

Using nearest neighbors techniques to bridge the gap between strategic and management forest inventories

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Abstract: Strategic forest inventories such as the European National Forest Inventories and the American Forest Inventory and Analysis program focus on producing large area estimates for a large number of variables. Management inventories, which are used to guide treatment prescriptions for individual forest stands, focus on producing small area estimates for a relative small number of variables. Because comprehensive management inventories are becoming prohibitively expensive, interest is emerging in developing methods for extending the information obtained from strategic inventories to focus management inventories more efficiently. For a large variety of international applications, the k-nearest neighbor technique has been shown to be useful for simultaneously mapping entire suites of forest attributes using satellite imagery. For large areas, estimates obtained by aggregating pixel-level classifications and predictions have been encouraging even though the precision of classifications and predictions for individual pixels has been low. For small areas, however, such has not been the case. However, a modification of the k-nearest neighbor technique based on an assumption of stand-level homogeneity with respect to forest attributes has produced estimates that permit acceptable rankings of stands with respect to selected attributes. These rankings may then be used to guide selection of stand for management inventories.