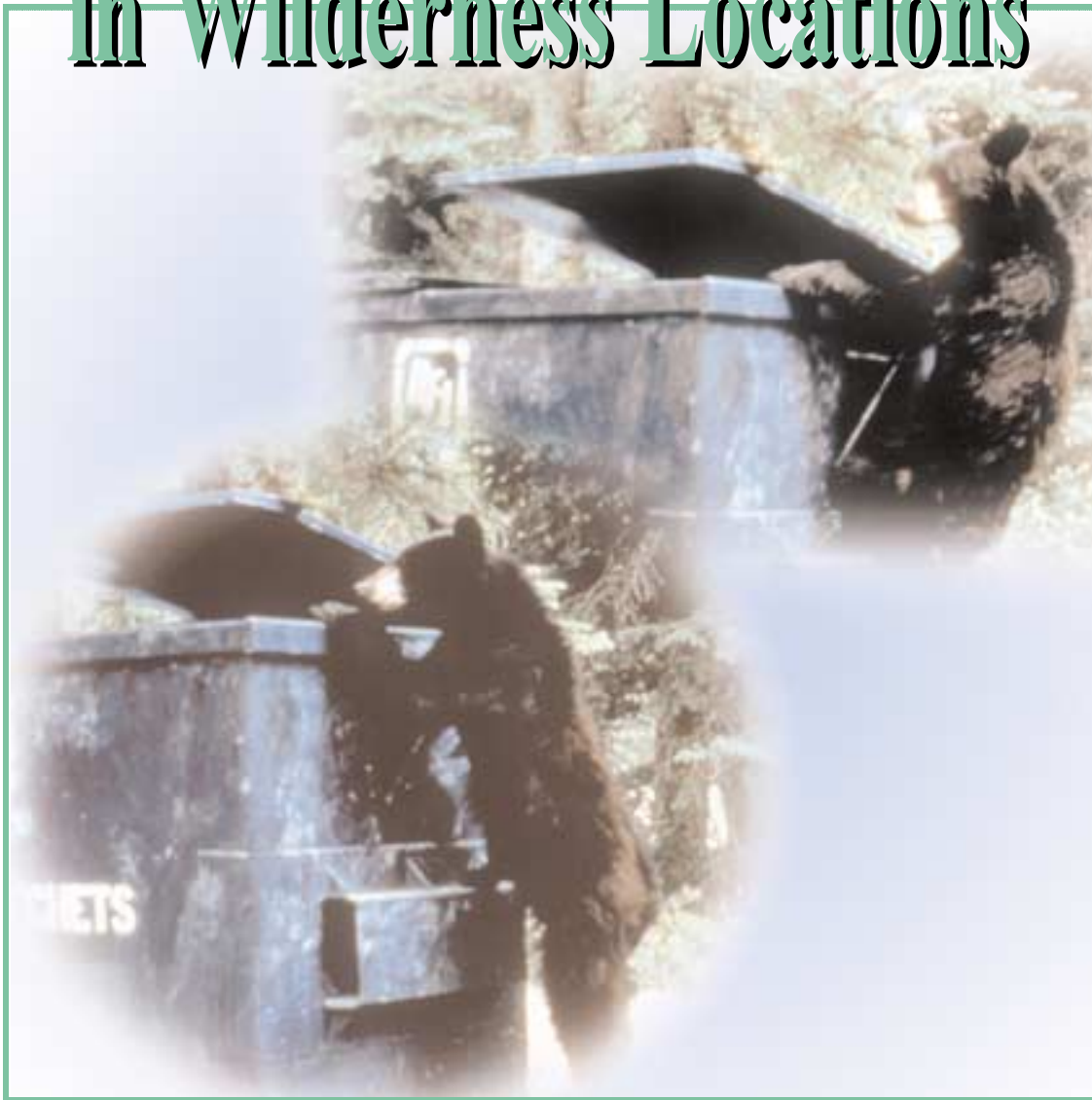


The Importance of Infrastructure Development in Wilderness Locations



Written by: Cameron Kelly Philipp
Haul-All Equipment Ltd.
Lethbridge, AB, Canada

Presented at The Western Black Bear Conference Coos Bay, Oregon, USA May 4, 2000 by:

