



Regional Mapping, Modelling, and Monitoring of Tree Aboveground Biomass Carbon

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Airborne lidar collections are preferred for mapping aboveground biomass carbon (AGBC), while historical Landsat imagery are preferred for monitoring decadal scale forest cover change. Our modelling approach tracks AGBC change regionally using Landsat time series metrics; training areas are defined by airborne lidar extents within which AGBC is accurately mapped with high confidence. Geospatial topographic and climate layers are also included in the predictive model. Validation is accomplished using systematically sampled Forest Inventory and Analysis (FIA) plot data that have been independently collected, processed and summarized at the county level. Our goal is to demonstrate that spatially and temporally aggregated annual AGBC map predictions show no bias when compared to annual county-level summaries across the Northwest USA. A prominent source of bias is trees outside forest; much of the more arid portions of our study area meet the FIA definition of non-forest because the tree cover does not exceed their minimum tree cover threshold. We employ detailed tree cover maps derived from high-resolution aerial imagery to extend our AGBC predictions into non-forest areas. We also employ Landsat-derived annual disturbance maps into our mapped AGBC predictions prior to aggregation and validation.