



## Val-Paradis: 25 Years After the Fire

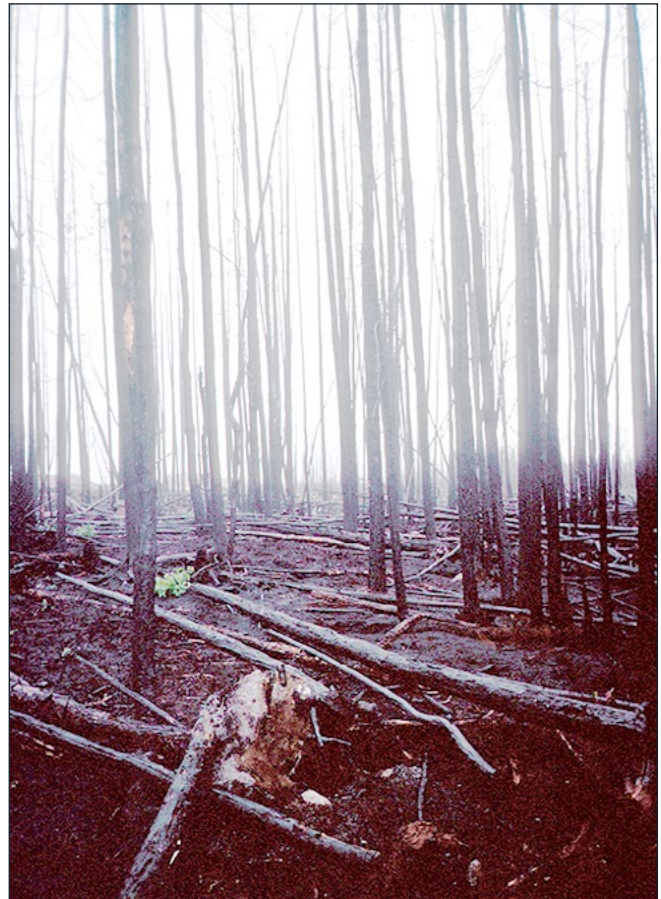
June 5, 1997, 8:00 p.m.: A flash of lightning ignited a fire near Val-Paradis, 160 km northwest of Val-d'Or. The fire was detected on June 9 at 11:30 a.m. It covered an area of 0.1 km<sup>2</sup> and kept growing. The firefighting strategy was then focused on protecting the infrastructure. At 2:00 p.m., the fire, pushed by the wind, continued to spread rapidly and reached a speed of 12 m/min. The municipality of Val-Paradis was threatened. At 5:30 p.m., the fire reached a size of 10 km<sup>2</sup>. On June 10, the community of Val-Paradis was evacuated and the fire continued to grow. On June 11, the fire reached 120 km<sup>2</sup>. At last, on June 12, the fire was under control and had reached a final area of 125.4 km<sup>2</sup>. Val-Paradis did not suffer any damage. All's well that ends well!

### An opportunity arising from the fire

The fire was extinguished and the infrastructure was protected, so researchers from the Université du Québec en Abitibi-Témiscamingue and the Canadian Forest Service saw in this situation a unique opportunity to observe the long-term effects of fire. This led to a multi-year research project enabling many scientists to better understand the long-term effects of fire and salvage logging on the ecosystem. Researchers established a research facility comprising 61 quadrats of 400 m<sup>2</sup>. Here are some examples of the studies that have taken place at this facility over the years.

### Tree mortality

Researchers found that tree death occurred primarily in the first two years after the fire and continued over the 10 years of the study. They estimated that trees still alive after 10 years would remain so for several years. Snag persistence and factors influencing it varied according to the species. Jack pine snags were the most persistent, followed by trembling aspen and black spruce snags. In addition, the more severe the fire, the more persistent the snags.



Site severely affected by fire, summer 1997.  
Photo: Danielle Charron, UQAT.

These dynamics have a significant impact on post-fire biodiversity. Knowledge of these dynamics will help influence woody material recovery strategies.

## Salvage logging and regeneration

In the mid-1990s, Quebec's forest management law was amended to provide for the salvage of wood affected by a forest fire on public lands. 64% of the forests affected by the Val-Paradis fire were salvaged.

Although salvage logging creates a significant amount of good quality seedbeds, a study conducted shortly after salvage logging in Val-Paradis concluded that it does not promote conifer regeneration for three reasons: loss of seed trees, loss of the aerial seed bank, and drier seed sites due to openings created by salvage. Researchers also noted that without subsequent reforestation, these forests will be dominated by trembling aspens, whose reproductive success is not affected by the salvage method used. Ongoing analyses, based on 25 years of monitoring, will be able to verify whether these trends continue over time.

To minimize the negative impacts of salvage and to reduce the use of planting to offset losses, researchers suggest that conifer seed trees should be left in place to serve as seed sources. These seed trees could provide a sufficient seed supply and possibly provide shade, thus reducing the drying effect of sun exposure. Such residual trees would have an even greater impact if they were left close to skidding trails where regeneration loss is most abundant.

### Modelling to the rescue

Researchers sought to predict jack pine and black spruce regeneration in burned sites where salvage logging occurred and in sites where it did not. Using data from Val-Paradis, they developed a model based on the quantity of seeds available before salvage, taking into account the number



Site where fire severity was intermediate, summer 1997.  
Photo: Danielle Charron, UQAT.

of trees present before the fire and the number of salvaged trees. This model helps to quickly evaluate after the fire whether it will be necessary to reforest the burned plots. It is also used to determine the best time to carry out salvage logging and the quantity of seed trees to leave on the site in order to maximize the regeneration of softwood species.

### Research continues

Other research is under way at the Val-Paradis site, notably on the impact of salvage logging 25

years later, on the impact of fire severity and pre-fire stand type on understory plant dynamics, on the soil microbiome, and on the evolution of the forest composition after fire. Long-term monitoring is rare in ecology, yet is essential for understanding ecosystem recovery after disturbance and for putting in place adapted management strategies. Thus, the site will continue to serve as a research location for years to come and will provide insight into the long-term effects of fire and salvage logging.

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