Dennis Neufeldt
Haul-All Equipment Ltd.
Lethbridge, AB, Canada

Tom Vail
McClintock Metal Fabricators Inc.
Woodland, CA, USA

The Importance of Infrastructure Development in Wilderness Locations

Wilderness locations, and especially national and provincial parks are essential for the enjoyment of outdoor activities. According to the most recent study on “The Importance of Nature to Canadians”, approximately 85 per cent of Canadians spent an average of 75 days in wildlife related activities in 1996 (Environment Canada (EC), 1999); this is up from an average 69 days reported in a similar 1991 study, “The importance of wildlife to Canadians” (EC, 1994).

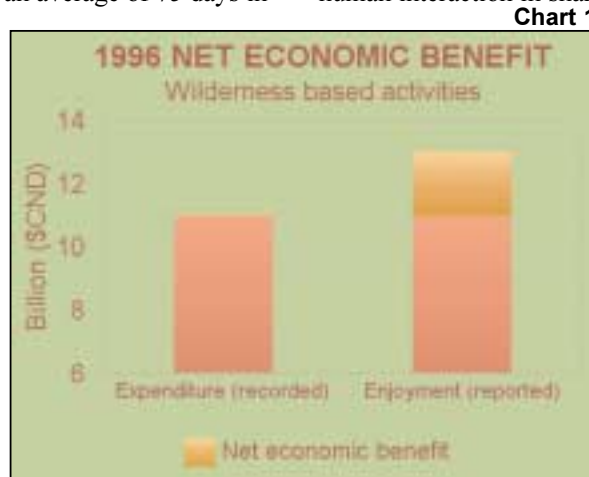
Not only do people enjoy participating in wilderness-based activities, the corresponding enterprise provides significant economic benefits. The same 1996 study found that expenditures on nature-related activities amounted to \$11.0 billion. In addition, the *net* economic benefit from these transactions was found to be \$2 billion (see chart 1). This is a significant amount especially in light of the implied asset of \$100 billion¹ from which it accrues.

Therefore, the economic consequence from poor wildlife management and failing to maintain the wildlife inventory for future generations is conservatively equivalent to a depreciated loss to Canadians of \$100 billion. On the other hand, providing a framework for sustainability through a policy of wildlife infrastructure development, is equivalent to an investment that will strengthen the capitalized portion of the wildlife asset.

The protection of this asset, regardless of its value, is paramount to the concept of sustainable development. Like an investment that pays a yearly annuity, the capitalized portion needs to be managed in a way that does not jeopardize the long term dividend yield. To ignore the consequence of unsustainable use is to

jeopardize the rights and health of future generations.

However, sustainable use of an asset requires a planned infrastructure that minimizes the negative environmental effects of human interaction in shared wilderness locations.



Source: Environmental Canada 1999

Leading wildlife biologist, Dr. Steven Herrero, has identified waste management as a key infrastructure element that has a significant impact on the health status of wildlife (Bear Attack, 1999). It has been shown that if the waste management system does not eliminate the food rewards from human garbage, wildlife becomes habituated to feeding in garbage containers and at landfills.

This behavior threatens to erode the economic benefit from wildlife related activities for four reasons:

- jeopardy to the safety of people in wilderness locations;
- the depreciated experience from viewing habituated wildlife;
- the threat to a species' ability to survive in a natural setting; and
- the costs associated with managing wildlife related issues.

These issues threaten economic benefits from the revenue, asset, and cost side respectively as explained below.

A decline in revenue is precipitated by a decline in the number of wilderness users as the level of perceived safety decreases and the level of perceived danger increases. It can be shown that bears habituated to human food and garbage become increasingly aggressive toward people and therefore, pose a real threat to human safety.

