

FOREST INVENTORY WITH LIDAR AND STEREO DSM ON WASHINGTON DEPARTMENT OF NATURAL RESOURCES LANDS

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Abstract—DNR’s forest inventory group has completed its first version of a new remote-sensing based forest inventory system covering 1.4 million acres of DNR forest lands. We use a combination of field plots, lidar, NAIP, and a NAIP-derived canopy surface DSM. Given that height drives many key inventory variables (e.g. height, volume, biomass, carbon), remote-sensing derived height information provides a powerful tool to make fine scale inference about height related forest attributes. Predictions can also be aggregated to sub-stand, stand, or strata levels. Remote-sensing derived forest attributes can also be used to automate stand delineation, a capability that we incorporated into our inventory system following object-oriented segmentation with eCognition software.

Our sampling design is closely related to the FIA plot design (paneled hexagonal grid), with slight modifications to the plot and grid layouts to accommodate remote sensing auxiliary variables, and to provide greater flexibility in adapting to changes in funding for field measurements. Modifications include (e.g.) using 1/5 acre fixed plots, survey-grade plot positioning with Javad GNSS units, and providing extra panels in each hex grid cell.

Our presentation will provide greater detail about our new inventory system, while describing key technical hurdles we overcame in moving a technology out of a (mostly) research mode and into an operational framework. Examples include merging a patchwork of remote sensing data, processing and managing tens of terabytes of point clouds, and distributing final products to our users. We also discuss hurdles that we have not yet overcome in an effort to motivate discussions which will benefit us and others who work to operationalize remote-sensing based methods.

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