

# Taking Endangered Species Seriously? British Columbia's Species-at-Risk Policies

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Cet article examine les initiatives du gouvernement provincial de la Colombie Britannique, en matière de politiques concernant les espèces menacées et juge si elles sont suffisantes pour satisfaire aux standards, accords et attentes nationaux et internationaux. Nous esquissons les grandes lignes de l'évolution des politiques concernées et signalons un ensemble de facteurs conduisant à de nouvelles politiques, qui influencent (ou devraient influencer) les décisions du gouvernement. Nos analyses montrent que le gouvernement de la Colombie Britannique n'a pas suffisamment rempli ses obligations nationales et internationales, en raison de la faiblesse de sa performance relative à l'établissement d'une liste légale d'espèces scientifiquement reconnues menacées d'extinction, d'une mauvaise conception de l'objet d'une législation concernant les espèces menacées, de contraintes arbitraires affectant la protection de ces espèces et de l'absence d'engagement légal pour assurer leur récupération. En conséquence de l'inefficacité de ses politiques, le gouvernement provincial s'expose à des actions punitives de la part de gouvernements et d'organisations non-gouvernementales extérieures à la Colombie Britannique.

This article examines species-at-risk policy initiatives of the British Columbia provincial government and evaluates their sufficiency for meeting international and national standards, agreements, and expectations. We briefly outline the evolution of the relevant policies and an array of policy drivers that influence (or should influence) government decisions. From our analyses, we find that the BC government has not sufficiently met its national and international obligations due to its low performance in the legal listing of scientifically recognized species at risk of extinction, a misconception of the purpose of species-at-risk legislation, arbitrary constraints on the protection of these species, and a lack of legal commitment to their recovery. As a result of its poor performance, the provincial government is vulnerable to punitive actions from governments and non-governmental organizations external to British Columbia.

## INTRODUCTION

We are now in the beginning of the sixth major mass extinction event of all geological time (Leakey and Lewin 1995; Pimm *et al.* 1995; Pimm and Brooks 2000).

The major cause of the current event is well known: the alteration, fragmentation, or destruction of species' habitats by humans (McNeely *et al.* 1995, 751; Sela *et al.* 2000). Overexploitation of resource species and the introduction of destructive "exotic" species into ecosystems where they are not native are additional contributing factors. By 2050, global climate change is predicted to compete with habitat alteration as the leading cause of species extinctions (Thomas *et al.* 2004).

At the current rate, "the loss of biodiversity ... has serious consequences for the human prospect in the future" (Royal Society in a joint statement with the US National Academy of Sciences 1992, 6) because humanity in the long term is dependent on the maintenance of the world's biodiversity. Scientists recognized the beginning of the current extinction phenomenon approximately three decades ago. In response, the United Nations formulated the World Charter for Nature in 1982 followed by the more specific Global Biodiversity Strategy in 1992. The single most significant human response to date occurred in 1992 when most of the world's nations signed the Convention on Biological Diversity at the world's first Earth Summit in Rio de Janeiro. Canada was the first nation to sign this Convention.

A requirement of the Convention was for each signatory party (nation) to develop domestic legislation to protect biodiversity. Biodiversity conservation legislation can be classified into three broad categories. The first category encompasses legislation that authorizes governments to legally designate large protected areas in which species and natural processes may persist relatively undisturbed by human activities. The *Canada National Parks Act* and the several provincial equivalents are examples.

In the second category are those pieces of legislation that stipulate preventative measures to protect biodiversity and other specified environmental values on the matrix of public or private lands beyond the boundaries of protected areas. British Columbia's *Forest and Range Practices Act* is an example. Its purpose is to mitigate harmful environmental consequences that can result from forest harvesting operations on public lands.

The third category encompasses legislation aimed at protecting from further harm those species that are already at risk of extinction. In addition, this type of legislation usually requires the *recovery* of species at risk in order to rectify past harms. Recovery usually entails repopulating the number of individuals in a species' natural habitat and/or rehabilitating its habitat. The US *Endangered Species Act* was an early example and the recently passed Canadian federal *Species at Risk Act* is another.

Our focus is on the third category of biodiversity conservation: the protection and recovery of species at risk of extinction. The methods that we used involved reviewing literature and conducting interviews. The literature includes international, federal, and provincial agreements, legislation, and policy. It also includes legal cases and research papers, reports that have been developed by species-at-risk recovery teams, and draft scientific accounts of species that are candidates for legal listing in BC.

We held structured and semi-structured interviews with selected personnel from federal, provincial, regional, and First Nation governments, from non-governmental organizations (NGOs), and from the forest industry in BC. Interviewees were assured anonymity.

British Columbia's performance in the protection of biodiversity is especially important in the Canadian context because BC is Canada's most biologically diverse province. Much of this biodiversity can be attributed to the diversity of BC's topography, giving rise to a broad array of ecosystems

(Foster 1993). Forest biodiversity is especially important in BC. Forests contain more species per unit area than other types of terrestrial ecosystems because of their vertical structure (Wilson 1988; Boyle 1991) and most of BC is forested. Accordingly, we devote special attention in this article to forest biodiversity.

The purpose of this article is to critically examine the BC provincial government's recent species-at-risk policies. The article takes the following format: first, we outline the array of policy drivers that should be influencing the current government's biodiversity and species-at-risk policy choices; second, we briefly explain how species at risk are listed and, in some cases, selected for legal protection by governments; third, we provide a sketch of the initiatives that provincial governments in BC have taken over the past decade to protect species at risk; and finally, we assess the extent to which the current provincial government's policy responses are sufficient to meet international and national standards, agreements, and expectations.

## INFLUENCES ON BIODIVERSITY CONSERVATION POLICY

Why should the Government of British Columbia conserve biodiversity in general and species at risk in particular, especially if it implies constraints on economic development, such as forest harvesting? We offer four answers: (i) the provincial government has agreed to do so; (ii) it carries obligations to future generations; (iii) the province could experience negative economic repercussions if it fails to do so; and (iv) the federal government now has the legal authority to overrule provincial government decisions that harm species at risk on the basis that species survival is an issue of national and international importance. We discuss each of these topics in turn.

### **The Province has Agreed to Conserve Biodiversity**

The Government of BC has directly or indirectly agreed to conserve biodiversity in the form of the following international and national agreements.

*The Convention on Biological Diversity.* The overall purpose of this 1992 international convention is to promote the conservation of biodiversity in general, including the sustainable use of its components. There are 242 nation-state parties to the convention. Article 8 specifically requires signatory parties to develop or maintain legislation for the protection of species at risk of extinction and to promote the recovery of threatened species.

The Convention's Expanded Programme of Work on Forest Biological Diversity stipulates that signatory parties must prevent forest harvesting from altering or fragmenting species' habitats in a way that is detrimental to species and to recover native species that are already threatened with extinction. The parties reaffirmed their commitments to the Convention in 2002 and agreed to a Plan of Implementation that seeks to implement the Convention on Biological Diversity's expanded action-oriented work program on all types of forest biodiversity (Earth Summit 2002).

