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## **ALBERTA'S FORESTS**

### **Position**

AWA is committed to maintaining healthy and intact forest ecosystems that will sustain biological diversity and viable wildlife populations, provide clean drinking water, and promote long-term economic opportunities. AWA supports responsible ecosystem-based forest management that does not compromise wildlife and wilderness values.

### **AWA VISION FOR FOREST MANAGEMENT**

#### **Managing Forests as Ecosystems**

- All aspects of forest management are based on the precautionary principle.
- Democratically sound public participation is a part of all aspects of Alberta forest management.
- Biological diversity, watershed and other ecosystem services, and opportunities for nature-based recreation are all recognized as forest values no less important than timber supply.
- Sustainable forests needs ecosystem based models that allow natural control mechanisms to function.
- Water quality and quantity are recognized as key products of all forests and a primary product of the Eastern Slopes watersheds.
- Remaining old growth forests are regarded as non-renewable and necessary for the maintenance of biological diversity.
- A system of protected buffers is in place so that protected areas are sheltered from adjacent development.
- Forest management takes into account the cumulative footprint of all activities on the landscape, including forestry, oil and gas, mining, and motorized recreation.
- Stumpage systems are not based on mandatory cut requirements (e.g.: Allowable Annual Cuts) but a system that reflects the true value and environmental costs of logging without providing incentives to log beyond long-term sustainability.
- The recommendations of the Alberta Forest Conservation Strategy Committee (AFCS), National Forest Strategy and Canada Forest Accord, including the goals and objectives they articulate, become frameworks for truly sustainable forest management.
- Adoption of the Forest Stewardship Council Canada's National Forest Management Standard sets the direction for improving forest management.
- Canada's obligations under the Convention on Biological Diversity are respected along with other agreements to protect aquatic resources, species at risk, as well as U.S. listed species that may not be listed in Canada.

#### **Implementation**

- Industrial-scale clearcut logging (including salvage logging) is eliminated from
  - a) Wild Spaces delineated on AWA's *Wild Alberta* map,
  - b) Woodland caribou range,
  - c) the entire Eastern Slopes in the Bow River and Oldman River watersheds,



- d) Prime Protection and Critical Wildlife Zones of the Eastern Slopes north of the Bow River watershed, and
- e) areas identified as environmentally significant.
- Forest management maintains remoteness and minimizes forest fragmentation through road building and clearcutting.
- Harvest volume takes into account all non-timber land values and is substantially lower than the expected long-term sustained yield of the forest ecosystem managed primarily for fibre.
- Fire is allowed to play an essential role in maintaining healthy forest ecosystems, recognizing that clearcutting does not emulate wildfire.
- While protecting human life and property, wildfires are allowed to burn and are not artificially suppressed except for species at risk protection where directed in recovery plans.
- Infestations of insects and disease are allowed to run their natural course. This will contribute to natural balance and, ultimately, to ecosystem restoration.
- Intensive plantation management or agro-forestry are viable options to encourage within existing private farmlands of marginal productivity. The purpose of such intensive management would be to provide additional timber, thus reducing pressure on natural forests.
- Pesticide use is minimized and eventually eliminated.
- Alberta pulp mills continue to reduce pollution, ultimately eliminating the discharge of toxins including chlorine.
- The development of value-added forestry activities that support local employment and sustainable economic opportunities are encouraged.

#### **Policy and Regulation**

- Sustainable forest management is managed through proper regulation and enforcement, including adequate civil service training, staffing and local authority.
- Comprehensive forest monitoring is performed by public agencies to credibly assess the cumulative impacts of current and past industrial activities within forest regions.
- A section of the forest agency is designated for the research, monitoring, and management of watersheds.
- A provincial policy is developed to address conservation through the legal protection of old-growth forest systems.
- Forest Management Plans include a credible consultative process with local Aboriginal communities and are consistent with traditional Aboriginal land values and practices.
- A dynamic, scientific, and independent forest management review and monitoring system is applied to all large-scale industrial forest developments. These include new forest management agreements and renewals, as well as forest development plans.
- Viable alternatives are identified and considered when assessing FMA applications, along with an assessment of the environmental impacts of all alternatives.



