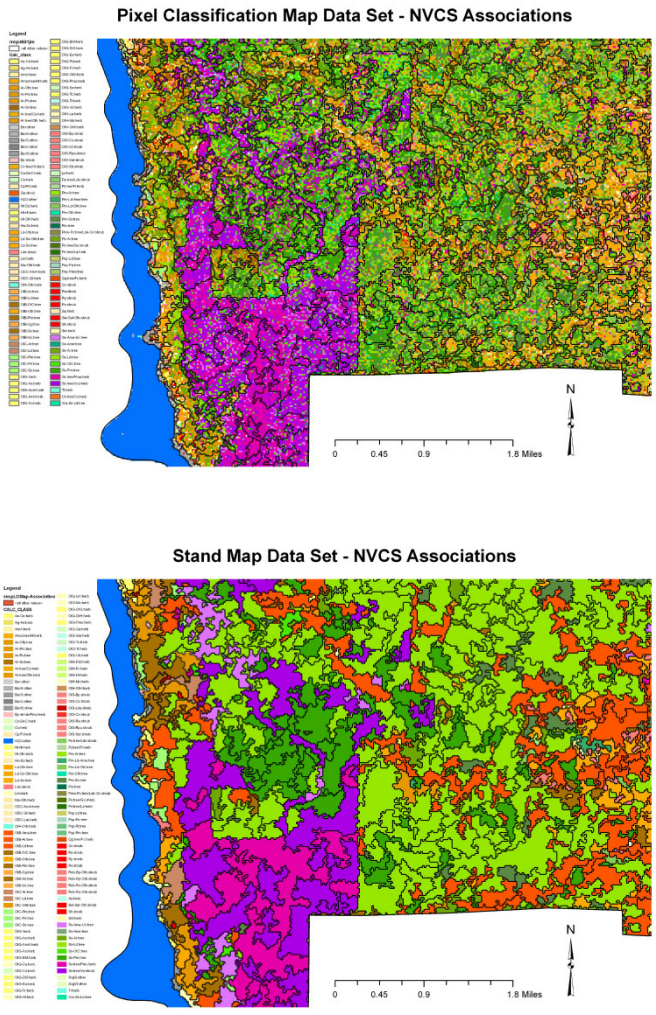
The Redwood National and State Parks Vegetation Classification and Mapping Project Map Data Sets Completed and Delivered![1]

By Ken Stumpf and Leonel Arguello

The Redwood National and State Parks Vegetation Classification and Mapping Project (RVCMP) was initiated in the spring of 2008 under the National Vegetation Mapping Program, and completed this past June, 2013. The primary goals of this project were twofold: 1) to develop a new comprehensive Vegetation Classification that would improve upon past Vegetation Classification efforts and 2) to develop new map data sets for the Redwood National and State Parks (RNSP) that would provide a solid foundation for natural resource inventory, planning, monitoring, analysis, and decision-making efforts. Newly collected plant community descriptions provided the basis for the Vegetation Classification efforts. These field data also provided the basis for mapping efforts that involved the classification and analysis of Landsat 5 Thematic Mapper satellite imagery.

Such a combined Vegetation Classification and mapping effort is highly dependent on the collection of large amounts of detailed quantitative field data. A total of 360 relevé samples collected by Dr. Ayzik Solomeshch comprised the Vegetation Classification data set. 445 plant community/landscape feature descriptions (ground-truthing) based on the implementation of line-point transect sampling were acquired and used to build the image classification training data set that was used to associate the ground-truth characteristics with the spectral image data. Both field sampling efforts included the estimation of species-specific cover values and the identification of trace species. Transect sampling efforts also included tree diameter (dbh) and canopy radius estimates for all tree features, as well as canopy position designations for every recorded vegetation/landscape feature. Sudden Oak Death Syndrome subplots and FireMon fuel sample transects were integrated with the transect sampling approach to provide additional information.