*The Santiago Declaration and Montreal Process.* In 1993, the Canadian government initiated the Montreal Process with the intention of establishing criteria and measurable indicators for sustainably managing the world's boreal and temperate forests. Nine nations, in both the northern and southern hemispheres, are parties to this process.<sup>1</sup> All of BC's forests are either boreal forests or temperate forests.

In 1995, the Montreal Process produced the Santiago Declaration, which endorses seven criteria and associated indicators of sustainability. Although legally non-binding, the criteria and indicators are intended to provide a common understanding of what is meant by sustainable forest management. They also provide a common framework for describing, assessing, and evaluating a country's progress toward sustainability at the national level (Santiago Declaration, section 1).

The first criterion is the conservation of biodiversity. Species diversity is one of the indicators of

biodiversity conservation, and special attention is given to “the number of forest dependent species” and “the status (threatened, rare, vulnerable, endangered, or extinct) of forest-dependent species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment” (Santiago Declaration, section 3).

The Santiago Declaration therefore established that a forest is *not* sustainably managed if species are threatened or endangered.

*Accord for the Protection of Species at Risk.* As a general issue, the division of powers among the federal government and the ten provincial governments, as articulated in the *Constitution Act, 1867*, adds an awkward element to Canada’s ability to commit unambiguously to international agreements. The purpose of the Accord for the Protection of Species at Risk, signed in 1996, is to confirm each government’s role in Canada’s commitments under the Convention on Biological Diversity.

In this accord, the federal government agreed to enact legislation to protect species that are at risk nationally, and each province and territory agreed to either enact new legislation or use existing legislation to protect species at risk within its jurisdiction. BC agreed to use its existing *Wildlife Act*.

*Canadian Council of Forest Ministers.* The Canadian Council of Forest Ministers (CCFM) is composed of federal, provincial, and territorial ministers with responsibility for forests. The CCFM was established in 1985 to foster cooperation on national and international matters relating to forest stewardship.

The CCFM has developed its own criteria and indicators for sustainably managing forests in Canada. In a manner similar to the international Santiago Declaration, the first of the CCFM’s six criteria is the conservation of biological diversity. The status of forest species (e.g., as threatened or endangered) is used to indicate how well

biodiversity is being conserved. The Council’s latest document pertaining to sustainability criteria and indicators states that “the greatest and most readily recognizable form of biological depletion lies with species extinction. Slowing down the rate of species extinction is a key objective for the conservation of biodiversity.” The Council uses two “core indicators” for monitoring species diversity: “the status of forest-associated species” and “population levels of selected forest-associated species” (CCFM 2003).

Given this suite of national and international commitments, the Government of British Columbia is obligated to conserve biodiversity in general and to protect species at risk by legislated means.

### **Obligations to Future Generations**

The BC government also carries obligations to future generations. Many people overlook this reason, but it is the primary reason that international, national, and regional agreements and policies have been developed in the first place. Not only is it prudent to conserve biodiversity for those of us in the present generation, but we have an obligation to future generations. This is easy to understand at an intuitive level, but more in-depth analyses are rare.

Although biodiversity is typically described as an umbrella term for the diversity of genes, species, and ecosystems, this conception fails to capture why its conservation is so fundamentally important for humanity. Biodiversity is a concept on a higher logical plane than simply the sum of genes, species, and ecosystems. Instead, it is best viewed as an environmental condition (Wood 2000).

As an environmental condition, biodiversity is not simply one value among other competing values, the combination of which should be “balanced” for an overall maximization of value to be derived from the natural environment and for the benefit of society. On the contrary, biodiversity is the *source* of all the other values that we derive from natural

environments and that future generations will depend upon (Wood 1997; Norton 2001, 2003).

All of this has a direct bearing on environmental management in British Columbia. When biodiversity is seen as an environmental condition, the need to conserve native species in general, and species at risk in particular, can be understood in context. For this main reason the conservation of biodiversity requires priority attention in the governance of public and private lands and waters (Wood 2000).<sup>2</sup>

### **Negative Economic Repercussions of Failing to Conserve Biodiversity**

If BC fails to meet its commitments under the international and national agreements discussed above, governments and non-governmental organizations external to Canada are poised to exert punitive economic sanctions. Here, we draw attention to two potential sources of economic risk.

*The US Government Accountability Office.* The Government Accountability Office (GAO) is the audit, evaluation, and investigative arm of the US Congress. By reporting to Congress, the GAO can influence the direction of trade disputes or negotiations — including the ongoing Softwood Lumber dispute — between Canada and the United States. The US appears to be interested in species-protection issues primarily from a trade perspective. In our interviews, we were told the US does not want to engage in trade with nations that are insufficiently protecting species at risk or that are extracting natural resources in ways that jeopardize the viability of species.

In 2002, the GAO, following a report prepared by the US Department of the Interior, investigated a species-at-risk issue in BC involving four transboundary species at risk — bull trout (*Salvelinus confluentus*), grizzly bear (*Ursus arctos horribilis*), marbled murrelet (*Brachyramphus marmoratus*), and woodland caribou (*Rangifer tarandus caribou*) — that could be affected by forest-harvesting practices. In this particular case, the

GAO concluded that forest-harvesting practices were not the only factors affecting the status of these species (United States 2002).

More recently, a federal court ordered the US Fish and Wildlife Service — the federal government agency that recommends species for legal listing under the US *Endangered Species Act* — to reconsider its decision not to list the Queen Charlotte Goshawk (*Accipiter gentiles laingi*) until it has assessed whether BC has enough remaining old-growth forest habitat for this species.<sup>3</sup> If BC's forests are insufficient, then the US Congress may be asked to legally list this species, which would have a negative impact on the accessibility of timber supplies in the US Pacific Northwest. Existing assessments accepted by the BC provincial government have indicated that BC might not have sufficient habitat for this subspecies (McClaren 2004). The resulting implication is that the US federal government may exert pressure on the BC provincial government in order to help protect a species listed under the US *Endangered Species Act*.

It is important to note that the US is not only interested in the extent to which BC protects species at risk, it also has institutions in place to investigate BC's performance.

*Forest Product Customers.* Forest certification is a mechanism whereby consumers can choose to purchase forest products from forests that have been certified as being managed in a sustainable manner. By way of intermediaries, including internationally recognized forest-certification organizations as well as governments and forest corporations that manage specific forests, consumers worldwide can exert pressure on how and for whom forests are managed. Forest certification is one of the principal factors shaping the definition of what it means to manage forests sustainably. The extent to which forest practices conserve biodiversity is a major criterion by which forests are judged as candidates for certification under some certification systems.

One of the provincial government's goals is to ensure that BC forest management is perceived as sufficiently "green" in order to obtain forest certification and thereby maintain the market acceptability of BC's forest products. Similarly, forest corporations in BC recognize an increasing need to ensure that their operations are certified.

