



# FAILING B.C.'s GRIZZLIES

## REPORT CARD and RECOMMENDATIONS

for Ensuring a Future for British Columbia's Grizzly Bears



David  
Suzuki  
Foundation

FAILING B.C.'s GRIZZLIES: Report Card and Recommendations  
for Ensuring a Future for British Columbia's Grizzly Bears

By Jeff Gailus, M.Sc.

On Behalf of the David Suzuki Foundation

March 2014

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David  
Suzuki  
Foundation

Suite 219, 2211 West 4th Avenue  
Vancouver, B.C. V6K 4S2  
T: 604.732.4228  
E: [contact@davidsuzuki.org](mailto:contact@davidsuzuki.org)

[www.davidsuzuki.org](http://www.davidsuzuki.org)



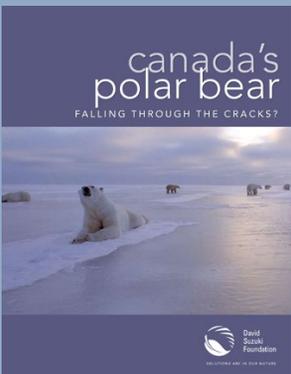
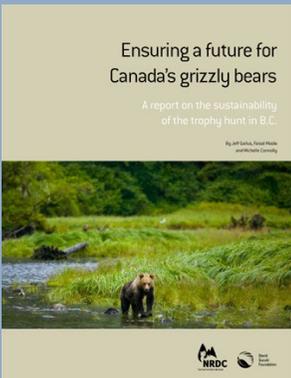
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## DISCLAIMER

Every effort to ensure the accuracy of the information contained in this study has been taken, however, the project was limited by the information and data that was available. We welcome suggestions for improvements that can be incorporated into later editions.



# Executive Summary

**IN 1995, THE BRITISH COLUMBIA GOVERNMENT JOINED** other governments in western North America to protect grizzly bears by releasing *A Future for the Grizzly: British Columbia Grizzly Bear Strategy*, which continues to be B.C.'s primary policy on grizzly bear management. B.C.'s grizzly bear conservation strategy recognized that grizzlies, like so much of North America's original wildlife and wilderness, "were disappearing." Then as now, British Columbia boasted approximately half of all Canada's grizzly bears, but the grizzly bear strategy warned that the province's grizzly bears and the habitat on which they depend were threatened by increasing human populations and growing demands for land and other natural resources.

The B.C. grizzly conservation strategy was developed and adopted by the NDP government and then maintained as the overarching policy guiding grizzly bear management in the province when the B.C. Liberals became the majority government in 2001. In June 2004, Bill Barisoff, B.C.'s Minister of Water, Air and Land Protection, publicly reaffirmed his government's commitment to implementing B.C.'s 1995 grizzly bear conservation strategy with the help of a grizzly bear management plan and other actions.

Has the British Columbia government made good on the commitment it made 19 years ago to protect B.C.'s grizzly bears from the myriad threats they face, promises that have been reiterated many times since? The answer is a resounding no.

By almost every measure, the B.C. government deserves failing grades for its implementation of the 1995 *British Columbia Grizzly Bear Strategy*. Although progress has been made on increasing scientific knowledge about grizzly bears (Grade: B), developing accurate population estimates (Grade: C), and increasing public knowledge of grizzly bears (Grade: C), very little has been done on the ground to protect B.C.'s grizzly bear population units from further decline and recover B.C.'s nine threatened population units to viable status.

The 1995 *British Columbia Grizzly Bear Strategy* identified protecting grizzly bear habitat as the most important factor in ensuring a healthy future for B.C.'s grizzly bears, but the government has not even begun to designate the network of Grizzly Bear Management Areas (GBMA) proposed in the strategy (Grade: D-). Likewise, little has been done to reduce human-caused grizzly bear mortality over the last 19



**B.C.'s grizzly bear conservation strategy recognized that grizzlies, like so much of North America's original wildlife and wilderness, "were disappearing."**

PHOTOS COURTESY THOMAS CALDWELL / FLICKR (TOP) AND FRANK ZEHNDER / FLICKR (BOTTOM)

## GOVERNMENT IMPLEMENTATION OF B.C.'S OFFICIAL GRIZZLY BEAR STRATEGY

	Grade
Conserve grizzly bear habitat	D-
Manage human-caused grizzly bear mortality	D
Ensure grizzly bear population numbers are accurately known	C
Maintain the abundance and diversity of grizzly bears	D
Increase scientific knowledge of grizzly bears	B
Increase public knowledge of grizzly bears	C



It's time to update and improve B.C.'s grizzly bear conservation strategy, and to recommit to its implementation.

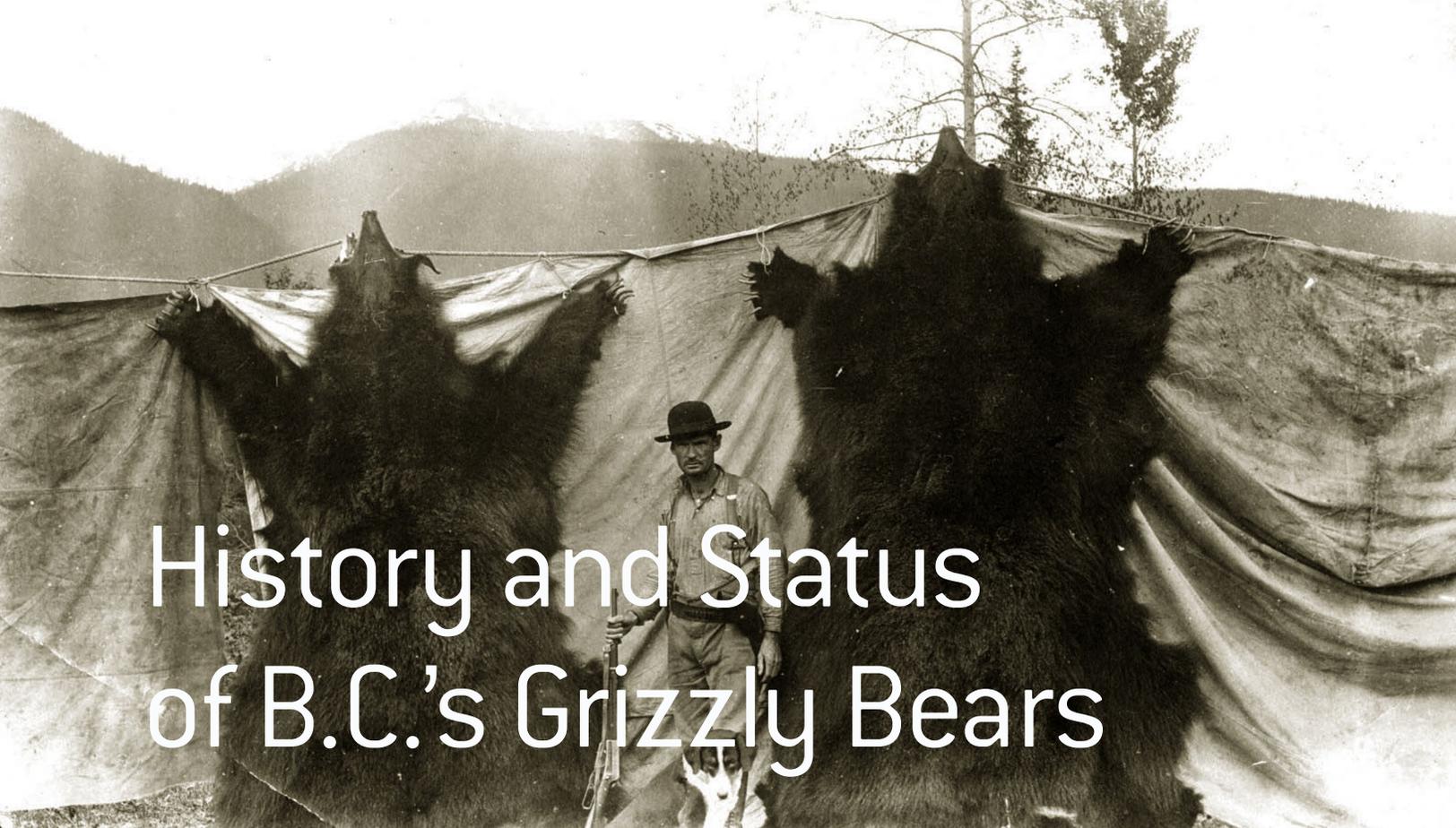
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years (Grade: D). In fact, recent research indicates that the government's attempt to manage grizzly bear mortality below sustainable thresholds while allowing a grizzly bear sport hunt has been ineffective, and grizzly bear mortalities have exceeded government thresholds in several grizzly bear population units, sometimes for several years in a row.

As a result, the government's goal of maintaining the abundance and diversity of grizzly bears (Grade: D) is failing. Although British Columbia still boasts approximately 15,000 grizzly bears, scientific research indicates that abundance and diversity (including genetic diversity) appears to have declined since 1995. Better population estimates indicate that several population units may have shrunk, and there is direct evidence that some population units in southern B.C. have declined. While grizzly bear recovery efforts have been successful in some parts of the United States, not a single recovery plan has been implemented for B.C.'s nine threatened population units, two of which have been found to be functionally extinct.

B.C.'s Ministry of Environment has admitted that the 1995 *Grizzly Bear Conservation Strategy* is now out-of-date. It's time to update and improve it, and to recommit to its implementation. This includes developing and implementing recovery plans for B.C.'s threatened population units, beginning a process to identify and designate a network of Grizzly Bear Management Areas, reducing excessive grizzly bear mortality from hunting and bear-human conflicts, and committing the long-term funding that is necessary to implement a new and improved *Grizzly Bear Conservation Strategy*.

Without it, grizzly bears across the province will continue to be at risk of further decline, and several of B.C.'s more threatened population units will disappear entirely.



# History and Status of B.C.'s Grizzly Bears

**GRIZZLY BEARS ONCE ROAMED MOST OF NORTH AMERICA**, from Alaska to Mexico and as far east as Ontario and the American Midwest. As Europeans moved west, grizzly bears and the habitat on which they depend contracted around the edges, like a shallow pond evaporating in the hot summer sun. By 1890 or so, grizzly bears had been extirpated from the Great Plains in both Canada and the United States. Scientists estimate that the grizzly bear has disappeared from approximately 24 per cent of its former range in Canada,<sup>1</sup> and 98 per cent of its range in North America.

One hundred years ago, there were approximately 35,000 grizzly bears (*Ursus arctos*) roaming British Columbia's coasts, mountains and grasslands (except for Vancouver Island and Haida Gwaii). Today, some 15,000 of the big, brown beasts – slightly more than half of all Canada's grizzlies – inhabit approximately 90 per cent of the province.<sup>2</sup>

All of British Columbia's grizzly bears are part of Canada's "northwest grizzly bear population," which the national Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has recognized as a "species of special concern" for 22 years. When COSEWIC first assessed the status of grizzly bears in 1990, it found that more than 60 per cent of remaining grizzly bear habitat, much of which was located in B.C., was deemed to be at risk.<sup>3</sup>

COSEWIC's 2002 re-evaluation of the status of Canada's grizzly bears drew similar conclusions. In particular, COSEWIC stated that, "Bears living in portions of the southern fringe of Canadian distribution are far from secure from the consequences of burgeoning human populations and activities," and that, "the genetic and

"The pattern of extermination of populations in the U.S. clearly shows that when populations become fragmented and isolated, they shrink numerically and are subject to extirpation."  
— Independent Scientific Review Panel, 2004

1 B.C. Ministry of Environment, Lands and Parks (MELP). 1995. *Conservation of Grizzly Bears in British Columbia. Background Report*. 70 pp.

2 B.C. Ministry of Forests, Lands and Natural Resource Operations. April 2012. *British Columbia Grizzly Bear Population Estimate for 2012*.

3 COSEWIC. 1990. *Update COSEWIC status report on the Grizzly Bear *Ursus arctos* (Prairie, Alberta, British Columbia, Northwest Territories and Yukon Territory populations) in Canada*. Ottawa.

“Preventing the slow northward migration of this line depends on active steps to conserve these insular and peninsular populations.”  
— COSEWIC



PHOTO COURTESY WESTERN ARCTIC NATIONAL PARKLANDS/FlickrR

geographic continuity that currently prevents their identification as distinct population units is at risk... Preventing the slow northward migration of this line depends on active steps to conserve these insular and peninsular populations.”<sup>4</sup>

In 2012, COSEWIC reassessed the status of Canada’s grizzly bears once again, reaffirming for the third time in 22 years that Canada’s grizzly bears were a species of “special concern.” This time they concluded that, “a number of populations in the southern extent of its range in Alberta and southern B.C. are known to be declining,” and “their poor condition in some parts of the range, combined with their naturally low reproductive rates and increasing pressures of resource extraction and cumulative impacts in currently intact parts of the range, heighten concern for this species if such pressures are not successfully reversed.”<sup>5</sup>

Unlike the polar bear, which COSEWIC also determined was a species of special concern, Canada’s grizzly bears are not listed under Schedule 1 of the federal *Species at Risk Act* (SARA), and thus do not benefit from conservation activities mandated under federal endangered species legislation, such as the creation of a federal management plan for the species and its habitat.

4 COSEWIC. 2002. *COSEWIC Assessment and Update Status Report on the Grizzly Bear (Ursus arctos) in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa.

5 COSEWIC. 2012. *COSEWIC Assessment and Status Report on the Grizzly Bear (Ursus arctos) in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa, ON.

In British Columbia, the Conservation Data Centre (CDC) has placed grizzly bears on the “blue list.” This means they are considered to be of “special concern [formerly vulnerable] in British Columbia,” because their biological characteristics – a slow reproductive rate in particular – make them “particularly sensitive to human activities or natural events.”<sup>6</sup> However, though ranked as a species at risk by the province, neither the species nor its habitat receive any formal protection as British Columbia lacks an endangered species law.

British Columbia’s grizzly bears and the habitats and food on which they depend are managed using a complex matrix of institutions, laws and regulations. The Fish and Wildlife Branch of the Ministry of Forests, Lands and Natural Resource Operations manages grizzly bear hunting, while the Ecosystems Branch of the Ministry of Environment oversees the management of the grizzly bears themselves. However, the Ministry of Environment has little say on what happens to grizzly bear habitat and food sources, which are by far the most critical factors concerning the grizzly bear’s future in B.C. For instance, Ministry of Forests, Lands and Natural Resource Operations determines how much of B.C.’s forests are cut (and how many kilometres of roads will be built to get the logs out), and how many cattle and other livestock are grazed in grizzly bear habitat, both of which negatively impact the health of B.C.’s grizzly bear populations. The Ministry of Forests, Lands and Natural Resource Operations also permits the construction of dams, mines, oil and gas wells, fish farms and tourism infrastructure (which in the case of parks, also involves the Ministry of Environment), which also negatively affect B.C.’s grizzly bears and their food sources.

Parks Canada manages national parks located in British Columbia, and the federal Ministry of the Environment is responsible for species at risk, including those listed as “species of special concern,” which include the grizzly bear. The federal Department of Fisheries and Oceans (DFO) manages commercial and sport harvest of wild salmon, an important food source for grizzlies that has declined significantly in B.C. over the last 100 years.<sup>7</sup> As a result, grizzly bears that depend on salmon-spawning habitats often have greatly reduced food resources in some years, which can negatively affect reproductive and population persistence rates.

Biologists know that contemplating the future of the grizzly bear at the provincial scale is not particularly helpful.<sup>8</sup> While grizzly bears maintain large home ranges to access adequate amounts of food, mates and security, the combination of natural (lakes, rivers, mountain ranges) and anthropogenic (highways, urban development) barriers have fragmented them into smaller subpopulations. For this reason, most biologists have realized that the only appropriate scale at which to manage and recover large grizzly bear populations is at the subpopulation level.<sup>9</sup>

According to the provincial government, grizzly bears have already been eliminated from large portions of their range, including the Lower Mainland, the Peace River area around Fort St. John, and parts of the Cariboo and Thompson-Okanagan regions in the south-central part of the province.<sup>10</sup> Transient males, particularly subadults, are occasionally sighted in unoccupied areas, but the government has stated that these areas are not regularly inhabited by grizzly bears, and no efforts are being made to restore viable grizzly bear populations to these areas.<sup>11</sup> However, recent sightings indicate grizzly bears are still alive and well in the Peace River area, and there are small “ghost” populations in the Southern Interior, even though the B.C. government has officially declared them extirpated. With appropriate management, it’s possible that grizzly bears could reoccupy some of these areas.



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PHOTO COURTESY EVAN LEESON/FICKR

6 Gyug, L., A. Hamilton and M. Austin. 2004. “Grizzly Bear (*Ursus arctos*). Accounts and Measures for Managing Identified Wildlife – Accounts V. 2004.”

7 Slaney, T.L. et al. 1996. Status of anadromous salmon and trout in British Columbia and Yukon. *Fisheries* 21.10: 20-35.

8 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. *Status of the Grizzly Bear (*Ursus Arctos*) in Alberta: Update 2010*. Alberta Sustainable Resource Development. Wildlife Status Report No. 37 [Update 2010]. Edmonton, AB. 44 pp.

9 Proctor 2007, *pers. comm.*

10 B.C. Ministry of Environment. [www.env.gov.bc.ca/soe/indicators/plants-and-animals/grizzly-bears.html](http://www.env.gov.bc.ca/soe/indicators/plants-and-animals/grizzly-bears.html), accessed January 22, 2014.

