Study areas were selected by Fort Jackson managers and SERDP-funded scientists for scientific investigation and prescribed burning experiments in 2017 and 2018. Selected areas had been burned two years previous and had a relative abundance of Sparkleberry (Vaccinium arboretum Marshall) shrub cover in mixed Pinus palustris and Pinus elliottii stands.

In 2018 aboveground shrub biomass (live and dead) was sampled within 4 experimental prescribed burn units: 16D1-18, 16D5-18, 24A7-18, and 24B8-18. The paired pre-fire and postfire plot locations were subjectively selected such that the sparkleberry shrub clumps within each pre- and post-fire plot pair were of similar size and structure. At each of the experimental burn units, there were 4 pre and 4 post burn 3D clip plots. These clip plots used the 3D sampling frame and stratum process (Hawley et al. 2018), however, occupied voxel data were not collected. The plots were clipped from the top of the vegetation down to 10 cm above mineral soil in 10-cm increments.

Metal conduit with reflective tape marked the center of the plot and the 3D sampling frame was placed so the conduit was in the center of the clip plot. Clip plots were 0.5 x 0.5 m in area and extended from ground level to 2 m above ground level. Plots were oriented so that plot edges ran parallel and perpendicular to the four cardinal directions. Differentially-corrected GNSS locations were adjusted by locating the conduits in the TLS point clouds and adjusting locations accordingly. Christie Hawley and Louise Loudermilk were assisted by Kendra Sultzer and Kelsey Smith, contractors with Whitetail Environmental working at Fort Jackson for gathering clip plot data.

TLS measurements across each burn unit, which were roughly 40x40 m in size, were taken before and after prescribed burns in both 2017 and 2018. For details on TLS measurements, see Hudak et al. (2020). Briefly here, an LMS 511 TLS scanner was used to take scans at various locations within burn units. TLS scans resulted in 3D point cloud data consisting of X,Y,Z locations. Point cloud data were georegistered to real-world coordinates by pairing treetops visible in the TLS point clouds with the same treetops visible in coincident georeferenced airborne laser scanner (ALS) data.

TLS point cloud data from various scans were merged and voxelized. Voxels coincident with clip plot locations were related to clip plot biomass data to develop models predicting fuels from point-cloud voxels. Models were applied to pre- and post-fire voxelized point clouds to estimate pre- and post-fire fuels and produce these grids. Pre- and post-fire fuel grids were differenced to create fuel consumption grids. Only the 2018 field observations that met our QA/QC standards were included in model development as detailed in Hudak et al. (2020). However, we applied models to both 2017 and 2018 TLS data to create these gridded products. For modeling details, see Hudak et al. (2020).

Hawley, Christie M.; Loudermilk, E. Louise; Rowell, Eric M.; Pokswinski, Scott. 2018. A novel approach to fuel biomass sampling for 3D fuel characterization. MethodsX. 5: 1597-1604. https://doi.org/10.1016/j.mex.2018.11.006.

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