IBM Business Consulting Services conducted a survey of 30 large buyers of BC's forest products, including American, Japanese, and European buyers (IBM 2002). They concluded that these buyers are shifting their purchasing power toward "greener" forest products. Most large forest corporations in BC have foreseen this trend and are anxious to obtain forest certification.

The large number of forest-dependent species at risk in BC can negatively influence the ability of forest corporations in BC to obtain forest certification. In a similar manner, the large discrepancy between the number of species at risk and those that are receiving sufficient protection and recovery efforts is also seen as a strong indicator of unsustainable forest management in BC.

### Federal Legislation

The newly enacted *Species at Risk Act* (SARA) contains what are known as "safety net provisions," which allow the federal government to override provincial jurisdiction on provincial lands for the sake of protecting and recovering nationally threatened or endangered species if the federal government is of the opinion that a provincial government is not taking sufficient action.<sup>4</sup>

When the Senate approved SARA in December 2002, it issued a special report in which it recommended that the federal government should not hesitate to invoke the safety net provisions if provincial laws are inadequate or if protective measures are not enforced (Canada 2002).

This represents a threat to the BC provincial government in the form of an intrusion into its constitutional jurisdiction.<sup>5</sup>

### A NOTE ON SPECIES-AT-RISK LISTS

A species can be listed as being "at risk" at provincial, national, or global levels and this has created some confusion.

If a species is driven to extinction, this means it no longer exists on the planet. This much is usually clear, although even extinction can have its nuances. For example, a species can be extinct in the wild while persisting in captivity.

Many of the world's species inhabit only a fraction of their historical ranges. Or to put this differently, they are not extinct globally, but they have been *extirpated* from some of their former areas of inhabitation. *Extirpation* refers to the *local* extinction of a species even while other populations of the same species remain in other areas. A species can be extirpated from BC, for example, but persist in other provinces in Canada. Or a species can be extirpated from Canada, while healthy populations persist in other countries.

In British Columbia, the BC Conservation Data Centre (CDC) — a scientific body within the BC government's Ministry of Sustainable Resource Management — lists species that are at risk *provincially*. This means that the CDC includes species that are in danger of (i) being extirpated from the province; (ii) being extirpated from Canada; (iii) going extinct in the wild; or (iv) going extinct entirely. The national Committee on the Status of Endangered Wildlife in Canada (COSEWIC), by comparison, lists species that are at risk *nationally*, which means that these species can fall into categories (ii) to (iv), above, but do not include species that are only in danger of extirpation from one province. And at the international level, the World

Conservation Union, based in Switzerland, lists the global status of species which refers only to categories (iii) and (iv), above, referring to the *global* status of species at risk.

Listing a species by a scientific body does not necessarily mean that it will be protected. This too has been a source of confusion. Lists of species at risk can be placed into two categories. The first are lists that simply serve to inform. These may be compiled and maintained by governments, such as the CDC, or by NGOs, such as the World Conservation Union. These lists are compiled by scientists who are specialists and sometimes world authorities on the species in question. The scientists may be employed by governments, universities, other research organizations, or NGOs. Herein, we refer to such lists as *scientific* lists.

Second, and by contrast, are lists of legally recognized species at risk in the sense that they have been recognized under the auspices of a statute that serves to protect them. So, for example, species legally listed under BC's *Wildlife Act* or Canada's *Species at Risk Act* are protected according to provisions in these statutes. In these cases, the statutes commit the respective governments to protecting the species they so list. We refer to these as *legal* lists.

It is important, therefore, not to confuse scientific lists and legal lists of species at risk. The decision to legally list a species is political and subject to approval or rejection on bases other than science. While selecting species for legal listing, any one government usually draws from its specified scientific body's lists. For example, COSEWIC's lists (i.e., scientific lists) are related to the SARA lists (i.e., legal lists) in the sense that the federal government is obligated to use COSEWIC's lists as the source of candidate species for SARA listing.

The discrepancies between scientific lists and legal lists indicate the extent to which governments are either diligent or negligent about protecting the

species at risk within their jurisdictions. A wide gap between the number of species at risk that scientists recognize and those that a government has committed to legally protect implies negligence. For example, both the Santiago Declaration and the Canadian Council of Forest Ministers use this indicator to judge the extent to which signatory parties are practising sustainable forest management.

## GOVERNMENT INITIATIVES

### **The Legacy of Previous Governments**

The provincial New Democratic Party (NDP), which was in power in British Columbia for two terms spanning most of the 1990s, and to a lesser extent its predecessor, the Social Credit Party, developed a number of initiatives that were intended to have a lasting influence on the conservation of biodiversity and other environmental objectives. Notably, these included:

*The Old Growth Strategy.* The Old Growth Strategy Project (1989 to 1991) represented a turning point in the governance of BC's forestlands. It ushered in a new level of attention to conservation and a new level of public participation in forest land-use planning. It was an explicit attempt to respond to a public groundswell against a long-standing presumption, or perhaps a tacit policy held by the Ministry of Forests, that all of the province's operable old-growth forests would be subject to harvesting in due time unless they were already in a protected area such as a provincial park or ecological reserve.<sup>6</sup>

Following a lengthy multi-stakeholder process, the project's final report recommended that while much old-growth harvesting could continue, large tracts of old-growth forests should be conserved (British Columbia 1992).

*The Protected Areas Strategy.* As the Old Growth Strategy Project was still in progress, the NDP came

to power in 1991 on an election platform that included a promise to double the area of BC's legally designated parks and wilderness from 6 percent of the provincial land base to 12 percent. The initiative became known as the Protected Areas Strategy, and through it the NDP government delivered on its promise. The strategy helped to promote a number of public values (e.g., providing recreational opportunities), but its primary intent was to help conserve the province's biodiversity by significantly increasing the amount of land devoted to protected areas and by strategically placing new protected areas in locations with high biodiversity values (British Columbia 1993).

*The Forest Practices Code.* The NDP government passed the *Forest Practices Code of British Columbia Act* in 1996. The purpose of the Code was to implement forest practices and plans that would help to dampen the environmentally harmful impacts of harvesting operations. Its scope was broad. It attempted, for example, to establish rules that would restrict the size and distribution of clearcuts in an effort to lessen the impact of harvesting on visual landscape aesthetics. The act was accompanied by a large number of regulations and guideline booklets covering all aspects of forest management from root disease control in commercial trees to the design of forest surveys. The conservation of biodiversity was given special emphasis in the Code, its regulations, and associated guidelines.

*Species-at-Risk Protection.* The NDP government agreed, in the 1996 Accord for the Protection of Species at Risk, to use its existing *Wildlife Act* to protect species at risk. Although the primary purpose of the *Wildlife Act* had been, and still is, to regulate hunting, fishing, and trapping activities on provincial land, it also contains provisions for the legal recognition of threatened or endangered species and for the protection of their habitat. In 1980 four species were recognized under the act (two mammal and two bird species<sup>7</sup>), but none has subsequently been recognized.

