Appendix A: Funding the Eastern Slopes Grizzly Bear Project

Parks Canada's funding of the Eastern Slopes Grizzly Bear Project (ESGBP), 1994–2003 ($000s)

Expenditure	1994/ 1995	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003*	Total
Researchers	50	60	60	50	50	50	50	75		445
Monitoring	45	45	55	56	49	21	20	25	30	346
DNA Sampling/Analysis		16								16
Lake Louise Monitoring			30	28	17	28	21	72		196
Lake Louise Research								13		13
Helicopter	10	10								20
Expert Workshop							4			4
Miscellaneous	3	3	4	4	5	4	1	29		53
Regional Habitat Mapping			3							3
Veterinarian**	2	2	5	7	8	1	4	3		32
Vehicles**	11	11	1							23
Aerial Monitoring**	25	25	30	27	30	25	30	30		222
GIS/Data Analysis**	3	3	3							9
Operating Support**				3	3	1	1			8
Monitoring Technician**	2	2	4	4	4					16
TOTAL	151	177	195	179	166	130	131	247	30	1,406

* Funding provided by the Parks Canada Species at Risk Recovery Fund.

** Multispecies support. Costs were estimated as some records were not available and some records were shared.

Source: Parks Canada, Access to Information Request (July 2002).

Appendix B: Parks Canada Science Review

In June, 2002, when the research and writing of this Critical Issues Bulletin was complete, Stephen Woodley and Gilles Seutin published a report from the National Office of Parks Canada in Ottawa entitled *A Review of the Science Programs in the Banff and Lake-Louise-Kootenay-Yoho Field Units* (Woodley and Seutin 2002). The general purpose of the report is to argue in favour of enhancing and strengthening the scientific work done in the Banff and *Lake-Louise-Kootenay-Yoho* (LLYK) field units. The report also addresses a number of issues raised in this publication.

Woodley and Seutin begin from recommendations advanced by the Council of Science and Technology Advisors in their 1999 report, *Science Advice for Government Effectiveness* (CSTA 1999), usually referred to as the SAGE report. In this report, six principles for sound science were identified, including the following:

> **II. Inclusiveness**
> Advice should be drawn from a variety of scientific sources and from experts in many disciplines in order to capture the full diversity of scientific schools of thought and opinion. (CSTA 1999: 4)

When quoting this section, Woodley and Seutin write "relevant disciplines" (2002: 7) rather than "many disciplines," which is a broader designation. The SAGE report also notes that where there is "significant scientific uncertainty" or "a range of scientific opinion" or there are "potentially significant implications for sensitive areas of public policy and where independent scientific analyses can strengthen public confidence," then it is "especially important" to seek advice from external and independent sources. Moreover, the SAGE report concludes: "Decision makers need to be open to both solicited and unsolicited advice from external sources" (CSTA 1999: 4). Parks Canada has not followed the SAGE advice on inclusiveness.

> **III. Sound Science and Science Advice**
> The government should employ measures to ensure the quality, integrity, and objectivity of the science and science advice it uses, and ensure that science advice is considered in decision-making. (Woodley and Seutin 2002: 7)

This is section III as quoted by Woodley and Seutin. The SAGE report adds that "the public expects government" to behave this way and that such independent scientific advice is to be considered "seriously," even when unsolicited. Special emphasis is given to scientific and external peer review. Moreover, "science advisors need to contribute sound scientific information unfiltered by other policy considerations." The science advisors themselves must be chosen "to reflect the diversity of opinions and to counter potential biases" and their advice must distinguish "scientific fact and judgement from their personal views in formulating their advice" (CSTA 1999: 5). Parks Canada has not followed the SAGE advice for Sound Science and Science Advice.

