

## **Short- term effects of post-fire logging on runoff and soil erosion at two spatial scales**

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Logging is the most common management practice after wildfires in forested areas in Portugal. Clearcutting is undertaken to recover burnt timber resources, to control resprouting, notably in the case of eucalypt plantations, and to reduce the risks of possible insect plagues, notably in the case of maritime pine because of the nematode plague. Still, relatively little is known about the combined effect of wildfire and post-fire logging on erosion processes. In the framework of the EU-FP7 project RECARE ([www.recare-project.eu](http://www.recare-project.eu)), the ESP team of the University of Aveiro set up an experiment to quantify the hydrological and erosion impacts of post-fire logging, at the scale of both 0.25 m<sup>2</sup> micro-plots and 16 m<sup>2</sup> plots. A eucalypt slope burnt in August 2015 by a moderate intensity fire and logged in September 2015 was selected for this study. The burned trees were harvested with a chainsaw, while the logs were piled with a rubber wheeled forwarder tractor. Following logging, two distinct sub-areas were identified within the logged slope based on soil disturbance: an area where the forwarder wheels had left marked trails (“trail”), and an area where such trails were absent (“control”). Three micro-plots and three plots were installed in the control area, while three micro-plots and six plots were installed in the trail area.

Generally, the trail area showed greater soil compaction and larger soil surface roughness than the control area. Between October 2015 and September 2016, mean runoff was 500 mm in the control micro-plots and 50% higher in the trail micro-plots. At the plot scale, however, no differences in runoff generation were observed between the two subareas. Sediment production over the same period, however, was twice as high in the trail area than the control area, at both plot scales. In the control area, mean sediment production was 8 Mg ha<sup>-1</sup> yr<sup>-1</sup> at the micro-plot scale and 6 Mg ha<sup>-1</sup> yr<sup>-1</sup> at the plot scale; in the trail area, these figures were 21 Mg ha<sup>-1</sup> yr<sup>-1</sup> and 13 Mg ha<sup>-1</sup> yr<sup>-1</sup>, respectively.

Post-fire logging activities and their timing should be evaluated against their potential impacts on runoff and erosion, and should be contemplated for additional erosion mitigation practices.