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Wildfire, soil erosion and the risk to aquatic resources: evidence from the burnt Evrotas River basin, southern Peloponnese, Greece.

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During August 2007, wildfires engulfed 200,000 hectares of land across the Greek mainland including 173,000 hectares of rural land in the Peloponnese peninsula. A rapid-response sampling programme was initiated to evaluate the immediate post-fire risk to water quality within this fire-prone Mediterranean landscape. Work included rainfall simulation experiments to estimate post-fire hillslope sediment and nutrient yields plus evaluation of changes in soil hydrological properties, aggregate stability and the quality of eroded sediment i.e. nutrient content and bio-availability. Preliminary plot-scale sediment yield data from the rainfall simulation experiments are reported here. High intensity rainfall events were generated over severely burnt, moderately burnt and unburnt surfaces (plot size = 0.5 m^2) under dwarf oak, pine and cedar forest. The study sites had received intermittent low intensity rainfall during the period between the fires and sampling and pre-experiment soil moisture levels ranged from 18 to 27 %. Overland flow generation times were reduced considerably in burnt terrain for all rainfall intensities in accord with measured reductions in surface permeability. Sediment yields from severely burnt terrain, standardized to events of 15 minutes duration, were estimated to be 0.96 $\pm$ 0.67, 0.15 $\pm$ 0.09 and 0.03 $\pm$ 0.01 t ha^{-1} for 60, 40 and 20 mm hr^{-1} intensity rainstorm events respectively. These are notably higher than those from unburnt control sites with sediment yields of 0.06 $\pm$

0.04, 0.01 $\pm$ 0 and 0 t ha^{-1} (again for 60, 40 and 20 mm hr^{-1} events). Equivalent sediment yields from moderately burnt sites were estimated at 0.25 $\pm$ 0.12, 0.06 $\pm$ 0.03 and 0.04 $\pm$ 0.04 t ha^{-1}. Continuing work is evaluating dissolved and particulate nutrient yields from these sites for a comprehensive evaluation of the potential risk to downstream water quality. Elevated sediment and nutrient delivery to low order streams following wildfire has important implications for habitat quality and water resource management.