Grassland, Shrubland, and Woodland Plant Assemblages of the Applegate Watershed Southwest Oregon

Eric Pfaff [1*] and Paul Hosten [2]
[1]Southern Oregon University, Ashland, OR
[2]Ashland Resource area, Medford District BLM, Medford, OR
*Corresponding author pfaffe@students.sou.edu

Abstract

Thirteen plant assemblages were delineated based on species composition from 425 stands representing grassland, shrubland and woodland vegetation types. The use of classification, ordination, and indicator species analysis produced relatively discrete and ecologically representative plant assemblages. Differences between assemblages in species richness, ground cover, plant functional groups, topographic and edaphic characteristics and woody plant structure provide a benchmark for better understanding variation between grassland, shrubland and woodland vegetation types in space and time.

Introduction

Grassland, shrubland, and woodland vegetation types are a major component of the landscape in the Applegate Valley of southwest Oregon. The Ashland Resource Area of the Medford Bureau of Land Management is currently implementing thousands of hectares of fuels reduction treatments annually, however, there is a paucity of data regarding these vegetation types and how they are affected by fuel reduction treatments. The purposes of the study were 1) to classify grassland, shrubland, and woodland vegetation types into assemblages and 2) to use those assemblages to gain a better understanding of species composition and richness, woody plant structure, plant functional groups, and associated site characteristic differences between the associations and hence the vegetation types.

Study Area

Figure 1. Study Area Map. Study area shown in red within the Klamath Mountains of southwest Oregon. The study area lies within the Applegate Valley of southwestern Oregon on U.S. Department of Interior (USDI) Bureau of Land Management (BLM) lands in the Ashland Resource Area.

Methods

The author collected species composition, woody plant structure (size classes and form), and site condition data for 425 non-conifer stands using a reconnaissance or releve style methodology. Thirteen plant assemblages based on species composition were classified using clustering techniques in conjunction with Indicator Species Analysis. NMS was used to investigate patterns of assemblages in ordination space. **Keywords:** Hierarchical agglomerative cluster analysis, Indicator Species Analysis (ISA), Nonmetric Multidimensional Scaling (NMS)

Results

Figure 2. Number of significant indicator species from indicator species analysis for each assemblage.

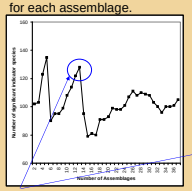
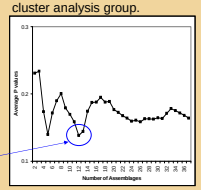


Figure 3. Average P values from the indicator species analysis for each cluster analysis group.