Of more significance for the protection of species at risk in BC, the NDP developed the Identified Wildlife Management Strategy (IWMS). The IWMS was originally expressed in provisions of the Operational Planning Regulation under the *Forest Practices Code*. It stipulated that a forest-dependent species at risk could be legally designated as an identified wildlife species, and if so, then appropriate measures for its protection would be designated at the same time, including, if necessary, a mapped area of partial or complete protection known as a wildlife habitat area. A list of 40 identified wildlife species was prepared and approved by government in 1999.

Also, limitations were placed on the extent to which biodiversity conservation measures in general and species-at-risk protection efforts in particular could restrict access to the province's supply of timber. Despite the enactment and implementation of the *Forest Practices Code*, internal government policy restricted the total impact of the Code to no more than 6 percent of the provincial timber supply (British Columbia 1996).<sup>8</sup> Included in the 6 percent limitation, the IWMS was not to have more than a 1 percent impact on timber supply.

*Summary of Previous Governments' Legacy.* Overall, the NDP government significantly increased the proportion of land legally designated in protected areas and ensured that the newly added areas were strategically placed in biologically important locations. It also ensured that meaningful public participation was a major component of strategic land-use decision-making. By way of the *Forest Practices Code*, the NDP initiated legal measures to mitigate the biologically harmful effects of forest harvesting, but limited the ability of the Code to constrain forest harvesting to a 6 percent impact on timber supply. The NDP did not make use of the relevant provisions in the *Wildlife Act*, and although it did establish the IWMS for protecting forest-dependent species at risk, it also placed a 1 percent



restriction on the extent to which the IWMS could impact timber supply access.

### **The Initiatives of the Current Government**

The BC Liberal Party came to power in May 2001 and introduced major changes in environmental and other legislation with an emphasis on less government, including streamlined legislation, and a heavier reliance on the private sector for the delivery of public goods and services.

Conservation policy in BC has been affected by this ideology. Here we outline some of the significant changes to the three categories of biodiversity conservation policy we discussed previously — that is, protected areas, protective measures in the matrix of lands outside protected areas, and species-at-risk protection.

In terms of protected area designation and management, the current government has passed the *Protected Areas Forest Compensation Act*. This piece of legislation is intended to ensure that forest corporations will receive full compensation if they lose harvesting rights to public forestlands by way of any protected area additions or boundary changes. This act inhibits the creation of new protected areas. Also, BC Parks, the government agency responsible for managing BC's protected areas, has been downsized and its budget reduced.

In terms of protecting biodiversity on the matrix of public lands outside the boundaries of protected areas, the most significant change has been the gradual replacement of the *Forest Practices Code of British Columbia Act* with the new *Forest and Range Practices Act (FRPA)*. Also known as the “results-based code,” this new act is intended to be less prescriptive by reducing the regulations and guidelines that forest corporations must follow while operating on public forestland. Instead, the government is setting “target” results and is asking forest corporations to find the most suitable means for meeting these targets. Objectives under FRPA al-

low companies to engage in species-at-risk protection, so long as it does not “unduly reduce the supply of timber from British Columbia's forests” (see [BC Reg 14/04 7(1)]).

The Liberal government uses the existing IWMS, now under FRPA, and an amended *Wildlife Act* as its two policy instruments for protecting species at risk. The IWMS is intended to handle forest-dependent species at risk, while the amended *Wildlife Act* is intended to handle other species at risk.

### **ASSESSMENT OF BC'S SPECIES-AT-RISK POLICIES**

In this section we assess four interrelated issues: the BC provincial government's willingness to legally protect forest-dependent species at risk, its conception of species-at-risk legislation, its imposition of constraints on species protection, and the extent to which it engages in the recovery (as compared to the protection) of species at risk.

#### **Scientific Lists versus Legal Protection**

From the international and national agreements we have discussed, we can draw two main conclusions. First, the existence of species at risk, as determined by credible scientific listing organizations such as BC's Conservation Data Centre, is an indicator of unsustainable environmental management. Second, the BC provincial government has agreed to protect species at risk with legal instruments (i.e., statutes and accompanying regulations) as compared to internal government policies.

How well, then, has the BC provincial government legally protected species at risk? The Canadian federal government's performance in response to these same international and national agreements serves as a basis for comparison.

At the time of writing, the federal government had legally accepted 74.7 percent of the species that

COSEWIC had presented to government for legal listing, had rejected 0 percent, and was partway through a public review process prior to accepting the remaining 25.3 percent. The BC provincial government, in contrast, had accepted only 3.2 percent of the BC CDC's equivalent species and had initially rejected the remaining 96.8 percent.

These percentages were derived in the following manner. When SARA came into effect in June 2003, COSEWIC reviewed its entire list (which had been accumulating since 1977 when COSEWIC was initiated as an unofficial assessment and listing body of volunteer scientists) and divided its listed species into two groups. In the first group were those species that had acceptable status reports. The government immediately accepted all 233 species in this group, dispensing with the discretionary public review process as a sign of its serious intentions. In the second group were those species that had out-of-date status reports. COSEWIC subsequently reassessed 79 species, all of which are now in a public review process as a first step toward legal listing. As of May 2004, COSEWIC had an additional 144 species on its lists (for a total of 456) and was in the process of reassessing them. None of the 312 species that COSEWIC has presented to government has been rejected so far.

By comparison, and at the time of writing, the disparity between BC's scientific lists of species at risk and those legally protected was large. However, we must be careful in comparing BC provincial lists (both scientific and legal) with their federal counterparts for three reasons. COSEWIC and SARA are concerned with species that are at risk in Canada as a whole — that is, they are nationally at risk. The BC CDC and the province's two legal instruments for protecting species at risk in BC — the *Wildlife Act* and *IWMS* — are concerned with species that are at risk provincially.

Second, COSEWIC and the BC CDC use slightly different criteria for lumping or dividing subspecies or significant populations within species, and for

judging the severity of threat, but this makes only a small difference. The two scientific lists have about 90 percent congruency according to COSEWIC interviewees. The national scientific lists, however, are smaller than the BC provincial lists because a species can be at risk in a province or territory but fail to reach the national lists because a neighbouring province or territory has viable populations of that species. Put differently, this means that the large geographical scale of Canada as a whole renders it harder for many species to be at risk of extinction nationally. Also, COSEWIC has not yet completed assessments on as many species, especially among invertebrates and non-vascular plants, as has the CDC.

Finally, the BC CDC lists not only "species" using the same definition as does COSEWIC,<sup>9</sup> but also "natural plant communities." The term "elements" is used as the general term in BC, and includes both "species" and plant communities. Currently, plant communities constitute 17 percent of the scientifically listed elements in BC, or 266 out of a total of 1,569 elements at risk (British Columbia 2004a). For a breakdown of BC CDC's red- and blue-listed elements at risk, see Table 1.

