Spatially explicit modeling of alternative futures for forest landscapes using TELSA/VDDT ***By David P. Hockman-Wert[1], Christian E. Torgersen[1], John H. Cissel[2], Chris D. Sheridan[3], and John H. Guetterman[3]***

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Researchers and managers have begun to use spatially explicit tools for visualizing and understanding the impacts of human and natural disturbances on forest ecosystems at a landscape scale. Spatial modeling with a GIS provides a visual, intuitive interface that makes it possible for scientists to (1) present different management options and (2) demonstrate how these scenarios play out in a dynamic landscape. The landscape modeling approach allows scientists and managers to provide feedback both in the development of alternative management scenarios and in the refinement of the spatial models.

The Landscape Scenario Analysis Project, initiated and funded by the Bureau of Land Management (BLM), is facilitating interactions between scientists from the USGS Forest and Rangeland Ecosystem Science Center and BLM managers regarding broad-scale implications of vegetation management for forest ecosystems in western Oregon. Landscape scenarios have been developed for BLM lands in the Oregon Coast Range, depicting potential forest conditions (cover type and structural stage) resulting from density management, hardwood treatments, and other forest and riparian treatments.

Spatially explicit modeling is performed with ESSA Technologies' Tool for Exploratory Landscape Scenario Analyses/Vegetation Dynamics Development Tool (TELSA/VDDT), a software package developed specifically for modeling interactions between natural disturbances and forest management. The spatial module in TELSA integrates directly with a geographical information system (ArcView 3.x) and provides the functionality to build models using existing spatial data layers such as forest stand characteristics, planning zones, and disturbance-prone areas. The flexibility of TELSA/VDDT makes it possible to develop model structures suitable for different ecological settings and management applications. The TELSA/VDDT software package also contains numerous mechanisms to control management and disturbance at landscape scales based on mapped characteristics (e.g., fire regime, rain-on-snow zone, Northern spotted owl home range, aquatic large wood source area). Landscape scenarios can be represented at a very coarse resolution initially and then refined over time as skills and insight are acquired.

Maps and graphs of temporal trends generated by the models have helped managers visualize the effects of natural and management disturbances on forest landscape and stand structure, and were specifically used in BLM planning and consultation processes. In particular, results from the model were used to help assess cumulative effects from timber harvest since data were compiled across ownerships and land-use allocations.