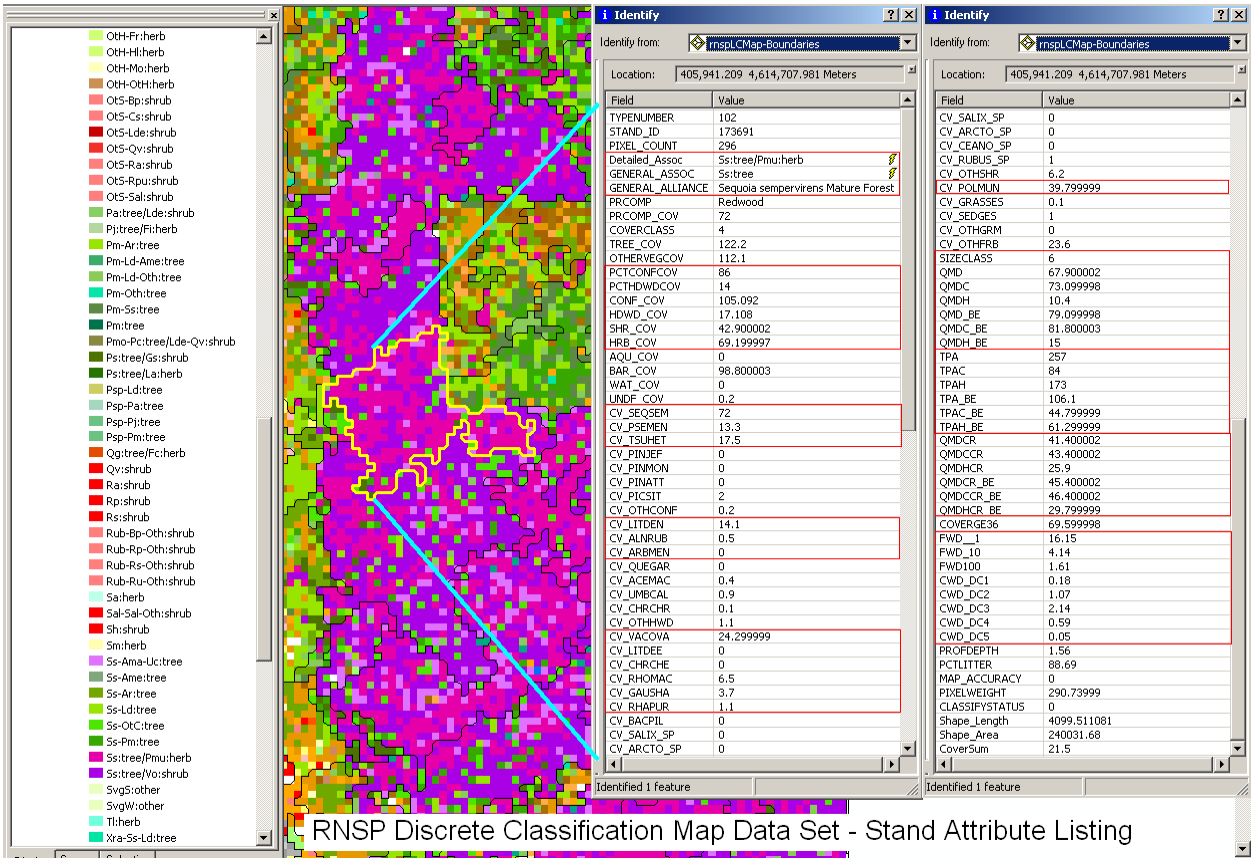
Original pixel classification and aggregated stand level map data sets.

[1] This article is reprinted from the Klamath Kaleidoscope, Fall/Winter 2013 Newsletter of the Klamath Network Inventory & Monitoring Program, NPS, Ashland, Oregon. Leonel Arguello is the Park Ecologist at Redwood National and State Parks, Orick, CA, while Ken Stumpf is the Director, Resource Management and Remote Sensing Applications at Geographic Resource Solutions, Arcata, CA. Additional maps have been added.

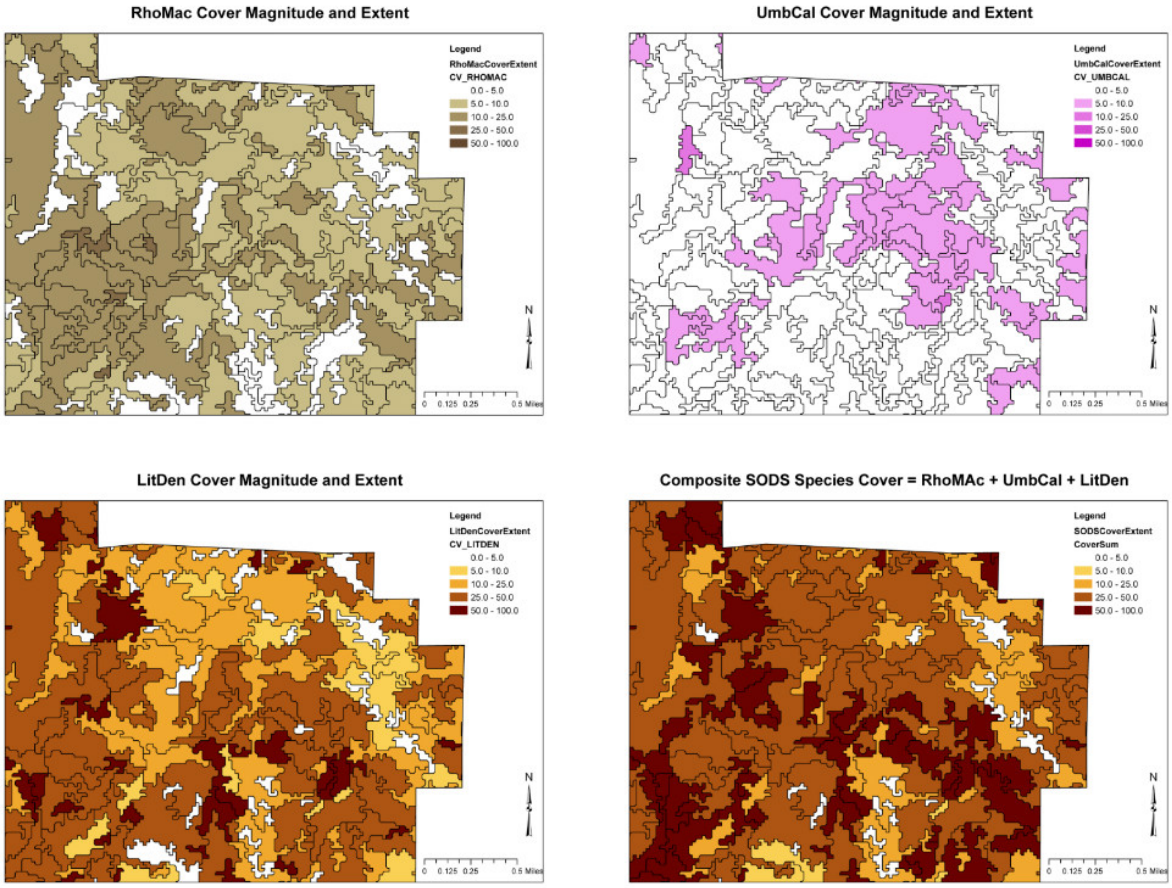
The Vegetation Classification efforts resulted in recognition of a total of 99 plant associations and/or land-cover types, including 44 forestlands types, 18 shrubland types, 15 dry and mesic herbaceous types, 11 wetland herbaceous types, 8 dune herbaceous types, and 3 additional land-cover types that represented sparse vegetation, barren areas, and water bodies.

