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**CRITICAL ISSUES**

*bulletin*

Science  
Fiction or  
Science  
Fact?

The Grizzly Biology  
behind Parks Canada  
Management Models



*by Barry Cooper, Jason Hayes, and Sylvia LeRoy*



**Critical Issues Bulletins**

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# Executive summary

The movement in North America to preserve natural areas and wildlife species has embraced the new crisis discipline of conservation biology. Supported by tax dollars and generous government grants, and by vocal and effective international environmental interest groups and lobbyists, conservation biology has had a distinct impact on the management of Canada’s national parks. The basis of conservation biology is the “fundamental shift in ethics” (Gibeau 2000: 49) toward a new understanding of what natural resources and parks are for. Even so, because conservation biologists employ the language and concepts possessing considerable phonemic overlap with other branches of wildlife science, conservation biology appears similar to standard or ordinary wildlife biology. Only when the end purposes are brought into focus do the differences between the two appear.

This Critical Issues Bulletin separates the science and politics of wilderness conservation by analyzing the basis of new models of park management. In particular, we examine the science that supports the “mission-oriented” research of the Calgary-based Eastern Slopes Grizzly Bear Project (ESGBP). As the central organization conducting grizzly research in southwestern Alberta, the ESGBP has had a significant impact on the management of Canada’s Rocky Mountain national parks. This report examines their use of data and computer models in the management of grizzlies and of protected areas. Among the things we found:

- Grizzly bear conservation is being used to justify the expansion of Parks Canada policy to areas far beyond park borders. Recent amendments to Canada’s National Parks Act and the brand new Species at Risk Act (SARA) give new legislative and regulatory weight to this preservationist prerogative.
- While no one questions the importance of managing grizzly populations carefully, reports that Alberta grizzlies are suffering from a “progression of extinction” are misleading. Much of the confusion owes to the misuse of common terms such as “extinction” and the distinction of geographically defined sub-populations.

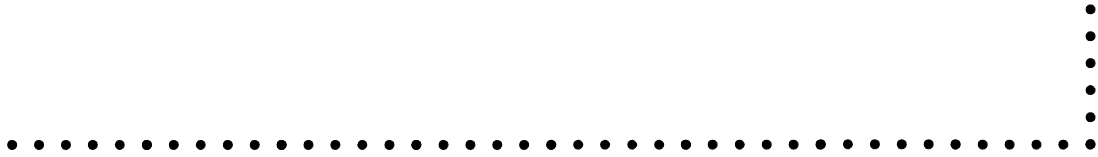
- Canada’s national parks are not “islands of extinction” for grizzly bears. Contrary to the claims of fear-mongers, the population of grizzly bears within the Rocky Mountain national parks is not remotely limited or depressed by genetics. Since 1988, the estimated number of grizzly bears in connected populations outside the national parks has nearly doubled—an increase of approximately 2% to 3% a year.
- Management decisions regarding Canada’s national parks are made in the absence of valid and reliable wildlife biology. In the language of computer models used to predict the long-term viability of grizzly bear populations, any human presence in the ecosystem is directly linked to grizzly bear “extinction.” This has prompted policy recommendations calling for radical restrictions on human access to parks and recreation areas in the Rocky Mountain area.
- Grizzly bear habitat models fail to distinguish between the mortality risk caused by a hunter and that caused by a hiker, which leads to the contention that any human presence in a “carnivore management unit” will reduce the effectiveness of the grizzly bear habitat.
- The benchmarks being used to determine core “security areas” for grizzly bears have been progressively expanding as ESGBP researchers confine their study to those most sensitive to human presence (“wary bears”).
- Parks Canada has responded with expensive initiatives to restore the “ecological integrity” of the parks, including \$24.6 million to terminate existing commercial leases in Canada’s national parks.

