

Prioritizing Post-fire Restoration in Chaparral Shrublands in Southern California

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Abstract:

The occurrence and size of wildfires in southern California have increased with human population growth. Chaparral vegetation recovery in post-fire landscapes can be impeded by a number of factors, including drought, excessive fire, and non-native species. Active restoration may be needed to enhance native shrubland recovery in areas affected by these stressors, yet across large fire scars identifying the need for restoration can be challenging. We developed a Post-fire Restoration Prioritization (PReP) tool to aid resource managers with early detection and prioritization of degraded chaparral landscapes in need of restoration. The PReP tool incorporates information on the post-fire regeneration strategy of plant communities and its interaction with fire history, pre- and post-fire drought, and non-native annual species to predict where recovery may be impeded, thereby identifying candidate areas for restoration. The tool also integrates spatial data on erosion risk for recent fires, so that areas in need of restoration can be prioritized for hillslope stabilization. Outputs from the tool can also be integrated with hotspots of ecosystem service provision and accessibility data to further refine restoration decision making. We demonstrate a proof of concept using the Copper and Powerhouse fires on the Angeles National Forest in southern California and find that 1,642 acres (10%) and 3,786 acres (14%) respectively are predicted to have low regeneration capacity and need restoration. Through field monitoring, we verified that areas predicted to have the lowest regeneration capacity indeed had the highest cover of non-native annual grasses and herbs and the lowest cover of native shrubs. The framework of the PReP tool is transferable to chaparral ecosystems across southern California and can guide management decision making to ensure long-term sustainability of chaparral and the ecosystem services it provides.