11 *Ibid.*

In order to manage grizzly bears more sustainably, the B.C. government has divided the province into 56<sup>12</sup> Grizzly Bear Population Units (GBPUs) that cover 90 per cent of the grizzly's historic range in British Columbia.<sup>13</sup> These GBPUs are “discrete or nearly discrete population units” that are managed “to ensure local conservation and management objectives are being met and to reflect known and suspected fractures in grizzly bear distribution.” GBPUs serve as the key units for setting population objectives and land-use priorities during strategic land-use planning.<sup>14</sup>

Each GBPU is classified as either “viable” or “threatened.” This status is based on the difference between the current population estimate and the estimated population capability for the GBPU, as determined through population and habitat modelling. Capability is defined as the ability of the land to support a specific density of grizzly bears independent of human influence. If the current population estimate is less than 50 per cent of capability (i.e. the population is less than 50 per cent of the number of grizzlies that the habitat could support), the GBPU is designated as threatened. According to the B.C. Ministry of Forests, Lands and Natural Resource Operations, the primary objective in these nine threatened GBPUs is “population recovery to prevent range contraction and ensure long-term population viability.”<sup>15</sup>

Although the accuracy of most population estimates are uncertain and subject to a wide margin of error,<sup>16</sup> available information indicates 47 of B.C.'s GBPUs are “viable.” Many of these units (especially in the north) appear to support healthy, intact subpopulations of grizzly bears that help to maintain ecological health and provide residents and visitors alike with hunting, sightseeing and other recreational opportunities. However, nine population units located along the Canada-U.S. border and up the coast north of Vancouver (representing approximately nine per cent of the province) are classified as “threatened.”<sup>17</sup> Although grizzly bears in these units are recognized as being at an increased risk of extirpation, these threatened GBPUs are not listed as such under the B.C. *Wildlife Act*, and therefore enjoy no additional protections beyond the suspension of the trophy hunt.

Like everywhere they exist, grizzlies face a perfect storm of threats in B.C., including habitat loss and fragmentation; human-caused mortality; and the continued decline of salmon, which is a primary food source for bears on the West Coast and the Interior, where salmon still spawn up B.C.'s rivers.<sup>18</sup> Climate change also poses a significant challenge to grizzly bear conservation, especially as it impacts important food sources like salmon, whitebark pine seeds and various berry-producing shrubs, like huckleberry.

Grizzlies already have been eliminated or are currently threatened in about 18 per cent of the province, and ongoing habitat alteration and non-existent recovery efforts threaten to make matter worse. Without concerted action to limit the impacts of increased development on grizzly bear habitat, many grizzly bear populations that survive precipitously in some parts of B.C. will be only a memory fifty years from now.<sup>19</sup>



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PHOTO COURTESY IMARK  
LABARBERA/FLICKR

12 Initially, there were 57 GBPUs. In 2012, the Central Purcell and South Purcell GBPUs were amalgamated into one unit, now called the Central Purcell GBPU, reducing the total number of GBPUs to 56. To ensure consistency, we use 56 GBPUs throughout this report.

13 B.C. Ministry of Forests, Lands and Natural Resource Operations. 2012. *Supra* note 2.

14 *Ibid.*

15 *Ibid.*

16 Artelle K.A., Anderson S.C., Cooper A.B., Paquet P.C., Reynolds J.D., et al. [2013] *Confronting Uncertainty in Wildlife Management: Performance of Grizzly Bear Management*. PLoS ONE 8(11): e78041. doi:10.1371/journal.pone.0078041

17 B.C. Ministry of Environment. 2010. “Grizzly FAQ.”

18 For more information on the factors that make grizzly bears particularly sensitive to extirpation as a result of human activities, see “Appendix I: Grizzly Bear Basics.”

19 B.C. Ministry of Environment, Lands and Parks (MELP). 1995. *Supra* note 1.

A photograph of a grizzly bear standing on a rocky bank next to a river. The bear is brown and is looking towards the water. The background shows a rocky hillside and some green vegetation.

# Planning a Healthy Future for B.C.'s Grizzly Bears

AS THE 20TH CENTURY ENTERED ITS FINAL DECADES, numerous governments in North America realized that if they were going to prevent the continued decline of grizzly bears, they would need to plan ahead. This should come as no surprise. Governments intent on successfully achieving socially desirable outcomes almost always develop and implement thoughtful plans and strategies, and serving the public interest by ensuring we do not eliminate some of our most popular wildlife species – especially sensitive species like the grizzly bear – is no exception.

To varying degrees, all the governments overseeing grizzly bear conservation and management in the North American West developed recovery plans and/or conservation strategies for the grizzly bear. Perhaps the best example of planning for the future of the grizzly bear occurred in the United States. Grizzlies in the lower 48 states were federally listed as threatened in 1975, and while efforts to prevent their continued decline began in the early 1980s, little was accomplished until the U.S. Fish and Wildlife Service developed a formal recovery plan in 1993. Since its implementation, grizzly bear populations in the Greater Yellowstone and Northern Continental Divide ecosystems have increased dramatically. The Greater Yellowstone population increased from around 250 bears in the 1980s to 600 today, and the Northern Continental Divide population has tripled to more than 900 bears, which makes grizzly recovery in these areas two of the greatest conservation success stories in history. In large part, these successes are the result of strong endangered species legislation and well-funded recovery efforts overseen by the U.S. federal government.

Canada hasn't been nearly as successful. In 1990, as concerns grew about the status of Alberta's grizzly populations, the Alberta government developed a grizzly bear management plan that was intended to increase the grizzly bear population from 790 to 1000 bears.<sup>20</sup> The plan identified the "preservation and management of habitat" as the primary strategy for ensuring the "survival of the

"The Grizzly Bear is perhaps the greatest symbol of the wilderness. Its survival will be the greatest testimony to our environmental commitment. The government of B.C. published the British Columbia Grizzly Bear Conservation Strategy, *A Future for the Grizzly*, with the hope of leaving a permanent legacy for our children."

— *A Future for the Grizzly: British Columbia Grizzly Bear Strategy*

PHOTO COURTESY MARK BYZEWSKI/FLICKR

20 Alberta Forestry, Lands and Wildlife. 1990. *Management Plan for Grizzly Bears in Alberta*. Wildlife Management Planning Series No. 2. Edmonton, AB.

grizzly bear in Alberta,” which would be accomplished by restricting the type and intensity of industrial and other human uses, and by controlling public access. Unfortunately, the plan failed because it was never implemented, and there are now only an estimated 700 grizzly bears in Alberta. The grizzly bear population was listed as an endangered species under the Alberta *Wildlife Act* in 2008. A recovery plan was developed in 2009, but to date it hasn’t been implemented in a meaningful way either.

About the same time, the British Columbia government also recognized the need to protect the province’s grizzly bear population from declining in the face of myriad threats. And so, in 1995, *A Future for the Grizzly: British Columbia Grizzly Bear Strategy* was released.<sup>21</sup> The British Columbia grizzly bear conservation strategy, which remains the government’s primary grizzly bear management policy, recognized that grizzlies, like so much of North America’s original wildlife and wilderness, “were disappearing.” Then as now, British Columbia boasted approximately half of all Canada’s grizzly bears, but the grizzly bear strategy warned that the province’s grizzly bears and the habitat on which they depend were threatened by increasing human populations and growing demands for land and other natural resources.

“We have the opportunity – and the global responsibility – to protect British Columbia’s remaining grizzly bears,” the strategy states. “We owe it to ourselves, to our descendants, and to the grizzly bears to implement a strategy for the survival of this majestic creature.”

The B.C. grizzly conservation strategy was developed and adopted by the NDP government and then maintained as the overarching policy guiding grizzly bear management in the province when the B.C. Liberals became the majority government in 2001. In June 2004, Bill Barisoff, B.C.’s Minister of Water, Air and Land Protection, publicly reaffirmed his government’s commitment to implementing B.C.’s 1995 grizzly bear conservation strategy with the help of a grizzly bear management plan and other actions.<sup>22</sup>

Has the British Columbia government made good on the promises it first made 19 years ago, promises that have been reiterated many times since?

This report attempts to assess the British Columbia government’s commitment to ensuring a future for all of B.C.’s grizzly bears by evaluating the degree to which the 1995 grizzly bear conservation strategy has been implemented. The conclusion may come as something of a surprise to the citizens of British Columbia and others concerned about the Great Bear’s future.



PHOTO COURTESY DENALINPS/FICKR

*“We have the opportunity – and the global responsibility – to protect British Columbia’s remaining grizzly bears, We owe it to ourselves, to our descendants, and to the grizzly bears to implement a strategy for the survival of this majestic creature.”*

*— A Future for the Grizzly: British Columbia Grizzly Bear Strategy*

21 B.C. Ministry of Environment, Lands and Parks (MELP). 1995. *Supra* note 1.

22 Barisoff, B. 2004. Letter to James Peek, Chair, Grizzly Bear Scientific Panel. June 15. Victoria, B.C. [www.env.gov.bc.ca/wld/documents/Dr.pdf](http://www.env.gov.bc.ca/wld/documents/Dr.pdf), accessed February 3, 2012.



# Report Card

## Assessing the B.C. Government's Implementation of its Grizzly Bear Conservation Strategy

**NINETEEN YEARS AGO, THE B.C. GOVERNMENT COMPLETED** the *British Columbia Grizzly Bear Strategy*, a laudable commitment to the long-term health of the province's 15,000 grizzly bears. This strategy provides a visionary blueprint for the conservation and management of the province's grizzly bear population. Rightfully concerned about the future of its grizzly bear population, the B.C. government recognized that the province's grizzly bears, though abundant in some parts of the province, all faced myriad threats to their long-term persistence. Without a plan, and the money to implement it, grizzly bears would likely continue to decline.<sup>23</sup>

Designed to help reverse the loss of grizzly bears in British Columbia and ensure the survival of this iconic species, the strategy listed four simple, if challenging, goals:

1. To maintain in perpetuity the diversity and abundance of grizzly bears and ecosystems on which they depend throughout British Columbia, including genetic diversity.
2. To improve the management of grizzly bears and their interactions with humans by modifying incompatible human activities and improving the regulation of hunting.
3. To increase public knowledge of grizzly bears and their requirements, and increase public involvement in appropriate grizzly bear management.
4. To increase international cooperation in management and research related to grizzly bears and the habitat on which they depend.

“While British Columbia is home to half of Canada’s grizzlies, we also have the fastest growing human population in Canada. We have the responsibility to act now in order to conserve grizzlies in North America.”

— *A Future for the Grizzly: British Columbia Grizzly Bear Strategy*

PHOTO COURTESY MIKE LABARBERA/FICKR

23 B.C. Ministry of Environment, Lands and Parks (MELP). 1995. Supra note 1.

To achieve these goals, the B.C. grizzly bear conservation plan listed several strategies. The first was to protect grizzly bear habitat. “The greatest single cause of declining grizzly bear populations is loss of habitat,” the report notes. And “our rapidly growing population’s increasing demands upon the land and its resources, and human intolerance of grizzlies, are the greatest cause of habitat loss and alienation.”

The heart of the habitat protection strategy was to preserve a network of “grizzly bear ecosystems as management areas.” These grizzly bear management areas would protect grizzly bear populations by ensuring activities that are incompatible with grizzly bears are “carefully controlled or not allowed.” Hunting in these areas, which would be connected by linkage zones, would be prohibited, and recreational activities that put grizzly bears at risk (like off-highway vehicle use) would be strictly controlled. *In toto*, this network of grizzly bear management areas would be managed “to secure the long-term survival of grizzly bear populations” in British Columbia.

The plan also recognizes that human-caused mortality must be reduced, and kept below sustainable thresholds. One of the primary ways of doing this is to conservatively manage the grizzly bear sport hunt so human-caused grizzly bear mortalities do not exceed sustainable levels. Concerned that inaccurate population estimates had led to overharvesting in some areas, the plan called for accelerating the completion of accurate population estimates in all grizzly bear management units and the implementation of a lottery-based permit system that reduced the number of bears that could be hunted in any given year. The strategy also recognized the need to reduce poaching by introducing larger fines and beefing up enforcement in the field.

Grizzly bears that become conditioned to human food and garbage tend not to live very long, either because they become easy targets for poachers, or because they become a nuisance or public safety threat and have to be euthanized. Recognizing this, B.C.’s grizzly bear conservation strategy placed significant emphasis on reducing the amount of garbage available to bears. This included adequate policy relevant to managing garbage in bear habitat, closing or bear-proofing landfills and transfer stations, and educating the public about the need to bear-proof homes, business and campsites.

The 1995 grizzly bear conservation strategy also acknowledged that there was much we didn’t know about grizzly bears in British Columbia, so it stipulated the need to “increase and intensify” research on grizzly bears and the requirements for their survival. Foremost among these needs were accurate population estimates, genetic analyses to determine gene flow and population isolation, and the locations of potential grizzly bear management areas. More research into the safety aspects of human-bear interactions was also deemed a priority.

To guide this research, the plan envisioned an independent Grizzly Bear Scientific Advisory Committee, which would advise the government on the conservation needs of grizzly bears. The panel would include provincial, national and international grizzly bear experts as well as First Nations representatives. This science-based committee would meet regularly, seek input from a separate public interest committee made up of representatives from various stakeholder groups and report to the province’s minister of environment.

Finally, the grizzly bear conservation strategy recognized the need for more public education. This strategy was not limited to waste management, but also included the need to raise awareness about safety in bear habitat; bear biology, ecology and behaviour; and the legislation and regulations pertaining to bear management and bear conservation.

However, despite the comprehensive array of goals and strategies meant to protect B.C.’s grizzlies, *A Future for the Grizzly* has not prevented the continued decline of grizzly bears in many part of British Columbia, in large part because much of the strategy has never been implemented or the strategy itself was insufficient to achieve its stated goals and objectives. As a result, several subpopulations on the southern edge of the province are at significant risk of disappearing forever.



“We intend to guide the implementation of the Grizzly Bear Conservation Strategy with a provincial Grizzly Bear Management Plan.”  
— Bill Barisoff, Minister of Water, Land and Air Protection, 2004

PHOTO COURTESY DOUGLAS BROWN/FICKR

## Conserve Grizzly Bear Habitat

GRADE  
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The 1995 *British Columbia Grizzly Bear Strategy* recognized that the most important part of any plan to ensure healthy, self-sustaining populations of grizzly bears is the protection, or conservation, of habitat. Most of B.C.'s public land is open to industrial, residential and recreational activities that are detrimental to grizzly bear persistence. As a result, "One of the primary means of reducing the loss of key grizzly habitat," the B.C. grizzly bear strategy states, "is to preserve a network of grizzly bear ecosystems as management areas. By establishing specific grizzly bear management areas, we can protect grizzly bear populations by ensuring that activities that are not compatible with grizzly bears are carefully controlled or not allowed."

According to the strategy, the identification and designation of Grizzly Bear Management Areas (GBMAs) would be prioritized based on "the suitability of grizzly bear habitat, proximity to existing and proposed protected areas, and levels of threat to grizzly bear populations."<sup>24</sup>

B.C.'s Grizzly Bear Scientific Advisory Committee supported the need for GBMAs, and, working with the government, identified three types of GBMAs to facilitate grizzly bear management in the province:

1. Small linkage GBMAs designed to enhance grizzly bear movement across human-caused fractures in the environment.
2. Medium-sized GBMAs that would serve as protected areas within larger exploited habitats.
3. At least one large, benchmark GBMA within each terrestrial ecoprovince in B.C. that would not be hunted and would serve as a representative population for that ecoprovince.

A 2003 scientific review of grizzly bear management in British Columbia by a blue-ribbon panel of independent scientists concluded that, "The concept of establishing large, protected GBMAs in B.C. has considerable value as a strategy for maintaining the long-term viability of grizzly bear populations, especially when accompanied by linkage zones connecting them to other occupied habitat in the province."<sup>25</sup> These GBMAs would not only preclude hunting, but protect grizzly bear habitat from activities that negatively impact grizzly bears, particularly unsustainable amounts of roads and motorized access. The panel placed particular emphasis on the nine threatened GBPUs in southern British Columbia.

The panel stated that GBMAs need to be relatively large, intact ecosystems that would be managed to protect the grizzly bear populations and their habitat.<sup>26</sup> Although resource extraction would not necessarily be prohibited, human activities would be controlled in such a way as to secure the long-term survival of grizzly bear populations.<sup>27</sup> They would be located in high quality grizzly bear habitat, preclude the hunting of grizzly bears, and be connected by linking corridors that contain the habitat requirements for grizzly bears to travel between management areas.

Unfortunately, in the 19 years since the *British Columbia Grizzly Bear Strategy* was adopted, the government has not designated a single GBMA in B.C. Neither has it "identified" key habitats throughout the province for consideration for management area designation." Instead, the government has changed both the name and intent of GBMAs. According to the Ministry of Environment, "these areas are now referred to as Grizzly Bear No Hunting Areas (GBNHAs)," although they are still referred to as GBMAs in some planning documents.<sup>28</sup> Three GBNHAs totalling 1.16 million hectares (more than half of which was already closed to hunting) were

"Only a concerted effort can ensure that the magnificent grizzly bear continues to roam our wild areas. The grizzly needs its own space."  
— B.C. government, 2002

24 Ibid.

25 Peek, J. et al. 2003. *Management of Grizzly Bears in British Columbia: A Review by an Independent Scientific Panel*. Prepared for B.C. Minister of Water, Land and Air Protection, Government of British Columbia, Victoria, B.C.

26 Ibid.

27 B.C. Ministry of Environment, Lands and Parks (MELP). 1995. *Supra* note 1.

28 B.C. Ministry of Environment. 2010. *Supra* note 17.



“There is no venue for discussing and debating and negotiating GBMAs right now. No strategic land use planning processes, no cross-landscape opportunities to influence road densities, motorized access patterns, no new processes for parks, conservancies and all the many other tools we have applied in the past to ensure the habitat side of the equation is well-managed.”