> **V. Openness**
> The government is expected to employ decision-making processes that are open, as well as transparent to stakeholders and the public. (Woodley and Seutin 2002: 7)

Thus, Woodley and Seutin. The SAGE report says:

> Democratic governments are expected to employ decision making processes that are transparent and open to stakeholders. Openness implies a clear articulation of how decisions are reached, policies are presented in open fora, and the public has access to the findings and advice of scientists as early as possible. It is essential that the public be aware of what the responsibility of government is in relation to the use of science. (CSTA 1999: 7)

The SAGE report also notes that "advice providers," including presumably unsolicited ones,

> need to be confident that their advice is considered seriously in decision making. Finally, there

> needs to be consultation with stakeholder groups and public discourse to ensure that public values are considered in formulating policy. Early and ongoing consultation both within government and with the public can mitigate greater negative debate and controversy when policies are announced. (CSTA 1999: 7)

In each of these areas, Parks Canada has systematically and egregiously failed to comply with guidelines and practices that it appears to endorse. With respect to "uncertainty and risk," also noted by Woodley and Seutin and listed in the SAGE framework, we have explained in the course of this report that risk analysis is consistently interpreted in such a way as to exclude human beings from protected areas even when human presence might benefit wildlife. The SAGE report explains that: "The goal of risk management is scientifically sound, cost-effective, integrated actions that reduce risks while taking into account social, cultural, ethical, political, and legal considerations," which includes the "need to communicate to the public and stakeholders the degree and nature of scientific uncertainty and the risk management approach utilized in reaching decisions" (CSTA 1999: 6–7). Parks Canada has not followed the SAGE advice on Uncertainty and Risk.

To assess the quality of the science conducted in the mountain parks, Woodley and Seutin: (1) interviewed 29 people using common questions, questions specific to the individual situation, and open-ended conversation; (2) assessed Parks Canada management documents to identify and prioritize science needs; and (3) assessed scientific publications by Parks Canada and contract researchers "over a 10-year period, including those in the grey literature." A further sample was selected "in particular to explore the issue of peer review" (Woodley and Seutin 2002: 9).

Peer review is the central issue in the publication of any scientific article or book in the natural sciences, the social sciences, or the medical sciences. It is the bedrock of scientific integrity and the foundation of scientific credibility. With respect to the statements reported in the previous paragraph, it would have been helpful to have the text of the questions available. This is done in social science in order to assess independently the validity and reliability of the instrument. It would have been helpful to have been provided with a definition of "the grey literature," which appears to be a term of art used by Parks Canada. It would also have been helpful to know the technique used to draw the sample with which they explored the issue of peer review.

Instead, the authors turn to a short disquisition on the meaning of science, which "is perhaps best thought of as a verb rather than a noun" (Woodley and Seutin 2002: 10), by which they mean the science is "a process for acquiring information and knowledge that enables learning" (p. 10). They then discuss the levels of investment in this "process" in the mountain parks and arrive at a total figure of about $8.8M for the period from 1994 to 2001 for project expenditures, excluding salaries and overhead. Approximately $6M was spent in Banff. For this expenditure, the Banff and LLYK field units have produced "in the order of 10 peer reviewed publications a year" (p. 11). The actual publications are not listed, nor is any breakdown between Banff and LLYK made. We will consider the issue of peer review below in more detail.

The authors conclude, however, that "relative to its investment" about 10 peer-reviewed papers a year constitutes "a high level of science activity" (Woodley and Seutin 2002: 12). Moreover, nearly everyone interviewed said it was "good quality" science. Of the 28 people listed as having been interviewed, well over 80% were either Parks Canada employees, recipients of Parks Canada contracts, or environmental activists.

There are, however, at least two critics, one, a "private citizen," the other, an officer of the Association of Mountain Parks Protection and Enjoyment. The details of their criticism were not provided. Instead, Woodley and Seutin assert that "ecosystem science" cannot provide "predictive precision" and so must rely on the precautionary principle as a way of translating uncertainty into management decisions. We have seen, however, that the precautionary principles as understood by Parks Canada is part of the problem and exists independently of predictive imprecision of "ecosystem science," which is also an undefined term of art (see, however, LeRoy and Cooper 2000: 19–20).