COSEWIC and the BC CDC use different labels for their respective species at risk, but their lists can be rendered comparable: if the CDC's "natural plant communities" are removed, then BC's red list consists of a composite of *provincially* extirpated, threatened, and endangered species — that is, the direct equivalent of COSEWIC's *nationally* extirpated, threatened, and endangered species. Similarly, BC's blue list of provincial "special concern species" (minus the plant communities) is the direct equivalent of COSEWIC's national list of "special concern" species.<sup>10</sup>

In the following analyses, therefore, we ignored the BC CDC's natural plant communities in order to make direct comparisons with COSEWIC or SARA lists, but included them when analyzing legal listing issues internal to BC alone.

TABLE 1  
BC Conservation Data Centre's Red- and Blue-listed Elements (2004)\*

<i>Type of Element</i>	<i>Red List**</i>	<i>Blue List***</i>	<i>Totals</i>
Animals	138	178	316
Plants	367	620	987
<b>Subtotals</b> (COSEWIC equivalent species)	<b>505</b>	<b>798</b>	<b>1,303</b>
Natural plant communities	139	127	266
<b>Totals</b>	<b>644</b>	<b>925</b>	<b>1,569</b>

Notes: \* "An element is a species or a plant community. The term 'species' includes all entities at the taxonomic level of species, such as subspecies, plant varieties, and interspecific hybrids" (British Columbia 2002).

\*\* "Includes any indigenous species, subspecies, or plant community that is extirpated, endangered, or threatened in British Columbia" (British Columbia 2004c).

\*\*\* "Includes any indigenous species, subspecies, or community that is considered to be of special concern (formerly vulnerable) in British Columbia" (British Columbia 2004c).

In a direct comparison of the federal and BC governments' performances in the transfer of species from their scientific lists to their legal lists, we found that whereas the federal government accepted or is in the process of accepting all of COSEWIC's offered species, the BC provincial government accepted 43 out of a possible 1,303, or only 3.2 percent, of the BC CDC's equivalent species (i.e., excluding plant communities). Four were legally listed under the *Wildlife Act* (and have been since 1980) and another 39 were recently listed as identified wildlife (British Columbia 2004b).

The BC government has initially rejected the remaining 96.8 percent of its equivalent (i.e., again, excluding plant communities) scientifically listed species by a process of elimination. If we add in the 266 plant natural communities that the BC CDC also lists as elements at risk, and which the BC government also failed to legally protect, then BC's total performance is 2.7 percent accepted and 97.8 percent implicitly rejected so far.

The elimination process unfolded mostly by way of an internal review process in 2000 and 2001. At that time, the BC Conservation Data Centre's red and blue lists contained 1,247 elements at risk, and the purpose of the review process was to determine which elements should be included as identified wildlife under IWMS (i.e., as *legally* recognized forest-dependent species at risk). The province eliminated 1,001 of these for a variety of reasons listed in Table 2, leaving 246 elements that were "candidates for designation as Identified Wildlife" (British Columbia 2002). The Liberal government accepted only 39 of these in May 2004 when it replaced the former government's original list of 40 identified wildlife with a different list of 39 species. These 39 species constitute, not coincidentally, those species that the federal government lists under SARA as nationally endangered or threatened forest-dependent species in BC. For a summary of how BC's *current* scientific list of 1,569 elements at risk was reduced to 43 legally recognized species at risk (including four under the *Wildlife Act*), see Table 3.

TABLE 2  
Reasons for Eliminating Scientifically Assessed Elements at Risk (2001)\*

<i>Reason</i>	<i>Number</i>
All blue-listed plant species and plant communities	358
No independent assessment available from NatureServe	88
Extinct, extirpated, or 'historical' in BC	58
Insufficient data	223
Not at risk from forest or range management practices	241
Known to occur only in protected areas	26
No longer considered at risk	7
<b>Total elements eliminated</b>	<b>1,001</b>

Note: \* Adapted from British Columbia (2002). The apparent lack of congruence between Tables 1 and 2 is due to the CDC's changed (and changing) definitions of some elements, particularly among the plant communities.

TABLE 3  
BC's Legal Recognition of its Scientifically Listed Elements at Risk\*

<i>Current Number of Elements at Risk on BC's Scientific Lists</i>	<i>1,569</i>
Number of elements eliminated in 2001 IWMS review (see Table 2)	(1001)
Remaining elements after 2001 IWMS review, but still not legally recognized	(207)
Number of elements added to BC Conservation Data Centre lists since 2001 IWMS review, but still not legally recognized	(318)
<b>Current number of legally recognized species at risk in BC**</b>	<b>43</b>

Notes: \* The term "elements" includes both "species" (as in COSEWIC's definition) and "plant communities."

\*\* Includes four species under the *Wildlife Act* and 39 under IWMS.

Are the reasons listed in Table 2 sufficient reasons for not legally protecting these species or elements at risk? It is not our purpose to determine the sufficiency of these reasons, but in passing, we can point out that most of them can easily be challenged by those organizations that will, at some time, judge the extent to which BC is in compliance with

its national and international commitments. In particular, from all that we have been able to ascertain, the elimination of all blue-listed plant species and plant communities (but not blue-listed animal species) was an arbitrary decision. As a result, 358 elements, or more than a quarter (28.7 percent) of the elements at risk on the BC CDC lists were eliminated.

The elimination of 241 elements because they were not at risk from forest and range-management practices is an assessment we take at face value. It is undoubtedly a reasonable assessment given the expertise of the individuals the government used to render these decisions. From government's perspective, IWMS was simply not the appropriate legal instrument to protect these species. Will the government use its *Wildlife Act* to protect these 241 species or elements at risk that do not qualify for IWMS? The government is reticent about this issue. It recently passed a *Wildlife Amendment Act, 2004*, and as a result the *Wildlife Act* now contains provisions that prohibit harm to individuals or residences of species at risk in a manner similar to SARA. But species have to be legally recognized as species at risk under the amended act before these provisions apply, and no additional species (other than the original four) have been proposed for legal listing.

After eliminating 1,001 elements (see Table 2) from an original scientific list of 1,247 elements at risk, 246 elements were remaining as "candidates" for IWMS. Will the provincial government legally protect the remaining 246 elements its own assessment had selected as candidates? The government has been remarkably opaque about this issue too. It decided to legally recognize the 39 SARA-listed species as identified wildlife, but this was probably to prevent the federal government from justifiably intruding on provincial land to protect these national species at risk.

Overall, the BC provincial government has demonstrated a reluctance to commit itself to the legal protection of forest-dependent species at risk even while its own species-at-risk scientific body has assessed and listed several hundred species or elements that require protection. Yet it is precisely this discrepancy between the scientific and legal lists that serves as an indicator of the extent to which the BC government is (or is not) in compliance with the above-mentioned international and national agreements. This discrepancy leaves the province vulnerable to trade sanctions or reduced market ac-

ceptability of BC's forest products, and might hinder the ability of the province and forest corporations to obtain forest certification.

