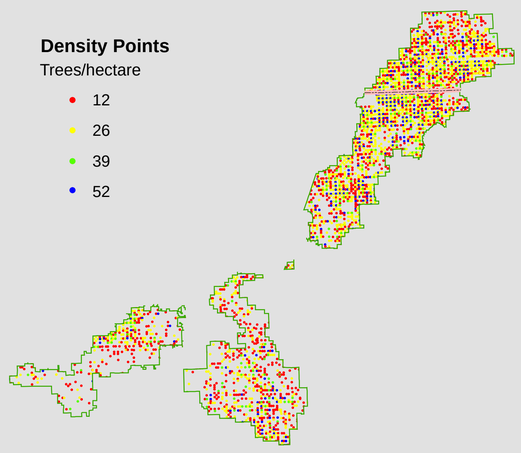
Umatilla National Forest
Historical Vegetation Mapping

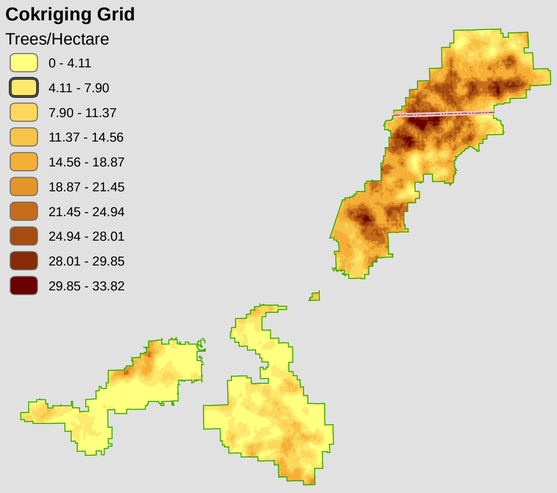
Distribution of Density Values for Douglas-fir



Umatilla GLO survey data for tree species frequency was analyzed on a species-by-species basis using Distance 4* sampling to assign density values to bearing trees at each corner and quarter-corner.

*Thomas, L., Laake, J.L., Strindberg, S., Marques, F.F.C., Buckland, S.T., Borchers, D.L., Anderson, D.R., Burnham, K.P., Hedley, S.L., Pollard, J.H. and Bishop, J.R.B. 2004. Distance 4.1. Release 2. Research Unit for Wildlife Population Assessment, University of St. Andrews, UK. http://www.ruwpa.st-and.ac.uk/distance/

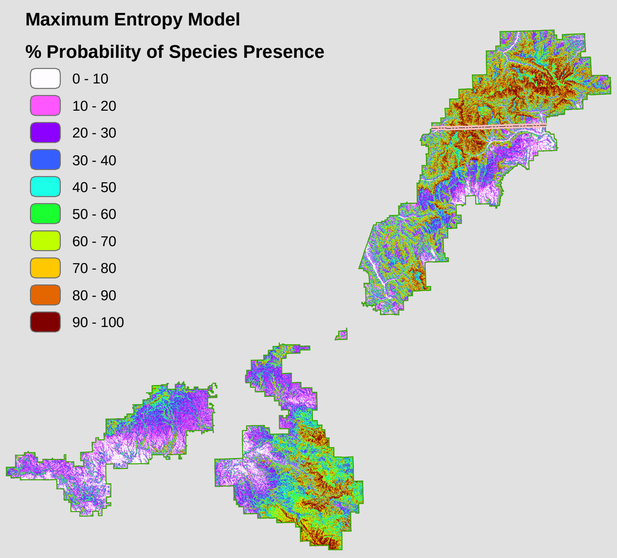
Cokriging Grid for Douglas-fir



Cokriging is modeled using ArcGIS Geostatistical Analyst. The Geostatistical Analyst cokriging option considered elevation (as extracted from DEM), landform model (described as one of 13 base components derived from slope on the DEM), and solar models (describing potential illumination based on aspect derived from the DEM).

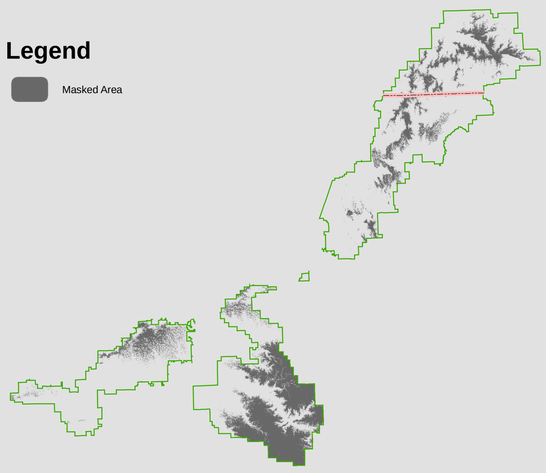
Cokriging analyses were performed to develop a prediction model for estimating species potential for a particular combination of elevation, landform, and illumination.