Geographic Resource Solutions (GRS) used their Discrete Classification Mapping Methodology (DCMM) to relate the detailed quantitative field data descriptions to the spectral signatures discernible in the Landsat TM imagery. This approach results in the retention of the detailed field data information throughout the mapping process, rather than the usual loss of information that accompanies more generalized classification procedures.

The Vegetation Mapping efforts resulted in two map data sets. The first was a raster map data set which represented the original image classification efforts at the Landsat pixel level of resolution. The second was a vector/polygon map data set which represented stands aggregated as distinct objects based on the similarity of their plant community and landscape characteristics. Both map data sets contain species-specific and lifeform cover estimates; tree size (diameter and crown) and stocking (stems/acre) information; ground surface condition descriptions; and woody debris counts. All aggregated stands meet or exceed the minimum mapping unit size limit (MMU) of 0.5 hectares or about 1.2 acres. The stand map data set was developed from the raster map data set based on the aggregation of the pixel classification map data. Each pixel or group of pixels that were smaller than the MMU were compared with adjacent



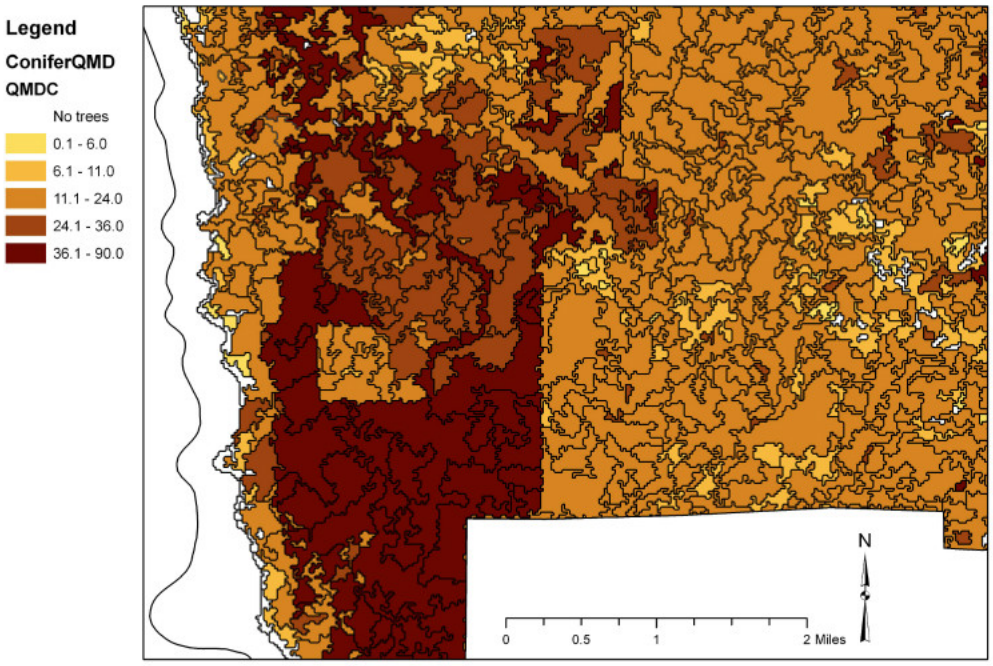
Stand level maps represent the aggregation of similar pixels and contain discrete estimates of many plant community and landscape features.



