

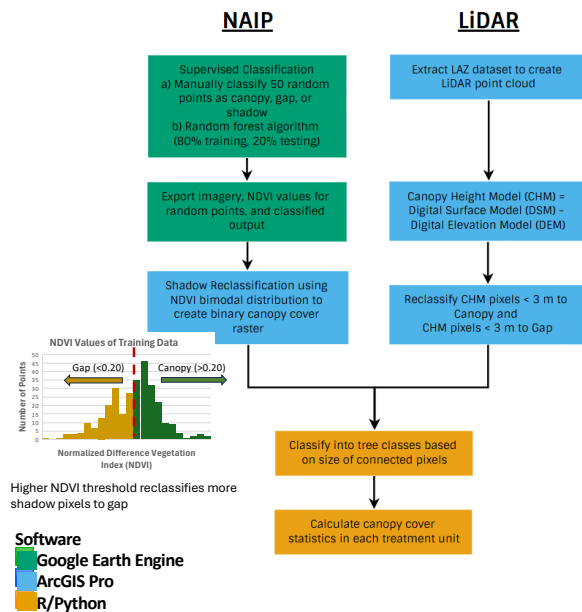
Spatial Heterogeneity in Thinned Forests: Using Aerial Imagery to Evaluate Forest Management Outcomes

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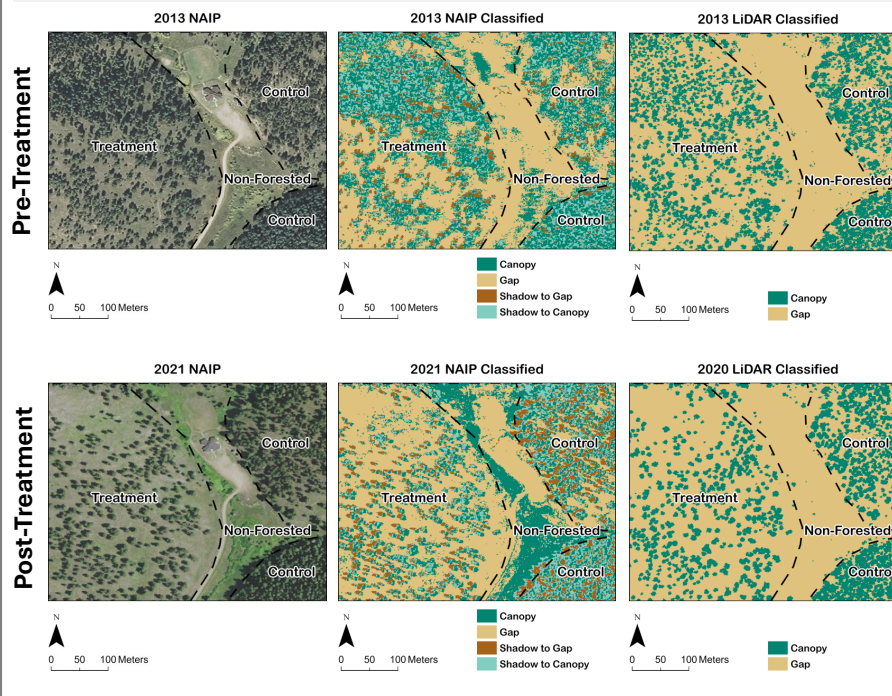
Introduction. Forest management in the montane zone of the Colorado Front Range often aims to restore forest structure and composition to historical (pre-European settlement) conditions which favor species such as ponderosa pine and open forest conditions with fewer trees. We define forest structure using metrics that describe spatial heterogeneity in forest cover (e.g., tree group distribution and gap size diversity). Management efforts in ponderosa pine forests generally remove trees to break up large areas of contiguous canopy, promote smaller tree groups, and create forest openings. We looked at a mechanically thinned forest in a Denver Mountain Parks property that was treated in 2019. Though LiDAR is the most accurate and efficient way to measure forest structure, spatial extent and temporal resolution is limited. We evaluated NAIP, which is available every two years, as an alternative.



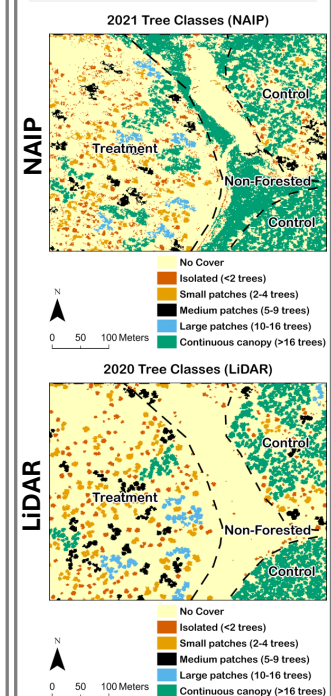
Methods



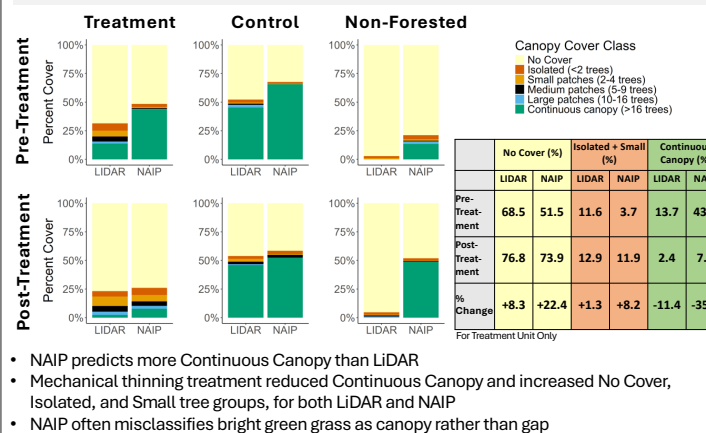
NAIP vs. LiDAR Classification



Post-Treatment



Results



Next Steps

- How can this analysis be improved?
 - Object-based classification
 - Post-processing steps: filtering out single pixels, grass, buildings
 - Consider other types of imagery with higher temporal resolution
- This methodology does not work well in post-fire areas.
 - Bright green grass is misclassified as canopy
 - Standing dead trees are classified as gap. Is that appropriate?

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