### **A Misconception of the Purpose of Species-at-Risk Legislation**

For the protection of species or elements at risk, the province is currently placing its greatest emphasis, or at least its most visible emphasis, on IWMS. At some time in the future, the current list of 39 identified wildlife may be expanded as additional elements are assessed for legal listing. But IWMS Version 2004 is revealing in this respect. In this version the government points out that the purpose of IWMS is to protect species at risk that "are negatively affected by forest or range management on Crown land and are not adequately protected by other mechanisms" (British Columbia 2004c). These other mechanisms are the province's network of protected areas and careful forest harvesting and planning as stipulated in provisions under FRPA (ibid.). But reliance on these other mechanisms is misplaced for several reasons.

Protected areas in BC — primarily provincial parks and ecological reserves — can, at best, protect *from further harm* only a small fraction of the province's 1,569 elements at risk. BC Parks, the provincial government agency responsible for the management of protected areas in BC, conducted its own analysis which shows that little reliance can be placed on the ability of protected areas to adequately protect species at risk. They found that only 6 percent of the species at risk on the BC CDC lists are found wholly within the province's protected areas, and that nearly half (46 percent) are not found in protected areas.<sup>11</sup> The remaining 48 percent have populations both within and outside protected areas, and many of these latter species probably cannot survive if only their protected-area populations are free from human disturbance. Beyond critically low thresholds, species can decline precipitously (Soulé 1987).

Perhaps the provisions in FRPA regarding careful forest harvesting, range management, and related

planning could help to protect *from further harm* many of the province's forest-dependent species at risk. Yet a recent report by BC's Forest Practices Board — an arm's-length, government-supported watchdog agency that monitors the effectiveness of the former Code and now FRPA — revealed that most of the mechanisms for conserving biodiversity have not been adequately implemented since the *Forest Practice Code* came into effect in 1996 (Forest Practices Board 2004).

More significantly, the BC provincial government's reliance on other mechanisms is misconceived from the start. Species-at-risk legislation is required precisely when the other two categories of conservation policies — that is, policies for protected areas and for protective measures on the matrix of surrounding lands — have failed. As a species-at-risk policy, the Identified Wildlife Management Strategy cannot turn to the other two categories of biodiversity conservation legislation for support because it is the lack of remaining policy options that makes species-at-risk policies necessary.

Again, SARA serves as a basis for comparison. The scope of SARA extends to species at risk even if they are found in protected areas such as national parks or on private lands. It also extends, if necessary, to provincial forestlands. SARA-listed species receive special protection wherever they reside precisely because more general protective measures have failed.

### **The 1 Percent Limitation on Timber Supply Impact**

The former NDP government implemented an internal policy that would not permit the *Forest Practices Code* to have more than a 6 percent impact on timber supply, as mentioned previously. Included in the 6 percent limitation, the IWMS was not to have more than a 1 percent impact.

The Liberal government has maintained the 1 percent limitation on timber supply impact for IWMS as an internal government policy (British Columbia 2004c, 13), and has also entrenched a

limitation on “wildlife” protection in FRPA regulations: protective measures for wildlife can be implemented only “without unduly reducing the supply of timber from British Columbia's forests” [BC Reg 14/04 7(1)]. The “unduly” clause for wildlife and the internal 1 percent cap on timber supply impact are currently the same, although regulation does allow for ministerial discretion [BC Reg 17/04 2(1)].

Is the 1 percent cap a problem? Three issues suggest that a 1 percent cap is at best unnecessary and is at worst a serious constraint on the ability of some forest districts to protect species at risk.

The first issue is, once again, the very small number of species at risk that have been legally recognized as identified wildlife. Any one forest district can contain a large number of scientifically listed forest-dependent species at risk and yet remain unconstrained by a 1 percent cap on timber supply impact because of the small number of species that it is legally required to protect.

Second, forest-dependent species at risk are unevenly distributed among the province's 29 forest districts. The more northerly districts contain relatively few species at risk (British Columbia 2004d). As a general statement, the modern human impact on natural ecosystems by way of forest harvesting, urban development, and agricultural development is comparatively light in the northern portions of the province. Given the small number of species at risk in these districts (whether legally recognized or not), the 1 percent limitation is unlikely to constrain these districts in their ability to protect identified wildlife and is therefore unnecessary.

By contrast, the more southerly districts contain most of the province's species at risk (*ibid.*). We examined two southern districts in detail (Wood *et al.* 2003). Both were experiencing difficulties in their attempts to protect the 40 identified wildlife species that were originally listed in 1999 and likely would be unable to fulfill their legal mandate with an expanded list.

In the short term (i.e., until more species are legally listed), the 1 percent limitation on timber supply impact might not act as a constraint if it were applied to the provincial Crown forest land base as a whole. Rather, the problem is in its application to each forest district. The provincial government commissioned a study in 1997 to estimate the total provincial timber supply impact if the intended measures to protect a proposed list of 38 identified wildlife were implemented. In that report, 25 of the 38 species were expected to have an impact on timber supply, and in total that impact at the provincial scale was less than 1 percent (Tanz 1997). Subsequent to this report, the government first assumed that implementing the original IWMS could be accommodated within a 1 percent timber supply impact for the province as a whole, and then prescribed by an internal government policy that the implementation of IWMS must not exceed a 1 percent timber supply impact in any one forest district.

If the 1 percent limitation were applied at a provincial scale, it could relieve individual districts from an unnecessary constraint in the protection of currently listed identified wildlife. But this would not get to the crux of the problem. If the provincial government were to recognize more species at risk for legal protection — that is, if it began to narrow the discrepancy between the scientific lists and legal lists that we discussed previously — then the 1 percent cap would likely become a constraint even if it were applied at the provincial scale. The central issue, therefore, is the government's purpose in applying *any* constraint on the ability of its agencies and the forest industry to protect those species at risk that the government has already legally recognized as requiring protection. Why constrain the protection of *these* species? We were able to confirm that the government's purpose is simply to avoid the opportunity costs of lost timber supply. Protecting species at risk involves protecting their habitat, and for forest-dependent species that usually entails a loss of timber supply.

The province's national and international commitments to the protection of species at risk are not

conditional on the acceptability of the opportunity costs involved. There is no escape clause in the Convention on Biological Diversity (including the Forest Biological Diversity Programme), the Santiago Declaration, the Accord for the Protection of Species at Risk, or the Canadian Council of Forest Ministers' Criteria and Indicators, for example, to the effect that species at risk will be protected only if the costs are acceptable.

It is, of course, within the provincial government's prerogative to establish limitations on the costs involved (whether direct costs or opportunity costs). But if this constraint results in a failure to protect legally listed species, then it is not clear that such constrained protection qualifies as legal protection as intended by the national and international agreements to which BC is committed. Vulnerability to further punitive actions from external governments and organizations is implied.

### **Protection versus Recovery**

Under the Accord for the Protection of Species at Risk, the federal, provincial, and territorial governments all agreed not only to protect species at risk, but also to "provide for the development of recovery plans" for species classified as threatened and endangered. This echoed the 1992 Convention on Biological Diversity, which required signatory parties to recover native species threatened with extinction.