— Senior B.C. government scientist, 2011

PHOTO COURTESY FRANK ZEHNDER/FLICHER

established in B.C.’s Great Bear Rainforest. These include the Nass-Skeena (Khutzeymateen), Ahnuhati, Khtuzte-Kitlope, Kimsquit, Upper Dean, and Tweedsmuir areas. However, none of these areas satisfy the intent or the management objectives for GBMAs set out in the *British Columbia Grizzly Bear Strategy*, nor do they adequately implement, on the ground, the recommendations of the independent scientific panel. This is because there is no legal mandate to manage industrial and recreational (apart from hunting) activities that are incompatible with grizzly bears in these areas, except where they overlap with previously designated protected areas.

It’s important to point out that the amount of land designated as parks and protected areas has increased significantly since 1995, and today approximately 106,000 sq. km. (13.4 per cent) of occupied grizzly bear habitat in British Columbia is protected.<sup>29</sup> However large this area may seem, it is unlikely to sustain grizzly bears in B.C. over the long term. Although many of these protected areas do provide some protection for grizzly bears, they were not designed or designated to act as GBMAs. Many are in the wrong places or are not managed for the needs of grizzly bears (i.e. some still allow hunting and/or industrial activity that are incompatible with grizzly bear persistence). The bottom line is that no GBMAs have been established, as indicated in the *British Columbia Grizzly Bear Strategy*, especially in the threatened GBPUs where they are needed most (i.e. where the “level of threat to grizzly bear populations” has been high enough to warrant classifying them as “threatened” populations).

Some wildlife habitat areas (WHAs) have been designated to protect grizzly bear habitat. WHAs are a tool in the Identified Wildlife Management Strategy, which attempts to “protect environmental values” under the B.C. *Forest and Range Practices Act*. However, WHAs are too small and too easily rescinded to provide the kind of core habitat protection that are required to provide a secure, long-term future for B.C.’s grizzly bears.

Why have no GBMAs been designated? According to the independent grizzly bear panel, “Attempts to establish additional GBMAs and appropriate linkage zones have not been successful due to opposition from wildlife managers and user groups. Increased efforts to educate the public about the value of GBMAs may be necessary before this concept can be fully implemented in the province.”

According to one senior manager, there is no political will to “impose new land use processes or new demands on the land base” to protect grizzly bear habitat in British Columbia, which has proven to be a significant obstacle to the creation of GBMAs. More recently, Minister of Forests, Lands and Natural Resource Operations Steve Thompson told Global B.C. TV that no other GBMAs are in the works.<sup>30</sup>

It’s difficult to say how much grizzly bear habitat has been degraded since the *British Columbia Grizzly Bear Strategy* was adopted 19 years ago, because no province-wide assessments have been conducted or made available to the public on how habitat security has changed since then. However, it’s fair to assume that activities that increase risks to grizzly bears – logging, drilling, road building and motorized access – have continued apace. Indeed, according to the independent review of grizzly bear management in B.C. conducted in 2003, it is not at all clear whether current trends in habitat management are consistent with maintaining adequate habitat to sustain grizzly bear populations that are both healthy and viable over the long term.<sup>31</sup>

This is because the responsibility for managing bear habitat is held by ministries also responsible for encouraging and regulating industrial and other human uses on public lands outside national and provincial parks, and the role of agencies responsible for managing grizzly bears, especially recovering threatened subpopulations, is “strictly consultative.” The province appears to lack the overriding “legislation requiring consideration of wildlife habitat needs on public lands. It is thus imperative that there be a close relationship between the wildlife managers and habitat managers. Each agency has a different mandate, organization and legal issues with which it must contend. There are coordination problems at all levels,

29 Government of British Columbia. 2004. *Identified Wildlife Management Strategy. Accounts and Measures for Managing Identified Wildlife: Southern Interior Forest Region.*

30 Global B.C. TV. 2012. “Grizzly bear hunt debate.” News Hour, April 2, 2012.

31 Peek, J. et al. 2003. *Supra* note 25.

from the individual examining proposed land use permits, up through regional offices, to the ministerial offices where policies are developed.”<sup>32</sup>

In lieu of GBMAs, land-use plans and the Forest Practices Code of B.C. recommend access management to protect grizzly bears. However, managing access is highly controversial and often ineffective. According to the independent grizzly bear panel, “legal measures have rarely been implemented in B.C.,” and access is not uniformly managed to accommodate bear populations.... Conservation areas that can be managed specifically for their wildlife values may be needed to effectively maintain distribution of viable populations of grizzly bears.”<sup>33</sup>

## Manage Human-Caused Grizzly Bear Mortality

**GRADE  
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The 1995 *British Columbia Grizzly Bear Strategy* recognized that in order to manage grizzly bear populations sustainably, it was important to understand how many grizzly bears existed in B.C. and what level of mortality they could sustain without declining. Unfortunately, human-caused mortality of grizzly bears has not declined, and too many die in many of B.C.’s GBPUs.

“The Ministry of Environment has been collecting detailed harvest data for Grizzly Bears since 1976. This data is considered to be both complete and accurate.... This, along with a number of other measures... has led Ministry scientists to conclude that the grizzly bear harvest is sustainable.”  
— *B.C. Ministry of Environment, 2011*

### TOWARDS A SUSTAINABLE GRIZZLY BEAR HUNT

Apart from a brief moratorium in 2001, British Columbia has always allowed grizzly bears to be hunted for sport. In order to better regulate the number of grizzly bear killed each year by hunters, as stipulated in the 1995 grizzly bear conservation strategy, the general open season was replaced in 1996 with a limited-entry hunt for resident hunters, and a quota system for guide-outfitters leading non-resident hunters. Currently, grizzly bear hunting is allowed in 42 of 56 GBPUs.<sup>34</sup> Government officials claim that this system has limited the number of grizzly bears killed by hunters to the point where the hunt is considered “sustainable.”

A “sustainable” hunt is defined as one that does not allow total human-caused mortality from hunting and all other sources (poaching, animal control, and collisions with automobiles and trains) to reach or exceed specific mortality thresholds designated for each GBPU. These thresholds range from four to six per cent per year, which may be adequate for some populations. However, when managing risks of decline in hunted populations of grizzly bears, these thresholds are likely unsustainable because of the uncertainty of population estimates.<sup>35</sup> Given the importance of female grizzlies to the long-term health of the population, the threshold for female mortality is no more than 30 per cent of total mortalities for a given area.

The number of bears allowed to be hunted in each area is calculated in accordance with the 2007 *Grizzly Bear Harvest Management Procedure*, which “provide[s] clear direction on the approach and methods for managing grizzly bear harvests province-wide.”<sup>36</sup> First, population estimates are made, then maximum mortality rates are set. Anticipated non-hunting mortalities are determined and unknown mortalities are estimated. Finally, harvest rates are established and limited-entry hunt authorizations and guide-outfitter quotas are calculated.

32 Ibid.

33 Ibid.

34 [www.env.gov.bc.ca/soe/indicators/plants-and-animals/grizzly-bears.html](http://www.env.gov.bc.ca/soe/indicators/plants-and-animals/grizzly-bears.html), accessed January 15, 2014.

35 McLoughlin, P. 2003. *Managing Risks of Decline for Hunted Populations of Grizzly Bears Given Uncertainty in Population Parameters*. Final report submitted to the British Columbia Independent Scientific Panel on Grizzly Bears. University of Alberta.

36 B.C. Ministry of Environment. 2007. *Grizzly Bear Harvest Management Procedure*.



If mortality in a given year is excessive, hunt authorizations and quotas are adjusted annually to ensure that average human-caused mortality thresholds over a five-year allocation period are not exceeded.

PHOTO COURTESY DOUGLAS BROWN/FICKR

In theory, the number of bears killed by hunters and other sources of human-caused mortality are monitored carefully. If mortality in a given year is excessive, hunt authorizations and quotas are adjusted annually to ensure that average human-caused mortality thresholds over a five-year allocation period are not exceeded. The B.C. government maintains that “it is extremely rare for mortality rates over a five-year period to be in excess of the allowable mortality,” and that when these situations arise, “mortality rates over the next five-year period are significantly reduced or eliminated to compensate for the overharvest in the previous five-year period.” Government documents also maintain that, “legal harvests are closed when either (or both) the six per cent total or the 30 per cent female limits are exceeded.”<sup>37</sup>

However, recent changes to hunting regulations indicate that some subpopulations may have been overharvested. Grizzly bear sport hunting was suspended in the Francois and Moberly GBPU because population overestimates may have contributed to excessive hunting mortality.<sup>38</sup> According to the B.C. Ministry of Environment, five additional hunted GBPU – Nation, Rocky, South Purcell, South Rockies and Tweedsmuir – exceeded the maximum allowable human-caused mortality.<sup>39</sup> Although most mortalities were the result of non-hunting mortality (primarily motor vehicle/train collisions and conflict kills), sport hunting contributed to the exceedance of government-set mortality thresholds.

A recently published independent scientific analysis of B.C. grizzly bear mortality data found that in fact, the exceedance of human-caused mortality thresholds is much more prevalent than the B.C. government has admitted (see Figure 1).<sup>40</sup> According to this analysis, 26 GBPU reached or exceeded total (male and female) mortality thresholds in at least one of three allocation periods between 2001 and 2011. Seven GBPU reached or exceeded mortality thresholds in two of three allocation periods, and the Tweedsmuir, Rocky and South Rockies GBPU each exceeded mortality thresholds in all three allocation periods.

Perhaps more important is the regularity with which female mortality thresholds have been exceeded. Twenty-four of 49 GBPU reached or exceeded female mortality thresholds in at least one allocation period

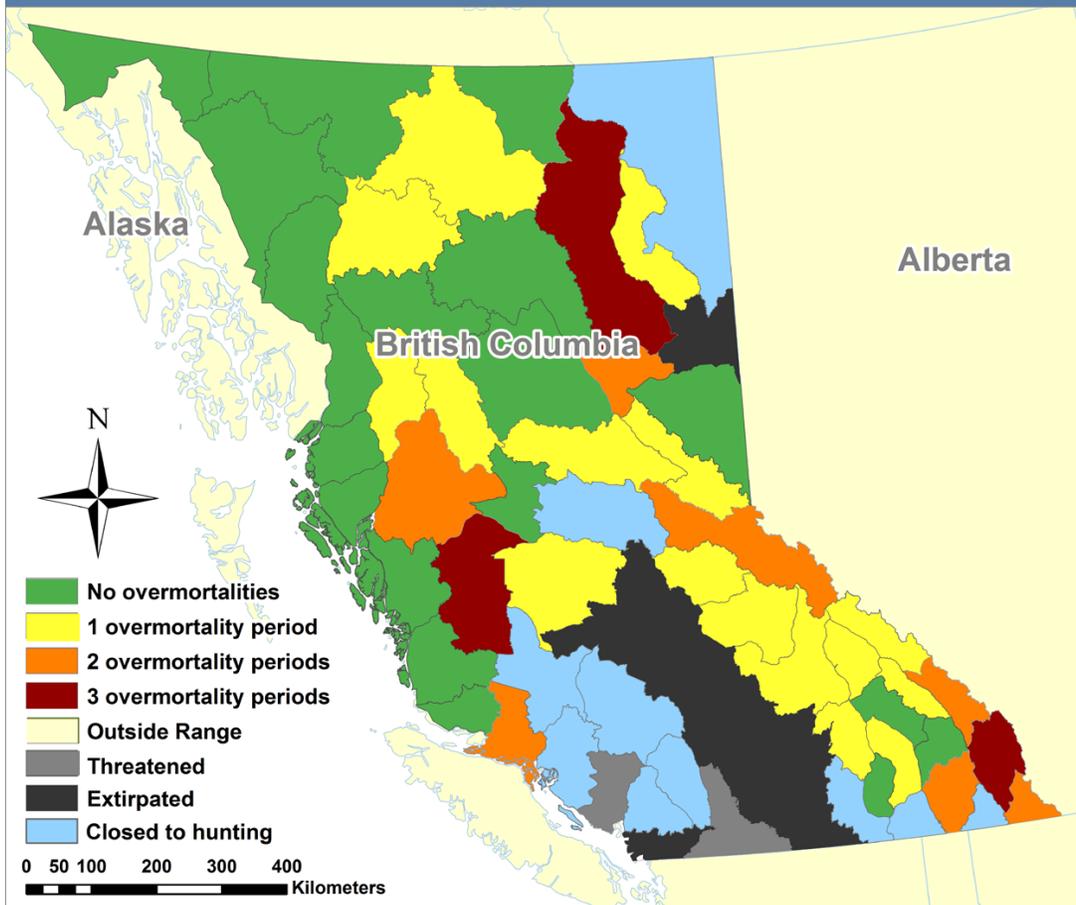
37 B.C. Ministry of Environment. 2010. Supra note 17.

38 B.C. Ministry of Forests, Lands and Natural Resource Operations. Supra note 2.

39 B.C. Ministry of Environment. 2010. Supra note 17.

40 Artelle KA, Anderson SC, Cooper AB, Paquet PC, Reynolds JD, et al. (2013) *Confronting Uncertainty in Wildlife Management: Performance of Grizzly Bear Management*. PLoS ONE 8(11): e78041. doi:10.1371/journal.pone.0078041

FIGURE 1: OVERMORTALITY IN B.C. GRIZZLY BEAR POPULATION UNITS



Note: Number of allocation periods (2001–2003, 2004–2006, or 2007–2011) in which female or total overmortality occurred in Grizzly Bear (*U. arctos horribilis*) Population Units (“population units”) of British Columbia, Canada. Shown are 2009 population unit boundaries. Hunting is not allowed in areas denoted as threatened, extirpated, or closed to hunting. One additional population unit (Blackwater-West Chilcotin) has been reclassified as threatened as of 2012.

Source: Artelle KA, Anderson SC, Cooper AB, Paquet PC, Reynolds JD, et al. (2013) *Confronting Uncertainty in Wildlife Management: Performance of Grizzly Bear Management*. PLoS ONE 8(11).

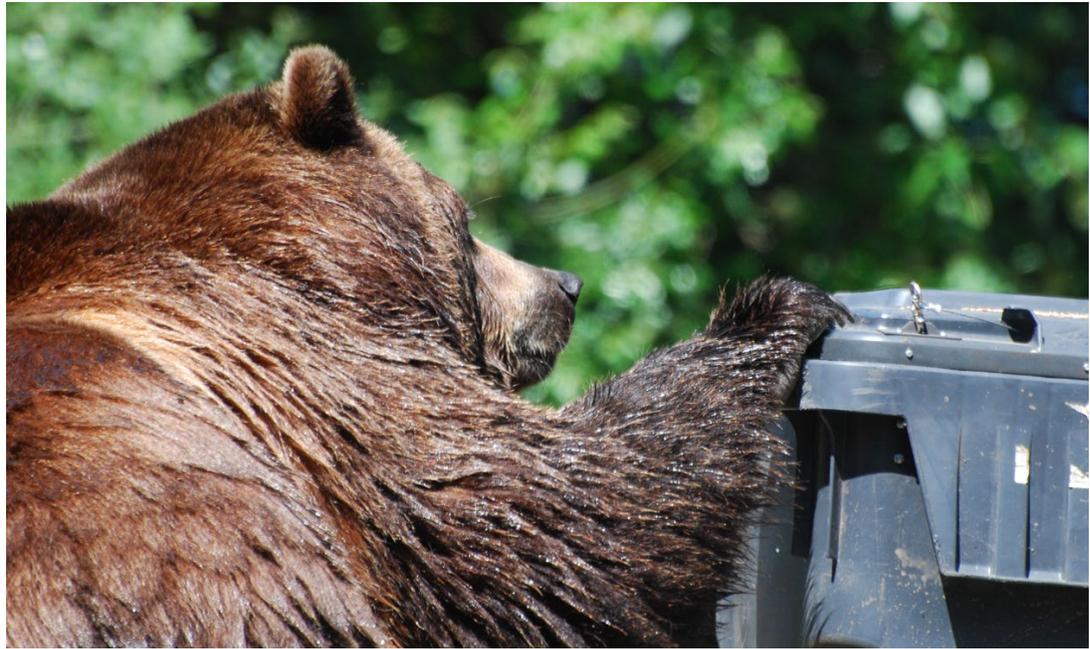
between 2001 and 2011. Three GBPUs (Flathead, Moberly and Rockies Park Ranges) exceeded female mortality thresholds in two of three allocation periods. South Rockies, Tweedsmuir and Rockies GBPUs each exceeded female mortality limits during all three allocation periods.

Although the government claims “actions have been taken” to “restrict or close specific hunts in order to reduce human-caused mortality” in GBPUs that experience overmortalities,<sup>41</sup> the results of this analysis indicate this has not happened in most cases. Indeed, despite repeated male and female overmortalities in the South Rockies GBPU between 2001 and 2011, which has been closed to hunting since 2011, the B.C. government has decided to re-open this GBPU to hunting in 2014.<sup>42</sup>

The evidence suggests that B.C.’s *Harvest Allocation Policy and Procedures* is not adequately ensuring the trophy hunt does not push grizzly bear mortalities above thresholds, and its implementation should be improved by making it more precautionary.

41 B.C. Ministry of Environment. 2010. Supra note 17.

42 <http://a100.gov.bc.ca/pub/ahte/hunting/re-open-grizzly-bear-leh-hunts-mus-4-20-and-4-23>, accessed January 16, 2014



## REDUCING THE NUMBER OF “PROBLEM” BEARS

The province's Bear Smart Community Program funded several bear hazard assessments and human-bear conflict prevention plans for municipalities, but that funding has dried up.

PHOTO COURTESY  
ONCEANDFUTURELAURA/Flickr

Recognizing that designating a network of connected grizzly bear management areas will not be enough to maintain the diversity and abundance of B.C.'s grizzly bears, the 1995 grizzly bear conservation strategy also contemplates the need for “other management processes [that] will be required in order to fully protect grizzly bears.” One of those strategies was the need to “reduce the amount of garbage [and other attractants] available to bears.” The 2003 independent review of grizzly bear management in B.C. also recognized the need to eliminate bear attractants in order to reduce habituation, food-conditioning and, ultimately, human-caused grizzly bear mortality.