With conservation biologists and interest groups promoting radical environmental policies playing increasingly important roles in the management and extension of government protected areas, it is prudent to note concerns that such policies may not reflect either the diversity of legitimate public interests or the best long-range

management policies. So long as Canada's national parks are defined as de facto grizzly habitat and human use is automatically considered to be a disturbance to it, the push to limit human enjoyment of natural areas is bound to increase. Eventually Canadians will be able to enjoy their wilderness, parks, and recreation areas only in some ethereal sense of deriving remote and virtual comfort from the knowledge that they exist. Thus, we make the following recommendations:

- We recommend that ESGBP's entire raw data set, modeling software, and parameters be placed in the public domain, not least of all because their research has been substantially funded by federal and provincial tax dollars.
- The results of computer simulations predicting the "extinction" of grizzly bear populations in the central Rockies should not be used to guide any actual management regimes until the data, the assumptions, and the methodology are reviewed by independent modeling specialists.
- Future use of habitat models should be constrained by the necessary inclusion of a cost/benefit analysis to determine if the implementation of the model findings will cause greater damage to provinces, regions, or communities than alternative management actions.
- These models should only be used as one of a group of tools in a broad suite of land and wildlife management tools. No single tool should play as determinative a role in the management of Canadian National Parks.
- Parks Canada should renew its commitment to both human use and environmental protection of the parks.
- Parks Canada should define and provide specific guidelines for the implementation of the precautionary principle. The current ambiguity surrounding its definition and preservationist tenor to its past application requires that a coherent framework be applied and implemented.
- Parks Canada's "ecosystem management" approach should not be used to expand its management prerogatives beyond national park boundaries. Likewise, any strategies of "adaptive management" must be tempered with the need for legal and administrative certainty for park visitors and service providers.

The issue that we take with conservation biology is not that its practitioners have preconceived opinions. Rather, we believe it is reasonable to expect that research claiming to be scientific, that is funded by tax dollars, and that has a direct impact on the management of publicly owned lands would be carried out in such a way that the biases of researchers have limited influence on their findings. Credible, independent peer-reviewed science, along with a broad suite of management tools and developing technologies, can provide the necessary apparatus to understand bear biology and models. When this understanding is rooted in a management approach that emphasizes individual responsibility, choice, and the education of bears and humans, both populations will be better served



# Introduction

In both Canada and the United States, federal parks and wildlife agencies have been in the vanguard of popular trends in wilderness conservation. Environmentalists protesting the anthropocentric thrust of modern social values look to government-run parks and protected areas as core refuges of pre-Columbian environmental integrity. For a select group of biologists, these protected areas provide a closed laboratory for wildlife research and experimentation. For radical environmental interest groups as well as for some scientists, the centralized structure of federal parks and land management agencies also provide attractive opportunities to influence policy and gain organizational funding (LeRoy and Cooper 2000). Recently, concern over the role of interest groups in public lands management has led to a healthy and lively debate over issues of bias and the application of weak methodologies to research projects (Chase 1987, 1995; Jones and Fredricksen 1999; Kay 1995). Further concerns exist over the use and predictive capabilities of computer-based population models.

## The US experience

Controversy over interest-group politics buttressed by an activist, not to say ideologically deformed, science has been well documented in recent critiques of public lands management in the United States. Given its beauty, delicate ecosystems, important wildlife populations, and its status as America's first national park, Yellowstone has long been the centre of debate about the application of science in park management in that country. According to Alan Fitzsimmons, former policy advisor to the US Department of Interior, "long-standing interest in the area plus the predominance of federal lands in the region—millions of acres of national forest surround the park—make the area a very attractive testing ground for new paradigm ideas" (Fitzsimmons 1999: 70). Foremost among these "new paradigm ideas" have been theories about ecosystem management, natural regulation, and ecological integrity.

## Devastating fires

In the summer of 1988, an estimated 249 fires burned across 1.4 million acres in the area of Yellowstone National Park. This included 45 fires that began in the park and five that started outside and moved in (Franke 2000). One third of the park was left in charred devastation after officials made the early decision to let the fires burn in the name of "natural regulation." This "hands-off" approach to the management of public lands resulted in dense, degenerate, or over-mature forests that encouraged the massive fires in Yellowstone National Park to begin with (Fretwell 2000; Nelson 2000). The same policies were responsible for fires that burned throughout Arizona and Colorado in the summer of 2002 (Ibbitson 2002) and constitute the long-term result of misconceived strategies of species management and protection (Chase 1987, 1995; Kay 1997).

## Spotted owls

The campaign to limit harvesting in the "old growth" forests of the Pacific Northwest likewise drew attention to the integrity of science in federal wildlife management policy. These efforts were successful when the spotted owl (*Strix occidentalis*) was listed under the Endangered Species Act. Highly focused research on the population viability (i.e., the number of owls necessary to maintain species persistence) of spotted owls was commissioned, which then was used to ensure the owl was listed as an endangered species, despite concerns over the integrity of the research design and over the absence of a traditional, independent, and reputable scientific peer review (Chase 1995). As activist Andy Stahl explained it, "the Northern Spotted Owl is the wildlife species of choice to act as a surrogate for old-growth protection, and I've often thought that thank goodness the spotted owl evolved in the Northwest, for if it hadn't we'd have to genetically engineer it. It's the perfect species to use as a surrogate" (Bourret 1999).

