WILDFIRE

AWA supports taking a more ecological approach to the role of fire in Alberta's ecosystems. AWA does not support fire suppression unless it is for the express purpose of saving communities and lives, and believes it is important to let fires burn naturally where it is safe to do so. This will allow forests and grasslands to restore themselves and enhance the overall ecosystem for flora and fauna in Alberta.

Points of Emphasis

1. Historically, Alberta's forests coevolved with fire. Fires were wild and unpredictable, equally likely to burn in forests of all ages. Caused by lightning, most of these fires were small and inconsequential (Johnson et al. 2001).

2. Climate was the main driver of fires; drier conditions would result in large and irregular fires that significantly impacted the landscape (Johnson and Larsen 1991). As a result, climate change is predicted to contribute to more frequent and more intense fires in the future.

3. Fire was a natural and essential disturbance to the landscape that recycled nutrients, regulated succession of plants, maintained diversity, and controlled insects and disease (Crutzen and Goldammer 2001).

4. Over a relatively short period of time, Alberta's forests have been divided up with cut lines, seismic lines, roads, trails, pipelines, and homes, carving a once unimaginable expanse of forest into smaller and smaller portions. Most ecosystems, especially foothills and grasslands have been stressed and transformed, and many ecosystem services have been lost. A return to a more natural fire regime is critical to restore these services, which will involve large protected areas set aside, as well as a return to forests managed primarily for a host of value, not just timber production. There is a clear need for province-wide, even continent-wide forest planning that identifies and designates large areas as “free to burn” in order to restore critical ecosystems.

5. The greatest concern about leaving wildfires to burn is that the fires may rage out of control and put property, people, and livestock at risk. High risk communities/private holdings must be identified and required, at their own expense, to reduce fire risk in the critical 40m zone around buildings. Reducing the risk of home fires could provide communities with the confidence to allow greater use of prescribed burns for ecosystem restoration. Care must be taken that Firesmart measures are applied appropriately and that clearcut logging is not permitted under a "Firesmart" guise.

6. Fighting fires is an expensive and dangerous venture. On a year-by-year basis, substantial resources are spent on maintaining a “stand-by” staff of fire watchers and fire fighters that are able to respond quickly to any fire outbreak. In 2013, the Alberta Government had allocated $18 million to wildfire suppression. Program spending ended up being $113 million over budget due to the costs of wildfire suppression (Government of Alberta 2014). The Province allocated $139 million for wildfire prevention in 2015, but had to increase this by $375 million in emergency funding to cover the costs of fighting wildfires throughout Alberta (Waldner 2015).

7. Fire retardants have potential negative impacts on water quality, vegetation, and animals due to nutrient loading as well as the chemicals being directly and indirectly toxic to wildlife (Backer et al. 2004).

8. Prescribed fire is an acceptable management tool to replace wildfires in some areas. However, it must be used with caution. Sound science and monitoring must be a part of the decision to burn an area.

9. Wildfire has potential effects on municipal water supplies and downstream aquatic ecosystems. This includes changes in the magnitude and timing of snowmelt runoff, increased loading of streams by nutrients, dissolved organic carbon, major ions and metals, as well as changes in source-water chemistry and the transport of sediment to downstream water-treatment plants (USGS 2012). Clearcut logging creates a separate but comparable set of adverse impacts on water quality (i.e. nutrient leaching, increased sediment loading) and must not be seen as a preferable disturbance to wildfire regimes on the landscape (USDA 2010).

10. Current Alberta Government forest policies encourage quick clear-cut harvesting of all merchantable trees left after a fire. Salvage logging should not occur, and the forests should be allowed to naturally regenerate, except where it is part of an existing FMU/license and it does not increase the rate of cut. Salvage logging has been shown to exacerbate the negative effects of disturbance and hinders the natural regeneration of the forest. Salvage logging or pre-emptive logging of insect-prone stands is especially inappropriate in species at risk habitat – for example, caribou, native fish, grizzly bear – where roads are a major vector for habitat loss, increased predation and/or human poaching.