The provincial government has no independent legal provisions for the recovery of provincial species at risk. The purpose of IWMS is to protect forest-dependent species at risk from further harm due to forest-harvesting operations, but does not provide for the recovery of species at risk.<sup>12</sup> Recovery is not required in the BC *Wildlife Act* either. By comparison, the federal *Species at Risk Act* requires a team of experts to prepare a recovery strategy for each endangered, threatened, or extirpated species recognized under the act. Recovery teams are currently operating in BC, but their purpose is to recover SARA- or COSEWIC-listed species.

Without implementing a recovery strategy for each species at risk, their status is not likely to change for the better; they will remain as species at risk or they will become extinct. As we have pointed out above, a major international and national indicator of *unsustainable* environmental management is the existence of species at risk, and special attention has been given to the existence of forest-dependent species at risk. The provincial government therefore is economically vulnerable, especially in the international forest-products market. A proactive approach for species at risk, at least for threatened and endangered species, would be to enact provincial legislation for the recovery of these species.

Finally, we note that if the provincial government were to amend the *Wildlife Act* to require recovery of provincially-listed endangered and threatened species, then it is not clear that a separate IWMS would be necessary. A single amended *Wildlife Act* (or a separate act for species at risk) that provides for the protection and recovery of these species, regardless of whether or not they are forest-dependent, would serve to fulfill the province's agreements to legally protect all species at risk and to develop recovery plans for those species classified as threatened and endangered. Extending its scope to encompass species at risk in protected areas would fill another gap in BC's current species-at-risk policies. A single act for this purpose would reduce redundancy in government regulations and would offer more transparency to the international community that monitors governments' performance in this regard.

## CONCLUSIONS

We examined the species-at-risk policy initiatives of the British Columbia provincial government, evaluated their sufficiency for meeting international and national agreements, standards, and expectations, and found them lacking in four respects. There

is a large discrepancy between the scientifically recognized lists of species at risk in the province and those that the provincial government has been willing to legally protect under the *Wildlife Act* and the Identified Wildlife Management Strategy under the *Forest and Range Practices Act*. The province, at least in its Identified Wildlife Management Strategy, has misconceived the purpose of species-at-risk legislation. It has also implemented a constraint on the extent to which the protection of legally recognized forest-dependent species at risk can impact timber supply, which brings into question whether such constrained protection qualifies as legal protection as intended by the national and international agreements to which BC is committed. We also found that the province's lack of independent commitment to the recovery of species at risk offers little reassurance that its legally listed species will recover from their status as species at risk of extinction.

If the provincial government intends to meet its international and national commitments, if it intends to act responsibly toward future generations, if it hopes to avoid possible negative economic repercussions from failing to do so, and finally, if it hopes to avoid federal intrusions into its normal constitutional jurisdiction, it must take the protection and recovery of species at risk more seriously. In particular, it must narrow the gap between its scientifically listed and legally listed species, reconsider the purpose of its species-at-risk legislation, revise or eliminate its constraint on the protection of forest-dependent species at risk, and engage, by independent legal means, in the recovery of species at risk.

## NOTES

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<sup>1</sup>These are: Australia, Canada, Chile, China, Japan, Korea, New Zealand, the Russian Federation, and the United States. European nations have a separate process with similar goals, the Helsinki Process.

<sup>2</sup>Biodiversity conservation admits to degrees. The conservation biology literature in general assumes that all native species need to be conserved. But this is impossible given that we do not know the number of species that exist. Science has identified only a small fraction of the species that are estimated to exist. And some organisms — e.g., fungi, bacteria, protozoa — do not easily qualify as true species in the normal sense of the term. So an outstanding issue in conservation biology is to determine exactly which species we should conserve. At a minimum, those species we can see and identify — particularly vertebrates, vascular and non-vascular plants, and some invertebrates — are usually presumed to be the minimum set of species that we should protect. In addition, the relevant literature suggests that for each of these species, we should maintain viable populations over the species' remaining natural habitat (cf. Soulé 1987).

<sup>3</sup>*Southwest Center for Biological Diversity v. Gale Norton, Secretary, U.S. Department of the Interior*. United States District Court for the District of Columbia. Civil Action No. 98-934.

<sup>4</sup>The safety net provisions are strongly worded. For example, section 61(4) states that the minister *must* make a recommendation to the Governor in Council if the minister is of the opinion that a province is insufficiently protecting a species' critical habitat.

<sup>5</sup>Despite sections 92 and 92A of the *Constitution Act, 1867*, which grant each province exclusive jurisdiction to manage its respective provincial lands, including forestlands, there are a number of areas in which the exclusivity of federal or provincial jurisdiction is not sharply defined. Hogg (1992, 446) argues that a "provincial in-

ability test" can be used to invoke the seldom-used Peace, Order and Good Government (POGG) clause in section 91 of the same *Constitution Act*. This clause grants all "residual" power (i.e., power not already assigned to the exclusive jurisdiction of the provinces) to the federal government. In this case, the POGG clause could be invoked precisely because the issue at stake is of national concern: the possibility of the extinction of a species from Canada as a nation can be interpreted as an extra-provincial matter.

<sup>6</sup>The term "operable" refers to those forest areas that can be harvested profitably using current or anticipated future harvesting technology.

<sup>7</sup>These are the Vancouver Island marmot, the sea otter, the American white pelican, and the burrowing owl.

<sup>8</sup>See Hoberg (2000) for review. Hoberg notes that the government first assumed that the Code would not impact timber supply by more than 6 percent and then entrenched this assumption by placing a 6 percent cap on the extent to which the Code would be permitted to impact timber supply (Hoberg 2000, 74).

<sup>9</sup>COSEWIC and the BC Conservation Data Centre both define "species" as "any indigenous species, subspecies, variety, or geographically or genetically distinct population of wild fauna and flora" (COSEWIC 2004).

<sup>10</sup>COSEWIC has five categories of species at risk. These are Extinct, Extirpated, Endangered, Threatened, and Special Concern. COSEWIC also keeps track of other species it has assessed, but which do not fall into these species-at-risk categories. These other lists are: Not at Risk and Data Deficient. For a complete description of each category, see [www.cosewic.gc.ca](http://www.cosewic.gc.ca). The BC CDC has a similar list of not-at-risk and data-deficient species or elements: its yellow list.

<sup>11</sup>Included in this BC Parks analysis are elements at risk, such as blue-listed plants, blue-listed plant communities, and non-forest-dependent species, which IWMS had eliminated.

<sup>12</sup>Currently, all 39 legally listed identified wildlife species are also listed under SARA and therefore will receive recovery team attention if they are classified as endangered, threatened, or extirpated. However, it is SARA, not provincial legislation, that requires recovery planning.

