

forest cover and fire history

The Role of Fire in Ecosystems

Due to the cool climate in the Yukon, plant matter decomposes more slowly than it is produced. As a result, large amounts of litter (organic matter) builds up, essentially “locking up” nutrients that are in this organic matter and insulating the soil, making it colder. Fire helps recycle the nutrients, returning them to the soil and making them available for new plant growth. By removing the heavy layer of litter, fires also result in higher soil temperatures. All these improve overall site productivity (Beaver, 2001).

Fires can also create suitable seedbeds by exposing mineral soil or dense ashes, where moisture and nutrient conditions are more favorable. Fire-blackened soil absorbs sunlight, heating the soil further – another advantage for seeds and seedlings (Heinselman, 1971).

Fire may trigger the release of large seed supplies or stimulate vegetative reproduction (as in aspens). Fire may also reduce competition for moisture, nutrients, heat and light by temporarily eliminating the overstory or understory trees, shrubs, and other vegetation (Heinselman, 1971).

Fire helps control forest insects and diseases that may cause significant damage to the stand. Wildfires generally occur in old growth stands that are more prone to insects and disease. Fires replace these old stands with younger ones that have a greater resistance to insects and disease (Heinselman, 1971).

In addition to fire's physiological effects on vegetation, the resulting mosaic of vegetation across the landscape is an underlying factor in maintaining a rich biodiversity. As burned areas regenerate, a patchwork of different plants and trees grow back. This results in a diversity of habitats for wildlife populations. For instance, fires can increase the quantity and quality of browse and the quality and availability of seeds and berries. In essence, the variety and abundance of Yukon plants and animals is as a result of fire (Beaver, 2001).

Fire cannot be excluded from the boreal forest. It is an integral part of the boreal forest and can only be postponed by active fire suppression. Eventually it will burn. Due to the remoteness of the Peel River watersheds, fires in this region have been left to run their course and the natural fire regime has not been disturbed.

Protected Areas and Fire

One goal of protected areas is to preserve biodiversity through a representative portion of the landscape for future generations to enjoy in an unaltered state. To do this, protected areas must be large enough to conserve not only viable wildlife populations, but also to sustain ecological processes (Noss, 1995). As part of this, for protected areas to do their job they must be able to withstand natural disturbance regimes within ranges of variation that are considered natural.

Fire is an important ecological process in the Yukon. It operates on a time scale of months to millennia, and plays a critical role in forest succession and biodiversity. Protected area design must take into consideration the dynamic nature of fire and its importance in landscape dynamics.

Since the 1970's, conservation biologists have discussed the concept of a minimum dynamic area (MDA). This is the smallest area that is required in order for a natural disturbance regime (like a fire regime) not to cause local extinctions (Wiersma, 2002). In the case of a

fire regime the minimum size of the protected area would have to be larger than the average size of a natural forest fire that is predicted to occur. Some protected area guidelines suggest that the minimum size of a core protected area should be 50 to 100 times larger than the size of the average regional disturbance event (for example, the average area of a single fire) (Borman and Likens, 1979; Shugart and West, 1981; Yukon Protected Areas Secretariat, 2000).

If we used this type of principle in the Peel River watershed, where according to Map 12 the average fire size was 5,213 hectares, we would need to set aside an area of at least 521,300 hectares (5,213 km²) in order to adequately protect a representative portion of the ecosystem. For comparison purposes, Fishing Branch Wilderness Preserve, to the northwest of the Peel watershed, is 540,000 hectares (5,400 km²) and Kluane National Park in southwest Yukon is 2,201,500 hectares (22,015km²).