DEFINITIONS

FireSmart
FireSmart is a program developed in Alberta and was designed to apply to the immediate area (10-40m) around homes and communities in the urban/wildland interface (Vicars 2003). It is based on research that shows home ignitability, rather than wildland fuels, is the principal cause of home losses during fire events.

Fire Suppression
Fire Suppression is the act of extinguishing or fighting fires.

Prescribed Fire
Prescribed fire is a controlled fire ignited for land use improvement (habitat, reforestation, etc.) (ASRD 2001). These fires are carefully planned under select weather conditions so that only the selected area is burned and the preferred benefits are obtained.

BACKGROUND

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). Natural fire regimes are important in creating a wide variety of habitats and patches of plants on the landscape (Cyr et al. 2009).

Boreal Forests

Boreal Forests contain species which are adapted to living in ecosystems that cyclically burn and have adapted to and rely on fire for viability. Fire-resistant trees have a thick insulating bark which protects them against low intensity fires; non-fire-resistant trees such as trembling aspen burn, leaving an open canopy that promotes new growth, maintains forest biodiversity and positively affects forest structure (McRae 2001). Other species which aren't necessarily fire resistant have adapted to fire in other ways - trees such as lodgepole pine are "pioneer" species and quickly occupy a site where fire has impacted a landscape (Owens 2006). Their serotinous cones release seeds in high temperatures, during fires a large storehouse of seeds is released, leading to rapid establishment of a forest (Owens 2006). There is also an obligate community of species dependent on immediate post-fire successional stages. Species like the black-backed woodpecker (the fire bird) are threatened by fire suppression and salvage logging (Chaundy and Gray 1998).

Wildfires typically consume less than 25% of the total biomass of a forest, which leaves large amounts of dead material which provides carbon storage and habitat for many species of plants and animals (McRae et al. 2001). The quick regeneration of grasses following a forest fire also benefits species such as caribou, providing increased grazing habitat.

Clearcut Logging vs. Wildfire

Clearcut logging is often claimed to be an acceptable substitute for fire. This assumption is incorrect because clearcut logging creates a set of impacts which are different from wildfire. Clear-cutting creates even-aged forests that are often mono-cultured. It may also cause a species shift towards white birch, aspen, and balsam fir and thus cause a decline in spruce and pine forests (Carleton and MacLellan 1994). In contrast, wildfire leaves a mosaic of burned and unburned areas, leaving forested islands of varying size, age and composition that can support a variety of wildlife (Cyr et al. 2009). These patches of unburned islands help to re-seed the burnt area and are temporary shelters for wildlife (Chaundy and Gray 1998). Fire often encourages the growth of conifers, as heat stimulates cone opening, reduces competition from hardwoods and ensures natural seed supply.

Another major difference between clearcutting and fire is that numerous standing dead trees usually remain after a fire. These dead trees reduce wind velocity, offer partial shade and provide habitat for numerous species. Fire recycles nutrients and contributes generally to soil building and fertility (Chaundy and Gray 1998). The slow deterioration of fire-killed trees keeps carbon, phosphorus, and nitrogen cycles buoyant. Following a burn, herbaceous forage plants usually at least double production in nutrient-rich soils. Clearcutting, on the other hand, removes whole trees. Successive removal of timber from forests reduces soil building and fertility as the carbon and nutrients that are stored in the trees are removed from the landscape entirely (Chaundy and Gray 1998). Wildfires also reduce the presence of plant hosts which assist the spread of pests and pathogens, in contrast, clear-cutting may

actually promote the spread of pests (McRae et al. 2001). Clearcut logging increases linear disturbance and habitat fragmentation on the landscape, which may be exacerbating outbreaks of forest insects and disease (Roland 1993). For example, the duration of forest tent caterpillar outbreaks is determined by the ability of their natural enemies (parasites and pathogens) to kill forest tent caterpillars. Breaking up the forest landscape affects the relative dispersal rates of insects and their natural enemies, allowing the tent caterpillars to "escape" from predation, parasitism, or disease.