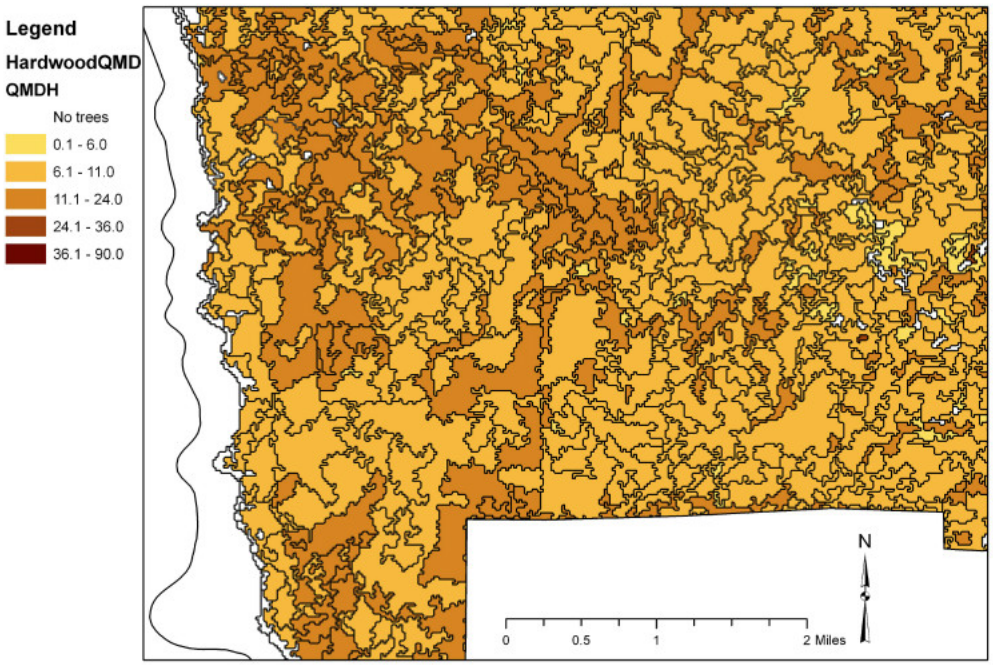
Maps of the extent and magnitude of cover of individual species or combinations of species may be generated rather than simply mapping NVCS Alliances or Associations by simply creating a new legend based on the attribute table column that contains the species cover estimate(s).

mapped data and merged into the adjacent mapped stand of the most similar vegetation/land-cover characteristics. Similarity was primarily based on the presence/absence of species and the relative magnitude of the species that were present using an approach very similar to how the Vegetation Classification was performed. The resulting map data sets contain much more information than a color lookup table value or an NVCS type name. While the species-specific cover estimates do enable the assignment of NVCS type designations, these cover estimates along with the associated tree size and cover stocking estimates, fine and coarse woody debris counts by size and decay class, and landscape feature estimates enable the mapping of a myriad of other information. Maps of the extent and magnitude of cover of individual species or combinations of species may be generated rather than simply mapping NVCS Alliances or Associations by creating a new legend based on the attribute table column that contains that species' cover estimate. Maps of different fine and coarse woody debris fuel classes may be developed, or maps representing average tree diameter, crown size, or stems per acre. Ken Stumpf of GRS maintains that "we can often develop different answers to our queries and analyses when we map and/or evaluate species components rather than just associations or alliances." The detailed quantitative information content of these map data sets will provide a solid foundation for present and future resource management information needs.

Average Conifer Tree Size (Quadratic Mean Dbh)