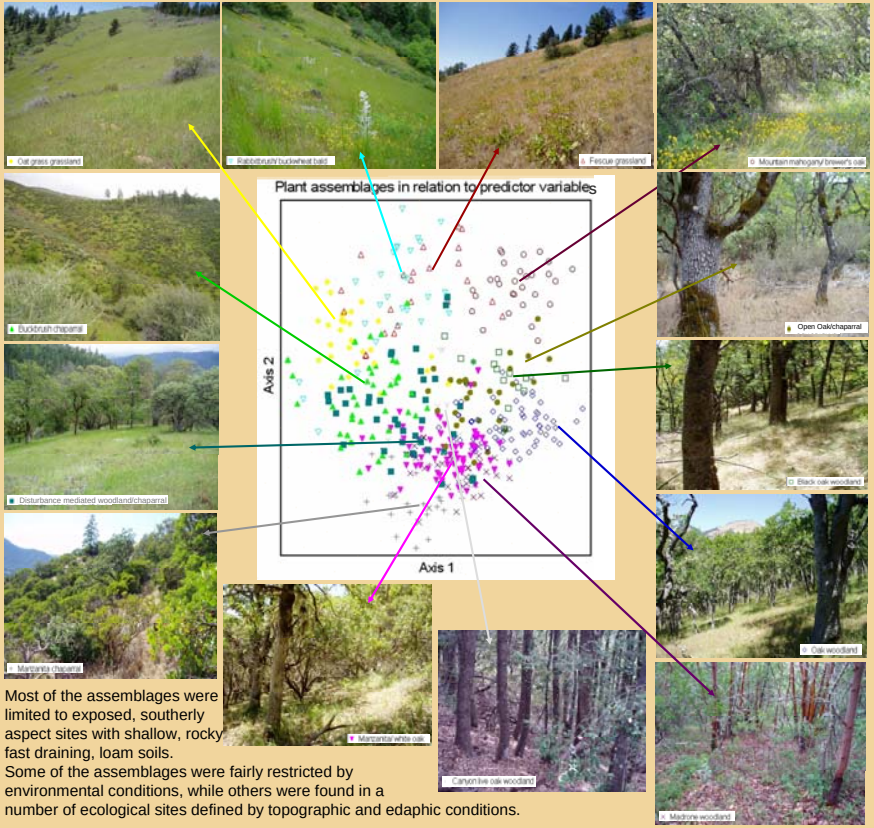


Thirteen stand clusters had both a high number of significant indicator species and low average P values. This indicates a high degree of fidelity of indicator species to stand clusters relative to other cluster amounts.

Table 1. Plant assemblage table

ASSOCIATION NAME	TYPICAL SPECIES (common names)	PHYSIOGNOMIC GROUP
Fescue grassland	Fescue/St. Johns wort/ balsamroot	Grassland/field
Buckbrush chaparral	Buckbrush/soft brome	Shrubland
Rabbitbrush/buckwheat bald	Rabbitbrush/stickweed and naked buckwheat	Grassland/field
Manzanita/white oak	Whiteleaf manzanita/Oregon white oak	Woodland/shrubland
Oak woodland	Oregon white oak/Chinook brome-feed/geheg dogtail/ spreading hedgenettle	Woodland
Oat grass grassland	Oat grass/ medusa head/ Lemmon's needlegrass/ California poppy/lupine	Grassland/field
Mountain mahogany/Brewer's oak	Mountain mahogany/Brewer's oak/serviceberry/ooldlaub/ yarrow/lambsquage ragweed	Shrubland
Open oak/chaparral	Oregon white oak/grand collonia/California brome/ hedgehog dogtail	Woodland/shrubland
Black oak woodland	California black oak/blue wild/ye/yellowleaf iris/beaked hazelnut	Woodland
Disturbance mediated woodland/chaparral	Madrone/white oak/buckbrush/ manzanita/cheatgrass/medusa	Woodland/shrubland
Madrone woodland	Madrone/black oak/deerbrush/ blacktwistorest	Woodland
Manzanita chaparral	Whiteleaf manzanita/ponderosa pine/white oak/blue dicks	Shrubland
Canyon live oak woodland	Canyon live oak/Douglas fir/ beardrush/Oregon grape/ honeysuckle	Woodland

Figure 4. Ordination based on species composition of 425 stands grouped into thirteen plant assemblages. Pictures are from a representative stand of each assemblage. Symbols represent surveyed stands.



Most of the assemblages were limited to exposed, southerly aspect sites with shallow, rocky fast draining, loam soils.
Some of the assemblages were fairly restricted by environmental conditions, while others were found in a number of ecological sites defined by topographic and edaphic conditions.

Figure 5. Mean percent cover by native/non-native functional group in the herbaceous layer for each assemblage

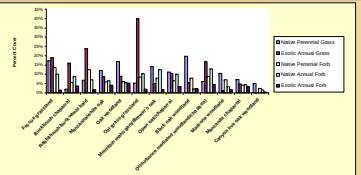


Figure 6. Mean percentage of oak size classes for each assemblage Sizes are diameter at breast height (dbh)

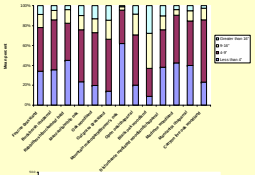
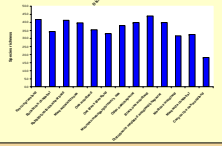


Figure 7. Mean richness for stands in each assemblage



Main Conclusions

- Classification and Indicator Species Analysis produced ecologically representative assemblages.
- An exception to the classification working well is the fescue grassland assemblage, which had a high elevation mostly native component and a low elevation mostly naturalized taxa component.
- Non-native taxa is mostly in the form of exotic annual grasses found typically in low elevation, low canopy situations (Figure 5).
- The high proportion of exotic annual grasses in the disturbance mediated woodland/chaparral assemblage suggests that disturbance may increase the proportion of exotic taxa (Figure 5).
- Oaks showed mixed size classes (Figure 6). Typically oaks belong to the small size classes with lesser amounts of larger trees.
- The rarity, high species richness by native plants (Figures 5 and 7), and the potential for the extirpation of the fescue grassland and black oak woodland plant assemblages warrant efforts to ensure their persistence on the landscape.

Acknowledgements
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