For example, in the early to mid-1970's, the frequency and severity of bear attacks on humans increased dramatically in Jasper National Park. Subsequently, steps were taken to educate Park users and eliminate food rewards. By 1981, a basic bear-proof infrastructure had been established and even with an overall increase in the number of Park visitors, the



¹Using two per cent since lower rates favour sustaining the yield into the future - as is preferred with environment projects - because higher rates favour current use of an asset.

occurrence of bear attacks related to food or garbage was eliminated (Ralf, 1995). Thus, a bear proof infrastructure is essential for providing safe wilderness locations and therefore protecting the revenue streams generated by the economic activity of recreational wilderness users.

The decline in asset value, and the corresponding economic benefits from asset utilization, will result from a decline in wildlife populations precipitated by an increase in mortality rates. Mortality rates increase as a result of decreased natural habitat as well as a deviation from natural patterns of behavior stemming from interactions with people. The result is an increased frequency of highway/rail accidents and animal “destruction.”

Unnecessary animal deaths are equivalent to the slash and burn practices witnessed in the rain forests of Brazil where valuable resources were destroyed and lost for the sake of rapid and inappropriate development.

Bear destruction is particularly ironic given a recent study conducted by Angus Reid which showed that the number one reason for visiting a park or wilderness location was for the purpose of wildlife viewing (Bradford, 2000). Knowing this, it should be of paramount concern to protect a park’s most important revenue generating attraction.

Finally from the cost side, it is generally agreed that reactive strategies are more expensive than proactive measures that prevent cumulative effects. Thus, education and the development of an infrastructure that protects bears, are primary management strategies that proactively manage the costs associated with protecting the wildlife resource.

For example, an average of 900 “nuisance” bears are reported destroyed each year in the province of British Columbia, and 1999 was no exception (Theodore, 1999). Although the “hard” costs associated with this preventable loss are included in the net benefit calculation, the depreciated value of the wildlife asset is not - undoubtedly a much greater expense. On this account, both hunters and environmentalists agree that the number of bears lost is too high, suggesting an unsustainable activity.

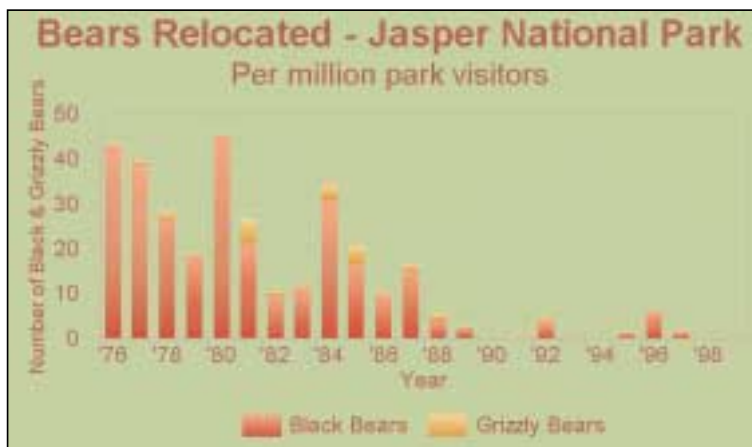
Stakeholders in British Columbia may need to make a greater investment in the type of infrastructure that eliminates food and garbage rewards, because to operate in stasis will only affect the economic benefit (i.e., annuity) in a way that will sharply erode the wildlife asset.

By contrast, Jasper National Park, spanning 5,280 square miles

in the province of Alberta, Canada, has destroyed an average of two black bears each year since 1988. Based on the roaming area of black bears in BC, the number of bears reported destroyed in that province is almost eight times the loss experienced in Jasper² (Ralf, 1995; Ralf, Bradford, (RB) 2000). One of the key differences is Jasper’s comprehensive bear proof waste management infrastructure.

In the 1970’s, Jasper National Park was experiencing an alarming trend of bear related injuries and attacks. Between 1976 and 1979, 12 Park visitors reported being injured. In the same period, 143 bears were relocated while 42 were destroyed (Ralf, 1995). Park documents and reports identified the problem to be a lack of awareness about bear safety as well as inadequate infrastructure to support bear-safe practices.