Entropy Model for Douglas-fir



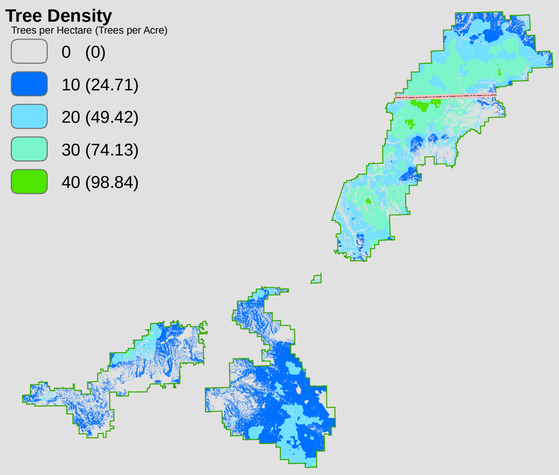
Maximum entropy represents the probable presence of a species. Locations where a species was present are combined with five environmental variables: aspect, elevation, landform, slope, and solar illumination. A cut-off probablility is used to generate a grid to act as a mask on the Cokriging model.

Probability Mask for Douglas-fir



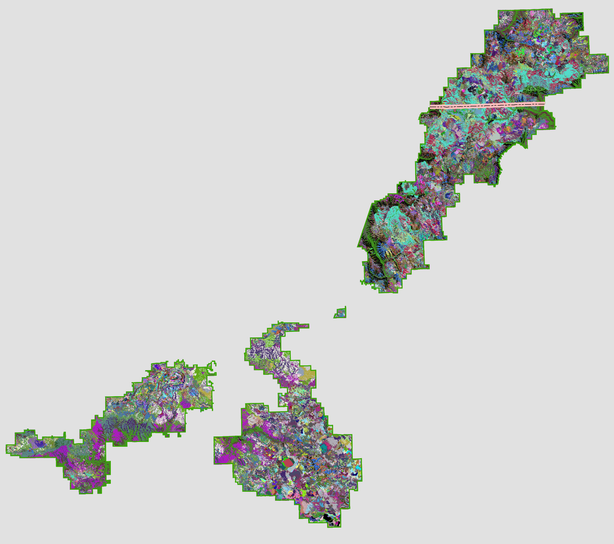
The mask is created by selecting a cut-off probability to limit the distribution of species. The cut off probability for Douglas-fir was 27% (the value at which 75% of the points were correctly predicted).

Final Tree Density Grid for Douglas-fir



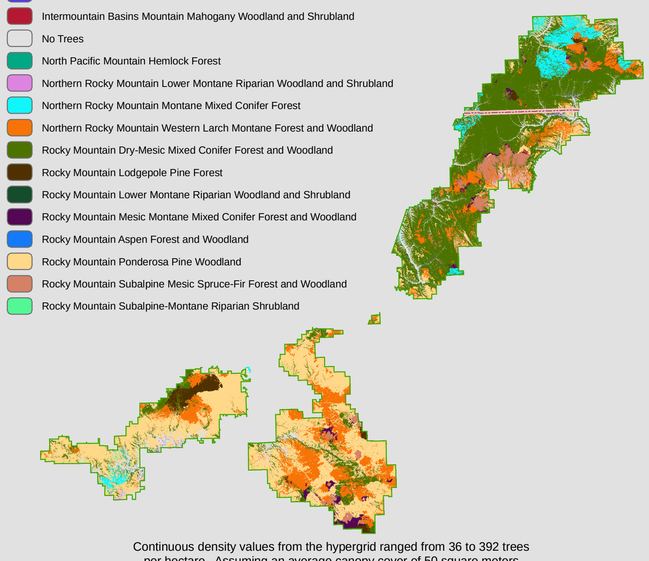
The final species grid is created by applying the mask grid to the cokriging grid, which is converted to an integer grid and reclassified into Trees per Hectare.

Density Class for Tree Species of the Umatilla NF



Final density grids were developed for 18 species independently. The 18 individual grids were then combined into a hypergrid and classed to 5,352 unique values representing combinations of species and tree density. This hypergrid was used by ecologists when assigning individual species/density combinations to terrestrial ecological systems.

Ecological Systems Present in Umatilla NF



Continuous density values from the hypergrid ranged from 36 to 392 trees per hectare. Assuming an average canopy cover of 50 square meters per tree, the resulting canopy cover values are used to categorize the ecological systems by physiographic class as follows:

Savanna < 30% canopy cover
Woodland 30 - 62% canopy cover
Forest > 62% canopy cover

Vicinity Map

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