REFERENCES

- Boyle, T.S.B. 1991. "Biodiversity of Canadian Forests: Current Status and Future Challenges," *The Forestry Chronicle* 68:444-52.
- British Columbia. 1992. *An Old Growth Strategy for British Columbia*. Victoria, BC: BC Ministry of Forests.
- \_\_\_\_\_. 1993. *A Protected Areas Strategy for British Columbia*. Victoria, BC: Land Use Coordination Office.
- \_\_\_\_\_. 1996. *Forest Practices Code Timber Supply Analysis*. Victoria, BC: Ministry of Forests and Ministry of Environment, Lands and Parks.
- \_\_\_\_\_. 2002. *Setting Priorities for the Identified Wildlife Management Strategy*. Victoria, BC: BC Ministry of Water, Land and Air Protection.
- \_\_\_\_\_. 2003. *Identified Wildlife Management Strategy: Standards for Managing Identified Wildlife, Version 2003 [Draft]*. Victoria, BC: BC Ministry of Water, Land and Air Protection.
- \_\_\_\_\_. 2004a. *BC Conservation Data Centre Home*. Accessed July 2004 at <http://srmwww.gov.bc.ca/cdc/>.
- \_\_\_\_\_. 2004b. *Order: Category of Species at Risk and List of Identified Wildlife*. Victoria, BC: BC Ministry of Water, Land and Air Protection.
- \_\_\_\_\_. 2004c. *Procedures for Managing Identified Wildlife, Version 2004*. Victoria, BC: BC Ministry of Water, Land and Air Protection.
- \_\_\_\_\_. 2004d. *State of Environment Reporting: Species at Risk in British Columbia*. Accessed July 2004 at <http://wlapwww.gov.bc.ca/soerpt/2risk/speciesglance.html>.
- Canada. 2002. *Senate Report*. The Standing Committee on Energy, the Environment, and Natural Resources. Excerpt from the Third Report. 9 December. Ottawa: Government of Canada.
- Canadian Council of Forest Ministers (CCFM). 2003. *Defining Sustainable Forest Management in Canada: Criteria and Indicators 2003*. Ottawa: Canadian Council of Forest Ministers.
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2004. Web site accessed June 2004 at <http://www.cosewic.gc.ca>.
- Earth Summit 2002. *Plan of Implementation*. Web site is [http://www.johannesburgsummit.org/html/documents/summit\\_docs/2309\\_planfinal.htm](http://www.johannesburgsummit.org/html/documents/summit_docs/2309_planfinal.htm). Accessed June 2004.
- Forest Practices Board. 2004. *Implementation of Biodiversity Measures under the Forest Practices Code: Implications for the Transition to the Forest and Range Practices Act*. Special Report 17. Victoria, BC: The Board.
- Foster, B. 1993. "The Importance of British Columbia to Global Biodiversity," in *Our Living Legacy: Proceedings of a Symposium on Biological Diversity*, ed. M.A. Fenger, E.H. Miller, J.E. Johnson and E.J.R. Williams. Victoria, BC: Royal British Columbia Museum.
- Hoberg, G. 2000. "The 6 Percent Solution: The Forest Practices Code," in *In Search of Sustainability: British Columbia Forest Policy in the 1990s*, ed. B. Cashore, G. Hoberg, M. Howlett, J. Rayner and J. Wilson. Vancouver: University of British Columbia Press.
- Hogg, P.W. 1992. *Constitutional Law of Canada*. Toronto: Carswell.
- IBM Business Consulting Services. 2002. *A Greenwood Shift in the Market for Forest Products from British Columbia*. A report commissioned by Institute for Media, Policy and Civil Society (IMPACS).
- Leakey, R. and R. Lewin. 1995. *The Sixth Extinction: Biodiversity and its Survival*. New York: Doubleday.
- McClaren, E. 2004. *Accounts and Measures for Identified Wildlife: Queen Charlotte Goshawk (Accipiter gentilis laingi)*. Victoria, BC: Ministry of Water, Land and Air Protection.
- McNeely, J.A., M. Gadgil, C. Leveque, C. Padoch and K. Redford. 1995. "Human Influences on Biodiversity," in *Global Biodiversity Assessment*, ed. V.H. Heywood and R.T. Watson. Cambridge: Cambridge University Press and United Nations Environment Programme.
- Norton, B.G. 2001. "What Do We Owe the Future? How Should We Decide?" in *Wolves and Human Communities*, ed. V.A. Sharpe, B. Norton and S.D. Donnelly. Covelo, CA: Island Press.
- \_\_\_\_\_. 2003. *Defining Biodiversity: Do We Know What We Are Trying to Save?* The Namkoong Family Lecture Series. Vancouver: Faculty of Forestry, University of British Columbia.
- Pimm, S.L. and T. M. Brooks. 2000. "The Sixth Extinction: How Large, How Soon, and Where?" in *Nature and Human Society: The Quest for a Sustainable World*, ed. P. Raven. Washington, DC: National Academy Press.
- Pimm, S.L., G.L. Russell, J.L. Gittleman and T.M. Brooks. 1995. "The Future of Biodiversity," *Science* 269:347-50.
- Royal Society of London. 1992. *Population Growth, Resource Consumption, and a Sustainable World: A Joint Statement by the Officers of the Royal Society of*

- London and the U.S. National Academy of Sciences.* London: Royal Society.
- Sela, O.E., F.S. Chapin, J.J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L.F. Huenneke, R.B. Jackson, A. Kinzig, R. Leemans, D.M. Lodge, H.A. Mooney, M. Oesterheld, N.L. Poff, M.T. Sykes, B.H. Walker, M. Walker and D.H. Wall. 2000. "Global Biodiversity Scenarios for the Year 2100," *Science* 287 (5459):1770-74.
- Soulé, M., ed. 1987. *Viable Populations for Conservation*. Cambridge: Cambridge University Press.
- Tanz, J. 1997. *Estimated Impact of the Identified Wildlife Management Strategy (Vol. 1) on Provincial Timber Supply*. Victoria, BC: Cortex Consultants Inc.
- Thomas, C.D., A. Cameron, R.E. Green, M. Bakkenes, L.J. Beaumont, Y.C. Collingham, B.F.N. Erasmus, M. Ferreira de Squeira, A. Grainger, L. Hannah, L. Hughes, B. Huntley, A.S. van Jaarsveld, G.F. Midgley, L. Miles, M.A. Ortega-Huerta, A. Townsend Peterson, O.L. Phillips and S.E. Williams. 2004. "Extinction Risk from Climate Change," *Nature* 427:145-48.
- United States. 2002. *Transboundary Species: Potential Impact to Species*. Washington, DC: United States General Accounting Office.
- Wilson, E.O. 1988. "The Current State of Biological Diversity," in *Biodiversity*, ed. E.O. Wilson and E.M. Peter. Washington, DC: National Academy Press.
- Wood, P.M. 1997. "Biodiversity as the Source of Biological Resources: A New Look at Biodiversity Values," *Environmental Values* 6 (3):251-68.
- \_\_\_\_\_. 2000. *Biodiversity and Democracy: Rethinking Society and Nature*. Vancouver: University of British Columbia Press.
- Wood, P.M., L. Flahr, J. Tanz and F. Backhouse. 2003. *Provincial and Federal Species at Risk Policies: Opportunities and Obstacles for Forest Planning in British Columbia*. Forest Innovation Investment Project No. R2003-0230.