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**BACKGROUND**

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**Ecosystem-based Forest Management**

Ecosystem-based planning, which has ecological sustainability as a primary management goal, should be the priority of forest managers. The key elements of ecosystem-based forest management include harvesting practices that emulate natural disturbances, adaptive management, ecological benchmarks, public involvement and application of the precautionary principle (Schneider 2001). Ecosystem-based planning ensures:

- An adequate system of parks and protected areas
- Ecologically appropriate harvest levels
- Retention of critical wildlife habitat
- Recognition of Aboriginal rights
- Equally distributed benefits to the community



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**Water and Watershed Management**

Four of Canada's great rivers originate on the Eastern Slopes of the Rocky Mountains – the Peace, Athabasca, North Saskatchewan and South Saskatchewan. Many documents, including some written prior to 1930 when Alberta gained control over its forests, attest to the fact that watershed protection has historically been considered the highest priority for Alberta's Eastern Slopes forest. The production in perpetuity of a supply of high quality water is the recognized traditional priority of the Eastern Slopes. *A Policy for Resource Management of the Eastern Slopes* (1979) and the revised edition (1984) restate this value and purpose, "the highest priority in the overall management of the Eastern Slopes is placed on watershed management". The Alberta government's 2008 Land-Use Framework also emphasized the watershed value of forests: "Historically, watershed and recreation were deemed the priority uses of the Eastern Slopes. These priorities should be confirmed, and sooner rather than later."

Healthy forest ecosystems play a critical role in ensuring high water quality and quantity. This is particularly true for headwaters forests. Forest elements such as soil, understory vegetation and dead wood store water during periods of high precipitation and slowly release it as conditions dry. In the same process, these forest elements filter water, improving its quality. By removing or damaging these essential elements, as through clearcut logging, the landscape's ability to filter, store and slowly release water is compromised. Throughout North America, municipalities have recognized the importance of watershed ecological integrity in supplying quality drinking water. Some municipalities, including New York and Vancouver, have gained control of lands in their upper watersheds to retain their critical forest elements and protect the water supply. In contrast, the headwaters of much of Calgary's water supply have been included within a Forest Management Agreement granted by the Alberta government.

**Public Participation**

Full and meaningful public consultation should take place in all forest management decisions. Relevant information must be provided to the public, and public views must be incorporated into forest management decisions. Full consultation with the public, Aboriginal, and local communities should encompass every stage of the forest planning, management, and monitoring process.

Alberta's forest resources on public land belong to all Albertans. The results of a 2007 Alberta government public survey, published in the Land-Use Framework Workbook Summary Report, included the following responses from the Alberta public:

- 71.8% of participants would be "willing to accept limits to Forestry development to provide for more Watershed Protection"
- 95% of respondents were very concerned or somewhat concerned about the "failure to consider the combined (i.e. cumulative) effects of land use activities."

In two 2011 public opinion surveys:

- 79.5 percent of respondents were "strongly opposed" or "somewhat opposed" to commercial logging in the Castle (March 2011, Lethbridge Citizen Society Research Lab, survey of 771 residents of Lethbridge and Coaldale)
- 77 percent of respondents "strongly oppose" or "somewhat oppose" commercial logging in the Castle (April 2011, Praxis, survey of 774 residents of Pincher Creek, Cowley, Crowsnest Pass, Piikani First Nation's reserve and Fort Macleod)



**Aboriginal Peoples**

If forest management is to be socially responsible, it is essential that forest managers fully recognize and respect existing Aboriginal Peoples' rights and title on the land. Aboriginal cultural values associated with forests must be identified, protected and monitored. Opportunities for joint forest-management agreements and Aboriginal participation in forest management must be created. Forest managers must make every reasonable attempt to obtain consent from affected Aboriginal communities and ensure that management practices remain consistent with traditional Aboriginal land-use values and practices.

