

MANY BENEFITS REALIZED AFTER A LONG-TERM FUEL REDUCTION AND RESTORATION STUDY IN WESTERN MONTANA

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Study Description

Long-term field studies are the gold standard for learning and proof-of-concept in applied forest ecology. In the northern Rocky Mountains, USA, researchers have showcased the enduring effects of fire hazard reduction and restoration treatments at the Lubrecht Fire and Fire Surrogate study. This study demonstrates the extra benefit of reduced severity to insect outbreak following mechanical treatments. Combined mechanical and fire treatments prove to have long-lasting restoration effects, including regenerating desirable tree species. Thanks to the simple design and clear results, this study has been a hot spot for outdoor education and technology transfer in the decades since initial treatment.

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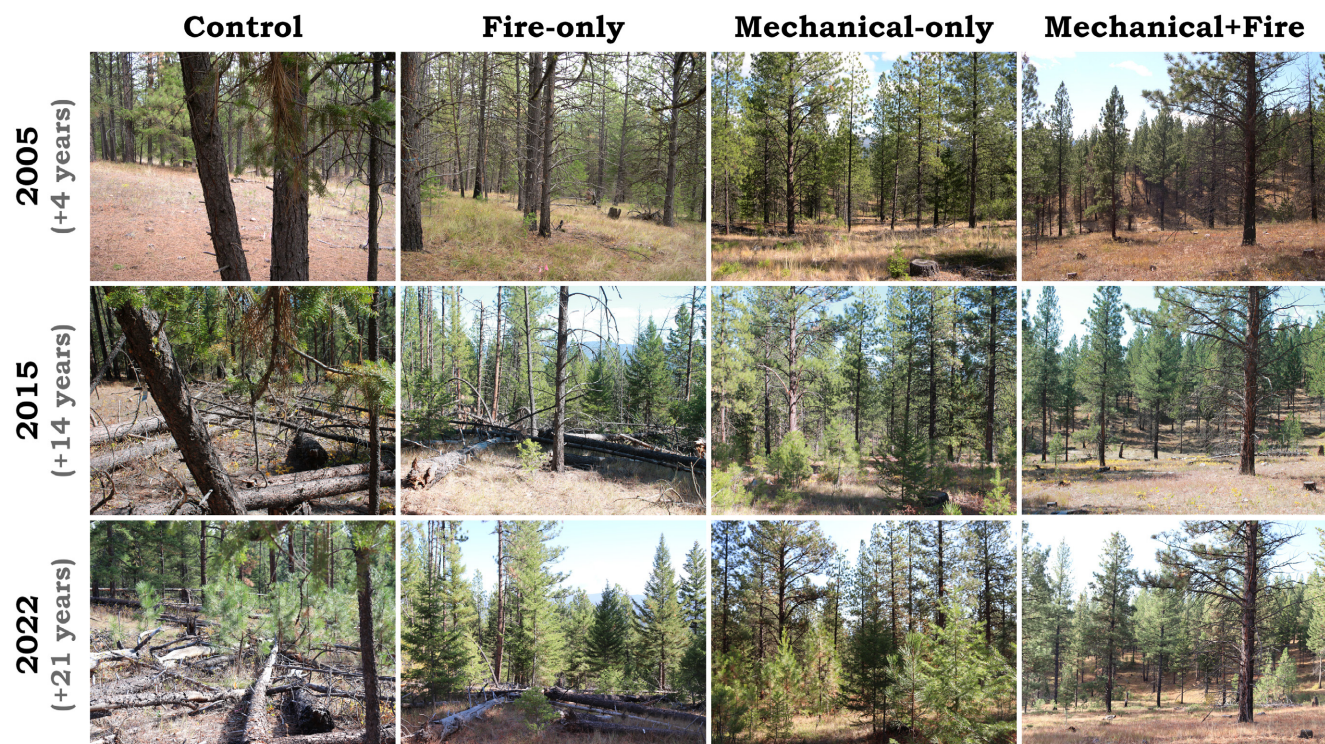


Photo I. Photo series highlighting punctuated effects of a mountain pine beetle outbreak in experimental areas without mechanical treatment (Control and Fire-only, left two columns) in contrast to the stable overstories in those with treatment (Mechanical-only and Mechanical+Fire, right two columns). Photographed units are from a contiguous 37-ha treatment block and shared the same outbreak pressure. Photographs were taken from the same point in each treatment unit over the years. Series progress from top row (2005: 4 years post-treatment) to middle (2015: 14 years post-treatment) to bottom (2022: 21 years post-treatment). In Control and Fire-only series note sparse forest floor in 2005, substantial pine deadfall by 2015, and remaining deadfall in 2022. Development of forest regeneration present in 2015 and 2022. Photo credit: Kerry Metlen (2005), Justin Crotteau (2015), Adele Underwood (2022).



Photo 2. Canopy opening in the Mechanical+Fire treatment with desirable tree regeneration. In addition to Douglas fir, a relatively shade-tolerant species in this forest type, species represented here also includes ponderosa pine and western larch. These two early-successional and fire-tolerant species typically recruit well in harvested gaps following prescribed fire, which consumes the forest floor organic layer and exposes bare mineral soil. Photo credit: Justin Crotteau.



Photo 3. Fire and Fire Surrogate study area on the University of Montana's Lubrecht Experimental Forest has been and continues to be a hot spot for outdoor education, hosting visiting groups of researchers, practitioners, and students. The proximity between treatment units enables holistic discussion of forest and disturbance ecology, forest succession, fuel treatment effectiveness, and silvicultural tradeoffs relevant to the greater northern Rocky Mountains region. Photo credit: Justin Crotteau (top); Andrew J. Larson (bottom).

These photographs illustrate the article “Long-term efficacy of fuel reduction and restoration treatments in Northern Rockies dry forests” by Sharon M. Hood, Justin S. Crotteau, and Cory Cleveland published in *Ecological Applications*. <https://doi.org/10.1002/eap.2940>