Abstract

This study presents new evidence of historic low-to-moderate-severity fires, intermixed with high-severity fires, in the foothills of the Rocky Mountains of west-central Alberta, Canada. High-severity fires that burned 120–300 years ago initiated even-aged cohorts of fast-growing lodgepole pine at each of the six study sites. Evidence of subsequent, low-to-moderate-severity fires included single and double fire scars on thin-barked lodgepole pine that were as small as 3.6 cm in diameter at the time of the fire, but survived. These low-to-moderate-severity fires resulted in structurally complex stands with a broad range of tree diameters and multiple cohorts of lodgepole pine, white and black spruce, and subalpine fir. At the site level, fire return intervals were variable, ranging from 29 to 167 years, but most were <80 years. Of the 9 years in which we documented low-to-moderate-severity fires, only the fires in 1889 and 1915 scarred trees at more than one site, indicating that these fires were small and had local effects. The new knowledge of historical, low-to-moderate-severity fires provided by this study has important implications for ecologically sustainable forest management. Although we recognize that further research needs to determine the extent of low-to-moderate-severity fires at the landscape scale, our results clearly indicate that a mixed-severity fires occurred at least locally. A broader range of silvicultural systems than is currently practiced would be consistent with historic forest dynamics.

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