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 termed fire specialists, thrive in the charred remains of a forest fire. For example, 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-toe 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 recycling of nutrients from the burned stands 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. As a result, salvage logging can impair ecosystem recovery (Lindenmayer et al. 2004).

Grasslands, Parklands, and Subalpine Meadows

Wildfires are as important and beneficial to grasslands as they are to the forests. Wildfires increase grass nutritive quality, palatability, availability and yield, reduce hazardous fuels, suppress unwanted plants, and improve wildlife habitat (Stubbendieck 1998). When grasslands are subjected to fire suppression, they may be converted to shrublands or forests (Collins and Wallace 1990). This is because an accumulation of litter leads to increased soil moisture, which in turn favours the succession of grasslands to forests (Gerling et al. 1994). In Alberta, succession of grasslands to trembling aspen forests has been the major outcome of fire suppression regimes (Gerling et al. 1994). When a wildfire takes place, woody plants are burned while the below ground root systems of grasses are left protected. In this way, contribute to maintaining grassland vegetation.

Parklands are grasslands with patches of aspen groves, shrubs, wetlands and peatlands scattered throughout the landscape. They are the transition area between forests and open grasslands. They are some of the most diverse and productive habitats in the world. Development has prevented natural fire regimes from taking place, as a result, shrubs and trees have been taking over grasslands associated with parklands (Bird 1961). There is a real threat that the parkland regions will be converted to forests if natural fire disturbances are not re-introduced to the landscape.

This is also the case with meadows in the Foothills region of Alberta, where historically a mixed-fire regime was common at a fire return interval of less than 80 years (Amoroso et al. 2011). This resulted in forests which were structurally complex, as well as contributed to open meadows which provided grazing habitats for ungulates. Thus wildfire reintroduction is necessary to retain the natural diversity that was present in this landscape and to prevent forest encroachment into Foothills meadows.

Sub-alpine meadows are ecologically diverse landscapes which exist due to the harsh climate in which they are located - long winters historically prevented trees from growing in these areas due to the length of the growing season. Encroachment in sub-alpine meadows by conifers is a result of a changing and warming climate, combined with changes in land use and fire suppression (Babiul et al. 2009). Fires may be necessary to slow the trend of forest expansion into these montane meadows (Magee and Antos 1992).

HISTORY

Historically, fire has played a significant role in the North American landscape. The species in Canadian forests have been interacting with fire since at least the Miocene era, and as such they have evolved in response to this pervasive natural disturbance (McRae 2001). Charcoal layers in the soils of Alberta's forests and in lake sediments are clear evidence of the historical and cyclical presence of fire. Pollen layers indicate that species compositions have remained essentially the same since they were established in the boreal some 3500-7500 years ago, while fires have swept through forests in approximately 250 year cycles.

At least since the last ice age, humans have occupied Alberta's forests and have learned to live with and exploit fire for their own uses. Some First Nations used fire to provide open camp sites, better wildlife forage, to dry out trails through muskegs, and to aid in hunting. Frequent, low intensity fires, some set by early humans, once cleared brush, small trees and insect-killed trees, leaving open, park-like stands supporting diverse wildlife. Before 1900, an average of 2.4 million ha of land burned annually in the interior NW United States; approximately two thirds of this occurred in sagebrush and grassland habitats (Baron 2003).

Suppression of forest fires is relatively recent, its purpose is to protect a timber supply, for the supposed benefit of all Albertans. (Murphy et al. 2006). The Rocky Mountain National Parks have a long history of fire suppression, beginning with the hire of the first forest manager in Banff national park in 1887, whose duties included of recruiting fire suppression crews and daily fire patrols. The park warden service was coordinated in 1909 for game and fire protection (Lothian 1987). In 1953, the Alberta Government established a Forest Protection Branch which was specifically mandated with fire control (ASRD 2001). Fire suppression programs over the past 50-100 years may have created a false sense of security that promotes more human development in forests and along the forest fringe or urban/wildland interface.