**Forest Biodiversity**

Forests are biologically diverse systems, representing some of the richest biological areas on Earth. They offer a variety of habitats for plants, animals and micro-organisms (Convention on Biological Diversity 2011). Managing forests to maintain their biodiversity must be a key element of forest management. A precautionary principle is important because many complex interactions among forests' native species remain little understood. Implementation of Alberta's promised, long-overdue provincial Biodiversity Strategy will support forest ecosystems and water security.

**National and International Commitments**

The governments of Alberta and Canada have made international commitments to the conservation of biodiversity and better forest management as signatories to the World Conservation Strategy, National Forest Strategy, Canadian Biodiversity Strategy, Convention on Biological Diversity, and Convention on the Protection of Migratory Birds in Canada and the United States.

**Species at Risk**

Forest management plans and procedures must be changed to accommodate developing recovery plans for species at risk. The Alberta government's 2008 *Grizzly Bear Recovery Plan* notes that "human use of access (specifically, motorized vehicle routes) is one of the primary threats to grizzly bear persistence." The plan calls for maximum linear access densities of 0.6 km/ km<sup>2</sup> in core grizzly areas and 1.2 km/ km<sup>2</sup> in all other grizzly range. These access thresholds apply to all access, not just that derived from the forestry industry. But there is no indication that forest management plans have been changed to reflect these maximum densities.

Similarly, recommendations for recovery of threatened woodland caribou have not led to improvements in forest management practices to reflect these recommendations. The 2010 updated provincial status report for woodland caribou emphasizes: "Levels of habitat alteration from industrial developments are high on most caribou ranges in the province and projections forecast continued high levels of future industrial activity. [...] Provincial land-use guidelines for industrial activities have not succeeded (as a sole tool) in providing for long-term caribou population and habitat conservation, and guidelines for caribou habitat protection currently are not being applied in all caribou ranges within the province."

Recovery plans have been published or are in production for other threatened and endangered species, including limber and whitebark pine and Westslope cutthroat trout. In all cases, forestry management plans and practices need to be adapted to reflect species recovery recommendations.





### **Old-Growth Forests**

The prime feature of old-growth forests is not age per se, but the set of characteristics shared by most forest types in the later stages of succession. A key feature of an old-growth forest is the breakup of the canopy due to mortality of individual trees as they reach maturity. This process leads to the release of understory plants, accumulation of snags and downed logs, and in some cases, the emergence of secondary canopy species. Relative to younger stages, old-growth stands have trees of many ages and sizes, and have more numerous large canopy trees, large snags and large downed logs. Overall, structural diversity is highest in old-growth, and this is reflected in unique plant and animal communities as well as significant species richness relative to younger stands (Schneider 2002). Additional attributes often associated with old-growth forests include:

- Trees showing dieback, major side branches, multiple tops, and scars
- Tip-up mounds
- Thick forest floor
- Abundant cavity-using animals and lichens that grow upon other plants
- High cover and diversity of fungi
- Large amounts of stored carbon
- Fire-scarred trees
- Food webs based on decomposing materials
- Vascular plants symbiotic with fungi
- Fungal-invertebrate and fungal-invertebrate-vertebrate relationships (based on Timoney, 1998)

In Alberta, there are insufficient requirements for maintaining old growth on the landscape. Cumulative impacts of forestry, energy and motorized recreation on old-growth forest are not effectively managed. Intact old-growth woodland caribou habitat continues to decline. Some newer forest management plans incorporate insufficient old growth targets – for example, Alberta-Pacific’s 2007 plan sets an old-forest cover goal for its total FMA area of no lower than 25% below natural variability.

Non-timber values of old-growth forest must be explicitly recognized and incorporated into an old-growth forest strategy for Alberta.

### **High Conservation Value Forests, Intact Forest Landscapes and Intact Cultural Landscapes**

High Conservation Value Forests (HCVF) and related Intact Forest Landscapes (IFLs) and Intact Cultural Landscapes (ICLs) are those forests with outstanding or critical biological, environmental, or social values. First defined by the Forest Stewardship Council (FSC) and included in the National Boreal Standard, HCVF is now widely discussed and used by NGOs, industry and governments around the world. HCVF comprise the crucial forest areas and values that need to be maintained or enhanced in a landscape. HCVF are found across broad forest biomes, within a wide range of forest conditions (largely intact to largely fragmented) and in ecoregions with complete or under-represented protected area network.

