Appendix 7: Reforestation Tool for Tree Mortality Landscapes

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Recent drought and bark beetle outbreaks in California have resulted in substantial impacts to forest ecosystems throughout the state, with thousands of acres in need of restoration or reforestation. This user-friendly, Web-based decision support tool is designed to assess priority areas for reforestation activities where tree mortality is high within the national forests of the Sierra Nevada bioregion. The tool consists of three components: (1) spatial prioritization tool, (2) stand data summary tool, and (3) reforestation best management practices guide. The spatial prioritization tool allows the user to view data layers related to tree mortality, forest type, mechanical treatment opportunities, fire severity, and other relevant datasets (e.g., wildland-urban interface, wildlife habitat, and landscape management units) (fig. A7.1). This tool permits users to select their geographic area of interest (national forest or district), relevant data layers, and the relative importance of individual data layers. The tool identifies areas of low, moderate, and high reforestation priority in either map, summary table, or raster datasets that can be further analyzed in Geographic Information System (GIS) if desired. The stand data summary tool uses field plot data collected from forest stands in the Sierra Nevada immediately after the 2012–2016 drought (collected in 2016–2017) to summarize post-drought stand conditions. This tool summarizes both overstory (e.g., stand densities and basal area by species) and understory (e.g., tree regeneration by species, total shrub cover) conditions. Finally, the best management practices guide embedded within the tool summarizes published reforestation methods and approaches that are based on climate adaptation and forest resilience principles. The guide describes innovative approaches to reforestation under specific topic areas, including seed zonation, spatial arrangement (e.g., regular vs. cluster planting), seedling densities, species composition, management of competing vegetation, and other considerations. A summary of relevant published literature and a user guide are also provided through the tool's weblink (https://www.climatehubs.usda.gov/hubs/california/tools/climate-wise-reforestation-toolkit).

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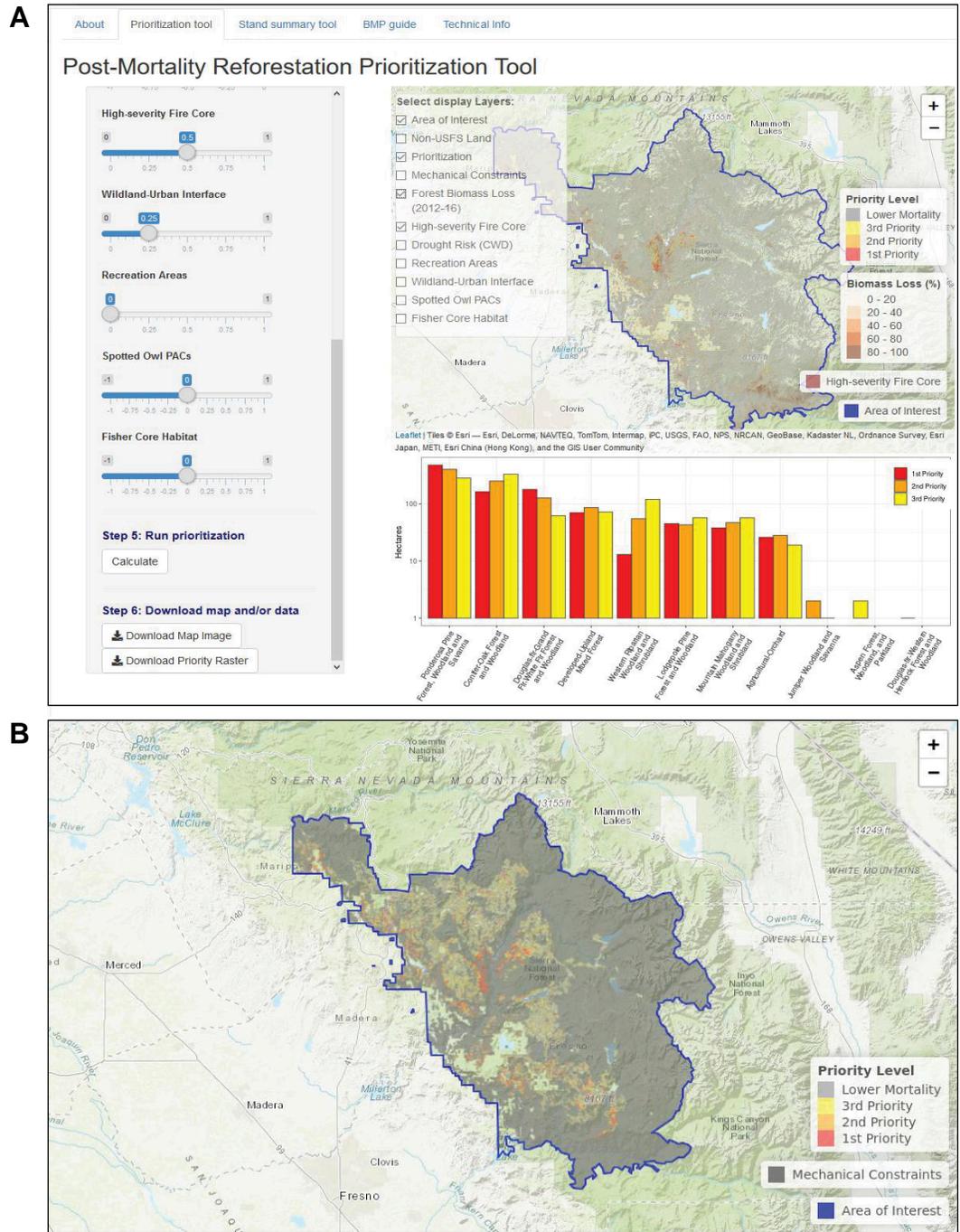
Figure A7.1—Web-based interface of the reforestation prioritization tool for tree mortality landscapes (panel a) permits the user to select a specific area of interest (e.g., Sierra National Forest) and relevant data layers (e.g., loss of forest biomass, wildlife habitat) to identify potential high-, moderate-, and low-priority areas for reforestation activities. Tool outputs include static maps (panel b), as well as data summaries and raster datasets.