

Interactive comment on “Before the fire: Assessing post-wildfire flooding and debris-flow hazards for pre-disaster mitigation” by Ann M. Youberg et al.

Anonymous Referee #2

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In the United States, flood and debris-flow hazard assessments are conducted routinely after major wildfires. Such assessments are used by local emergency management officials to identify areas at risk and develop emergency response plans. Often, however, there is insufficient time between the fire and the first rain storm to fully develop emergency response and evacuation plans. This study describes how more complete planning can be achieved by assessing the potential for debris flows before a fire occurs.

The study uses an established fire model to create a wildfire scenario in Coconino County, Arizona, USA. The authors then use the simulated burn severity and a series

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of models to evaluate the potential for flooding and debris flow to design rain storms. The hazard assessment includes estimates of flood and debris-flow inundation, which is an analysis that is generally too time consuming to perform during post-fire hazard assessments. There is growing interest in pre-fire hazard assessments, and this the third pre-fire analysis that I am aware of.

The study is clearly valuable for Coconino County, and the discussion of lessons learned during the assessment may appeal to a broader audience. However, I do not think a summary of a published hazard assessment is appropriate for this journal. The manuscript does not test a method/hypothesis or present a significant new concept. I acknowledge that the addition of runout modeling to pre-fire planning is new and important, but this aspect of the manuscript is not fully developed or tested. I think the manuscript would be much stronger if it were reframed to test the proposed methods for pre-fire assessment and demonstrate how well they work. Some questions that could be addressed are: How well does modeled crown fire activity match observed distributions of soil burn severity? How well do the simulated levels of forest treatment reflect burn severity in real fires with real treatments? How accurate are the flood runout predictions? How transferable are estimates of curve numbers from one area to another? How accurate are the estimates of debris-flow probability, volume, and runout? What are the uncertainties? I think this question is particularly important because the predictions of who/what will be impacted will be scrutinized heavily.

In addition, or alternatively, the paper could dig deeper into the planning and mitigation challenges that pre-fire hazard assessments uncover. The end of the paper mentions there were unexpected challenges that came during implementation of the mitigation measures, but these challenges are not described.

Lastly, I think the paper needs to provide more details on the specific methods used in the study. These details are probably included in the engineering reports that the paper references, but more of this information needs to be included in a journal paper to make it easier for readers to understand the assumptions that go into the modeling.

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