

# POTENTIAL NATURAL (HISTORIC ?) VEGETATION OF THE CENTRAL ILLINOIS RIVER VALLEY

O. EUGENE HICKMAN

*Natural Resources Conservation Service (USDA), Bend, Oregon*

## ABSTRACT

One of several large valleys in mountainous southwest Oregon is the central portion of the Illinois River Watershed. This area of foothills, alluvial fans, old stream terraces and floodplains is ecologically distinct from the surrounding watershed and from other western Oregon valleys. Soils have been surveyed and potential natural vegetation patterns were developed from an analysis of the soil survey, along with field sampling. Plant communities and their distribution were found to be strongly related to soil landscapes. The major potential plant communities along with associated soils were identified for each geomorphic surface. Reports about this region during early settlement indicated much of it was heavily forested. Historic vegetation often varied from potential natural vegetation as does what we see today because of treatment and disturbance effects. The original land surveys and relic stands give us insight into the nature of the potential natural vegetation and some of the historic vegetation encountered.

## INTRODUCTION

One of many prominent valleys in the Siskiyou Mountains of Southwest Oregon is the very interesting Illinois River Valley. The Illinois Watershed (Figure 1) covers about 629,000 acres and spans over 50 miles from its headwaters in the high Siskiyou to its mouth at the Rogue River near Agness. The central Illinois valley shown in Figure 1, along with some associated hills and ridges, surrounds Cave Junction, thirty miles south of Grants Pass. This area which covers about 85,000 acres, is the portion of the watershed described here for potential natural vegetation.

Potential natural or historic vegetation; what is the difference? Historic vegetation implies "presettlement" vegetation, but not necessarily pristine vegetation. It is merely the "actual" vegetation composition and pattern that existed here just prior to European settlement in the 1850's. Because of Indian burning, and because natural disturbances have always occurred such as lightning fires, disease, insect outbreaks, drought, windstorm damage, etc., actual vegetation then as now, would include an array of successional stages probably ranging from near-climax to recently disturbed stands. Any map made at that time of actual vegetation, would have been out-of-date periodically as new disturbances occurred and as plant succession initiated recovery.

Potential natural vegetation is a concept involving an attempt to describe what the climax, or at least near-climax vegetation would be like for a given environment, in the absence of disturbance, either natural or human caused. The climax vegetation represents a stable plant community, dynamically balanced with its unique, theoretically stable environment, and is the focal point of succession as shown Figure 2. After any of a variety of

disturbances alter the pristine cover for the site, succession begins moving back towards the "potential" or climax plant community. Just as the placement of a weight on a coil spring will deflect it, if the weight is removed, the spring naturally recoils. And likewise, the site naturally recovers and moves automatically toward climax when the weight or disturbance is removed. This is unless, of course, the disturbance was so great that the site crossed a threshold and was unable to return, remaining static or moving toward a new climax community and possibly one that is yet unpredictable to the ecologist.

To interpret potential vegetation, it is helpful to have information such as high condition relic stands if any can be located, historic vegetation records, soil landscape information, and also comparable stands in other areas that may relate to the study site. Ecological work focusing on "potential" or climax vegetation permits one to classify the landscape on an ecosystem basis. Landscape divisions then coincide with environmental boundaries which influence the vegetation and are closely related to management interpretations.

Historic or presettlement vegetation alone provides interesting but limited practical information. Historic and potential native vegetation studies together are far more useful. They are essential tools for reconstructive surgery, so to speak, on highly developed landscapes such as agricultural lands, urban areas, mining claims and timber harvest units of the Illinois Valley.

There are three basic questions which will be discussed regarding this valley, primarily the valley floor. 1) What are the primary potential (climax) plant communities, some of which may have been represented in the historic vegetation of the area. 2) To what landscape/soil features are they related (or where is their home?). 3) And how extensive are they in the valley?

Common names are used for plants throughout this paper, but a list of corresponding scientific names is included in the Appendix. Vegetation cited here is also listed with other habitat information in "Plant Checklist for Range and Forest Inventories in Southwest Oregon" (Hickman 1992).

#### SETTING

##### *Vegetation/Climatic Zones of the Illinois River Watershed*

This emphasis on vegetation of the Illinois Valley is the result of a watershed study by the U.S. Department of Agriculture. The Illinois River Watershed has been classified or divided into vegetation/climatic (ecological) zones as the result of this work. It has also been completely soil mapped, except for the California portion, in two Soil surveys (USDA SCS 1983, USDA NRCS 1994). Vegetation zones used here are defined by Daubenmire (1968) as part of his hierarchical classification of landscapes. Briefly they represent the geographical area potentially occupied by one climatic climax plant community on zonal (non-restrictive) soils in flat positions. A vegetation zone has a relatively similar macroclimate throughout its extent, from the perspective of vegetation.

Zonation in the watershed ranges from high elevation snow zones dominated by cold tolerant species such as mountain hemlock, shasta fir and white fir, to warm low elevation coniferous forests and hardwood savanna. The Interior Valley Zone or center of this watershed, is shown in Figure 1. This zone is best characterized by the near absence of the tree size form of tanoak. For this reason, delineation of the Zone is not just a topographic situation, the valley, but is primarily an ecological unit including some hill slopes and low ridges.