This controversy raised additional questions about the relationship between environmental activists and their allies in the scientific community. It turned out that

these concerns were well founded. A 1988 US Federal Claims Court ruling determined that the US Forest Service arbitrarily, capriciously, “and without rational basis,” employed faulty data relating to spotted owl habitat to stop logging activity in a Californian forest. According to the presiding judge, forest supervisor John Phipps “justified reliance upon known biased results because he believed that any bias would err in favour of maintaining owl habitat and canceling the proposed timber sale” (Wetsel-Oviatt Lumber Company, Inc. v. The United States 1998). In his testimony before the US Senate Committee on Energy and Natural Resources in October 2000, Forest Service Deputy Chief Jim Furnish later stated that such claims relating to the Northern Spotted Owl in Oregon, Washington, and California had resulted in damages paid by government of over US\$32 million (Furnish 2000).

### **Wolf recovery**

Similar controversy accompanied the 1987 plans of the US Fish and Wildlife Service for wolf recovery in the northern American Rocky Mountains (an area including Yellowstone, northwest Montana and central Idaho). According to the US Fish and Wildlife Service (USFWS), 300 wolves would be needed (100 in each of three recovery areas) to restore wolves to the level of recovery mandated under the Endangered Species Act. Curious as to how the USFWS arrived at that number, Dr. Charles Kay, wildlife biologist at Utah State University, filed a request with the USFWS under the Freedom of Information Act. Their reply indicated that the USFWS recovery targets had been established with little or no supporting scientific evidence, leading Kay to conclude that “all the government’s wolf recovery reports, population models, and studies regarding possible impacts on big-game hunting are arbitrary and capricious. They represent not science but a masterful job of deception” (Kay 1996: 3–5).

### **“Lynxgate”**

Another group of American Federal and Washington State wildlife biologists in the employ of the US Forest Service made international headlines in late December 2001, when one of them alleged that a federally funded study of the Canadian lynx (*Lynx canadensis*) included fraudulent data. These bureaucrats had submitted hairs from captive lynx allegedly in order to mislead and bias study results toward finding the presence of the endangered lynx in the wild. If the alleged hoax had gone undetected, the falsified presence of these hairs would have led the Environmental Protection Agency (EPA) to impose restrictions on

human use, including major closures in Wenatchee and Gifford National Forests in Washington State, in order to protect what would then have been considered critical lynx habitat. The biologists defended their actions by arguing that the lab charged with identifying previously submitted samples provided “screwy” results (Glick 2002: 3). Accordingly, they “independently decided to test the men and women in white coats by sending them hairs from captive lynx,” which ought to be seen as “control samples.” Although the biologists admit that they “did not follow the chain of command” and that the lynx study did not require or allow the use of “control samples,” they nevertheless claimed, “there was no collusion.” A Forest Service investigation cleared them of criminal charges but prompted a congressional investigation of the scandal, along with a review by the General Accounting Office of the national lynx inventory process (Hanson 2002; Malfi 2002). Whether a deliberate conspiracy, or simple misunderstanding of the rules, the approach and the findings of these biologists were brought into disrepute.

As claims and evidence of fraud and misdirection have mounted, taxpayers have become disillusioned and now regularly question the headlines and stories that accompany the continuous warnings of environmental crisis. Charges of abused science, weak methodologies, unreliable computer models, and bias ensure wilderness protection remains controversial. At the same time, the existence of government funding in both the United States and Canada creates a presumption not just of stability, which is necessary for long-term research, but of legitimacy. Accordingly, where independent scrutiny later unearths evidence of fraud and abuse of public trust, government efforts and the overall move toward intelligent conservation-based management regimes have been severely damaged.