As of 2016, the National Boreal Standard will be replaced by FSC Canada's National Forest Management Standard. Currently, the Draft does not include HCVF's, but will include High Conservation Values, which are 1) Species Diversity, 2) Landscape-level ecosystems and mosaics, 3) Ecosystems and habitats, 4) Critical ecosystem services, 5) Community needs, and 6) Cultural values. Instead of Forests, FSC has broadened its standard to High Conservation Value Areas, which are zones and physical spaces which possess and/or are needed for the existence and maintenance of identified High Conservation Values. IFLs and ICLs will also be more clearly defined in the new standard.





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**Habitat Fragmentation**

Logging road networks are expanding in Alberta's forest with little consideration of the cumulative impacts on ecosystem function. It is essential that forest managers create and implement access-management plans that include strategies for retaining significant sections of forest areas in an unfragmented condition (i.e. contiguous core forest). Such strategies should minimize forest access (including shared access for all industrial activities), prevent road building in candidate protected areas, avoid ecological impacts on protected areas and candidates from road adjacency, and effectively abandon and decommission roads, bridges and water crossings. Maximum thresholds for access densities should be developed for all forests, taking into account the needs for species such as woodland caribou, grizzly bear and threatened native trout species.

**Forest Monitoring**

There is a need for credible and comprehensive forest monitoring that accurately assesses the impacts of current and past forestry operations on ecosystem composition and function. Credible scientific professionals working independently of industrial influences must conduct all monitoring activities. Effective monitoring requires the use of benchmarks, including protected areas and permanent sample plots, and should include a commitment to measure changes in species populations, wildlife habitat use, soil moisture and soil fertility over time. Water quality and quantity monitoring and research must be an integral part of forest management. The collection of accurate growth and yield data for the forest is also a priority. This information should be accessible to the general public without cost.

**Allowable Annual Cut**

Consistent with ecosystem-based planning, methods of calculating the rate of cut should focus primarily on maintaining ecological integrity, and secondarily on ensuring a stable flow of wood fibre to mills. The level of harvest volume should consider all non-timber land uses and be substantially below the long-term sustained yield of the forest ecosystem managed primarily for fibre.

**Wildfire vs. Clearcutting**

The occurrence of wildfire is essential to the survival of Alberta's forests. Fire is a natural and essential disturbance to the landscape that (1) recycles nutrients, (2) regulates succession of plants, (3) maintains diversity, (4) reduces biomass, (5) controls insects and disease, (6) triggers and regulates interactions between vegetation and animals, and (7) maintains biological and biogeochemical processes (Crutzen and Goldammer 1992). By respecting fire as part of nature and by taking a more ecological approach to the role of fire in healthy forests, Alberta's natural forests and associated biological diversity are more likely to be sustained into the future. Without fire, the existing mosaic of many-aged and multi-species stands would not exist. Clearcut logging is not, and should not be considered to be a substitute for wildfire regimes. For more information, please refer to AWA's position statement on Wildfire.

**Salvage Logging**

Current Alberta Government forest policies encourage quick clear-cut harvesting of all merchantable trees left after a fire. Such policies ignore the importance of standing dead timber in terms of maintaining forest species and overall ecosystem processes. Many species, often described as fire specialists, thrive in the charred remains of a forest fire. For example, recent research in Alberta's boreal forests indicates that burned sites and the food sources present within them (i.e. bark beetles) are



critical to the survival of the black-backed (*Picoides arcticus*) and three-toed woodpecker (*Picoides tridactylus*) (Hoyt and Hannon 2002). Feeding activities by such wildlife create holes in dead and dying trees that promote the presence of fungi and decomposing bacteria. Together these species hasten the breakdown of nutrients from the burned stands and cycle them back into the developing forest.

Even during severe fire events, remnants of intact forest may survive. These islands of unburned trees act as a refuge for species of bacteria, fungi, plants and animals that later recolonize the burn site and replenish the young forest. Unfortunately, salvage logging does not differentiate between dead and living trees. As such these refugia are removed from the landscape along with the burned stands.

