Predicting Post-fire Sediment Risks to Streams[AFS]

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Severe erosion that commonly follows intense wildfires throughout the Mountain West radically alters aquatic habitats. Before human encroachment local fish populations survived these disturbances by escaping to and/or repopulating from unaffected refuge areas. Habitat loss and degradation limits these areas and increases the threat of post-fire erosion. Therefore we need to identify locations where the potential for severe post-fire erosion overlaps degraded or spatially limited aquatic habitat. Gully rejuvenation usually results in

high volume debris flows. These flows represent the most severe form of post-fire erosion, delivering large pulses of fine sediments, rocky debris, and wood from ephemeral channels into perennial stream systems. Gully rejuvenation is more likely to occur where high severity burns impacts relatively large portions of, and is concentrated near, watershed divides. This paper presents a GIS-based technique using satellite derived burn severity mapping to identify potential sources of severe post-fire erosion. 1st and 2nd order ephemeral basins are delineated and assigned a Burn Severity Distribution Index (BSDI) value. Basins with high values are identified as highly probable debris flow sources if the burned area receives a intense rainfall soon after a fire. A model is proposed to assess the risk of severe erosion response as a function of the BSDI. A method to co-ordinate this risk analysis with aquatic habitat assessment is demonstrated. This approach may prove to be useful for Burned Area Emergency Rehabilitation (BAER) teams as they identify aquatic resources most at risk following wildland fire.