### **Canadian controversies**

Unfortunately, Canadian land and wildlife agencies have not been immune to such controversies. A recent debate has taken place concerning the viability of the wolf population in and around Algonquin Provincial Park in Ontario. The debate is rendered more complicated by assertions that the Algonquin population is in fact a subset of the rare and endangered red wolf—even though most scientists consider the alleged subspecies to be a hybrid of the common gray wolf and coyote (Roy *et al.* 1996; Reich *et al.* 1999; see also Allendorf *et al.* 2001). Nonetheless, environmental interest groups are now demanding an immediate ban on the killing not only of wolves but of coyotes



as well because “it is difficult to distinguish between a coyote, an Eastern Canadian [Algonquin] wolf and a coyote-wolf hybrid” (Earthroots 2002: 10). Similarly, logging operations were shut down in the “Great Bear Rainforest” of British Columbia when environmental activists and some wildlife biologists argued that the forested area was home to the rare Kermode, or “Spirit Bear”—even though evidence suggest that the local population of bears so identified was a genetic anomaly rather than a unique and endangered species (Blood 1997; Marshall and Ritland 2001). Moreover, properly managed logging operations improve bear habitat.

### Lucrative bear research

Environmental activism and wildlife research have also become a growth industry in southwestern Alberta, particularly in the Canmore area east of Banff National Park. Controversy over tourism and commercial development in the Banff-Bow Valley corridor during the late 1980s and early 1990s, along with media attention to “charismatic megavertebrates,” namely grizzly bears and wolves, allowed environmental interest groups to capture public attention and push for action by the federal government. In 1994, the federal government commissioned the \$2.6 million Banff-Bow Valley Study (BBVS). Part of the study involved identifying “keystone species” to serve as “indicators” of the ecological health of the area. Of the several indicator or “icon” species studied, including aspen, elk, and wolf, none has generated as much public attention or attracted so many research dollars as the study of the grizzly bear (*Ursus arctos horribilis*) (Banff-Bow Valley Study 1996: 95). In the words of grizzly bear researcher Stephen Herrero, focusing attention on grizzly bear protection within the national parks as the first step in a large-scale wilderness conservation strategy “would also attract new money for habitat conservation in ecosystems surrounding national parks” (Herrero 1994: 10). Herrero’s prediction has clearly come to pass: since 1994, more than \$10 million has been spent on ecosystem research in the Bow Valley, including more than \$2.24 million in the year 2000 alone (Watt, 2001). These estimated dollar amounts are probably too low because they are based on questionnaires administered only to researchers currently working on projects in the Bow Valley. The hundreds of thousands of dollars contributed every year by agencies for ecosystem research and management through full-time staff and operating budgets are not included (Watt 2001: 3), nor are other monies spent by private individuals.

## Grizzly research at Parks Canada

Many researchers capitalized on residual momentum from the BBVS, the continuing flow of tax dollars available for their studies, and consistent media and interest-group publicity. As the chief advocates of grizzly research in the area around Banff, known as the Central Rockies Ecosystem (CRE), the Eastern Slopes Grizzly Bear Project (ESGBP) was a central player in the BBVS. The ESGBP “was initiated in 1994 to address the urgent need for scientific information about the cumulative effect of human development and activities on grizzly bears” in the eastern slopes of the Rocky Mountains (ESGBP 1999a). During the first eight years the project has existed, ESGBP researchers have produced a series of reports, theses, and papers on grizzly bears and bear management in the CRE. Parks Canada has provided funding and sought the opinions of these biologists when updating management plans for the mountain national parks, even though few of these papers have been peer reviewed (see Appendix B, page 46).

ESGBP work has been billed as the model for integrating science and policy in land use management. ESGBP publications praise their own ability to influence Parks management and alter its policies (Herrero *et al.* 2000: 3). As the Project Highlights page on the ESGBP Web site notes, the work ESGBP researchers completed for the Banff Bow Valley Study (Gibeau *et al.* 1996) was subsequently used to establish the central objectives of the 1997 Banff National Park Management Plan (Parks Canada 1997). These objectives are:

- to restore habitat by limiting human activity and eliminating existing trails;
- to restore and secure habitat on surrounding lands;
- to reduce the number of grizzlies killed by human activity to less than 1% of population annually;
- to establish a new human use management plan;
- to manage park as bear habitat; human use will be judged according to the modeled impact of various activities on the “habitat effectiveness” of each “carnivore management unit;”
- to apply the precautionary principle in all management decisions.