Salvage logging is also a common practice after insect/disease infestations spread through a forest stand. With the expansion of mountain pine beetle range, Alberta has implemented a mountain pine beetle management strategy that includes salvage logging after MPB attack (ASRD 2007). This practice carries with it a number of detrimental impacts to forests. Salvage logging following a mountain pine beetle attack in Alberta has been shown to result in a decrease in species richness and understory plant cover, a decrease in pH, and differences in microbial properties as compared to an un-salvaged stand (McIntosh 2013). On the other hand, there were no effects of the moderate MPB attack and only small changes to the microbial communities in a forest following high intensity MPB attack (McIntosh 2013). This lack of change in response to mountain pine beetle attacks suggests that forests are resistant to change and have high ecological inertia (McIntosh 2013). In contrast, salvage logging has immediate and dramatic effects.

One of the primary justifications for salvage logging is that it is believed that stands after insect/disease attack are more susceptible to wildfire. However, insect-killed forests have been shown to pose no additional likelihood of wildfire in conifer forests as compared to forests without insect damage (Garrett et al. 2015).

### **Forest Insects and Diseases**

Insects, parasitic plants and diseases have evolved for millions of years in synchrony with our forests. While in natural ecosystems they may take a localized toll on forest trees, historically they have not caused large-scale forest die back because of evolved feedback mechanisms. Ecosystems out of balance are a primary contributor to insect and disease epidemics in forests. Forests that are in poor health often have low biodiversity and are overcrowded due to years of fire and insect suppression. In turn, these unhealthy forests are vulnerable to insect and disease attacks and need to be restored to healthy states. Native insects and disease contribute to overall forest health by thinning out weaker trees and improving productivity. Sustainable forestry needs ecosystem-based models that allow these natural control mechanisms to function. For more information, please refer to AWA's position statement on Forest Insects and Disease.

### **Pesticide Use**

Pesticide use must be minimized and eventually phased out, due to health and environmental impacts on people, fish and other wildlife. Alternative silvicultural methods should be adopted that reduce the need for pesticide use in regenerating forest areas.





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**Motorized Recreation**

Off-highway vehicle (OHV) use on public lands is incompatible with the maintenance of ecological integrity and should be prohibited in sensitive wilderness areas (including, but not limited to, areas protected through legislation or policy for the maintenance of environmental values, areas managed for the protection of environmental values, areas identified by the province as Environmentally Significant, and other undisturbed wilderness areas).

Designated trail systems must be developed that provide ecological integrity for key wildlands, watershed areas, and areas of significant ecological value. Motorized recreation must be permitted only on roads, trails, and routes expressly designated and/or constructed for their use. OHV use needs to be considered a privilege and not a right. AWA supports a “closed unless open” approach to OHV use on public lands, as opposed to “open unless closed.” In the absence of a designated trail network, public lands should default to being off limits to OHVs.

Because OHV use has an extremely high impact on riparian zones and wetlands, it is important that well-designed designated trails avoid these sensitive areas with significant buffer zones. Recreation on all public lands must be effectively managed, including adequate enforcement. For more information, please refer to AWA's position statement on motorized recreation.

**Alberta Forest Conservation Strategy**

The Alberta Forest Conservation Strategy (AFCS) was the product of a broad representation of interest groups and is the best available guide to the vision and goals held by Albertans regarding public forests. A fundamental principle of the AFCS is that forest ecosystem health must be maintained if we are to continue to receive benefits from forest ecosystems. The AFCS recommended “that the Government of Alberta and forest users adopt and implement ecosystem-based forest management as quickly as practicable.” (AFCSSC 1997). The government, however, never released the AFCS as drafted by its broadly-based advisory committee. In its place, the government released policy documents, such as *The Alberta Forest Legacy*, that included statements about sustainability, but were devoid of actual commitment to change (Schneider 2001).