Initially, B.C.'s grizzly bear conservation strategy stated that “the Waste Management Branch of the Ministry of Environment has earmarked \$250,000 annually for controlling waste to help eliminate garbage-habituation in bears throughout the province.” In the early 2000s, the government provided a one-time grant of \$290,000 for the province-wide Bear Aware program and another \$10,000 for the Northern Bear Awareness Program in Prince George.

The B.C. Ministry of Environment did develop a community-based Bear Smart Communities Program in 2002. According to the program's website, the Bear Smart Community Program was designed by the Ministry of Environment in partnership with the British Columbia Conservation Foundation and the Union of British Columbia Municipalities. It is a voluntary, preventative conservation measure that encourages communities, businesses and individuals to work together. The goal is to address the root causes of bear/human conflicts, thereby reducing the risks to human safety and private property, as well as the number of bears that are destroyed each year.

The province's Bear Smart Community Program funded several bear hazard assessments and human-bear conflict prevention plans for municipalities, but that funding has dried up. It is unclear to what degree money has been allocated for controlling waste and other anthropogenic bear attractants, but there doesn't appear to be any to speak of at this point in time. “To the best of my knowledge there is no money,” said Sylvia Dolson, the executive director of Whistler's Get Bear Smart Society, in October 2010. “Certainly none we have access to.”<sup>43</sup>

43 *Pers. comm.*

Despite these efforts, and the additional efforts of numerous environmental organization and hundreds of volunteers, only four communities have been designated as “Bear Smart” in the 16 years since the grizzly bear conservation strategy was adopted. Two of these communities (Kamloops and Lion’s Bay) are not located in currently occupied grizzly bear habitat. Squamish and Whistler are the only official “Bear Smart” communities located in or near occupied grizzly bear habitat, and there is some question about how Bear Smart they actually are. Seventeen black bears were killed as a result of human-bear conflicts in Whistler in 2011, the highest number of conflict bears destroyed in more than a decade. No grizzly bears were seen in Whistler recently.

Current legislation is not particularly helpful. Although Section 88.1 of the B.C. *Wildlife Act* makes it an offence to leave out food, food waste, compost or other waste or garbage that could attract dangerous wildlife, it is rarely enforced, even in the most blatant cases. As a result, conservation officers kill about 50 grizzly bears every year for “reasons of public safety.” Bella Coola seems to be the provincial hotspot: As many as 30 grizzlies were destroyed there in 2008 and 2009. Most conflict bears are destroyed and some are relocated, but these usually die or return to the original conflict site. Local residents shoot some to protect their property. According to the B.C. government, these kinds of losses greatly affect grizzly numbers in some areas.”<sup>44</sup>

According to the 2003 independent scientific review, “the Bear Smart Community Program should include a proactive component that is based on an assessment of communities with the most potential for bear problems. Additional efforts could involve identifying locations where chronic grizzly bear non-hunting mortality occurs and evaluating causes and some approaches for reducing such mortality. The program should include a monitoring effort to assess strategies for involving the public in grizzly bear management and progress in reducing grizzly bear mortality in the province.”

## HUMAN-CAUSED MORTALITY IN THREATENED GBPUS<sup>45</sup>

Although not explicitly stated in the 1995 grizzly bear conservation strategy, minimizing human-caused deaths of grizzly bears in threatened GBPUs is of the outmost importance. Government policy since 1995 indicates that the “primary objective” in threatened GBPUs is to recover them to viable status (i.e. to increase grizzly bear populations to greater than 50 per cent of each GBPUs habitat capability).<sup>46</sup>

When the grizzly bear conservation strategy was adopted in 1995, nine of B.C.’s 57 (now 56) GBPUs were designated as threatened. Today, those same nine population units remain even more threatened, and not a single recovery plan has been implemented to begin the long, slow process of increasing these populations to sustainable, viable levels.

In many cases, the population estimates for these GBPUs are lower today than they were in 1995. Sometimes this is because initial population estimates were optimistically large, but in some GBPUs it’s because human-caused mortality levels have been unsustainably high. In most GBPUs, insufficient monitoring means we simply don’t know what the mortality rates are, or whether these threatened subpopulations have increased or decreased over the years.

Of all the threatened GBPUs in British Columbia, the ones in the southeast corner of the province have been the most rigorously studied. The smallest and most at risk of these is the Yahk GBPU, where the grizzly bear population is extremely small (~40–50) and the mortality rate is high (approximately six to eight per cent per year), a rate that bear biologist Michael Proctor maintains is “certainly not consistent with population



Squamish and Whistler are the only official “Bear Smart” communities located in or near occupied grizzly bear habitat, and there is some question about how Bear Smart they actually are.

PHOTO COURTESY RAUL PACHECO-VEGA/Flickr

44 Province of British Columbia. 2002. “Grizzly Bears of British Columbia.”

45 See Appendix I for more information on B.C.’s nine threatened GBPUs.

46 B.C. Ministry of Environment. 2010. Supra note 17.

increases necessary for ‘recovery.’” In fact, excessive human-caused mortality in recent years has likely resulted in an overall population decline over the last three decades.<sup>47</sup>

Like the Yahk, the South Selkirk GBPU is right at the top of the list of Canada’s most threatened grizzly bear subpopulations, in large part because it is so small and isolated. The population estimate for this subpopulation is significantly lower today than it was when B.C. adopted its grizzly bear conservation strategy. Today, just 58 bears remain in the South Selkirk GBPU. Whether that’s because the population actually declined or the methodology used to calculate the estimate has improved is unknown, but human-caused mortality rates have been significant. Each year between 1999 and 2004, three per cent of the population was killed by humans; when unknown mortality is factored in, the mortality rate increases to between 4.5 and six per cent.<sup>48</sup> In 2004, biologists calculated a slightly increasing growth rate for the south Selkirk Mountains.<sup>49</sup> However, this may have changed given a recent increase in mortalities.

In most other threatened GBPUs, we don’t have an accurate understanding of population dynamics, either because monitoring of mortality is inadequate and/or because the province hasn’t conducted accurate population estimates.

## Ensure Grizzly Bear Population Numbers are Accurately Known



The first step toward ensuring human-caused grizzly bear mortalities are kept low enough to prevent population declines (or in the case of threatened GBPUs, to encourage recovery) is to calculate accurate population estimates. Accurate population estimates determine how many grizzly bear tags will be awarded to hunters each year, and they allow biologists and resource managers to determine whether human-caused mortality rates are sustainable. Population estimates that are inaccurately low rob hunters of opportunities to kill grizzly bears for sport, while population estimates that are excessively high allow too many bears to be killed, which can drive populations down and put them at increasing risk of extirpation.

Figuring out how many grizzly bears occupy each GBPU is not easy. Because grizzly bears are naturally reclusive, and because they often live in rugged, forested environments, they are notoriously difficult to count. Still, B.C.’s 1995 grizzly bear conservation strategy identified the need to “revise estimates of grizzly bear populations” based on a province-wide inventory and assessment of grizzly bears and their available habitats. A blue-ribbon panel that reviewed grizzly bear management in British Columbia in 2003 endorsed this priority, stating that “population estimates are the foundation for the management of B.C. grizzly bears.”<sup>50</sup>

Efforts to do so, however, have been mixed. Methodologies for estimating grizzly bear populations have improved dramatically since the B.C. grizzly bear conservation strategy was adopted, and new, DNA-based mark-recapture protocols are believed to provide relatively accurate population estimates. However, even this method has accuracy concerns since it underestimates the number of females with young, which tend to avoid hair-snagging stations. To date, over 30 grizzly bear mark-recapture inventories have been conducted in B.C., though they only cover 14 per cent of all occupied grizzly bear habitat.

Earlier methods, which are still used in some parts of B.C., are less reliable. One such method is a multiple regression model that uses known densities from inventories in other areas to predict grizzly bear densities

The first step toward ensuring human-caused grizzly bear mortalities are kept low enough to prevent population declines (or in the case of threatened GBPUs, to encourage recovery) is to calculate accurate population estimates.

47 Kasworm, W. et al. 2009. *Cabinet-Yaak Grizzly Bear Recovery Area 2008 Research and Monitoring Progress Report*. U.S. Fish and Wildlife Service, Missoula, Montana.

48 Proctor, M. et al. 2005. *Genetic analysis reveals demographic fragmentation of grizzly bears yielding vulnerably small populations*. *Proceedings of the Royal Society*, London B 272:2409–2416.

49 Wakkinen, W. L. and W. F. Kasworm. 2004. “Demographics and Population Trends of Grizzly Bears in the Cabinet-Yaak and Selkirk Ecosystems of British Columbia, Idaho, Montana, and Washington.” *Ursus* 15(1):65-75.

50 Peek, J. et al. 2003. *Supra* note 25.



In practical terms, recent population estimates indicate that less reliable methodologies have tended to overestimate grizzly bear populations, resulting in either incorrect status designations for certain GBPUs, or in potentially excessive grizzly bear mortality by both hunting and other causes.

PHOTO COURTESY GLACIERNPS

within GBPUs that have not been surveyed. In other parts of B.C., a so-called expert-based model is used to determine bear density, but it is more subjective than the multiple-regression model. It is the over-reliance on this subjectivity that caused the blue-ribbon panel of grizzly bear biologists to voice their concern in 2003.

In practical terms, recent population estimates indicate that these less reliable methodologies have tended to overestimate grizzly bear populations, resulting in either incorrect status designations for certain GBPUs, or in potentially excessive grizzly bear mortality by both hunting and other causes. Of 55 adjustments to population estimates since 2004, 32 (57 per cent) indicate that populations are smaller – often substantially so – than had been assumed. Only one population estimate – for the South Selkirk GBPU, which was the first to be estimated using the more accurate, DNA-based mark-recapture method – has stayed the same, indicating that the expert-based and multiple-regression methods are much less reliable.

For instance, a 2007 mark-recapture census found just 87 grizzlies in the Central Purcell GBPU, rather than the 150 that were estimated to exist there in 2004 using a multiple-regression model. Grizzly bear hunting is allowed in the original Central Purcell GBPU because the 2004 population estimate was more than 100 bears, and habitat capability was significantly more (93 per cent) than the 50 per cent threshold that defines a “threatened” GBPU, where hunting is not allowed. However, the new population estimate is less than 100 individuals, which normally precludes hunting, and lowers the population to habitat capability ratio to just 54 per cent, which is very close to the 50 per cent threshold that normally justifies a “threatened” listing.<sup>51</sup>

The South Purcell GBPU, which also allows hunting, also experienced a similar reduction in estimated population. The official grizzly bear population estimate (based on a multiple regression model) for this area since 2004 has been 158 individuals, but the same 2007 study indicates that only 92 bears occupy the South Purcell GBPU – 70 per cent less than the previous estimate. Given that the habitat capability for this GBPU is 198 bears, the current estimate reduces the population from 80 per cent of habitat capability to just 46 per cent, which would normally justify an end to the hunt and a “threatened” listing.

Since the South Purcell and Central Purcell GBPUs have been amalgamated into what’s now called the new Central Purcell GBPU, the population estimate is only 48 per cent of habitat capability. As has been previously

51 Proctor, M. et al. 2007. *Abundance and Density of Central Purcell, South Purcell, Yahk, and south Selkirk Grizzly Bear Population Units in southeast British Columbia*. (Kaslo, B.C.: Birchdale Ecological, March 2007).

noted, populations approaching 50 per cent of habitat capability should be managed more conservatively and may require management designed to increase population size.<sup>52</sup>

Perhaps the most extreme example of the consequences of overestimating grizzly bear populations occurred recently in the Southern Coast Mountains north of Vancouver. A DNA-based, mark-recapture population inventory conducted in four threatened GBPUs – Garibaldi-Pitt, South Chilcotin Ranges, Squamish-Lillooet and Stein Nahatlatch – between 2004 and 2007 came up with some shocking results.<sup>53</sup> While the South Chilcotin Ranges GBPU was found to contain more grizzly bears (147) than previously had been estimated (104), the estimates for the other GBPUs were lower, two of them dramatically so. The official estimate for the Stein-Nahatlatch GBPU dropped from 63 to just 23 grizzly bears left in what was found to be one of the two most genetically isolated subpopulations in North America. (The other is the “McGillvray Group” just to the north of it, an isolated subpopulation of just 53 bears in the southern end of the South Chilcotin Ranges GBPU. This indicates that even estimating populations at the GBPU level may not be good enough, as subpopulations may exist at much finer scales.) To the east of the Stein-Nahatlatch GBPU lies the Garibaldi-Pitt GBPU, which population models estimated contain 18 or so bears. The more recent effort, however, found not a single grizzly in the entire GBPU. (The official estimate now stands at two, after a grizzly bear was documented on a field camera.) Either way, this GBPU has been functionally extirpated.

Despite the number of new, more accurate population estimates in certain parts of B.C., it seems clear that most of the population estimates used to manage grizzly bears (and the sport hunt) are not particularly accurate – and some of them may be far too high, which could have potentially dire consequences for the long-term health of the grizzly bear population. COSEWIC, in its recent 2012 reassessment of the status of grizzly bears in Canada, wrote (in its typically understated manner) that “[t]he lack of any estimates of trends from B.C., where more than half the bears are found, is notable.”<sup>54</sup>

The independent grizzly bear panel recommended developing new analytical tools, such as resource-selection functions, to assess bear density based on habitat attributes and human disturbance. Such methods are far less subjective and more accurate than the Fuhr-Demarchi Method (F-D). The panel also recommended that securing precise population estimates be given a higher priority. This has yet to happen, and is particularly important for small and at-risk subpopulations, and for subpopulations that endure a sport hunt.



The independent grizzly bear panel recommended developing new analytical tools, such as resource-selection functions, to assess bear density based on habitat attributes and human disturbance.

PHOTO COURTESY  
DOUGLAS BROWN/FLICKR

## Maintain the Abundance and Diversity of Grizzly Bears

**GRADE D** Although British Columbia still boasts approximately 15,000 grizzly bears, scientific research indicates that abundance and diversity (including genetic diversity) appears to have declined since 1995. Better population estimates indicate that several subpopulations may have shrunk, and there is direct evidence the subpopulations in southern B.C. have declined. There hasn't been a confirmed record of grizzly bears in the North Cascade GBPU since 1998. Grizzly bears in the Gardibaldi-Pitt GBPU are functionally extirpated.

Three of B.C.'s subpopulations already show significant declines in genetic diversity. The subpopulation in the South Selkirk GBPU, and two separate subpopulations in the Stein-Nahatlatch GBPU, are the three most genetically isolated grizzly bear subpopulations in North America. Further analysis may indicate that

52 Ibid.

53 Apps, C. et al. 2009. *Grizzly Bear Population Abundance, Distribution, and Connectivity Across British Columbia's Southern Coastal Ranges*. Version 1.0. Aspen Wildlife Research and Ministry of Environment, Victoria, B.C.

54 COSEWIC 2012. Supra note 5.



other subpopulations also suffer from declining genetic diversity, but we know that isolation and genetic drift have already decreased the ability of bears to survive disease and adapt to changing environmental conditions in these three areas.

Small populations of grizzly bears in the hot, dry climate of B.C.'s southern interior grassland ecoprovince are of particular importance, as they represent the last chance in North America to maintain grizzly bears in this habitat type. Grizzly bears historically occupied this entire area, as well as other hot, dry regions in the southern United States and Mexico. However, they were long ago extirpated from northern Mexico, Texas, Arizona, New Mexico and southern Colorado, leaving B.C.'s "hot, dry plateaus" as the only place in North America where grizzly bears still persist in this unique ecological setting.

The aridity of the hot, dry grassland canyons and valleys of south-central B.C. (like the United States' desert southwest) likely gave rise to local adaptations, especially the ability to survive in a region where summer temperatures are often severe and food sources less diverse and abundant. This would have required unique behavioural adaptations, especially foraging strategies different from those in more productive ecosystems. This knowledge was accumulated by bears over thousands of years of exploiting the dry habitats of the Fraser-Chilcotin and Okanagan valleys and surrounding landscapes. Whether this behavioural and ecological knowledge was phenotypic (i.e. manifested physically), or whether it may have been translated (through phenotypic selection) into genotypes is unknown. It's also possible that there may be physiological adaptations associated with historical occupation of dry ecosystems including, for example, greater tolerance of heat and dryness and water retention.<sup>55</sup> These unique characteristics make B.C.'s Interior grizzlies as worth protecting as the great brown bears on the West Coast.

Despite the government's stated goal of recovering all threatened population units to viable status, only one recovery plan has been developed (for the North Cascades GBPU, in 2004) and it was never implemented. According to government sources, there is no money and little political will to develop recovery plans for the other threatened GBPUs.<sup>56</sup> Independent biologists working for the not-for-profit Trans-border Grizzly Bear Project apparently are drafting a recovery plan for the South Selkirk and South Purcell/Yahk GBPUs.

Relegating grizzlies to Alaska is about like relegating happiness to heaven; one may never get there.  
— Aldo Leopold, *A Sand County Almanac*

PHOTO COURTESY FRANK ZEHNDER/FLICKR

55 Horejsi, B. 1999. The Endangered Granby-Gladstone Grizzly Bear Population: A Conservation Biology Analysis for Recovery. Calgary: Western Wildlife Environments Consulting Ltd.

56 McRory, Wayne. 2013. McRory Wildlife Services Ltd. Response to 2011 Terrestrial Wildlife Component of the Environmental Impact Statement (EIS) & Associated Documents Regarding the Proposed New Prosperity Gold-Copper Mine Project at Teztan Biny (Fish Lake) with Specific Reference to the Grizzly Bear. Report for Friends of Nemaiah Valley (FONV) for submission to the CEAA panel.

Gaps in research are the result of lack of political will and government funding, *not* the competence or commitment of the excellent biologists on staff in the various government ministries involved in grizzly bear and habitat management.