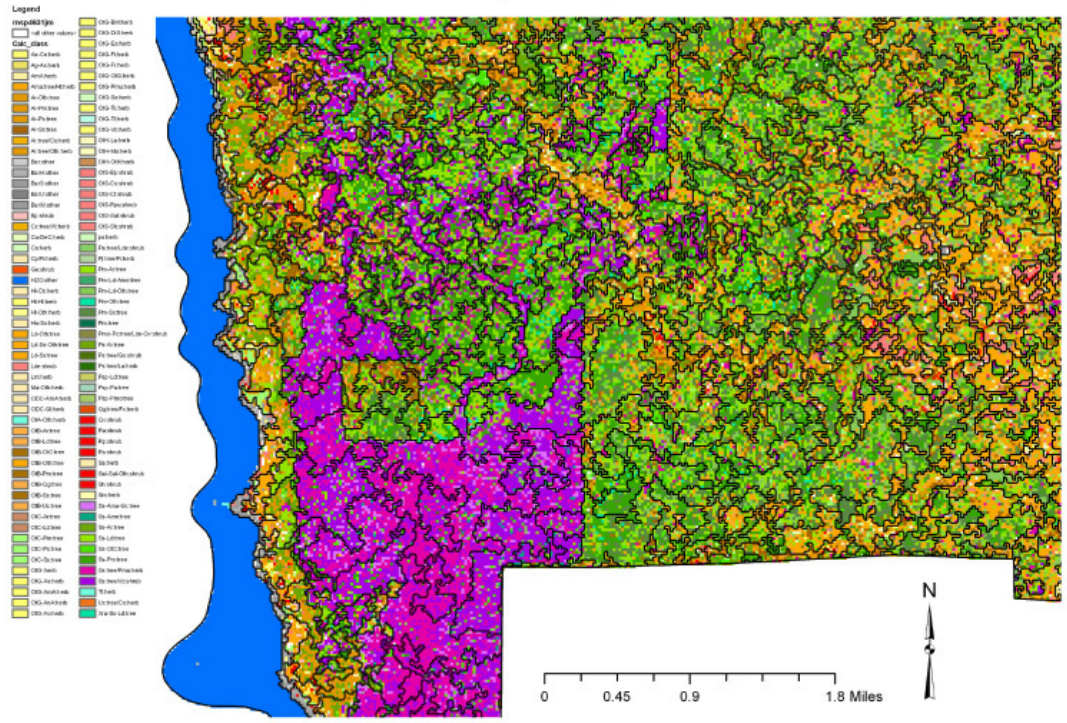


Average Hardwood Tree Size (Quadratic Mean Dbh)

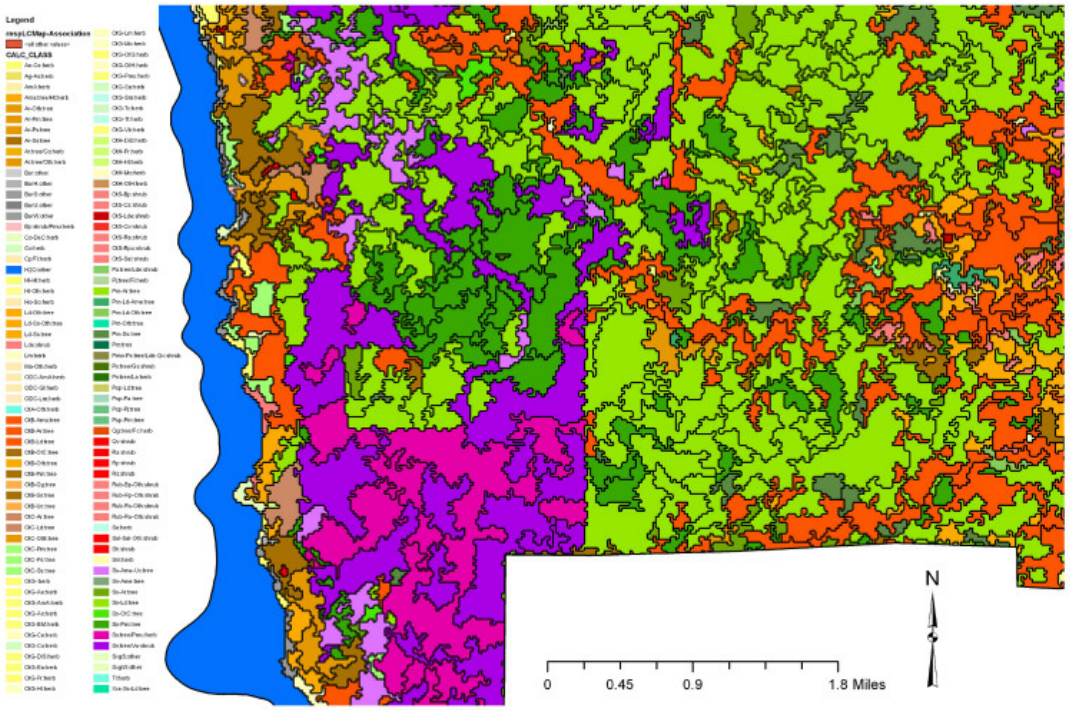


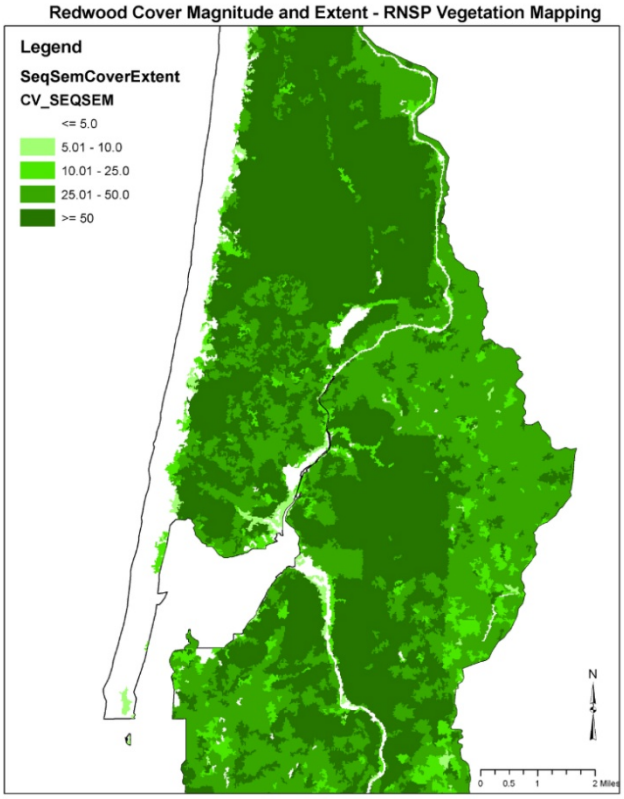
Tree Size maps developed to represent conifers and hardwoods.