**National Forest Strategy**

AWA supports the themes and objectives outlined in the National Forest Strategy 2003-2008 (National Forest Strategy Coalition 2003):

- Manage Canada’s natural forest using an ecosystem-based approach that maintains forest health, structure, functions, composition and biodiversity.
- Develop legislation and policies to improve the sustainability (social, environmental, and economic) of forest-based communities.
- Accommodate Aboriginal and treaty rights in the sustainable use of the forest recognizing the historical and legal position of Aboriginal Peoples and their fundamental connection to the ecosystem.
- Stimulate the diversification of markets, forest products and services and benefits (both timber and non-timber).
- Maintain and enhance the skills and knowledge of forest practitioners and mobilize the broader Canadian knowledge community to establish a new forest innovation agenda for Canada.





- Actively engage Canadians in sustaining the diversity of benefits underlying the importance of Canada's forest.
- Increase the economic, social and environmental contribution by Canadian woodlot owners to Canadian society through a concerted effort by stakeholders to strengthen policies and services that encourage and support viable woodlot businesses.
- Create a comprehensive national forest reporting system that consolidates data, information and knowledge for all valued features of the forest, both urban and rural.

## **AWA Forest-Related Projects**

### **Forestry in the Southern Eastern Slopes**

Our long-term vision for the southern east slopes of Alberta is to achieve a healthy and intact forest ecosystem that will sustain wildlife populations and other biodiversity, provide clean drinking water, and sustain long-term economic opportunities. An AWA report, *The Forests of Alberta's Southern Eastern Slopes: Forests or Forestry?* was published in 2007, and an updated version published in 2010.

In October 2011, AWA and a number of environmental, watershed, landowner groups and businesses, published a series of recommendations, titled *Sustainable Forests, Sustainable Communities: The Future of Alberta's Southwestern Forests*.

### **Forest Stewardship Council**

The Forest Stewardship Council (FSC) is an international organization that develops standards for well-managed forests through the participation of its four constituent groups: the Aboriginal, economic, environmental and social chambers. AWA is a member of the FSC.

AWA supports the Forest Stewardship Council (FSC) and the adoption of FSC Canada's National Boreal Forest Standard (and the upcoming National Forest Management Standard). A strong FSC standard is an important component of a forest conservation strategy that maintains the health and integrity of our boreal forest, as well as the people and communities that depend on it. Any FSC certification for the Eastern Slopes must consider the special headwaters, biodiversity and climate change pressures there. More information about FSC can be found at [www.fsccanada.org](http://www.fsccanada.org).

### **Markets Research**

AWA supports the use of market action to encourage the procurement of wood products from sustainably harvested forests. A growing number of retailers have expressed commitments not to purchase wood from Endangered Forests (see [www.ForestEthics.org](http://www.ForestEthics.org) for a discussion of Endangered Forests) and to purchase FSC products when possible. Periodically, AWA has notified retailers of Alberta wood products of concerns about unsustainable Alberta forest practices that their customers would not support.

## **References**

Alberta Forest Conservation Strategy Steering Committee. 1997. Alberta forest conservation strategy. Alberta Environmental Protection, Edmonton, Alberta.