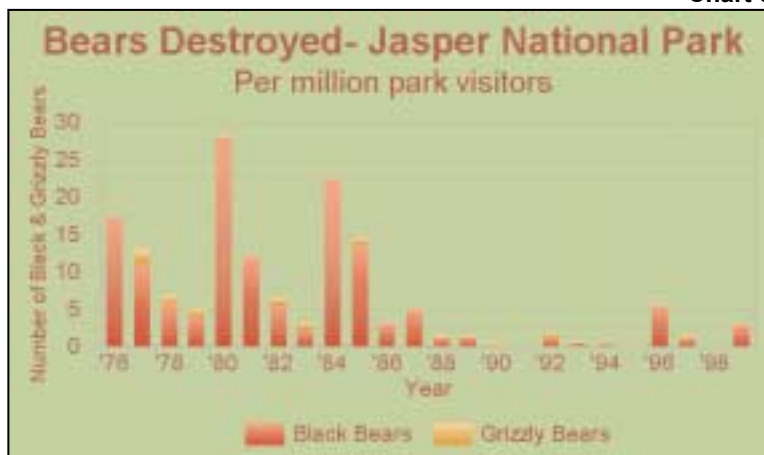
Chart 2



Source: Jasper National Park, 1995, 1999

The Park’s solution was a two tiered strategy of education and infrastructure development. Education consisted of pamphlets distributed at Park entry points and advertisements around the town site. Although infrastructure development started in 1970 with the closure of open sky dumps in favour of a regional landfill, real progress wasn’t recorded until 1981 when an electrified fence was installed around the landfill, and when bear proof garbage containers were provided in outlying campgrounds.

Chart 3



Source: Jasper National Park, 1995, 1999

Injuries to humans by bears dropped from three in 1979 to zero in 1981 (Ralf, 1995). However, large numbers of bears were still being relocated or destroyed as bear activity continued in the town site. The solution was to extend the installation of bear proof containers from campgrounds to include the town site. This proved to be successful as evidenced by a drop from 22 to 8 in the number of bear relocations and a drop from seven to two in the number of nuisance bears being destroyed (RB, 2000).

² $[900 / (360,000 * 0.85)] / [5,280 / 2] = 7.8$, the number of bears destroyed in BC (900) over their roaming habitat (85% of 360,000 sq mi), in relation to the number destroyed in Jasper (2) given the resident habitat within the Park (5,280 sq mi).

Education and infrastructure development have had a significant impact on our ability to share wilderness locations with wildlife populations in Jasper National Park. Comparing the twelve year spans before and after the principal bear management plan was implemented in 1988, bear relocations are down from an average of 30 to 3, and bears destroyed are down from 13 to 2 per year. The decline in bear/people conflicts has been significant especially in light of a 37 per cent increase in the average number of visitors to the Park between the two periods. Put another way, relocations have declined from 25.6 to 2.0 per/ million visitors (see chart 2), and bears destroyed have dropped from 11.5 to 1.4 per/ million visitors (see chart 3).



In addition to a significant positive effect on the wildlife asset, the improved infrastructure generated actual savings to administrative budgets. There was a total cost savings of over \$303,000 in conflict management. This is equivalent to an average cost savings of over \$25,000 per year in warden time and equipment, representing an average savings of 80 per cent per year over the previous period.

The intangible savings are much greater. Jasper’s bear management program has saved the lives of an estimated 130 bears and over 325 were saved the trauma of relocation.

This sharp decline in the number of destroyed and relocated bears could be evidence to suggest that an animal proof waste management system is the most significant step toward sustainability of our shared wilderness areas.

A bear proof waste management system can also provide savings in the cost to collect and transfer waste material over non-bear proof methods, including conventional curbside collection.