Woodley and Seutin discuss a number of housekeeping matters such as the need to rely heavily on graduate students and congratulate the authors of several unnamed "recent research projects" on the "solid project design" that has informed their work. And yet, "many specialists and biologists" with whom they spoke raised questions about the solidity of the research design and suggested that "consultations and peer reviewing might be warranted." On the whole, however, the authors assure us that Parks Canada has "done an excellent job at defining and reviewing the design of the projects" (Woodley and Seutin 2002: 23).

When the authors discuss the data on peer review, they use a 15-year time period, not the seven-year period (1994 to 2001) used earlier to assess Parks Canada's expenditures on research. They do not provide any information about the costs for this 15-year period. Included in the category of peer-reviewed publications were university theses, conference proceedings, and articles in both "minor" and "primary" journals. There are no examples given of either type of journal nor of conferences said to have been refereed. University theses are not usually considered peer-reviewed publications. In all categories, 41% of the publications from Banff and 16% of LLYK were "peer reviewed." Of those published in "primary journals," 19% were produced at Banff and 7% at LLYK (Woodley and Seutin 2002: 25).

By the broad definition of peer review, Banff's researchers produced seven publications a year and LLYK, fewer than three. Using the more strict understanding of peer review that confines it to "primary journals," Banff produced slightly more than three a year and LLYK produced just over one publication a year. Woodley and Seutin are of the opinion that "the level of peer review conducted in Banff is very high by any standards" (Woodley and Seutin 2002: 25). It is more accurate to say that seven (or three) publications a year is high only by Parks Canada's standards.

Since there are no costs given for the 15-year period and the data for the seven-year period from 1994 to 2000 indicate only that Banff and LLYK "have been producing in the order of 10 peer reviewed publications a year" some additional assumptions must be made to calculate the per-unit costs of a peer-reviewed publication. We will simplify by looking only at Banff, which is considered to have a "very high" production of peer-reviewed articles. Adding the lower rates for peer-review articles in LLYK would raise the costs per unit.

If we assume that funding levels over the 15-year period are about the same as those from 1994 to 2001—around $850,000 a year—under the broad definition of peer review, each publication cost about $120,000. Under the strict definition, each peer-reviewed publication from Banff cost about $258,000.

Woodley and Seutin single out the ESGBP's research and claim that 60% of their publications were peer reviewed. They do not provide costs so no estimate of the price of each publication can be made. Nor are the publications listed, so it is impossible to determine what kind of peer review was involved.

The authors next considered the question of translating scientific advice into management decisions. The authors state: "there is not a clear path for science advice to get to the management table, nor any clear record of what the science advice for a given issue was, and how it was used." As a result, the authors continue, "management decisions are seen by many as lacking in openness and transparency," which results in "a level of misunderstanding between managers and specialists, with the latter feeling that scientific information and advice they worked hard to produce was not appropriately considered by managers" (Woodley and Seutin 2002: 27).

If the "science" produced by the "specialists" were reliable and valid wildlife biology, this might be a problem. But, because so much of the conservation biology produced by these "specialists" is so questionable to begin with, the common sense and experience of management officials in Parks Canada actually on the ground in the parks (rather than at headquarters in Ottawa) has no doubt served the citizens of Canada and park visitors much better than the strict application of such "science" ever could do.

The concluding sections of the report by Woodley and Seutin contain some remarkable assertions. First, they note that there is no proper method of archiving data and no regulations by which data can be made available to external scrutiny—which is what genuine peer review would entail.

Second, they claim that, if only the scientific value of the projects had been properly communicated, criticism would vanish. The possibility that some projects are ill conceived and expensive seems not to have occurred to them.

Third, the authors complain that much of the criticism of Parks Canada has been "ideological, value-based and even personal," and not directed at the credibility of the science. When scientific credibility is questioned, however, they claim that the focus is on the following three issues (Woodley and Seutin 2002: 33):

(1) research is driven by researchers' personal values, not objective analysis;

(2) it is not peer reviewed;

(3) its fundamental concepts—including ecological integrity and population viability analysis—are invalid.

