

MAP OF PLANT ASSOCIATIONS OF
EL MORRO NATIONAL MONUMENT,
NEW MEXICO

D. Archibald McCallum

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INTRODUCTION

The notion of the "plant association" comes to us from the heyday of typological plant ecology just after the turn of the century. In those days people thought species of plants lived in communities, which had rather definite boundaries. Now we think that each species responds individually to its own ecological needs and that species that consistently occur together do so because of congruencies in these needs. For a pertinent example, in the hypothetical case illustrated in Fig. 1, the pinyon-juniper woodland, a familiar plant association in the El Morro area, results from the partial congruency in water needs (among others) of those two species.

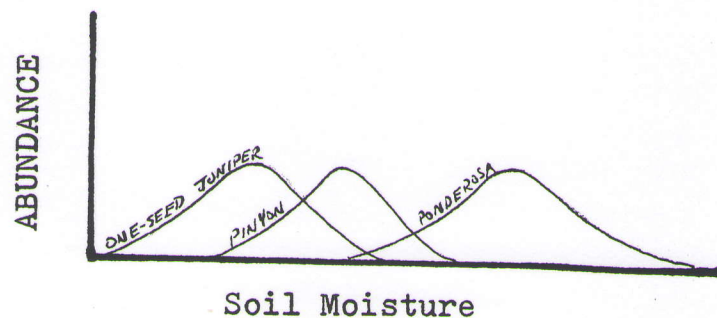


Fig. 1. Hypothetical plots of abundance of three species against usable soil moisture.

Note that although there is considerable overlap there are sites on which One-seed Junipers can flourish but Pinyons cannot. Likewise there are moister sites where Pinyons predominate, and even moister ones where Ponderosa Pines take over. The "vegetation continuum" portrayed by this graph is

the way species are really arrayed in nature. A rigorous study of the vegetation* of El Morro would seek patterns of the sort exemplified in Fig. 1 by assessing the abundance of different species along a resource continuum (e.g. soil moisture), in other words it would apply a scale to the axes on the graph.

But such a study is "beyond the scope of the current investigation" (science's favorite weasel-words), and for the purposes of the National Park Service may not be necessary at the current intensity of management activity (i.e. essentially non-manipulative stewardship). The association concept does help the observer name what he sees. In Fig. 1 the modes of pinyons and junipers are closer together than those of pinyons and ponderosas. Correspondingly, in this area most of us do discriminate pinyon-juniper woodland from Ponderosa Pine forest.

So, I have mapped some plant associations for El Morro National Monument. If the user keeps in mind the points made above, the map should be helpful in conceptualizing the arrangement of plants on the Monument without giving a false sense of definity. These plant associations grade into each other. The only definity is in the lines on the map, and they are definite only because lines tend to be that way. The lines were "eye-balled", albeit in the field. Their positions are therefore arbitrary, but no more so than the positions some mathematical formulation (e.g. the dominant species has a relative density of X%) would prescribe. The base photograph

*"Vegetation" is the arrangement of plant species in nature. "Flora" is the species composition of the plants of an area. The flora of El Morro has been studied rigorously.

was kindly provided by E. A. Swenson, State Biologist of the Soil Conservation Service.

MAJOR PLANT ASSOCIATIONS AND SUBDIVISIONS

Symbol

- PO I. Ponderosa Pine-Gambel Oak woodland. Occurs only contiguous to cliff faces, which collect and deliver water and provide shade that reduces evaporation. Other trees in this association are Alligator Juniper and Rocky Mountain Juniper (found only in it) and Colorado Pinyon and One-seed Juniper.
- PP I.a. Ponderosa Pine outliers. Open stands of a few trees occur in several places away from the cliffs. Scattered trees grow on the cliffs; they are not mapped.
- JP I.b. Alligator Juniper-Pinyon woodland. Dominated by large Alligator Junipers. Transitional between I and II but distinctive for the absence of ponderosas.
- PJ1 II. Colorado Pinyon-One-seed Juniper woodland.
II.a. Occurs only on top of Inscription Rock mesa, and appears to be a true "climatic climax", i.e. not dependent on features of the substrate to increase available soil moisture.
- PJ2 II.b. Occurs on slopes and appears to be an "edaphic climax", i.e. the rocky substrate collects water in the cracks between the rocks. The more open sections contain lowland shrubs (III).
- S II.c. Juniper savannah. Transitional between II and III. Contains occasional pinyons; the junipers are densely to sparsely distributed, the gaps among them usually filled by large shrubs of III.
- SH .III. Horsebrush-Rabbitbrush shrubland. Occupies nearly all of the low sites and extends far up the slopes. Tetradymia canescens, Chrysothamnus nauseosus, and C. greenii are the dominant species. Many others are common but less conspicuous because of smaller size. The following occur in dense single-species stands.
- AT III.a. Four-wing Saltbush (Atriplex canescens). Recently excavated ruins and other disturbed sites.
- LY III.b. Wolfberry (Lycium pallidum).
- EU III.c. Winterfat (Eurotia lanata).
- AR III.d. Sand Sage (Artemisia filifolia). Site of an arroyo filled in the 1930's.

- IV. Grassland.

GR IV.a. Blue Grama (Bouteloua gracilis). Three small sites, all basins. Blue Grama grows in all associations but these are the only places it is dominant. I will speculate on the evolution of this situation in a separate paper on the history of the vegetation in the region.
- DR IV. b. Sand Dropseed (Sporobolus cryptandrus). An area of loose sand, to which this species is well-adapted. Chrysothamnus Greenei, a medium-sized shrub, is as common as the dropseed.
- CH Cheatgrass (Bromus tectorum). Hardly a grassland. The very loose sand gives evidence of severe disturbance. The combination of good moisture and severe disturbance is made to order for this annual. The canyon apparently was used as a corral in the nineteenth century. Parts of it have yet to heal.

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May 53