PHOTO COURTES YNPS/FICKR



## Increase Scientific Knowledge of Grizzly Bears

### GRADE B

Much research has been conducted in B.C. by independent and government biologists over the last 19 years, and this has helped improve our understanding of grizzly bears and what needs to be done to achieve the goals of B.C.'s grizzly bear conservation strategy. However, many questions still remain unanswered, and much of what we know in certain areas has not been adequately implemented. For instance, population estimates in most GBPUs are simply not accurate enough to allow industrial activity and motorized access and trophy hunting to continue at current rates, especially in threatened GBPUs, nor do they allow for the conservative and responsible management of the grizzly bear sport hunt. While genetic analyses have been conducted in a few GBPUs, most subpopulations are still waiting for research to determine gene flow and the degree of isolation. If an assessment of potential locations for grizzly bear management areas for the most at-risk subpopulations was ever conducted, it hasn't been released to the public or moved into the implementation stage. These gaps in research are the result of lack of political will and government funding, *not* the competence or commitment of the excellent biologists on staff in the various government ministries involved in grizzly bear and habitat management.

Unlike many other species that are listed as threatened in B.C. (such as Porsild's bryum, the Dromedary Jumping-Slug and Haller's apple moss) there is no recovery team for grizzly bears.<sup>57</sup> The independent Scientific

<sup>57</sup> B.C. Ministry of Environment. 2008. "Recovery Teams and Recovery Implementation Groups in British Columbia." March 2008. [www.env.gov.bc.ca/wld/documents/recovery/RcvryTeams\\_RIGs\\_BC.pdf](http://www.env.gov.bc.ca/wld/documents/recovery/RcvryTeams_RIGs_BC.pdf), accessed June 12, 2012.

Advisory Committee was supposed to help fill that gap by meeting regularly to advise the B.C. government on the conservation needs of the province's grizzly bears, but it was disbanded. Although there are several qualified biologists on staff with various B.C. government ministries, the intent of the independent scientific advisory committee was for provincial, national and international grizzly bear experts, as well as First Nations representatives, to provide ongoing assistance in the slow, difficult process of recovering southern B.C.'s threatened grizzly bear subpopulations. The fact it no longer exists is a reflection of the government's lack of commitment to grizzly conservation in the province of B.C.

In an effort to cooperate with neighbouring jurisdictions that share grizzly bear populations with B.C., the province has allowed its biologists to participate in international scientific organizations (e.g., International Association for Bear Research and Management), and to pursue discussions with the U.S. regarding grizzly bear management across the Canada-U.S. border. The province signed an agreement with the Interagency Grizzly Bear Committee in 1986 to coordinate management of shared populations, and this cooperative effort is still in place. However, British Columbia has not made much progress in ensuring threatened transboundary grizzly bear subpopulations are managed as well as they are in the United States. In some cases, such as in the Yahk GBPU, it may be decreased habitat security and unsustainable mortality rates on the Canadian side of the border that has prevented recovery from taking place in the United States.

## Increase Public Knowledge of Grizzly Bears

### GRADE C

The province's grizzly bear conservation strategy includes the need for a comprehensive educational program for intermediate and senior secondary level students, as well as the general public, especially in the areas of bear safety, waste management, bear ecology and current wildlife regulations. Project Wild, with the support of the B.C. Ministry of Environment, provides study guides and workshops on grizzly bears, but it is unknown what impact this has had on public knowledge of grizzly bears.

In June of 2002, the province developed a community-based Bear Smart Program intended to reduce conflicts between bears and people. Designed for communities and municipalities in bear country, the program certifies communities as Bear Smart when they have met specific standards. In 10 years, only two communities located in or near grizzly bear habitat (Squamish and Whistler) have been designated "Bear Smart," and because of ongoing bear deaths, there is some question about how Bear Smart they actually are.

Other educational tools have also been developed and disseminated. The government website provides basic information about bears and how to avoid conflicts. An insert into the fishing and hunting regulations alerts sportsmen about encounters with grizzly bears. Recommendations about using pepper spray and how to respond when confronted by bears are also included. Numerous non-profit organizations such as the Get Bear Smart Society also work to educate the public about bears and how to live with them.

However, all the government's public education efforts are voluntary, meaning that to participate the general public must request them, or citizen groups must deliver them. Limited resources means limited reach, and bear deaths as a result of conflicts with humans have not decreased. In 2011, 381 grizzlies were killed, 12 per cent more than the average of 340 deaths per year between 1976 and 2011, and more than were killed in 22 of the 36 years. 2011 saw the most grizzly deaths since 2007, when grizzly mortality reached an all-time high of 443.<sup>58</sup> On average, human-caused grizzly mortality has not decreased since 1976.

A much more pro-active and well-resourced educational effort will be necessary if public safety is to be enhanced and bear deaths minimized.



The fact that the independent scientific advisory committee no longer exists is a reflection of the government's lack of commitment to grizzly conservation in the province of B.C.

PHOTO COURTESY  
DOUGLAS BROWN/FICKR

58 Rockwell, L. 2012. "B.C.'s grizzlies and human-caused mortality: 2011 data." David Suzuki Foundation.



# Recommendations

*“The Grizzly Bear Conservation Strategy was written in 1995 and some of the information contained in this document is now out-of-date.”*

*— B.C. Ministry of Environment, 2011*

PHOTO COURTESY MARIO  
PACKHAISER/FLICKR

TEN YEARS AGO, IN HIS 2004 LETTER TO JAMES PEEK, chair of the independent grizzly bear scientific panel, Minister of Water, Land and Air Protection Bill Barisoff reaffirmed the B.C. government’s commitment to implementing the 1995 Grizzly Bear Conservation Strategy.<sup>59</sup> In particular, he made several commitments to Mr. Peek on behalf of the people of British Columbia. These included:

1. Develop a provincial grizzly bear management plan to guide the implementation of the grizzly bear conservation strategy, including the consideration of funding needs and potential funding mechanisms.
2. Prepare a report with background information on each grizzly bear population unit, including assumptions used in developing population estimates and setting harvest levels.
3. Complete consultation on population objectives and use this process to further our efforts to establish a provincial system of legally established benchmark grizzly bear management areas.
4. Improve the method by which population estimates were made in lieu of the panel’s recommendations.
5. Consider the development of sustainable resource management plans and/or access management plans that would improve grizzly bear conservation.
6. Consider the role of forest management practices in the conservation of grizzly bear habitat.

While much considering may have been done, little has improved on the ground to ensure a future for British Columbia’s grizzly bears. B.C. has not developed a grizzly bear management plan to guide the implementation of the grizzly bear conservation strategy, and there is little funding or human resources to do the work. Neither is there a background report on each grizzly bear population unit. Although improvements have been made in

<sup>59</sup> Barisoff, B. 2004. Supra note 22.

how population estimates and harvest levels are derived, they are either incomplete (in the case of the former) or inadequately implemented (in the case of the latter). And not a single GBMA has been designated in all of B.C.

It is unclear why so little has been done since 1995, or even 2004, to implement B.C.'s grizzly bear conservation strategy and the excellent recommendations made by the independent grizzly bear scientific panel. It likely has to do with lack of political will and inadequate financial commitments. Whatever the reason, the delay has left a monumental environmental debt that it's time to repay. Many of B.C.'s grizzly bear subpopulations are at serious risk of disappearing forever. Indeed, two different GBPUs (North Cascades and Garibaldi-Pitt) are already functionally extinct.

In an effort to remind the government of its commitments, and to further the excellent work of the independent grizzly bear scientific panel and many of the people who work for the government to ensure a healthy future for B.C.'s grizzly bears, we offer the following 10 recommendations.

## 1. Recommit to the Grizzly Bear Conservation Strategy

As the Ministry of Environment recently admitted, the Grizzly Bear Conservation Strategy is now out-of-date.<sup>60</sup> It's time to update and improve it, and to recommit to its implementation. This includes developing a process to designate GBMAs and committing the long-term funding that is necessary to implement the strategy.

## 2. Protect Grizzly Bear Habitat

The provincial government has publicly committed and re-committed to designating a network of protected areas and GBMAs to protect grizzly bear habitat. It's time to develop a process to identify the best places to put them, and then designate them on the ground where it matters. Priority should be given to grizzly bear subpopulations in threatened GBPUs. The province should also open a public review process to ensure industrial and recreational activities are not unduly impacting grizzly bears on all public land.

## 3. Develop a Detailed Background Report

Eight years ago, Minister of Water, Land and Air Protection Bill Barisoff committed to publishing a detailed background report on the status of each GBPU in B.C., including population objectives. It's time this was developed and made available to the public.

## 4. Legally List B.C.'s Threatened Grizzlies

Nine of B.C.'s GBPUs have been classified as "threatened" by the Ministry of Environment, but this classification affords them no additional legal protection. It's time they were formally listed as threatened and provided the protection such species deserve. Unfortunately, that will also require B.C. to adopt a *Species at Risk Act* that provides the legal protection that B.C.'s current *Wildlife Act* does not.



The BC government has publicly committed and re-committed to designating a network of protected areas and GBMAs to protect grizzly bear habitat.

PHOTO COURTESY VIJAYSRV/FLICHR

60 B.C. Ministry of Environment. [www.env.gov.bc.ca/wld/grzz/](http://www.env.gov.bc.ca/wld/grzz/), accessed January 22, 2014.

## 5. Implement Recovery Plans for B.C.'s Threatened Grizzlies

Not a single recovery plan has been implemented for any of B.C.'s nine threatened grizzly bear population units, and only one has ever been written. It's time to develop and implement recovery plans for these at-risk subpopulations. The North Cascades, for which a recovery plan already exists, and the South Coast Mountains might be good places to start: the Sea-to-Sky Land and Resource Management Plan mandates the development and implementation of recovery plans for four GBPUs: the Garibaldi-Pitt, the Squamish-Lillooet, the Stein-Nahatlatch and the South Chilcotin.

## 6. Invest in Accurate Population Estimates

Methodologies for estimating grizzly bear populations have come a long way since 1995, and the new-and-improved methods have been used to correct inaccurate guesstimates in a few GBPUs. It's time to develop new estimates for the remaining GBPUs and conduct regular monitoring, giving priority to threatened GBPUs and those in which grizzly bears are hunted. This will reduce the chance of over-harvest and ensure that grizzly bear subpopulations don't slip through the cracks, as they have in the Garibaldi-Pitt GBPU.

## 7. Ensure the Grizzly Bear Sport Hunt is Sustainable

Recent evidence indicates that human-caused mortality, in large part a result of overhunting in some GBPUs, often exceeds sustainable thresholds. A new, open and transparent process that allows for public and First Nations input would prevent excessive grizzly bear mortality and substantiate the government's claim that the hunt is being managed sustainably. Because of inherent uncertainty in population estimates, it's also essential to conduct regular monitoring and be more precautionary when calculating harvest limits and quotas. Until the substantive policy issues are rectified, the B.C. government should enact an immediate moratorium on the sport hunt.

## 8. Implement Access Management Plans

Access management is perhaps the most important aspect of grizzly bear conservation and recovery. Access management plans are an essential part of any recovery plan. Until such time as recovery plans have been developed for B.C. threatened GBPUs, access plans should be developed to ensure that adequate habitat security is available. Access management plans should also be developed for other small or at-risk subpopulations that are at or approaching 50 per cent of habitat capability.

## 9. Engage First Nations

Grizzly bears are an important part of many First Nations cultures, and First Nations people have much to contribute to ensuring a future for B.C.'s grizzly bears. Government should ensure that First Nations are a central part of developing plans and strategies for grizzly bear conservation across the province.

## 10. Make B.C. a "Bear Smart" Province

The B.C. government has taken the first steps to make B.C. a Bear Smart province, but only two communities in grizzly bear habitat have achieved that status, leaving public safety at risk and too many grizzly bears to die of preventable human-bear conflicts. It will require government leadership and a significant financial investment to "Bear Smart" all communities in grizzly bear habitat. Now's the time.



Government should ensure that First Nations are a central part of developing plans and strategies for grizzly bear conservation across the province.

PHOTO COURTESY  
RPATERSO/FLICKR

## APPENDIX I

# B.C.'s Threatened Grizzly Bears



WHILE NORTHERN AND COASTAL BRITISH COLUMBIA contains a number of healthy grizzly bear subpopulations, grizzly bear subpopulations in some parts of southern B.C. are declining,<sup>61</sup> and almost all of them are at increasing risk of decline and disappearance if proactive recovery efforts aren't begun soon.

The provincial government has designated nine of British Columbia's 56 grizzly bear population units as "threatened," though this is an informal label that provides these subpopulations with no additional legal protection. There are also at least two other small, at-risk subpopulations, known as "ghost" subpopulations,<sup>62</sup> that are not formally recognized by the government. Recent research has discovered that two of these threatened subpopulations are likely functionally extinct, and one of them may have disappeared entirely. The good news is that all these subpopulations can be nursed back to health – and the government's own grizzly bear conservation strategy shows us how.

What follows is a summary of the status of each of B.C.'s threatened subpopulations.

Grizzly bear populations of less than 250 individuals are prone to decline and can rapidly reach a critically low threshold of 40–125 individuals. Without dramatic intervention, populations of 40–125 bears are quite vulnerable to extinction. Isolated populations of 50–90 bears have little chance for long-term viability without dramatic intervention.

PHOTO COURTESY DOUGLAS BROWNI/FLICKR

61 COSEWIC. 2012. Supra note 5.

## Southeast B.C.

Thanks in large part to the work of biologists like Clayton Apps, Bruce McLellan and Michael Proctor, southeast B.C. boasts some of the best-studied grizzly bear subpopulations in North America, and their research brings both good news and bad.

The good news is that there are some healthy subpopulations in this corner of the province, including the Flathead GBPU in the Flathead River Valley. This GBPU boasts 175 grizzlies and the highest densities in the interior of North America, though recent evidence suggests this subpopulation may be declining.<sup>62</sup> These bears are well-connected to the Northern Continental Divide subpopulation in northwest Montana, and to about 50 bears in southwest Alberta, bringing the size of the entire transboundary population in the Crown of the Continent Ecosystem to about 1,000 bears.

The bad news is that several of Canada's most threatened grizzly bear subpopulations are located in southeast B.C., the result of the fragmentation of the north/south-oriented Rocky, Purcell and Selkirk Mountain ranges that span the U.S.–Canada border.<sup>63</sup>



Several of Canada's most threatened grizzly bear subpopulations are located in southeast B.C., the result of the fragmentation of the north/south-oriented Rocky, Purcell and Selkirk Mountain ranges that span the U.S.–Canada border.

PHOTO COURTESY  
CAILLUM SMITH/FLICKR

### YAHK GBPU

South of the Central Purcell GBPU lies the Yahk GBPU. Here, south of Highway 3 and sandwiched between highways 93 and 95, the grizzly bear subpopulation is extremely small (~50), the amount of core habitat is quite low (~15 per cent), and the mortality rate is high (approximately six to eight per cent per year), a rate that Proctor maintains is “certainly not consistent with population increases necessary for ‘recovery.’”<sup>64</sup>

Like the North Continental Divide Ecosystem (NCDE) subpopulation, the Yahk subpopulation straddles the Canada-U.S. border. Approximately 20–25 bears live on the Canadian side and between 15 and 25 survive in northwest Montana's Yahk Valley.<sup>65</sup> In B.C., the population is just 20 per cent of capability.<sup>66</sup>

Reproductive rates in the Yahk subpopulation (and the Cabinet subpopulation just to the south) are low relative to other populations in North America, which suggests that the Yahk population “may not be able to sustain mortality rates near the high end of what otherwise is the acceptable range for grizzly bears in the region.”<sup>67</sup> Unfortunately, human-caused mortality rates for this population are at the high end of this range. This may account for the fact that, despite an increasing population from 1983 to 1998, excessive human-caused mortality in recent years has likely resulted in an overall population decline from 1983 to 2008.<sup>68</sup>

One of the main factors contributing to the high mortality rate and population decline is lack of adequate secure core habitat: just 16 per cent of the area was determined to be core grizzly bear habitat, and an average road density of 2.3 km/sq. km suggests that “it may be difficult for females to find suitable habitat. This may be one of the reasons that after four years of effort in the Yahk GBPU, we have captured or DNA-sampled very few female grizzly bears.” By comparison, the average amount of core habitat in home ranges used by “successful” females (i.e. those who survive long enough to reproduce) is 51 per cent, and the average home range road density for successful females is between 0.6 and 1.2 km/sq. km.<sup>69</sup>

62 Bruce McLellan, *pers. comm.*

63 COSEWIC. 2012. *Supra* 5.

64 Proctor, M. et al. 2007. *Supra* note 51.

65 *Ibid.*

66 *Ibid.*

67 Proctor, M. et al. 2005. *Supra* note 48.

68 Kasworm, W. et al. 2007. *Cabinet-Yahk grizzly bear recovery area 2006 research and monitoring progress report.*

69 Proctor et al. 2008. *Habitat Security for Grizzly Bears in the Yahk Grizzly Bear Population Unit of the South Purcell Mts. of Southeast British Columbia.* [Kaslo, B.C.: Transborder Grizzly Bear Project].

South of the border, the U.S. Fish and Wildlife Service and its partners have significantly reduced the backcountry road network over the last 10 years. Decreasing road densities have resulted in approximately 55 per cent secure core habitat, in contrast to the Canadian Yahk's current level of 16 per cent. Despite this, the grizzly bear subpopulation has not begun to recover, perhaps because the Canadian portion of the population unit is something of a mortality sink. "Success will likely depend on similar access management strategies being implemented in the Canadian part of this ecosystem."<sup>70</sup>

With such a small and isolated population, combined with extremely degraded and unsecure habitat and high mortality rates, the Yahk population might be one of the more desperate in Canada. Proctor and his colleagues ranked the conservation status of the Yahk GBPU as "poor."<sup>71</sup> Proctor also wrote that the "Yahk GBPU clearly needs enhanced management activities in order for the threatened grizzly bear subpopulation to be returned to a self-sustaining healthy population."<sup>72</sup> This will require decreasing road densities and mortality rates, increasing core security areas, and restoring functional linkage across Highway 3, whereby the occasional female migrates from the Central Purcell GBPU and successfully reproduces. To recover this subpopulation, human-caused mortality must be reduced to two per cent of the population (and surrounding areas) per year. This equates to about one bear per year in the B.C. portion of the population unit.<sup>73</sup>

## SOUTH SELKIRK GBPU

The South Selkirk GBPU to the west is one of the most genetically isolated subpopulations in Canada, and therefore one of the most threatened.