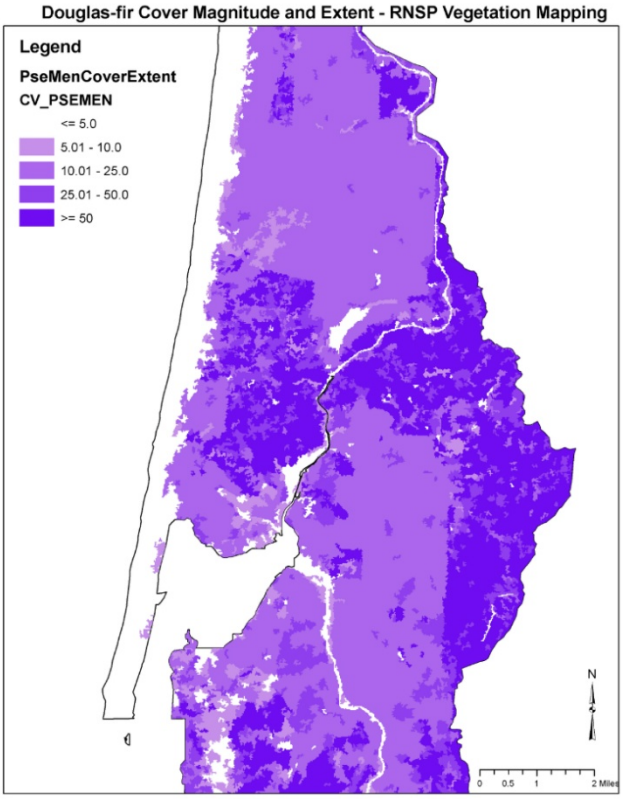
Pixel Classification Map Data Set - NVCS Associations