We have quoted and analyzed, in this Critical Issues Bulletin and in a previous publication (LeRoy and Cooper 2000), the statements of researchers who provided this

"scientific" advice that indicated clearly that their "personal values" drove their research. Indeed, the whole notion of conservation biology is, as we have argued in great detail, an ideological movement, not science, which is in any case a noun, not a verb.

Further, the report by Woodley and Seutin indicates, in a vague and unscientific way, just how much of the "science" produced in the mountain parks is subject to peer review. It is our view that seven (or three) reports a year is not a record to be proud of. Moreover, it is not at all clear who the "peers" in this peer review process are. That is, no evidence is provided as to whether the "peers" are employees of Parks Canada, researchers in the ESGBP or scholars independent of the researchers who wrote the reports. There is no discussion of whether the "primary journals" are, in fact, scientific and reputable, nor what these journals are.

Third, we have discussed above the notions of ecological integrity and population viability analysis. Readers can judge for themselves how valid and reliable these notions are and the legitimacy with which they are employed by Parks Canada and their "specialists."

For Woodley and Seutin, however, matters are clear: "we examined each of these issues during our review and see no evidence of any systemic pattern of poor or biassed science being done" (Woodley and Seutin 2002: 33). They may take comfort in what they failed to see; we do not.

Notes

1 This conclusion is based on a basic ranking of environmental charities, as classified by the CCRA charities division as G1: "nature, habitat-conservation groups", G2: "preservation of species, wildlife protection", G3: "general environmental protection, recycling services". In 1998, CPAWS spent $75,440 on political advocacy. The information was analyzed by the authors using a database compiled by the CCRA charities division. It should be noted that only a small fraction of Canadian environmental charities chose to declare the amount spent on advocacy (line 124 on the CCRA registered charity information return), limiting the utility of such a ranking.

2 At time of printing, the Act had yet to receive Royal Assent.

3 As Paterson noted, "this statement is a genetic non-sequitur, in that the second part [that the population is usually already in trouble] is not a certifiable consequence of the former [that the population may be highly inbred]. Technically, all domesticated animals are 'highly inbred,' and repetitive inbreeding, called 'line-breeding,' in animal husbandry is the main mechanism by which desired characteristics are set and reinforced in a population" (pers. comm. with Barry Cooper and Sylvia LeRoy, 2002).

4 The total grizzly bear population in British Columbia is estimated to be between 10,000 and 13,000 animals (BC Ministry of Environment, Lands and Parks 1995).

5 Unsurprisingly, ESGBP researchers qualify this finding with the judgments that the population is "delicately balanced" (Ellis 2001), and "balanced on a pencil head . . . balanced at best" (Zickefoose 2001).

6 This unquestioned and immediate classification of "rock and ice" as unsuitable ignores the fact that grizzlies throughout North America regularly make use of rock and talus slopes in their search for prey species such as marmots (see http://www3.gov.ab.ca/srd/fw/watch/rabb_hoary.html for a brief description). In Yellowstone, grizzlies use rock and talus slopes as an essential foraging area for army cutworm moths (*Euxoa auxiliaries*), which is recognized by Yellowstone park managers as one of "four major food sources" for Yellowstone grizzlies (National Parks Service 2000: 44, 157).

7 Stephen Herrero and his son, Jacob completed the initial cumulative effects assessment for the Cheviot project (Herrero and Herrero 1996).

8 The reintroduction of the fire regime, which shaped the Eastern Rockies ecosystem, would do far more to bolster habitat needs for this population than the reduction of contemporary human impacts will. See Kay 1994, 1995; Kay *et al*. 1999.

9 This criteria is based on a World Conservation Union (IUCN) requirement for a minimum viable population of 1,000 individuals (IUCN 2001: 21–23).

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