



## Salvage logging effect on soil properties in a fire-affected Mediterranean forest: a two years monitoring research

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In the Mediterranean countries, forest fires are common and must be considered as an ecological factor, but changes in land use, especially in the last five decades have provoked a modification in their natural regime. Moreover, post-fire management can have an additional impact on the ecosystem; in some cases, even more severe than the fire. Salvage logging is a traditional management in most fire-affected areas. In some cases, the way of doing it, using heavy machinery, and the vulnerability of soils to erosion and degradation make this management potentially very aggressive to soil, and therefore to the ecosystem. Very little research has been done to study how this treatment could affect soil health. In this research we show 2 years of monitoring of some soil properties in an area affected by a forest fire, where some months later this treatment was applied.

The study area is located in “Sierra de Mariola Natural Park” in Alcoi, Alicante (E Spain). A big forest fire (>500 has) occurred in July 2012. The forest is composed mainly of *Pinus halepensis* trees with an understory of typical Mediterranean shrubs species such as *Quercus coccifera*, *Rosmarinus officinalis*, *Thymus vulgaris*, *Brachypodium retusum*, etc. Soil is classified as a Typic Xerorthent (Soil Survey Staff, 2014) developed over marls. In February 2013, salvage logging (SL) treatment consisting in a complete extraction of the burned wood using heavy machinery was applied in a part of the affected forest. Plots for monitoring this effect were installed in this area and in a similar nearby area where no treatment was done, and then used as control (C) for comparison. Soil samplings were done immediately after treatment and every 6 months. Some soil properties were analysed, including soil organic matter (SOM) content, basal soil respiration (BSR), microbial biomass carbon (MBC), bulk density (BD), soil water repellency (SWR), aggregate stability (AS), field capacity, nitrogen, etc.

After two years of research, results showed significant soil degradation as a consequence of the salvage logging treatment. Most of the soil parameters studied showed differences between control and salvage logging treatments, SOM content in first 2.5 cm of topsoil being less than half in SL plots in comparison with C plots. BSR, MBC and AS were also statistically significant lower in SL plots. BD increased as a consequence of SL treatment. In conclusion, we can affirm that with this type of soil, which is very vulnerable to soil degradation, this treatment has a very negative effect on the ecosystem; this was also reflected in the abundance and diversity of plant species.

*Acknowledgements: to the “Ministerio de Economía and Competitividad” of Spanish Government for finance the POSTFIRE project (CGL2013- 47862-C2-1-R), Spanish Soil Science Society, FUEGORED, Alcoi council, ACIF Alcoi, and Sierra de Mariola Natural Park for their support.*