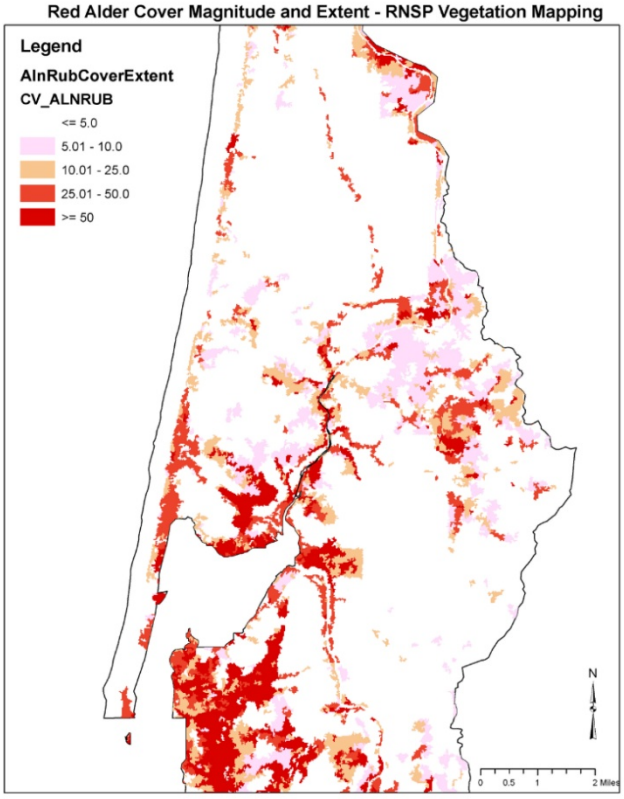


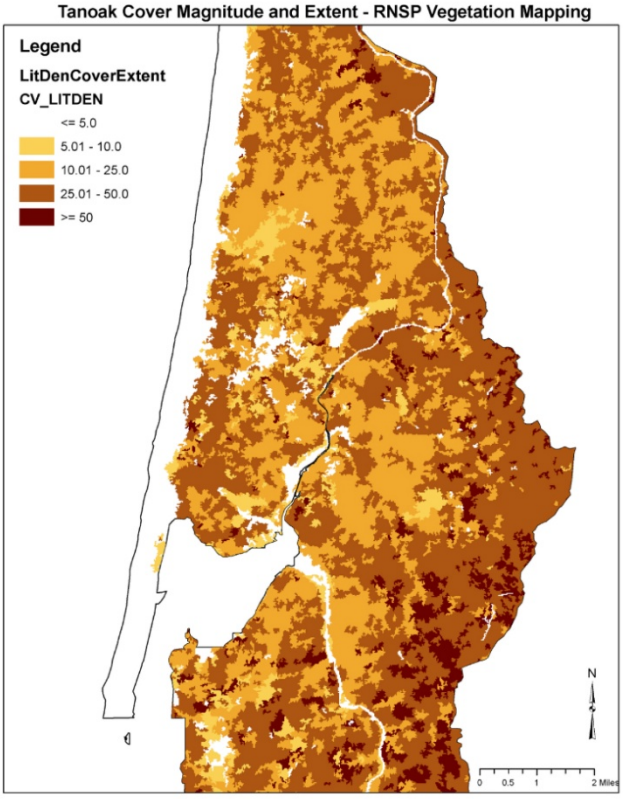
Stand Map Data Set - NVCS Associations





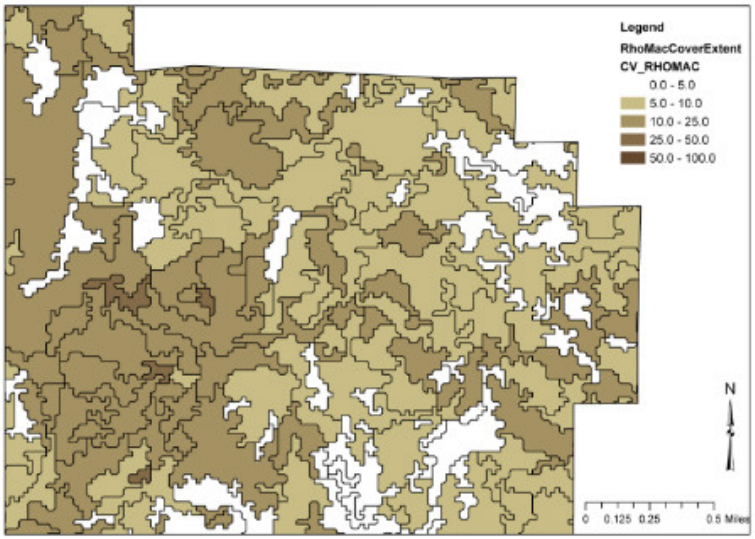




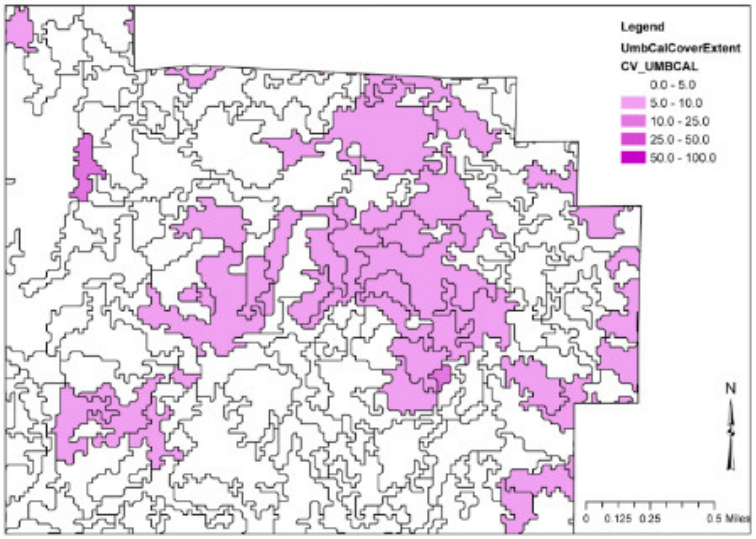


More Species extent and magnitude maps for redwood, Douglas-fir, alder, and tanoak.