- Alberta Reforestation Standards Science Council. 2001. Linking Regeneration Standards to Growth and Yield and Forest Management Objectives. Prepared for Alberta's Minister of Sustainable Resource Development.
- Alberta Sustainable Resource Development. 2007. Mountain Pine Beetle Action Plan. . Accessed on November 30, 2015: <http://aep.alberta.ca/lands-forests/mountain-pine-beetle/albertas-strategy/documents/MPB-ActionPlan-Dec2007.pdf>
- Alberta Sustainable Resource Development. 2008. Alberta Timber Harvest Planning and Operating Ground Rules Framework for Renewal.
- Alberta Sustainable Resource Development, Fish and Wildlife Division. 2008. Alberta Grizzly Bear Recovery Plan 2008-2013.
- Alberta Sustainable Resource Development and Alberta Conservation Association. 2010. Status of the Woodland Caribou (*Rangifer tarandus caribou*) in Alberta: Update 2010.
- Alberta Wilderness Association. 2007. The Forests of Alberta's Southern Eastern Slopes: Forests or Forestry? Alberta Wilderness Association. 2010. The Forests of Alberta's Southern Eastern Slopes: Forests or Forestry? 2010 Update.
- Alberta Wilderness Association et al. 2011. Sustainable Forests, Sustainable Communities: The Future of Alberta's Southwestern Forests.
- Alberta-Pacific Forest Industries Inc. 2007. Alberta-Pacific FMA Area Forest Management Plan (Revised) September 2007 (Approved September 2008). Chapter 1.
- Bruce L., J. Stelfox, B. Udell and B. Dancik. 1990. Forest Management in Alberta: Report of the Expert Review Panel. Alberta Energy/Forestry, Lands and Wildlife.
- Chaundy R. and T. Gray. 1998. Forests, Fires and Logging: Setting the Record Straight. Forest Ecology Series – Fact Sheet #2. Wildlands League. Available at URL: [www.wildlandsleague.org](http://www.wildlandsleague.org)
- Convention on Biological Diversity. 2011. CBD website - [www.cbd.int/forest](http://www.cbd.int/forest)
- Dancik B., D. I. Crossley, J. F. Reynolds and A. D. Crerar. 1979. The Environmental Effects of Forestry Operations in Alberta: Report and Recommendations. Environment Council of Alberta.
- Hoyt J. S. and S. J. Hannon. 2002. Habitat associations of the black-backed and three-toed woodpeckers in the boreal forest of Alberta. Canadian Journal of Forest Research. 32: 1881-1888.
- Garrett , M.W., Campbell, J.K., Zald, H.S.J, Bailey, J.D., Shaw, D.C., and R.E. Kennedy. 2015. Does wildfire likelihood increase following insect outbreaks in conifer forests? Ecosphere 6: 118.
- Government of Alberta. 1977, 1984. A Policy for Resource Management of the Eastern Slopes.
- Government of Alberta. 2007. Land-Use Framework Workbook Summary Report.
- Government of Alberta Office of Statistics and Information, 2010. Provincial Harvest to Annual Allowable Cut Comparison - Crown Lands, 2000-2001 to 2009-2010.  
<https://osi.alberta.ca/osicontent/Pages/Factsheets/ProvincialHarvesttoAnnualAllowableCutComparisonCrownLands.aspx>
- Lethbridge Citizen Society Research Lab. 2011. Castle Special Management Area. Lethbridge Public Opinion Study – Winter 2011





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Government of Alberta. 2008. Land-Use Framework

McIntosh, A.C.S. 2013. Ecology of understory and below-ground communities in lodgepole pine forests under changing disturbance regimes. Thesis for Doctor of Philosophy in Forest Biology and Management. University of Alberta.

National Forest Strategy Coalition. 2003. National Forest Strategy 2003-2008: A Sustainable Forest, The Canadian Commitment. Available at URL: <http://nfsc.forest.ca>

Pembina Institute 2000. Forests. Section 7. Forest Sustainability Condition Indicators – Indicator 1: Timber Sustainability Index. Available at URL: <http://pembina.piad.ab.ca/programs/economics/gpi/1999/>

Plotkin, R. and C. Henschel. 2002. A Canadian ENGO Vision for Boreal FSC Certification, September 6, 2002.

Praxis. 2011. Castle Special Management Area. Public Opinion Study, Spring 2011. Municipal District of Pincher Creek, Village of Cowley, Municipality of Crowsnest Pass, Town of Pincher Creek, Piikani First Nation's reservation and Fort Macleod.

Schneider, R. 2002. Alternative Futures – Alberta's Boreal Forest at the Crossroads. The Federation of Alberta Naturalists and The Alberta Centre for Boreal Research, Edmonton, Alberta.

Schneider, R. 2001. Forest Management in Alberta: A Review. Alberta Centre for Boreal Research, Edmonton, Alberta.

Schneider, R. 2001. Whatever Happened to the Alberta Forest Conservation Strategy? Centre for Boreal Research, Edmonton, Alberta.

Timoney, K., and Lee, P. 2001. Environmental management in resource-rich Alberta, Canada: First World Jurisdiction, Third World Analogue. J. Env. Man. 64, Dec 2001.

Timoney, K. 1998. The Old-Growth Forests of Alberta. Treeline Ecological Research, Sherwood Park, Alberta.