The population estimate for this subpopulation is significantly lower today than it was when COSEWIC assessed the status of grizzly bears in Canada in 2002. At that time, COSEWIC placed a great deal of emphasis on the small and isolated nature of this population isolate, which was then estimated to be 97 animals and at risk of extirpation in the long term.<sup>74</sup> Today, the population estimate for the South Selkirk GBPU is just 58 bears.

The South Selkirk GBPU is isolated by a matrix of highways and lakes in the southern Selkirk Mountains. To the east lies the south arm of Kootenay Lake and human settlements in and around Creston; Highway 3A-3B-22 road corridor and all the human settlements along its flanks forms an impermeable barrier to the north and west. There is no southern boundary in Canada, for the southern Selkirk subpopulation spills over into the United States, where an additional 20 or so bears eke out an existence under the protection of the United States *Endangered Species Act*. Transportation and river corridors, in concert with unsuitable habitat with significant levels of human activity, define the southern boundary in this population unit in northern Idaho and northeastern Washington State.

The annual average human-caused mortality rate on the B.C. side of the border was three per cent of the population between 1999–2004, which increases to between 4.5 and 6 per cent when unknown mortalities are considered.<sup>75</sup> Other research indicates a slightly increasing growth rate for the south Selkirk Mountains.<sup>76</sup> However, this may have changed given the recent increase in mortalities. To recover this subpopulation, known human-caused mortality must be reduced to two per cent of the population (and surrounding areas) per year. This equates to about two bears per year.<sup>77</sup>

Decreasing road densities have resulted in approximately 55 per cent secure core habitat, in contrast to the Canadian Yahk's current level of 16 per cent.

70 Ibid.

71 Proctor, Michael et al. 2012. "Population Fragmentation and Inter-Ecosystem Movements of Grizzly Bears in Western Canada and the Northern United States." *Wildlife Monographs* 180:1–46. January 2012.

72 Proctor et al. 2008. Supra note 69.

73 Proctor, M. et al. 2005. Supra note 48.

74 COSEWIC. 2002. Supra note 4.

75 Proctor, M. et al. 2005. Supra note 48.

76 Wakkinen, W. L. and W. F. Kasworm. 2004. "Demographics and Population Trends of Grizzly Bears in the Cabinet-Yaak and Selkirk Ecosystems of British Columbia, Idaho, Montana, and Washington." *Ursus* 15(1):65-75.

77 Proctor, M. et al. 2005. Supra note 48.

The long-term persistence of the Yahk and Selkirk South GBPUs, “likely depends on connectivity to the adjacent larger Central Purcell Mountains immediately to the north and northeast. To allow fragmentation of the larger Purcell Central/Selkirk-Central subpopulation could inhibit the long-term sustainability of bears across the region.”<sup>78</sup>

## SOUTH/CENTRAL PURCELL GBPU

In 2012, the South Purcell GBPU and the Central Purcell GBPU were amalgamated into a single, larger GBPU (now called the “Central Purcell GBPU”) with a population estimate of 176 grizzlies. This estimate is 75 per cent lower than it was in 2004, likely the result of better methodologies rather than an outright decline in the actual number of bears.<sup>79</sup> According to B.C. government records, the new, larger Central Purcell GBPU can support as many as 360 grizzly bears, which means the current population estimate is just 44 per cent of habitat capability, a number that would normally justify an end to the hunt and a classification as a “threatened” GBPU. However, this population unit is still classified as “viable” and a grizzly bear sport hunt is still permitted in most of the GBPU – even though human-caused mortality in the hunted portion of the South Purcell GBPU is too high. GBPUs with populations approaching 50 per cent of habitat capability should be managed more conservatively and may require management designed to increase population size.<sup>80</sup>

However, increasing levels of human activity, particularly motorized access on a burgeoning road network and the approval of the Jumbo Glacier Resort west of Invermere, B.C., in the Central Purcell GBPU, threatens grizzly bears in the entire region. According to Proctor, not only would the Jumbo Glacier Resort “likely begin and stimulate the detrimental process of fragmentation of that core subpopulation,” it would seriously compromise the ability of this subpopulation to act as a “source of bears for the surrounding fragmented small threatened subpopulations.”<sup>81</sup> As a result, Proctor recommended that the application to build the Jumbo Glacier Resort be rejected in the interests of maintaining long-term security for the regional grizzly bear population. The resort was approved by the B.C. government in March, 2012.

Proctor and his colleagues ranked the conservation status of the Central Purcell GBPU as “cautious.” Given that “the future persistence of the South Purcell GBPU . . . is likely reliant on being connected to a healthy grizzly bear population in the Central Purcells,”<sup>82</sup> it would be prudent and precautionary to suspend the trophy grizzly bear hunt in the South Purcell and Central Purcell GBPUs (now the larger Central GBPU) until this subpopulation has recovered to well above 50 per cent of habitat capability.

## KETTLE-GRANBY GBPU

The Kettle-Granby GBPU lies east of Highway 33 and south and west of Lower Arrow Lake. How many grizzlies remain here is unclear. The official 2012 B.C. government estimate is 86. However, a DNA mark-recapture study conducted in 2002 estimates that only 38 grizzly bears eke out an existence in a landscape dominated by logging, roads and recreation. One study, by Brian Horejsi, estimates there may be as few as 30 adult bears.<sup>83</sup>



Increasing levels of human activity in the Central Purcell GBPU threatens grizzly bears in the entire region.

PHOTO COURTESY  
HEATHER&MIKE/Flickr

78 Proctor, Michael et al. 2012. Supra note 71.

79 The B.C. government maintains that “the variation in estimates from year to year do not reflect a trend in grizzly bear numbers in the province,” and any changes “should not be interpreted as a decline in grizzly bear numbers since 2008, but rather a more accurate estimate of the total population size in the province.”

80 Proctor, M. et al. 2007. Supra note 51.

81 Proctor, Michael. 2010. Letter to the B.C. Ministry of Environment and Environmental Assessment Office. Dated July 2010.

82 Ibid.

83 Horejsi, B. 1999. Supra note 55.

This threatened GBPU appears to be split into two subpopulations of approximately 20 bears each: one north of Highway 3 between Christina Lake and Castlegar and one south of the highway. Motorized access and settlement continues to expand in the region, and fire suppression has limited the amount of early seral (berry-producing) habitat. There is also continued potential for conflict between livestock and bears.<sup>84</sup>

According to the 2002 COSEWIC grizzly bear assessment, approximately 20 grizzly bears comprise a population isolate known as the Sheep Creek-Rosland group. These bears have been fragmented from the rest of the Kettle-Granby population by Highway 3, and the dense human settlement along the Columbia River prevents them from reconnecting with the small and isolated South Selkirks population to the east.

There is no accurate information on human-caused mortality rates in the Granby, but successful recovery will require it be kept below three per cent annually, or just one dead bear per year.<sup>85</sup>

## B.C.'s Southern Interior

For more than two decades we've been led to believe that grizzly bears no longer existed in most of B.C.'s southern interior ecoprovince (roughly equivalent to the "hot, dry plateau" grizzly bear zone defined by Vivian Banci in 1990). Located between the Coast and Columbia mountains, winters remain cold here, but the summers are hot and dry. Vegetation in the valleys and basins is typically steppe or bunchgrass prairie that contains sagebrush or occasional ponderosa pine or Douglas fir, while higher altitudes reveal subalpine coniferous forests. Think Merritt, B.C., and the Okanagan.

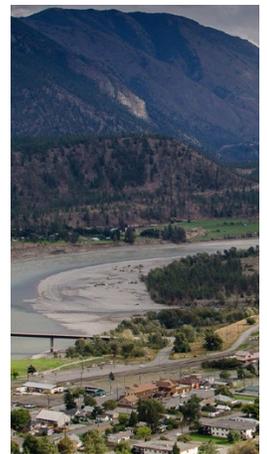
### GHOST POPULATIONS IN THE B.C. INTERIOR

On B.C.'s official map of the status of its 56 grizzly bear population units (GBPUs), most of the southern interior is a dark gray hole labelled "unoccupied." While human settlement and a variety of industrial and recreational activities have rendered most of this arid landscape inhospitable to grizzly bears, B.C. government biologists have identified two tiny "ghost" population isolates clinging to survival on the hot, dry plateau of the southern interior.<sup>86</sup> Two threatened GBPUs on the Interior's margins also harbour threatened grizzly bear populations, but little has been done to recognize let alone recover these small and highly threatened grizzly bear populations.

These grizzly bears may represent the only remaining subpopulation in North America adapted to the hot dry habitats once roamed by grizzly bears in the desert southwest of the United States and into Mexico. Because these populations are small and highly fragmented, with no nearby source populations to provide demographic rescue, they will require aggressive recovery efforts that likely would include augmentation.

One of these small, isolated ghost populations of fewer than 20 bears hangs on in what the B.C. government considers "unoccupied" grizzly bear habitat. Boundaries likely include Lillooet and the Fraser River to the west and the Kelly Lake Road and the town of Clinton to the north, and presumably the Trans-Canada Highway to the east. There may be two groups of animals, one south and one north of Highway 12/99 through Pavilion.<sup>87</sup>

According to anecdotal reports, another ghost population of fewer than 10 grizzly bears also persists in the middle of "unoccupied" habitat between Merritt and Kelowna. The area is heavily logged and highly roaded. It is also considered "cottage country" and is heavily used for public and commercial recreation. Two small



The southern interior ecoprovince, where grizzly populations are most threatened, has high levels of agriculture, grazing, access, recreation and land alienation. — *Independent Scientific Review Panel, 2003*

PHOTO COURTESY COLIN J. MCMECHAN/ FLICKR

84 Ibid.

85 McLoughlin, P. 2003. Supra note 35.

86 COSEWIC. 2002. Supra note 4.

87 Ibid.

provincial parks, Pennask Lake and Pennask Creek, are located in the area, ostensibly to support a “biologically exceptional” (but non-native) rainbow trout fishery.

If these two population isolates are to be rescued from imminent extirpation, substantial recovery efforts will need to be implemented immediately.

## NORTH CASCADES GBPU

Grizzly bears in the threatened North Cascades GBPU are isolated in an area east of Hope, B.C., north of the Canada-U.S. border, west of the Okanagan and south of Lytton. Potential connectivity to occupied bear habitat to the northwest is impeded by the formidable combination of the Fraser River, the Trans-Canada Highway, the Canadian Pacific and Canadian National railroads, and associated human settlements. Habitat directly east and northeast of this GBPU is blocked by highways and a railway, and is currently thought to be unoccupied and largely unsuitable given the significant amount of habitat alteration and human development. However, this subpopulation is directly linked to approximately 4,000 square kilometres of prime grizzly bear habitat in Washington State to the south.

Several protected areas along the southern base of this triangle-shaped GBPU – including Cascade Recreation Area, Cathedral Provincial Park, Chilliwack Lake Provincial Park, E.C. Manning Provincial Park, Skagit Valley Provincial Park and the Snowy Protected Area – have helped maintain the amount of core grizzly bear habitat in this population unit at 60 per cent (as of 2004). At the same time, several land-uses pose potential threats to grizzly bears and the amount of core area in this GBPU, including forestry, mining, agriculture, settlement and residential development, transportation corridors, recreation, and hunting, many of which continue to increase.

How many bears remain in the North Cascades GBPU is unknown, and information about the degree of genetic isolation of this population is absent because of the paucity of hair or scat samples. The most current estimate suggests only six animals.<sup>88</sup> More recent efforts to detect grizzly bears in the North Cascades largely have been unsuccessful; the fact there has been no human-caused mortality recorded in this GBPU for the last seven years should be a red light that the grizzly bear population is smaller than originally thought.

During a hair sampling project in 1998, only one grizzly bear—a female—was detected, and four grizzly bears—a female with a cub, and two independent bears of unknown gender – were seen but never captured or confirmed (NCGBRP 2004). Subsequent efforts to snare, dart or spot grizzly bears from the air between 1999 and 2003 turned up no evidence of grizzly bears in this GBPU. There was a reliable sighting of a female with cubs in the northern portion of this population unit, near Boston Bar, a potential disperser from the southern end of the unit.<sup>89</sup>

Due to the small size and isolation of the North Cascades grizzly bear population it is believed to be at significant risk of eventual extirpation in the absence of active recovery efforts. According to the 2004 recovery plan for this subpopulation, “If the needs of grizzly bears are not incorporated into planning for the area to a greater degree, these impacts could significantly reduce or foreclose the potential for the population to recover.”

This population is shared with the state of Washington, where grizzly bears are listed as “threatened” under the U.S. *Endangered Species Act*. They also are designated as “endangered” by state legislation. It is unknown how many grizzly bears exist in the U.S. portion this population unit. Experts confirmed that a photo of a bear taken by hiker Joe Sebille in October 2010 is, indeed, a grizzly, the first confirmed sighting of one in the North Cascades since 1996. Expert opinion suggest the population in the U.S. portion of the North Cascades is believed to be between five and 20 bears.<sup>90</sup>



There has been no human-caused mortality recorded in this GBPU for the last seven years should be a red light that the grizzly bear population is smaller than originally thought.

PHOTO: SIGN AT ENTRANCE TO MANNING PARK

88 B.C. Ministry of Forests, Lands and Natural Resource Operations. 2012. *Supra* note 2.

89 McLellan, *pers. comm.*

90 Servheen, C. 1999. “Status and Management of the Grizzly Bear in the Lower 48 United States.” C. Servheen, S. Herrero, and B. Peyton, compilers. Pp. 50-54. *Bears: Status Survey and Conservation Action Plan*. IUCN/SSC Bear and Polar Bear Specialists Groups. IUCN, Gland, Switzerland and Cambridge, United Kingdom.

After a great deal of time and money was invested by the B.C. government, a provincial recovery plan was adopted in 2004 for the North Cascades GBPU in B.C. and plans were underway to begin implementing it. However, the project was cancelled and little was done on the ground to recover grizzlies in the North Cascades. The goal of the recovery plan is to restore the North Cascades grizzly bear population unit to viable status, which would require the estimated population to increase to approximately 150 grizzly bears, which would take approximately 50 years.<sup>91</sup> Recovery plan components include access management, prevention of internal fracture zones, restoration of linkages to external population units, habitat mapping, a human-bear conflict prevention plan, and population augmentation.

It is unclear how much political will there is to reinstitute the recovery plan. B.C. government biologist Bruce McLellan said, “There’s talk about it, but I don’t know how far up the chain it goes. There’s interest from conservation groups. There’s good habitat there. We flew over that country in a helicopter. Good habitat. Lots of berry patches.”<sup>92</sup>

## BLACKWATER-WEST CHILCOTIN

At the northern end of the B.C. Interior is the Blackwater-West Chilcotin GBPU. Like the Kettle-Granby, little is known about this subpopulation. Until recently, an estimated 193 grizzly bears were thought to exist here, but the B.C. government’s official 2012 population estimate indicates only about 50 grizzly bears remain in this GBPU, a 260 per cent reduction since 2004. This new information may indicate a population decline, or it may simply be the result of more accurate methods of estimating population size. It may also be a reflection of the significant uncertainty associated with estimating grizzly bear populations, a concern for all GBPUs.

## B.C.’s Southern Coast Mountains

Four of B.C.’s nine threatened GBPUs occupy the southern tip of a peninsular population of grizzly bears in the South Coast Mountains. Like the Rocky, Purcell and Selkirk mountains, a combination of geography and human activity has created yet another finger of grizzly bear habitat stretching out of the north and into southern B.C.

That there are grizzly bears here at all is something to celebrate. The southern edge of the region borders the Greater Vancouver Metro area, 21 municipalities with a combined population of 2.25 million people. Several other smaller communities are scattered throughout and between occupied grizzly bear habitat, including Powell River (20,000 people), Sunshine Coast (26,000), the Squamish-Whistler-Pemberton-Lillooet corridor (35,000), the Fraser Valley (257,000) and the Cariboo (62,000). The area also sees more than two million visitors and recreationists, and that number is expected to grow considerably over the next 25 years.<sup>93</sup>

Given the amount of urban, industrial and recreational activity planned for this area, the lack of reliable information on grizzly bear population status has concerned scientists and resource managers for years. Resource use in the region includes forestry, public and commercial tourism and recreation, hydro-electric power, cattle grazing, agriculture, settlement and water supply. While protected areas make up 18 per cent of the region, the cumulative effects of proliferating land-uses will likely increase transportation infrastructure (including roads), urban development, population growth and greater demand for outdoor recreation.<sup>94</sup>



Blackwater-West Chilcotin grizzly population estimates may be a reflection of the significant uncertainty associated with estimating grizzly bear populations, a concern for all GBPUs.

PHOTO COURTESY DRU/FLICKR

91 North Cascades Grizzly Bear Recovery Team. 2003. *Recovery plan for grizzly bears in the North Cascades of British Columbia*. Ministry of Water, Land and Air Protection, Victoria, British Columbia, Canada.