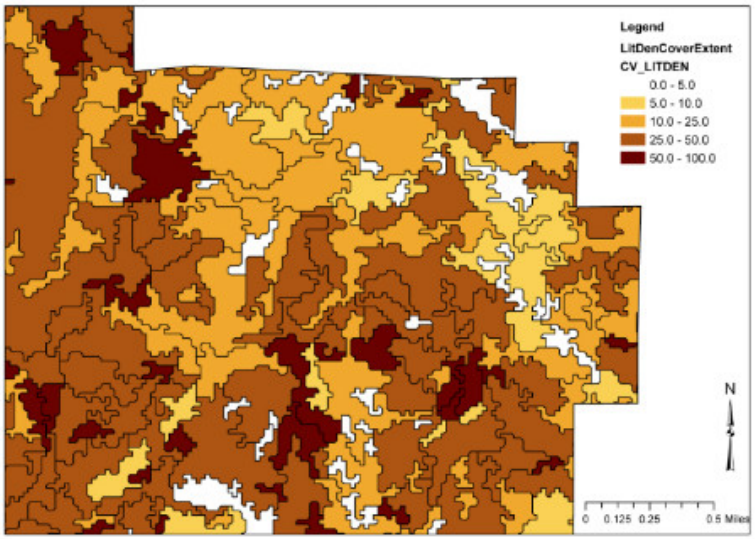
RhoMac Cover Magnitude and Extent



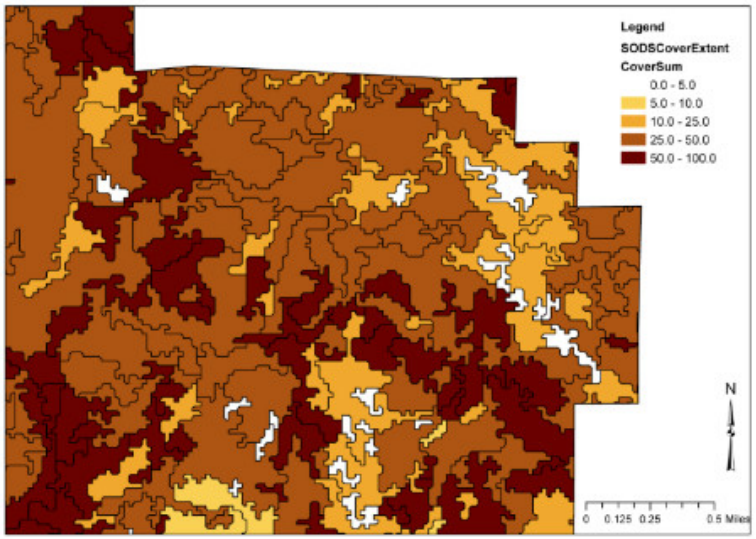
UmbCal Cover Magnitude and Extent



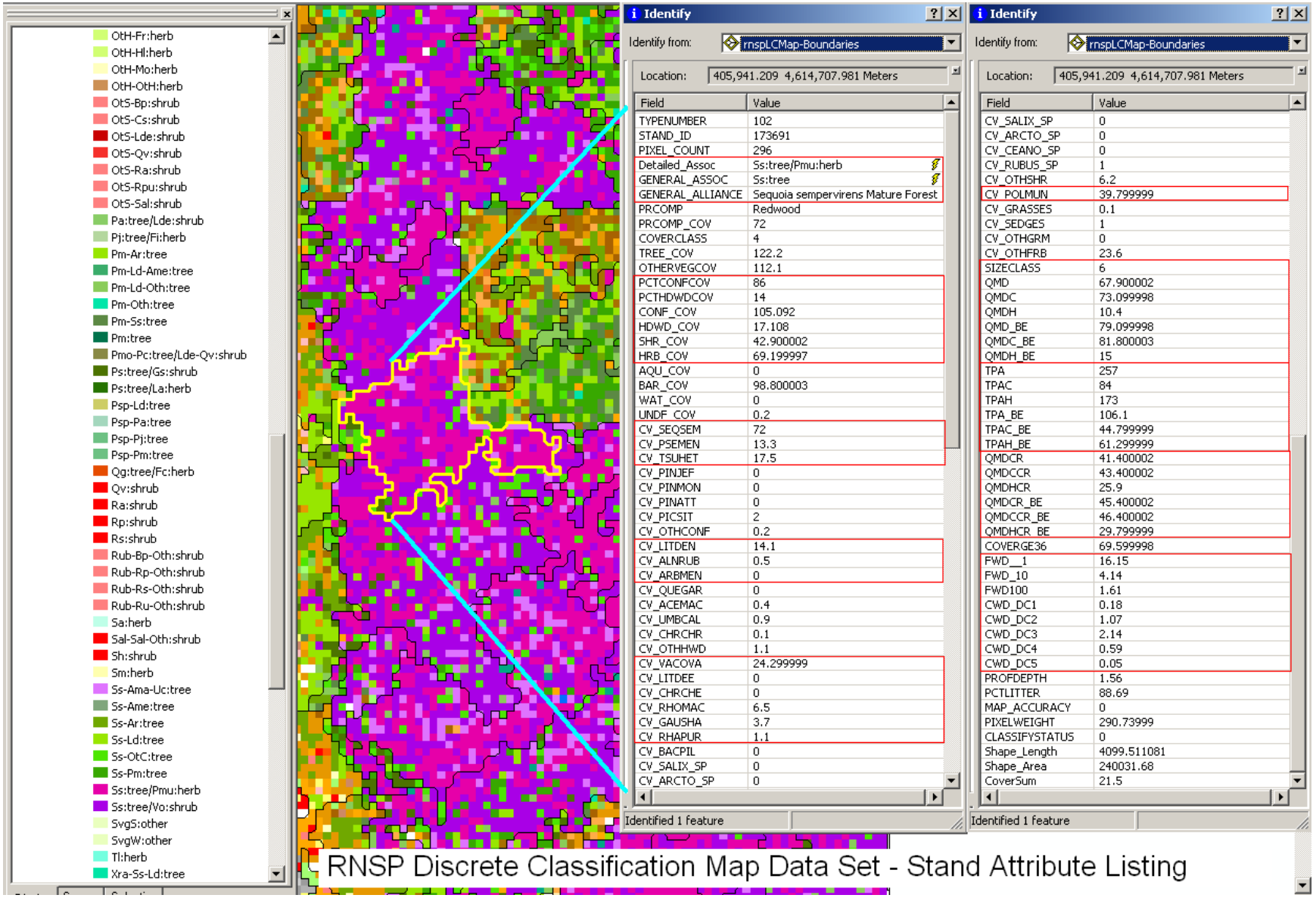
LitDen Cover Magnitude and Extent



Composite SODS Species Cover = RhoMAc + UmbCal + LitDen



Maps of extent and magnitude of cover for species (California Bay, tanoak, and rhododendron) susceptible to Sudden Oak Death Syndrome.



An example of the detailed quantitative information available in the map data sets.