For example, in 1997 the Town of Canmore, Alberta (a population of 8,500) began to phase in bear proof waste collection, completing the installation project in May ‘99. Bear proof “Hyd-A-Way” containers were installed in residential and commercial districts. The containers are serviced by a side loading collection vehicle that is typically operated by a single person. Canmore’s fiscal budget for 1996 shows that the cost of curbside

collection and transfer was \$187,000. Although that was the last year curbside service was offered, the town estimates that the same service for the 2001 fiscal year would cost \$361,000 given a 3 per cent inflation rate and a 27 per cent population growth. By contrast, a recent estimate suggests that the town’s cost to collect and transfer waste using the bear proof containers should be approximately \$201,000; an approximate savings of \$160,000 or 44 per cent (see chart 4).

Appropriate infrastructure can also generate significant cost savings due to reduced property damage. For example, in 1995, vehicle damage in the amount of \$250,000 US was reported in Yosemite National Park, stemming from the improper storage of food and garbage (Bears in the Balance). This could be substantially reduced through education coupled with appropriate handling of food and waste.

It is clear that the provision of an appropriate waste management infrastructure can have a real affect on the net economic benefit derived from wilderness activities. Given the examples above, it is easy to understand that proper infrastructure is key to the sustainable use and enjoyment of wildlife-based activities. Furthermore, an infrastructure that promotes the sustainable use of the wildlife asset:

- **Protects revenue streams.** People who may be concerned about bear attacks are more likely to enjoy and frequent wilderness locations when bear/humanpeople conflicts are minimized or eliminated.
- **Protects current and future asset values.** Bears are healthier when human food and garbage rewards are eliminated. Wildlife inventory levels remain in an ecological balance when “nuisance” bears are saved from being destroyed.
- **Minimizes costs.** A significant cost savings is accrued from a reduction in man power, supplies, insurance claims and the cost to collect waste material. The cost savings can be used for reinvestment back into the community: a financial reward for protecting wildlife.

Chart 4



Source: Calculated from 1999 Annual Report, Town of Canmore

•**Benefits are maximized.** Maximizing the enjoyment from wildlife related activities follows the same principles used in business to maximize shareholder benefits while achieving sustainable use of company assets. These principles are: (i) steady and consistent revenue

growth; (ii) wise asset-equity investments; and (iii) cost minimization.

Applying these common sense rules to wildlife management in wilderness locations will provide the framework necessary for sustainable enjoyment.



In summary, this analysis suggests there is a significant social and financial benefit from investing in the health status of wildlife in shared wilderness locations.

Works Cited

- Environment Canada. Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians. (1999). The Importance of Nature to Canadians: Survey highlights. (QH77.C3F47). Ottawa.
- Environment Canada. Federal-Provincial-Territorial Task Force on the Importance of Nature to Canadians. (1994). The importance of wildlife to Canadians: The economic significance of wildlife-related recreational activities in 1991. (QL894.24F54). Ottawa.
- Town of Canmore. Water & Sanitation, Solid Waste Services. (1999). 1999 Annual Report. (Unpublished). Canmore.
- Ralf, R. Bradford, W. (1999) Bear/Human Conflict Management: Year End Report - 1999. Jasper National Park: Unpublished.
- Ralf, R. (1995). History of Bear/Human Conflict Management in Jasper National Park: 1907-1995. Jasper National Park: Unpublished.
- Theodore, T. (1999, December 12). "Too many 'nuisance bears' killed, hunters, environmentalists agree." Vancouver (CP).
- Ellis, R. (1999). Bear Attack: Encountering Grizzlies. Video: Keg Productions. Toronto.
- YNP, (Yosemite National Park). Bears in the Balance. Video: YNP Production. Yosemite National Park.
- Bradford, W. (2000, April 25). Wildlife/Human Conflicts Specialist, Jasper National Park. [Interview conducted by the writer.]

The author gratefully acknowledges the kind and dedicated assistance of Rick Ralf and Wes Bradford of Jasper National Park; Andreas Comeau of The Town of Canmore, Alberta; and Roland Maw of Lethbridge Community College. Their belief in the importance of this project's theme allowed its completion in the time frame allowed.