Unfortunately, portions of this research agenda have been plagued by persistent concerns about its scientific validity. For example, the objective of “restoring habitat” already assumes that habitat is in need of restoration. A second concern is focused on the impact of the strategic alliances some researchers have forged with the agencies

and lobby groups that support their work. These concerns are intensified when one examines the links between research, funding agencies, and the administrative and regulatory bodies that have the duty of acting upon wildlife research in the implementation of public policy (Ray and Guzzo 1990; Jones *et al.* 2000; LeRoy and Cooper 2000; Shelton 2001; Tremblay 2001). Among the organizations undertaking research in the Banff-Bow Valley area, the ESGBP is noteworthy because it enjoys a unique and intimate bond with Parks Canada and its bureaucratic decision-making apparatus. For example, Dr. Mike Gibeau has been both a principal researcher for the ESGBP and, at the same time, a Parks Canada warden (Banff Centre 2001).

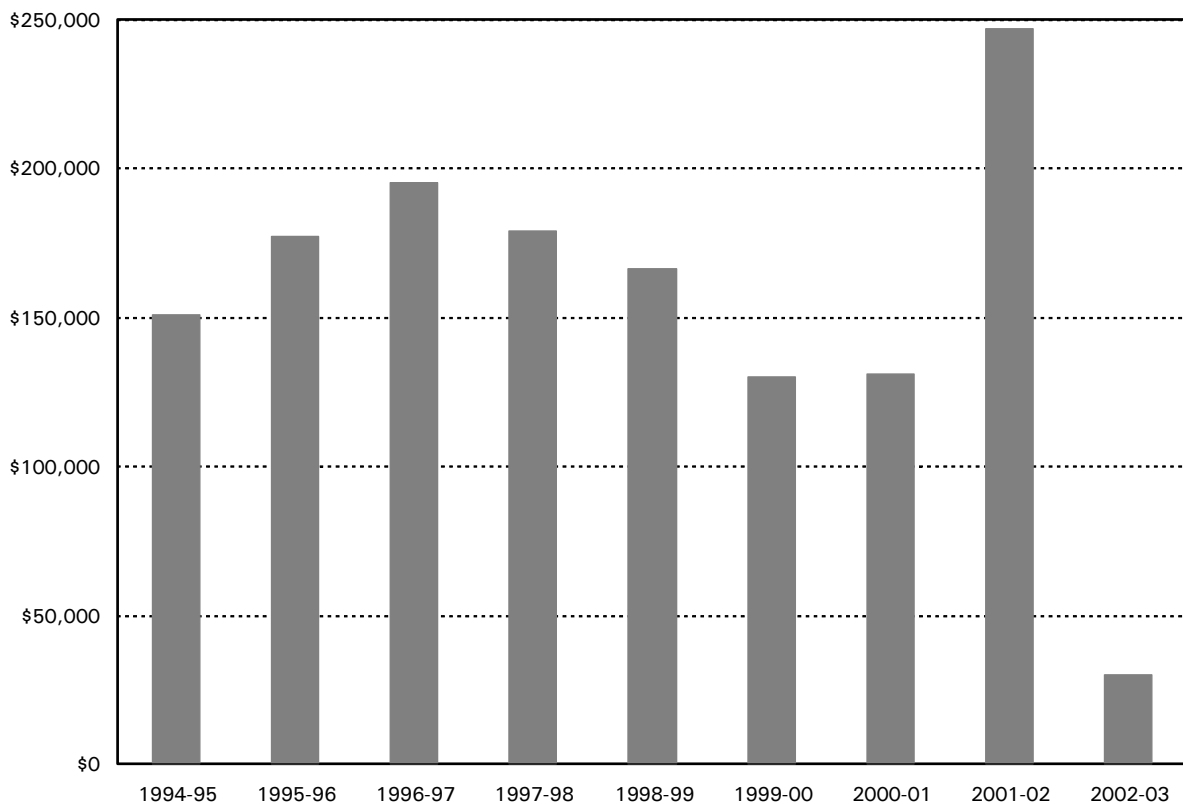
### Strategic alliances

Despite this clear relationship, the ESGBP claims to have “no formal links to policy or management decisions although it has had significant influence in this regard”

(Herrero *et al.* 2000: 3). The absence of formal links, however, has facilitated the establishment of strong and effective informal ones. Reflecting a commitment from federal Heritage Minister, Sheila Copps, to develop “formal connections with universities and other science-based agencies” (Copps 2000), more than half of ESGBP’s yearly budget requirements were met by direct funding from Parks Canada between 1994 and 2002 (Herrero *et al.*, 1998; Parks Canada 2001a). To date, this funding has amounted to \$1.4 million (see figure 1). On the other side of the ledger, ESGBP publications claim they “have had significant success in seeing . . . our most important research findings translated into [national parks] policy and management actions” (ESGBP 1999).