92 McLellan, B. 2011. *pers. comm.*

93 Apps, C. et al. 2009. *Supra* note 53.

94 *Ibid.*

Until recently, little empirical data were available for most of the grizzly bear subpopulations in this region. Not surprisingly, recent research indicates that grizzly bear populations in southwest British Columbia are smaller, more isolated and more fragmented (and therefore more threatened) than previously thought. This indicates that the grizzly bear population in this region has contracted markedly into small and demographically isolated subpopulations. Two of these population isolates are extremely genetically isolated, and genetic variability in most of them is as low or lower than the Greater Yellowstone population, which is thought to have been isolated for about 100 years.<sup>95</sup>

## SOUTHERN CHILCOTIN RANGES GBPU

The Southern Chilcotin Ranges GBPU lies north of Pemberton and Seton and Anderson lakes, which mark the boundary between the Stein-Nahatlatch GBPU to the south. It is bounded to the east by Highway 97, to the west by Chilko Lake, and to the north by Highway 20. According to B.C. government biologist McLellan, “some areas are really wild and good habitat, but there are lots of human-use issues there too, especially recreation, including Gun Lake and Spruce Lake.” There is an estimated 15,000 square kilometres of habitat in this GBPU, which could serve as important core habitat, though more than 20 per cent of the area is heavily roaded. No trophy hunting of grizzly bears is permitted in this population unit.

As recently as 2008, the population estimate for this GBPU was 104 bears (based on the subjective, expert-based Fuhr-Demarchi method). However, recent research indicates the population may be larger, and more fragmented, than previously thought. Apps et al. (2009) included the south and central portion of the Southern Chilcotin Ranges GBPU in their Southern Coast Mountains grizzly bear study. Although they didn’t survey the northern reaches of the population unit, they estimated 147 grizzlies in the area south and west of Chilko Lake. In this portion of the GBPU they found densities “roughly double those of the subjective estimate,” but they suggest “caution” in extrapolating these densities across the entire GBPU because they did not sample the entire area, “and the remaining portion may support a lower density of grizzly bears.” In 2012, the B.C. government roughly doubled the official population estimate for this GBPU, from 104 to 203.

However, there is a caveat to this good news story on the southern Chilcotin Plateau. Of the 147 grizzly bears estimated for the southern portion of this population unit, 53 of them have been isolated south of Carpenter Lake into what is known as the “McGillivray Group.” This is the most genetically isolated grizzly bear subpopulation in North America. The *F<sub>st</sub>* score of the McGillivray group (0.389) is almost twice that of the South Selkirk population (0.23). This indicates this subpopulation was reduced to a very small number of bears and has been genetically drifting away from the variation found in the larger regional population.<sup>96</sup>

This population isolate originates from an area around McGillivray and the Whitecap Mountains northwest of Anderson Lake. Anderson Lake and Carpenter Lake (an impoundment created by a hydro dam in 1960), the loss of salmon in the Bridge River system, as well as extensive road networks and human access, human settlement (particularly Goldbridge and Bralorne), and the railway, all contributed to the isolation of this population from the rest of the South Chilcotin Ranges population to the north and the Stein-Nahatlatch to the south.<sup>97</sup>

According to Apps and his colleagues, there is evidence that this population has recently expanded and is beginning to reconnect with adjacent populations. McGillivray bears have moved west and connected genetically with bears west of Hurley River Road. Although there is some evidence of males moving north into the greater Southern Chilcotin Ranges GBPU, this connection is likely more recent and tenuous than movements west.

Given the relative isolation of the McGillivray group, Apps and his colleagues recommend that the McGillivray Group “be treated and managed under assumptions independent of the rest of the GBPU to the north.”<sup>98</sup>



There are an estimated 147 grizzlies in the area south and west of Chilco Lake.

PHOTO COURTESY  
FORT GIRL/Flickr

95 Ibid.

96 Ibid.

97 Ibid.

98 Ibid.

Despite the small isolated and threatened nature of this subpopulation, the provincial government recently indicated it has no plans to initiate a recovery plan for this GBPU.<sup>99</sup>

## STEIN-NAHATLATCH GBPU

South of the South Chilcotin GBPU is Stein-Nahatlatch GBPU, centered on Stein Provincial Park. It is bounded by the Fraser River, two national railways and the Trans-Canada Highway to the east; the highly settled Fraser River Valley to the south; and Anderson and Seton lakes to the north. Harrison Lake and the Lillooet River separate it from the currently unoccupied Garibaldi-Pitt population unit to the west.

Although habitat effectiveness is relatively high (81 per cent),<sup>100</sup> threats include roads, logging, recreation, illegal mortality, potential conflict with cattle grazing, and fire suppression.<sup>101</sup> No trophy hunting of grizzly bears is permitted in this population unit, but according to McLellan, there are no major berry fields and the status of salmon is unknown. However, it's a prime candidate for recovery because large portions are relatively unroaded.

The most recent estimate is just 23 grizzly bears, almost one-third of the B.C. government's 2008 estimate of 61 bears, live in the northern portion of this population unit.<sup>102</sup> There is no evidence of bears in the southern quarter of the population unit east of Harrison Lake, because habitat quality is suboptimal and human access is high.

The Stein-Nahatlatch GBPU is the second most isolated population units in southern B.C. This population was reduced to a very small number of bears and has been genetically drifting away from the variation found in the larger regional population. Because of this isolation, this very small population is at risk of continued loss of genetic variability and subsequent extirpation.<sup>103</sup>

## SQUAMISH-LILLOOET GBPU

Northwest of Squamish and Whistler lies the mountainous Squamish-Lillooet GBPU. It is bounded to the southeast by Highway 99, to the southwest by the Pacific Ocean, and to the north by the highly developed (settlement, logging, agriculture) Upper Lillooet Valley. According to the 2002 COSEWIC assessment, specific threats include expanding settlement, very high open-road densities with high traffic volumes, and very high recreational and commercial tourism use. Extensive logging resulting in an overall lowering of habitat security and suitability has also impacted the grizzly bear population, and fire suppression has only exacerbated this situation. However, habitat effectiveness appears to be high (81 per cent), and no trophy hunting of grizzly bears is permitted in this population unit or the Toba-Butte unit to the north.

The recent population study by Apps and his colleagues indicates that this population unit contains approximately 52 grizzly bears, slightly less than the previous subjective, expert-based estimate of 56 bears. The difference may be explained, in part, by the fact the southern portion of the population unit is apparently unoccupied by grizzly bears. Grizzly bears in the Squamish-Lillooet GBPU appear to be genetically well-connected to bears in the Toba-Butte GBPU to the north and the central portion of the South Chilcotin Ranges GBPU to the northeast. It is from these GBPUs to the north that grizzly bears have recolonized the Squamish-Lillooet GBPU.<sup>104</sup>

The most recent estimate is just 23 grizzly bears, almost one-third of the B.C. government's 2008 estimate of 61 bears, live in the northern portion of the Stein-Nahatlatch GBPU population unit.

99 McRory, Wayne. 2013. Supra note 56.

100 Hamilton et al. 2004.

101 COSEWIC. 2002. Supra note 4.

102 Apps et al. 2009. Supra note 53.

103 Ibid.

104 Ibid.

## GARIBALDI-PITT GBPU

Perhaps the most tragic story has unfolded in the Garibaldi-Pitt GBPU, located northwest of the Greater Vancouver Regional District. It is bounded by the urban jungle of the Lower Mainland to the south, the Sea-to-Sky Highway corridor and Hwy 99 to the west, and Duffy Lake Road/Hwy 99 to the north. According to the latest (2002) COSEWIC assessment of grizzly bears, there was some hope that connectivity was possible eastward across the Lillooet River and into the Stein-Nahatlatch population unit, but recent research has proven that to be unfounded.<sup>105</sup> Although no grizzly bear trophy hunting is permitted in this population unit, other threats include habitat alteration due to logging, agriculture, and high road densities and traffic volumes.

As recently as 2008, the population estimate was 18 bears. However, a 2009 DNA study in the Southern Coast Mountains found no evidence of grizzly bears in the Garibaldi-Pitt GBPU. Apps and his colleagues maintain that “our results strongly suggest that any previously resident population has been extirpated. . . . The likelihood [this population unit] supports any sustained resident grizzly bear population is extremely low.”<sup>106</sup>

While there is genetic evidence that Stein-Nahatlatch bears may have moved through the northern portion of this GBPU and into the Squamish-Lillooet GBPU in the past, there was no evidence this has occurred recently – until late 2011. Video evidence of a grizzly bear fishing for salmon in the upper reaches of the Pitt River (approximately 30 kilometres north of Pitt Lake) indicates that at least one recent immigrant dispersed into the area from the Squamish-Lillooet GBPU to the west or from the Stein-Nahatlatch GBPU to the northeast. The provincial government’s official population estimate is two,<sup>107</sup> but this GBPU is functionally extinct for the time being.

This recent sighting supports other evidence that some of the threatened subpopulations in the Southern Coast Mountains have been slowly expanding and reconnecting over the last 20 years. Genetic evidence indicates male bears recently have emigrated out of the Stein and into other population units — including one that recently bred with a McGillivray female and produced a Stein-McGillivray cub.<sup>108</sup>

However, many of the threats to grizzly bear persistence have continued and, in some cases increased, particularly motorized access. While male movements may have alleviated concern regarding inbreeding depression, lack of meaningful demographic connectivity (i.e. female movement) is still a major concern. Unlike the fragmented meta-population in the Purcell-Selkirk region, where a relatively healthy subpopulation south of Hwy 1 and north of Highways 3, 31, and 6 can function as a source area for adjacent population isolates, there is no similar source anchor population in the Southern Coast Mountains meta-population.

Promoting healthy demographic connectivity and gene flow among grizzly bears in southwest B.C. is critical to prevent the continued northward contraction of grizzly bear range and ensure the long-term conservation of the regional population. It will require a “very intensive recovery effort” to recovery grizzly bears in southwest B.C.<sup>109</sup>

The good news is that these four population units – Southern Chilcotin Ranges, Stein-Nahatlatch, Squamish-Lillooet and Garibaldi-Pitt – recently were included in the planning area for the Sea-to-Sky Land Resource Management Plan area. The stated goal of the Sea-to-Sky LRMP with respect to grizzly bears is to “achieve and maintain a viable status for each of the four grizzly bear population units that overlap the plan area.”<sup>110</sup> The primary (though not sole) metric that defines “viable status” requires that the current population estimate be greater than or equal to 50 per cent of the GBPU’s estimated habitat capability. The Sea-to-Sky LRMP also



A 2009 DNA study in the Southern Coast Mountains found no evidence of grizzly bears in the Garibaldi-Pitt GBPU.

PHOTO COURTESY  
THOMAS QUINE/FLICKR

105 Ibid.

106 Ibid.

107 B.C. Ministry of Forests, Lands and Natural Resource Operations. 2012. *Supra* note 2.

108 Apps et al. 2009. *Supra* note 53.

109 B.C. Ministry of Environment. 2010. *Supra* note 17.

110 B.C. Ministry of Agriculture and Lands. 2008. *Sea-to-Sky Land and Resource Management Plan (LRMP)*.

mandates the development and implementation of recovery plans (including access management plans and linkage management plans) for each of these population units.

Recovery of these population units to viable status would require that the regional grizzly bear population be reconnected and increased significantly. Recent population estimates for Southern Chilcotin Ranges GBPU indicates that it likely meets the government's definition of a viable population; however, because of the small and isolated nature of the McGillivray Group, this GBPU may still warrant continued "threatened" status until it has been meaningfully reconnected to grizzlies in both the central portion of the Southern Chilcotin Ranges GBPU and the Stein-Nahatlatch GBPU.

The estimated habitat capability of the Stein-Nahatlatch GBPU is 217, so the population would have to increase five-fold from current levels (23) to be recovered to viable status. The estimated habitat capability of the Squamish-Lillooet GBPU is 165, which means the population would have to almost double from current levels (53) to reach viable status. The estimated habitat capability of the Garibaldi-Pitt GBPU is 226 grizzly bears. Given the absence of bears in this GBPU, at least 113 grizzly bears would need to be re-established in this population unit to achieve this goal. In addition, all of these GBPUs would have to be reconnected to one another to avoid isolation and genetic over the long term.

If the successful recovery of grizzly bears in Yellowstone and the Northern Continental Divide ecosystem is any indication, a similar effort in the Southern Coast Mountains will take decades and costs millions of dollars.

## Beyond B.C.'s Borders

Although geographical features and human development can prevent grizzly bears from moving between subpopulations, political boundaries do not. Many of B.C.'s grizzly bears are part of threatened subpopulations that straddle borders with the province of Alberta, and the states of Idaho, Montana and Washington.

This is particularly important when B.C.'s bears are part of threatened subpopulations in other jurisdictions. For instance, there are seven threatened grizzly bear subpopulations in Alberta, several of which are connected to GBPUs in British Columbia. Just south of the U.S. border, four grizzly bear subpopulations are listed as threatened under the U.S. *Endangered Species Act*. These include the Northern Continental Divide subpopulation, the Cabinet-Yahk subpopulation, the Selkirk subpopulation and the Northern Cascade subpopulation.

In some of these subpopulations – namely, those in the Yahk, Southern Selkirk and North Cascades GBPUs – recovery plans must be coordinated across the Canada-U.S. border in order to achieve B.C. and U.S. recovery goals and objectives. In particular, the Yahk, South Selkirk and Cabinet (in Montana) subpopulations are small, relatively isolated, and include a relatively low percentage of protected land. The Cabinet and Yahk areas have the poorest conservation status because of their smaller sizes and decreasing population trends, and will require more intense management effort, including augmentation, if they are to be maintained.<sup>111</sup> According to Proctor and his colleagues, "management plans tailored to the specific requirements of each grizzly bear subpopulation in the Canada-U.S. trans-border region will be necessary to effectively and efficiently stabilize or recover these fragmented populations." They recommend that "the entire regional metapopulation be considered, that multiple jurisdictions work together on a larger strategy to manage the system for inter-area connectivity, particularly of females, and that larger core subpopulations be managed as potential sources of bears for adjacent smaller threatened subpopulations."<sup>112</sup>

"Much of the present grizzly bear habitat is shared between British Columbia and the United States.... The international spotlight will be upon us as we embark on this ambitious and important conservation strategy.... The conservation of grizzlies requires the cooperation of all jurisdictions in which they occur. British Columbia will take a leadership role in managing grizzly bears in North America."  
— *A Future for the Grizzly: British Columbia Grizzly Bear Strategy*

111 Proctor, Michael et al. 2012. Supra note 71.

112 Ibid.



## APPENDIX II

# Grizzly Bear Basics

“No other creature better represents the wilderness in British Columbia than the grizzly bear; nothing is a better measure of our success in maintaining biodiversity than the survival of this species.”

— *A Future for the Grizzly: British Columbia Grizzly Bear Strategy*

PHOTO COURTESY DENALINPS/Flickr

**MOST BIOLOGISTS BELIEVE THAT GRIZZLY BEARS** are an essential part of healthy, fully functioning ecosystems in western North America. Known as a “keystone” species, grizzlies are “ecosystem engineers” that help to regulate prey species (such as elk and deer) and propagate plant species such as blueberry and buffaloberry. They help to maintain plant and forest health by dispersing plant seeds and aerating the soil as they dig for roots, pine nuts and ground squirrels.<sup>113</sup> On the coast, grizzly bears, as well as black bears, carry nitrogen-rich salmon carcasses into the forest, providing a critical source of nitrogen that enhances the health of old-growth forests.

Their large home ranges also make them an “umbrella” species, which means that managing the landscape for grizzly bear population health also helps to maintain abundant populations of many other species, healthy aquatic ecosystems and fisheries, and clean and abundant supplies of water for downstream users.<sup>114</sup>

“Grizzly bears are indicators of sustainable development,” says Dr. Stephen Herrero, who headed Alberta’s Eastern Slopes Grizzly Bear Project, one of the largest grizzly bear research efforts in North America. “Where viable populations of grizzly bears persist, the landscape is being managed sustainably.”<sup>115</sup>

However, history has proved that grizzly bears have trouble surviving where humans are plentiful, or when mortality from hunting and other causes exceeds their slow reproductive rates. Their biology makes them extremely susceptible to local and regional population declines, largely because they have low reproductive rates and low dispersal capabilities.<sup>116</sup> These factors mean that even small numbers of human-caused grizzly bear mortalities can result in rapid population decline.

113 Soulé, Michael and John Terborgh, eds. 1999. *Continental Conservation*. Island Press.

114 Merrill, Troy et al. “Life History, Reserve Design and Umbrella Effects: Grizzly Bears and Aquatic Systems in Western Montana.”

115 Herrero, S. Personal communication. February 2010.

116 Weaver et al. 1996. “Resilience and Conservation of Large Carnivores in the Rocky Mountains.” *Conservation Biology*. 10:964-976.

Likewise, at-risk grizzly bear populations take a long time to recover even after they have been protected.<sup>117</sup> Population declines occur when there are high mortalities of adults, while population recovery relies on the production and long-term survival of cubs.<sup>118</sup> Even under the best conditions, the natural growth rate of grizzly bear populations rarely exceeds eight per cent per year.<sup>119</sup> In the Northern Continental Divide Ecosystem, average growth rate between 2004 and 2009 is three per cent.<sup>120</sup>

Minimizing human-caused mortality, especially of females, combined with adequate protection of core, roadless habitat, is the key to grizzly bear management and recovery.<sup>121</sup> This is particularly critical for small populations of fewer than 100 individuals.<sup>122</sup>

## Human-Caused Grizzly Bear Mortality

Human-caused mortality is the greatest source of mortality for grizzly bears and is the primary factor limiting grizzly bear populations.<sup>123</sup> An analysis of 13 different studies indicates that 77 to 85 per cent of radio-collared grizzly bears died at the hands of humans.<sup>124</sup> Other research indicates that between 17 and 54 per cent of human-caused grizzly bear mortalities remain unreported.<sup>125</sup>

Sustainable levels of human-caused mortality, which can allow for population recovery and long-term persistence of threatened populations, range from 2.8 per cent to 4.9 per cent.<sup>126</sup> This means grizzly bear populations in productive habitat and/or with high reproductive rates can withstand 4.9 per cent annual human-caused mortality. However, populations in moderate habitat and/or with low reproductive rates can only withstand human-caused mortality rates of 2.8 per cent or less. Given the uncertainty of population estimates, hunted populations should be managed at the lower end of this range to prevent mortality levels from exceeding sustainable thresholds.<sup>127</sup>

Mortality rates of females, which are the reproductive engines of any population, should not exceed 30 per cent of the approved mortality threshold.<sup>128</sup> For example, a population of 100 grizzly bears in productive habitat will begin to decline if five or more bears (or two females) are killed each year.

