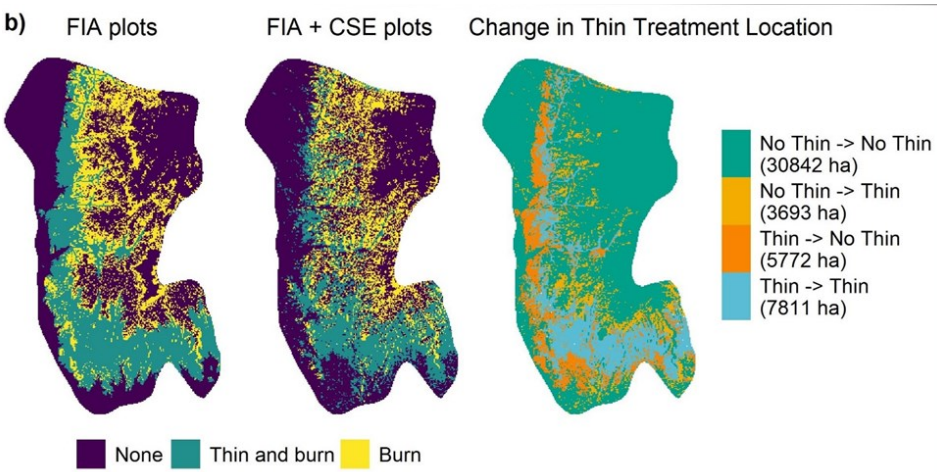
Earth Systems Ecology Lab



Adding additional forest inventory plots helps constrain the error that results from interpolating vegetation conditions, leading to an improved estimation of forest conditions across space. The initial vegetation conditions change where high-severity fire risk is greatest and this causes a change in where treatment locations are likely to be most effective. This figure shows the difference in treatment locations caused by using 68 FIA plots versus 1072 common stand exam and FIA plots to create the initial vegetation conditions.

More Inventory Data Improves Risk Modeling

Over a century of fire-exclusion and on-going climate change are increasing the risk of high-severity wildfire in southwestern US forests. Forest management that includes combinations of tree thinning and prescribed burning help reduce the risk of high-severity fire, but can be costly to implement. Given that ongoing climate change is increasing the flammability of our forests by increasing atmospheric warming and drying, we need to prepare forests to receive fire. Given the costs of thinning, identifying landscape positions where high-severity fire risk is greatest and deploying thinning in those locations can facilitate a larger area being treated with prescribed fire. Identifying these high-risk locations using simulation models to support planning requires that the uncertainty in model outputs is acceptable for managers and stakeholders. The objectives of this study were to evaluate the effects of forest inventory plot sample size on model behavior in the Santa Fe Fireshed.

We ran simulations that included differing numbers of inventory plots to construct the initial vegetation conditions. We found that better capturing forest variability with more plot data substantially changed model results. For example, when we used a larger sample of 1072 common stand exam plots to build the initial vegetation conditions layer, we identified nearly 5000 fewer acres requiring thinning than when we constructed the layer only using Forest Inventory and Analysis data. Our findings indicate that with geographic coordinates for all forest plots, we can better quantify uncertainty in our model outputs.

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THE UNIVERSITY OF NEW MEXICO

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Management Implications

Additional field inventory can improve model estimates of areas with high-severity fire risk.

Collecting geographic coordinates for each plot will increase their value for modeling and help reduce uncertainty.

This approach may also be useful for determining how much sampling is required to achieve an acceptable level of uncertainty for the planning process.

Publication:

Hecht, H, DJ Krofcheck, D Carril, MD Hurteau. In review. Estimating the influence of field inventory sampling intensity on forest landscape model performance for determining high-severity wildfire risk.

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