When ESGBP researchers cultivate close professional ties with wealthy and well-organized environmental interest groups such as the Canadian Parks and Wilderness Society (CPAWS), when ESGBP research and publications receive regular praise and support from these same interest groups, and when ESGBP researchers

**Figure 1: Direct funding of the Eastern Slopes Grizzly Bear Project (ESGBP) by Parks Canada**



Note: ESGBP funding for 2002/2003 was provided through the Parks Canada Species at Risk Recovery Fund. Source: Parks Canada, Access to Information Request. See Appendix for detailed ESGBP budget contributions.

are regularly featured in CPAWS articles and co-sponsored seminars (CPAWS 2000a, 2000b; Gibeau 2001), there is reason to be concerned with the appropriateness of the relationship among the ESGBP, interest groups, and Parks Canada.

Federal grants and contributions by Parks Canada and other government departments appear to have closed the loop and cemented the relationship between a specific and highly focused kind of wildlife research, federal government bureaucracies, and the environmental lobby. For instance, between 1994 and 1996, the same period during which CPAWS played a prominent role in BBVS round-table discussions, the interest group received \$33,000 in direct transfers from Parks Canada (Government of Canada 1995: 10, 1996: 10). Given this disproportionate financial support transferred to this one group (CPAWS represented only one of 14 interest sectors involved in the round table), it is hardly surprising that the perspective on park use supplied by tourism and tourist services was under-represented (Ritchie 1999: 109). Even the BBVS Task Force was forced to acknowledge that the study's final conclusions were limited by major data gaps with respect to human use and economic activity (BBVS 1996: 392; see also LeRoy and Cooper 2000: 23–34).

A more recent example is the \$234,000 federal contract awarded to CPAWS through the federal government's \$96.5 million Voluntary Sector Initiative. According to a Voluntary Sector Initiative (VSI) Backgrounder of March 20, 2002 (Voluntary Sector Initiative 2002), funding has been approved to enable CPAWS to act as the lead organization in the "Heritage Policy Development for Greater National Park Ecosystems" project. According to the VSI, this "project is designed to enhance the ability of the voluntary sector to effectively participate in policy development for greater park ecosystems" (Voluntary Sector Initiative 2002). Reflecting the recommendation of the Ecological Integrity Panel to have the federal government initiate "studies of habitat protection opportunities outside park boundaries in greater park ecosystems and beyond" (Parks Canada 2000b: 9-9), CPAWS has been partnered with Parks Canada to help establish the government policy agenda. Conflict of interest charges were recently raised when it was discovered that Parks Canada's chief scientist is married to the CPAWS national director in charge of the VSI-funded project (Remington 2002).

CPAWS has also been the frequent recipient of the federal government's "community animation" grants directed towards their preservationist advertising cam-

paigns in the Banff-Bow Valley area. For example, in 1999 the group received \$3,000 for their proposal to "[Heal] the Bow Valley through Community Empowerment" (Health Canada 2000: 39). This follows earlier grants of \$8,500 for a CPAWS "Bow Valley Area Public Involvement Campaign," which focused on the importance of preventing further economic development in the Bow Valley corridor, and a \$35,000 grant, shared with the Alberta Wilderness Association and the Federation of Albertan Naturalists, for their "Albertans for Wild Places" advertising campaign to assist local individuals and organizations in their recruitment, planning and advocacy skills (see LeRoy and Cooper 2000: 31–32).

An additional reason for concern is the relationship between CPAWS and the Canadian Heritage Department. Measured in terms of revenue, CPAWS is not the largest environmental charity in Canada. According to data compiled by Revenue Canada, however, CPAWS spends the most money on advocacy and other political activities.<sup>1</sup>

Compounding public concern over the conflicts of interest between ostensibly independent scientific research, a dedicated and well-funded interest group, and federal officials in Parks Canada and Canadian Heritage, is the adamant refusal by these researchers even to consider the concerns and interests of the public that exists outside the environmental lobby. In any liberal democracy, the freedom of citizens to advocate changes to government policies is typically balanced by the freedom of citizens to disagree with the proposed changes. The time for an informed conversation, discussion, or debate over proposed policies, however, is before, not after they are implemented. Unfortunately, despite a conventional request for "interested readers to carefully examine the strengths and limitations of [their] data" (Herrero *et al.* 2000: 5), ESGBP researchers have refused to respond to critiques of their research. No credible reason has been offered for this refusal.

