

Salvage logging reduces plant species richness and diversity one year after wildfire

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Abstract

This study analyzes the effects of salvage logging on plant species richness and diversity after the first growing season following a high-severity wildfire in southeastern Spain. In September 2005 a stand-replacing fire burned ca. 1400 ha of pine reforestation in the Sierra Nevada Natural and National Park (near Granada, in Andalucía). These pine reforestations were planted during the 1960s and 1970s, with individual stands dominated by *Pinus pinaster*, *Pinus nigra* and *Pinus sylvestris*. Four plots of ca 25 ha each were established in fire-killed pine stands along an altitudinal gradient (from ca 1500 m to 2300 m a.s.l.). In each plot, three treatments were implemented during the winter of 2005-2006, each with three replicates of ca 2.7 ha. The treatments are: 1) "Control", no cutting or removal of the standing dead trees (snags); 2) "Branches", ~90% of the snags were cut but left on site, with cut tree branches spread across the soil surface to provide a coarse woody biomass mulch; 3) "Extraction", all snags were cut, with the woody biomass (logs and branches) removed from these sites (salvage logging). Salvage logging was done manually in the experimental plots, although heavy machinery was also used in the rest of the area.

In each replicate we established 8 transects (25x2 m) where all perennial species were recorded in late summer 2006 (thus in the first growing season after the fire), noting species identity and number of individuals. Species richness was similar among treatments, but diversity (Shannon index) and density were, overall, the highest in Control treatment. Post-fire salvage logging had a negative effect on plant community recovery in the short term. This ongoing research is also studying the effects of these post-fire treatments on herbaceous and woody vegetation recovery, ecosystem nutrient cycling and carbon fluxes, and restoration of species and ecological interactions, particularly key mutualistic interactions fostering vegetation succession.

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