

Fire Frequency in Dry Interior Douglas-fir Forests

Research Project # 94-10

Quick Sheet
#3

Fire is a potent and frightening force in the forest. In B.C. we incur a large public cost each year to control forest fires, and some years catastrophic forest fires still cause tremendous losses and suffering in rural and urban communities. Fire is, however, a natural part of forest ecosystems in British Columbia. The frequency of the fires and their severity strongly influence the character of the ecosystem and the species of plants and animals that are found there.

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Coastal B.C. and parts of the interior have wet climates. These areas do not often have the conditions that give rise to large forest fires, and so the forest develops for long periods (hundreds of years) without being disturbed by fire. The dry climate of much of the interior, on the other hand, creates conditions that cause large fires to occur more frequently.

Each of our tree species is adapted to fire according to the frequency of fire in the ecosystems the species inhabits. For example:

- aspen trees are easily killed by fire, but the trees' roots survive and re-stock the site with new young shoots
- lodgepole pine trees are also killed by fire, but their seeds are protected in closed cones that are opened by the heat of the fire -- the seeds falling on newly burned ground regenerate a new pine forest
- Douglas-fir trees often survive a fire because their thick bark insulates the living tissues of the tree and protects the trunk from fires of light to moderate severity.

Moderately severe fires often wound Douglas-fir trees, so that some bark is killed. This then forms a scar, which the tree must heal to protect itself from diseases and insects. As the scar is healing, the new tissue is susceptible to further damage, so that other fires can easily cause more scars. This series of scars is recorded in the wood of the tree, and can be read like the tree's life history.

Research project #94-10¹ examined the fire history of two Douglas-fir stands in the UBC/Alex Fraser Research Forest. Using dendrochronological (tree ring analysis) techniques, accurate tree ring assessments allowed the dating of fire scars from 23 cross sectional discs taken from 9 trees.

The fire scar dating of all the discs shows that, prior to the early 1900's, forest fires occurred (on this site) every 15 to 18 years on average. The severity of these fires varied significantly, with some of the fires scarring only one tree, and others scarring nearly all of the trees sampled.

¹ Daniels, L.D., J. Dobry, and K. Klinka. 1995. Fire history of two Douglas-fir stands in the Alex Fraser Research Forest: A pilot study. B.C. MoF Cariboo.

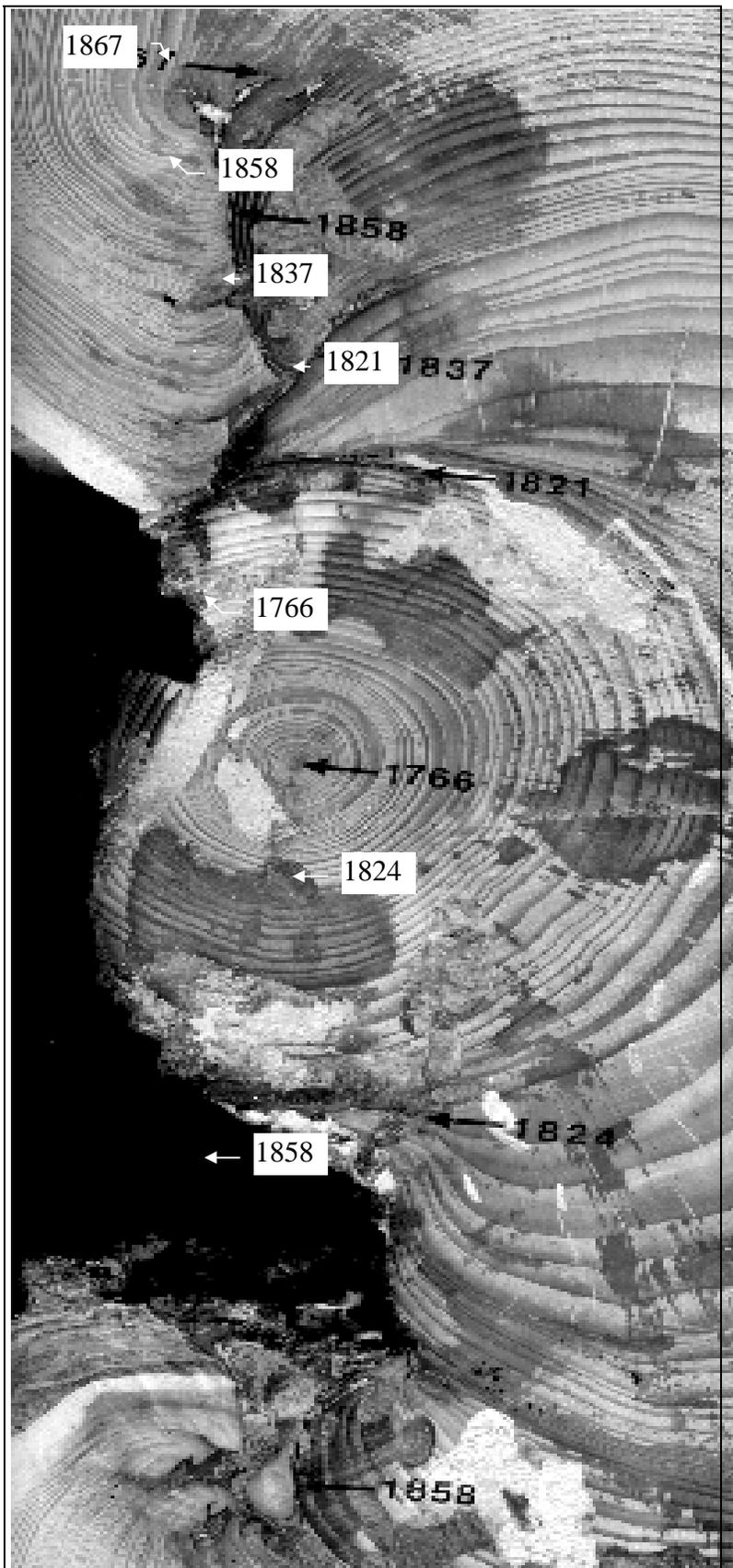


Figure 1 shows the type of fire scar examined. This tree was first burned in 1821, and again in 1824. This gave rise to a fire scar, which the tree began to heal. The next fire in 1837 damaged the healing bark, and caused another scar. Not all of the fires that burned on the site damaged each tree. Damage depends upon fuel concentrations near the tree and the severity of the fire. Later fires caused scars in 1858 and 1867.

It is noteworthy that no fires have burned on the sample sites since 1915. If fires have not occurred in 80 years where the ecosystem naturally experiences a fire every 15 years, what is the result? It seems that our fire protection efforts have had a significant effect on the ecosystems we manage.

Prescribed burning may be an appropriate tool for managing these fire based ecosystems, and this is the subject of ongoing research throughout B.C.