## Political science

Concerns about the strategic alliances forged between wildlife researchers and the agencies and lobby groups that fund their work are intensified when those same scientists are publicly quoted as being advocates of a distinctly political agenda (Ray and Guzzo 1990; Tremblay 2001; Shelton 2001; LeRoy and Cooper 2000; Jones *et al.* 2000). Senior ESGBP researcher Stephen Herrero conceded years ago that "biases and values have significantly

influenced the scientific or factual data” he has collected (Herrero 1970: 1148). Other more explicitly “preservationist” arguments devolve into quasi-Marxist discussions of “management [and] information subcultures,” and of the “enlightenment” of conservation biologists and information specialists in contrast to the oppressive expectation of “obedience” held by managers (Mattson and Clark 2001: 202). For example, at a recent Banff conference on Human Use Management in Mountain Areas, sponsored by Parks Canada, grizzly bear biologist Dave Mattson (Mattson and Clark 2001: 227) described how a “myth of property rights” interferes with grizzly conservation strategies. Others, such as Reed Noss, one of the initiators of a new quasi-science, conservation biology, have long advocated the removal of rights to own private property and the right to access public land (Noss 1994: 3–4). Absent from this rhetoric is any recognition of the role that incentives play in protecting wildlife and wilderness and the importance of multiple use strategies for natural resource management; absent as well is any acknowledgement of the responsibilities exercised by private landowners in maintaining the integrity of ecosystems by their on-going management practices (Anderson *et al.* 1999; Anderson and Leal 2001).

The willingness of some scientists to move from wildlife biology to a focus on economic and political issues has provided several critics with evidence that their science is, in fact, subordinate to their economic and political opinions. However that may be, a broad and deep area of disagreement exists over strategies of wildlife conservation. Within this context, however, we are responding in this study to the conventional invitation noted above, to examine the strengths and limitations of the ESGBP’s arguments, models, and data (Herrero *et al.* 2000: 5). As Dr. David L. Garshelis recently argued, “there are few places where biologists admit to not knowing whether a bear population was increasing, decreasing, or stable, yet the reality is that there are few places where we really *do* know for sure how bears are faring . . . I believe that ultimately we, as bear biologists benefit—because bears benefit—by critically examining the basis of our knowledge and admitting our foibles and uncertainties” (Garshelis 2002: 4).

## Objectives of this study

The benefits of admitting these uncertainties extend to the concerned public, whose rights, opportunities, liberties, and livelihood are affected by government wildlife conservation policies. To date, however, debates over appropriate conservation policies in and around the mountain national parks have been distorted by a failure to acknowledge the extent of genuine scientific disagreement over approaches to grizzly bear biology and protection strategies. We propose, therefore, to review existing scientific literature in order to analyze and appraise the grizzly bear research that is being used to support models of park management on the eastern slopes of Alberta’s Rocky Mountains. In particular, we will examine:

- Conflicting assessments of the current and historical status of grizzlies in Alberta. Special attention will be paid to the problems related to measuring geographically determined subpopulations.
- The assumptions, reliability, and recommendations of an ESGBP-led Population Habitat and Viability Analysis (PHVA) and use of the VORTEX computer simulation model to predict the probability of grizzly bear extinction.
- Parks Canada’s cumulative effects assessment measures, in particular their ESGBP-derived habitat effectiveness modeling and security areas analysis.
- The methodology and applications of ESGBP’s behavioural distinction of bears as either “wary” or “habituated.”
- The use of the precautionary principle, both in grizzly bear research and as the basis of Parks Canada policy.

Finally, we will review the policy alternatives for managing large carnivores such as grizzly bears in and around Canada’s Rocky Mountain national parks. Many environmental groups, conservation biologists, and park managers have begun to urge that Alberta grizzly bears can only be saved from predicted extinction by preserving a vast tract of unbroken territory that covers almost 1.2 million square kilometres of public and private land from Yellowstone National Park to the Yukon (Harvey 1998). While we do not dispute the common-sensical observation that bears need adequate habitat, our findings suggest that increasingly extensive closures and restrictions are neither necessary nor wise.