On average, 10,000 wildfires burn annually in Canada, usually 1000 being in Alberta. On average, 40% are ignited by lightning and 60% by humans. These figures have changed significantly as forests are increasingly accessed (see figure below).

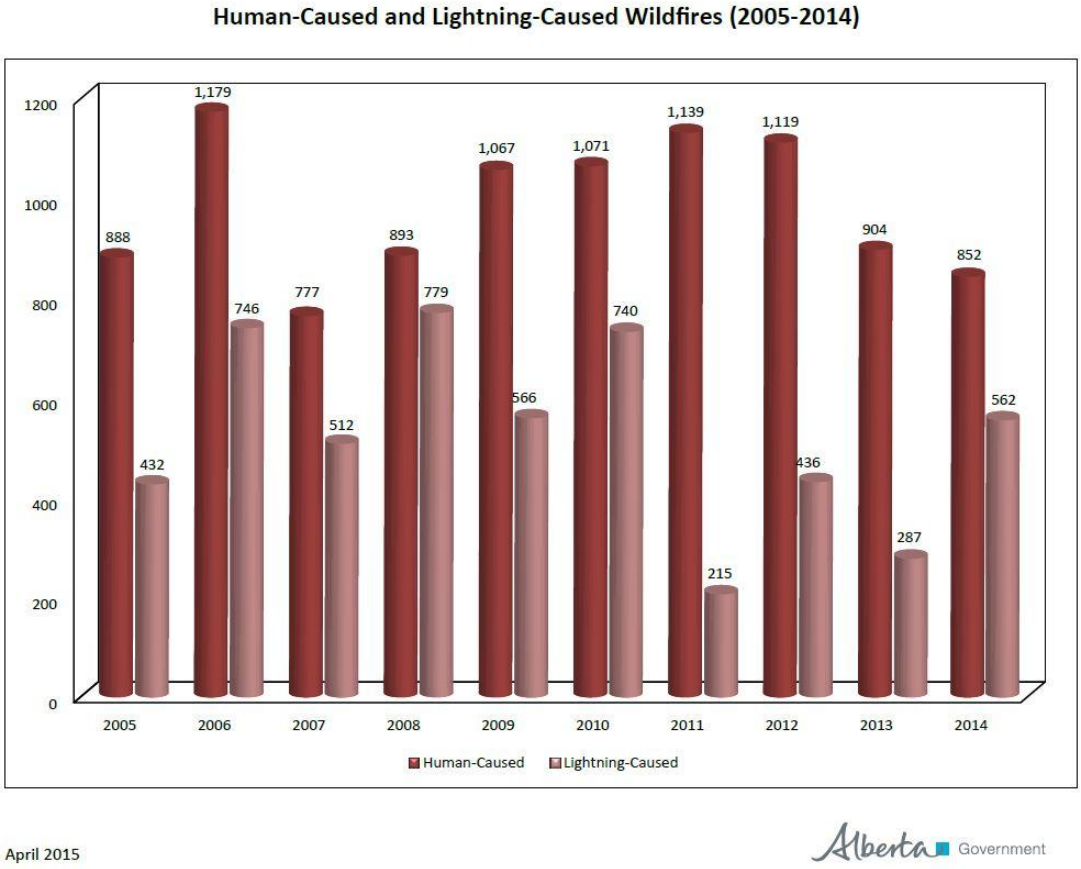

Figure 1. Human-caused and lightning-caused wildfires in Alberta from 2005-2014. Source: Government of Alberta.

Currently, Alberta responds to every wildfire reported in the Forest Protection Area (approximately 60% of the province's land base) and attempts to contain/suppress it within the first 24 hours (Alberta Agriculture and Forestry 2014).

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