Experiences in Sweden and the contiguous United States indicate that human-caused grizzly bear mortality can be reduced sufficiently to allow grizzly bear populations to recover.<sup>129</sup> Threatened grizzly

“Populations that are fragmented and isolated from neighboring populations are potentially subject to inbreeding. Since these fragmented populations are typically small, perhaps the most serious short term concern is that they will be exterminated as a consequence of small population demographic and environmental stochasticity. The pattern of extermination of populations in the U.S. clearly shows that when populations become fragmented and isolated, they shrink numerically and are subject to extirpation.”  
— *Independent Scientific Review Panel, 2003*

117 Alberta Sustainable Resource Development and Alberta Conservation Association. Supra note 8.

118 Ibid.

119 Schwartz et al. 2006. “Temporal, Spatial, and Environmental Influences on the Demographics of Grizzly Bears in the Greater Yellowstone Ecosystem.” *Wildlife Monographs*, 161:1-68.

120 Mace, Richard et al. 2012. “Grizzly Bear Population Vital Rates and Trend in the Northern Continental Divide Ecosystem, Montana.” *Journal of Wildlife Management*, 76: 119–128.

121 Boyce et al. 2001. “Population Viability for Grizzly Bears: A Critical Review.” *International Association of Bear Research and Management Monograph*, 4:1-45.

122 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

123 Ibid.

124 McLellan et al. 1999. “Rates and Causes of Grizzly Bear Mortality in the Interior Mountains of British Columbia, Alberta, Montana, Washington and Idaho.” *Journal of Wildlife Management*, 63:911-920.

125 Ibid.

126 McLoughlin, P. 2003 Supra note 35.

127 Ibid.

128 Harris, 1986. “Modeling Sustainable Harvest Rates for Grizzly Bears.” In A.E. Dood, R.D. Brannon, and R.D. Mace, editors. *Final Programmatic Environmental Impact Statement: The Grizzly Bear in Northwestern Montana*. Montana Department of Fish, Wildlife and Parks, Helena, Montana. 287. pp.

129 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

bear populations have increased substantially in the Yellowstone<sup>130</sup> and Northern Continental Divide<sup>131</sup> recovery areas following the implementation of policies to maintain large core areas and reduce motorized access in grizzly bear habitat, which reduces the chances of human-induced mortality.<sup>132</sup>

## Habitat Fragmentation

The loss and fragmentation of habitat has been widely acknowledged as a primary cause of species decline worldwide. Habitat fragmentation occurs when portions of a given landscape are transformed or destroyed by natural processes or human activities, reducing the total amount of habitat and creating isolated habitat patches. This process is harmful because it can lead to smaller and more isolated populations, which become more vulnerable to local extinction due to extreme events such as fire, disease, and human-induced mortality, and to the negative effects of inbreeding depression. The more fragmented the habitat, the more likely species will be negatively impacted.

Habitat alteration and fragmentation result primarily from human activities, including resource extraction (e.g., coal, oil, gas, mining and forestry), agriculture, energy generation and transmission, recreational activities, and settlement. Grizzly bears may be affected directly through removal or degradation of suitable habitat, or indirectly by avoiding human activities and changes on the landscape. The extent to which these pressures affect grizzly bear populations depends on the degree to which management interventions are successful at limiting mortality risk and habitat alienation for grizzly bears.<sup>133</sup>

Even inside national and provincial parks, undisturbed habitat is shrinking and grizzly bears are displaced by interactions with humans and associated development.<sup>134</sup> Roads and trails lead to habitat avoidance and grizzly bear mortality.<sup>135</sup>

Roads and other types of habitat degradation can reduce the movement of bears to the point that it influences the genetic composition within and among grizzly bear populations. Populations may become isolated when they are no longer able to move freely across the landscape and interact with each other as they once did.

Grizzly bears, especially adult females, are reluctant to cross highways, which can become barriers to gene flow and demographic rescue.<sup>136</sup> In concert with other geographic factors, such as major water bodies, rivers, and rugged mountain ranges, highways impermeable to grizzly bear movement can result in population isolation and decline.

In the short term, habitat loss and fragmentation can lead to poorer nutrition, lower reproductive rates, and higher levels of human-bear conflict and human-caused mortalities. In the long term, habitat loss and fragmentation lead to decreased population health and population decline.<sup>137</sup>



“Recent work by Proctor et al. (2002) demonstrates that highways are very effective at restricting bear movements and fragmenting habitat.”

— Independent Scientific Review Panel, 2003

PHOTO COURTESY BRUCE MCKAY,  
YELLOW SNOW PHOTOGRAPHY/FLICKR

130 Schwartz et al. 2006. Supra note 119.

131 Kendall et al. 2009. “Demography and Genetic Structure of a Recovering Grizzly Bear Population.” *Journal of Wildlife Management*, 73:3-17.

132 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

133 Kansas, J. 2002. *Status of the Grizzly Bear (Ursus Arctos) in Alberta*. Alberta Sustainable Resource Development, Fish and Wildlife Division, and Alberta Conservation Association, Wildlife Status Report No. 37, Edmonton, AB. 43 pp.

134 Gibeau, Michael. 2000. *A Conservation Biology Approach to Management of Grizzly Bears in Banff National Park*. Ph.D. thesis, Resources and the Environment Program, University of Calgary, Calgary, AB, Canada. 129 pp.

135 McLellan, B.M. and D. N. Shackleton. 1988. “Grizzly Bears and Resource-extraction Industries: Effects of Roads on Habitat, Behaviour and Demography.” *Journal of Applied Ecology*, 25: 451-460.

136 Proctor, M. et al. 2005. Supra note 48.

137 *Alberta Grizzly Bear Recovery Plan 2008-2013*. 2008. Alberta Sustainable Resource Development, Fish and Wildlife Division. Alberta Species at Risk Recovery Plan No. 15. Edmonton, AB. 68 pp.



## The Trouble with Roads

It is well known that habitat alteration and road building by forestry, mining and hydrocarbon development cause declines in grizzly bear numbers.<sup>138</sup> Increased human access to grizzly bear habitat leads to mortality caused by poaching, self-defence kills, hunters mistakenly shooting grizzlies instead of black bears, and wildlife-vehicle collisions. Increased access can also displace grizzly bears from high-quality habitat, thus potentially impacting their ability to meet their individual resource requirements. In addition, grizzly bear mortality can be caused by the relocation or destruction of so-called “problem” bears.<sup>139</sup>

One study, in the Alberta portion of the Central Rockies Ecosystem, found that 89 per cent of human-caused grizzly mortalities occurred within 500 metres of a road on provincial lands, and 100 per cent of human-caused mortalities occurred within 200 metres of a trail in national parks.<sup>140</sup> On the northern East Slopes of Alberta, grizzly bear survival rates decreased with increasing densities of “open routes”<sup>141</sup> that allow motorized access.<sup>142</sup> Because female grizzly bears spend more time close to roads than males, they are subject to a higher level of mortality.<sup>143</sup> Many other studies also have found that human-caused mortality, including hunting, most often occurs near roads. The weight of evidence suggests that areas with high open-route densities cannot sustain populations of grizzly bears. As the proportion of altered habitat increases, mortality rates inevitably increase.<sup>144</sup>

Although clear cuts can provide additional food resources for grizzly bears in the short term, they typically remain accessible to motorized vehicles, especially ATVs, after forestry operations end, so bears in these areas are at higher risk of encountering humans, and therefore dying.<sup>145</sup> Another problem is that temporary logging roads often stay open for a minimum of five years before being reclaimed.<sup>146</sup> Any benefits in improved food resources from clear-cut forestry are outweighed by increased mortality risks associated with forestry roads. In fact, clear cuts tend to become population sinks for grizzly bears and are incompatible with grizzly bear recovery and persistence.<sup>147</sup>



Any benefits in improved food resources from clear-cut forestry are outweighed by increased mortality risks associated with forestry roads.

PHOTO COURTESY DOUGLAS BROWN/FICKR

138 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

139 Ibid.

140 Benn, Bryon. 1998. *Grizzly Bear Mortality in the Central Rockies Ecosystem, Canada*. M.E.D. thesis. University of Calgary, Calgary, AB. 151 pp.

141 “Open routes” include roads, cutlines, seismic lines and any other trail that provides motorized access into grizzly bear habitat by two- or four-wheel vehicles.

142 Stenhouse, G., R. Munro and K. Graham. 2003. *Foothills Model Forest Grizzly Bear Research Program 2002 Annual Report*. 162 pp.

143 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

144 Ibid.

145 Nielsen, Scott et al. 2004. “Modelling the Spatial Distribution of Human-caused Grizzly Bear Mortalities in the Central Rockies Ecosystem of Canada.” *Biol. Conserv.* 120, 101-113.

146 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

147 Nielsen, Scott. 2005. *Habitat Ecology, Conservation and Projected Population Viability of Grizzly Bears (Ursus arctos L.) in West-central Alberta, Canada*. Ph.D thesis, University of Alberta, Edmonton. 261 pp.

Even within protected areas such as national or provincial parks, motorized access and other human activity (e.g., high levels of non-motorized human use of hiking trails) lead to human-caused grizzly bear deaths.<sup>148</sup> These activities displace grizzly bears from preferred habitats and increase grizzly bear habituation, which can lead to increases in the human-bear conflicts that eventually lead to grizzly bear mortality.

Experience has shown that unsustainable levels of human-caused grizzly bear mortality can be prevented by limiting the number of roads and trails built into grizzly bear habitat, and by protecting large core areas where there are no roads or trails.<sup>149</sup> In areas that are already heavily roaded, excessive rates of bear mortality can be reduced only by effectively reclaiming roads so that motorized access is prevented.<sup>150</sup>

## Grizzly Bears Need Habitat Security



Secure grizzly bear habitat must be a minimum of 10 square kilometres.

PHOTO COURTESY PETER  
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One of the most effective strategies for grizzly bear conservation is to maintain or restore adequate levels of grizzly bear habitat security.<sup>151</sup> Adequate levels of habitat security reduce the number of human-bear encounters and, as a result, human-caused bear mortalities.

The amount of secure habitat required to protect grizzly bears ranges from 55 to 68 per cent of a given management or recovery area.<sup>152</sup> Secure habitat is defined as being more than 500 metres from an open motorized access route or a trail that sees high levels of non-motorized human use (greater than 20 parties/week).<sup>153</sup> Secure habitat must also be a minimum of 10 sq. km.<sup>154</sup> These characteristics reduce the likelihood that bears will encounter, and therefore be killed by, people. Secure habitats do not contain open motorized access routes, though they can include roads and non-motorized trails that have been decommissioned, obliterated or made impassable by permanent barriers (but not gates).<sup>155</sup>

Although recovery areas must be sufficiently large to support sustainable grizzly bear populations (i.e. thousands of square kilometres), the scientific literature suggests that habitat security must be measured at a much finer scale to ensure adequate protection for grizzly bears. Ideally, habitat security should be measured at the scale of an average female home range.<sup>156</sup> In the Yellowstone grizzly bear recovery plan, habitat security was measured in units of approximately 200–300 sq. km.

Maintaining adequate levels of habitat security based on open-road densities is used widely in U.S. grizzly bear recovery efforts, particularly the Yellowstone and Northern Continental Divide ecosystems. For instance, the open-route density threshold in the Greater Yellowstone Grizzly Bear Recovery Area is 0.6 km/sq. km., and the total (open and closed) route-density threshold is 1.2 km/sq. km. Only approximately 10.5 per cent of the Yellowstone recovery area has open-route densities greater than 0.6 km/sq. km. This has allowed

148 Benn, B. and S. Herrero. 2002. "Grizzly Bear Mortality and Human Access in Banff and Yoho National Parks, 1971-98." *Ursus* 13:213-221.

149 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

150 Ibid.

151 U.S. Fish and Wildlife Service. 1993. *Grizzly Bear Recovery Plan*. Missoula, MT. 181 pp.

152 Mace, R.D. and J.S. Waller. 1997. *Grizzly Bear Ecology in the Swan Mountains*. Montana Fish, Wildlife and Parks, Helena, MT. 191 pp.

Mace, R. D. and T. L. Manley. 1993. *South Fork Flathead River Grizzly Bear Project: Progress Report for 1992*. Montana Fish, Wildlife and Parks, Helena, MT. 34 pp.

153 Gibeau, Michael. 2000. Supra note 134.

154 Gibeau, Michael et al. 2002. "Grizzly Bear Response to Human Development and Activities in the Bow River Watershed, Alberta." *Biological Conservation*, 103:227-236

155 Interagency Conservation Strategy Team. 2007. *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area*.

156 Ibid.

the Yellowstone recovery area to maintain 85.6 per cent secure habitat.<sup>157</sup> Habitat security in the Northern Continental Divide ecosystem averages 68 per cent.

## How Many is Enough?

Grizzly bear populations, like all wildlife, must be large and well-distributed enough to withstand the vagaries of chance events, such as accelerated climate change, large-scale habitat changes like fires and floods, and random mortality events like disease. Population goals should maximize the number of bears that can be expected to survive within the available space. This approach minimizes risk by achieving the maximum number of bears that can be supported by the available habitat. The greater the number of bears and the greater the extent of their geographic range, the lower the risk of decline and extirpation.<sup>158</sup>

History has shown that grizzly bear populations of less than 250 individuals are prone to decline and can rapidly reach a critically low threshold of 40–125 individuals.<sup>159</sup> Without dramatic intervention, populations of 40–125 bears are quite vulnerable to extinction.<sup>160</sup> Isolated populations of 50–90 bears have little chance for long-term viability without dramatic intervention.<sup>161</sup> Of 37 isolated grizzly populations present in the lower 48 states by 1922, only five remained by 1975 (Servheen 1999).

Although the Yellowstone grizzly bear population is still listed as threatened, the United States Fish and Wildlife Service considers it to be sufficiently recovered to no longer require the protection of the U.S. *Endangered Species Act* because it had reached 500 individuals.<sup>162</sup> Other research suggests that grizzly bear population units should be at least 500–700 individuals to outlast the vagaries of catastrophic natural events, food availability and human behaviour and survive for hundreds of years.<sup>163</sup>

It is impossible to know what the world will look like several thousand years from now, but it is likely to be quite different than it is today. Several thousand interacting grizzly bears are required to maintain genetic diversity and population persistence over thousands of years.<sup>164</sup> This requires relatively frequent exchanges of individuals and genes among several population units. Evolutionarily robust populations, therefore, would be greater than 2,000 individuals.<sup>165</sup>

The International Union for the Conservation of Nature (IUCN) guidelines recommends that, in general, wildlife populations maintain more than 1000 mature breeding adults to prevent unacceptable risk of decline. Typically, only approximately 50 per cent of any given grizzly bear population is comprised of mature breeding adults.<sup>166</sup> According to the IUCN, populations smaller than 1000 mature breeding adults should be listed and managed as “vulnerable” (“threatened” in British Columbia), while populations with less than 250 mature breeding adults should be listed and managed as endangered.<sup>167</sup>



History has shown that grizzly bear populations of less than 250 individuals are prone to decline and can rapidly reach a critically low threshold of 40–125 individuals, which become quite vulnerable to extinction.

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157 Ibid.

158 U.S. Fish and Wildlife Service. 1993. Supra note 151.

159 Mattson, D. and M. Reid. 1991. “Conservation of the Yellowstone Grizzly Bear.” *Conservation Biology* 5: 364-372.  
Wielgus, R. 2002. “Minimum Viable Population and Reserve Sizes for Naturally Regulated Grizzly Bears in British Columbia.” *Biological Conservation* 106 (2002): 381-388.

160 Wiegand, T. et al. 1998. “Assessing the Risk of Extinction for the Brown Bear (*Ursus arctos*) in the Cordillera Cantabrica, Spain.” *Ecological Applications* 68: 539-570.

161 U.S. Fish and Wildlife Service. 1993. Supra note 151.

162 Interagency Conservation Strategy Team. 2007. Supra note 155.

163 Mattson, D. and M. Reid. 1991. Supra note 159; Wielgus, R. 2002. Supra note 159.

164 Merrill, T. 2005. *Conservation Strategy for Grizzly Bears in the Yellowstone to Yukon Ecoregion*. Yellowstone to Yukon Conservation Initiative, Technical Report #6.

165 Ibid.

166 Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Supra note 8.

167 Ibid.



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British Columbia's wilderness is one of the last global safe havens for grizzly bears, which are extinct or at risk of disappearing worldwide. But humans are threatening grizzlies' ability to survive in B.C. because of unsustainable hunting, poaching and the destruction of grizzly habitat due to industrial and recreational development.

This peer-reviewed report analyzes whether the B.C. Grizzly Bear Strategy is sustaining bear habitat, preventing overkilling of bears by humans, maintaining the abundance and diversity of bears, and increasing public and scientific knowledge of grizzly bears. The strategy has guided grizzly bear management in the province since it was adopted in 1995.

The study finds that little progress has been made to implement the Grizzly Bear Strategy, though threatened bear populations can rebound if the government moves quickly to protect habitat, develops recovery strategies and puts a moratorium on the trophy hunt.

For more information about the science and conservation of species at risk in Canada, such as grizzly bears, please visit [www.davidsuzuki.org](http://www.davidsuzuki.org) and you can contribute to the conversation yourself on Twitter at [#biodiversity](https://twitter.com/biodiversity)



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