##### *The Illinois Valley Contrasted with Other Local Valleys*

The Illinois Valley is unique when compared with three other nearby valleys. Figure 3 shows the location of cities in these valleys which are Cave Junction, Grants Pass, Roseburg and Medford. The Illinois Valley surrounding Cave Junction, probably has the greatest diversity of species and the most contrasting environments. The array of plant communities gives evidence of coastal influence and high precipitation (50-70 inches). Richard Waring's publication on the Siskiyou (1969) delineates some very contrasting floristic regions in southern Oregon. Cave Junction represents the only valley of these four, that is located within his Western Siskiyou Floristic Region which relates to many of the

vegetation differences seen here.

The Illinois Valley has some features in common with the Umpqua Valley at Roseburg which has lower precipitation (about 32 to 45 inches), and the Rogue Valley at Grants Pass where precipitation is only 30 - 35 inches. All three of these valleys do have the potential to produce Douglas fir dominated stands, on suitable soils, on their valley floors. The greatest contrast is with the Rogue Valley at Medford where precipitation is the lowest (about 18-27 inches). In this valley where oak and pine are the primary features and serpentine soils are absent, Douglas fir cannot dominate stands on the valley floor because of low precipitation.

Climatic factors help explain why the valleys are unique or different ecologically. Cave Junction has the lowest average minimum temperatures of all four valleys throughout the summer growing season. It is surpassed only by Medford in the winter which is the coldest from November through February. Medford is also the hottest of all valleys in mid summer. Figure 4 shows average monthly precipitation discussed earlier and how Cave Junction's 60 inches is distributed. Winter precipitation is very high along with spring and fall rainfall which exceeds all other valleys.

##### *Soil Landscapes and Geomorphology*

In this discussion considerable importance will be given to soil-vegetation relationships. Natural vegetation patterns are closely related to the local soil landscape and the geomorphology of the valley. The geomorphic surfaces consist mainly of flood plains, low stream terraces which were once flood plains, high stream terraces of even older flood plains and alluvial outwash fans below the surrounding upland slopes. In addition, these fans and terraces are, in places, dissected by drainages which have created a separate set of narrow flood plains and minor terraces. The landforms of each surface have formed soils of different ages with different characteristics. Our diverse vegetation legend for the valley is primarily the result of diverse soil and landscape features that affect the plant community composition. A composite soil map of this valley was produced from the Josephine Soil Survey Report to aid vegetation/landscape correlation for this study.

A landscape profile of the valley (Figure 5) shows these landforms and some of the related non-serpentine soils (see soil names on landscape drawings). Starting at the river there is sand and gravel called riverwash which is barren or supports Cottonwood-Ash-Willow cover and is frequently flooded. Adjacent to the sand and gravel are higher, better developed flood plain soils with mixed hardwood, pine and deciduous shrub cover, but less frequent flooding. Further back we find a major terrace

front where the low stream terrace begins with older non-flooding soils and forest cover. The oldest terrace and highest level is next with even older soils and distinct plant cover. Unless alluvial fan outwash is encountered, the uplands are last with other unique soils and plant cover. Wet basins and drainageways that dissect these landforms develop a variety of other soils and often support riparian or wetland cover.

### POTENTIAL NATURAL VEGETATION *Upland Slopes*

The Interior Valley Vegetation Zone includes some steep upland cover types, not part of the valley floor. They will only be generalized here, but could be classified into communities with the recent vegetation guide by USDA Forest Service (1996). For the purposes of this report, most topography with slopes greater than 20 percent is considered with the upland vegetation group.

Douglas fir will dominate most environments with typical non-serpentine soils. These are basically Mixed Conifer-Mixed Hardwood (madrone, black oak) forests where incense cedar, ponderosa pine and hardwoods are most prominent on the warm southern aspects. Minor areas of shallow stony soils on south slopes or ridgetops represent a White Oak/Bunchgrass (Idaho fescue) potential. Tanoak (tree form) is normally absent here in contrast with adjacent areas just outside the Interior Valley Vegetation Zone, where it is often abundant.

Ultrabasic (serpentine/peridotite) soil severely interferes with normal plant community development. The result is restricted stocking or growth rates, and changes in species composition. Vegetation here is generally mixed conifer forest with Douglas fir, Jeffrey pine, incense cedar (better soils), or Jeffrey Pine/Fescue savanna (shallow, very stony soils) and small inclusions of wet areas (pitcher plant/azalea bogs, drainageways, tufted hairgrass and/or California oatgrass meadows).

### *Terraces and Fans with Non-Serpentine Soils*

This group represents old stream terraces/fans without serpentine influenced soils. Three major plant associations are recognized, all dominated or co-dominated by Douglas fir, and these are associated with two named soils. Two minor plant associations are also included.

1. Douglas Fir-Madrone-Black Oak/Snowberry (low terraces)  
Soils: Kerby, Foehlin, Central Point.
2. Douglas Fir-Madrone-Black Oak-Sugar Pine/ Hazel (high terraces; probably represents the climatic climax vegetation for the valley floor)  
Soils: Pollard, Abegg, Selmac.

3. Douglas Fir-Tanoak/Hazel (*minor* inclusions on high terraces and hill slopes found in several places at the south end of the Valley)  
Soils: Pollard.
4. Mixed Oak-Douglas Fir-P. Pine/Serviceberry-Snowberry Tall Oregon grape (low terraces)  
This plant association is found on deep but very stony, loam soils with low water supplying capacity. Stoniness here is so variable that plant composition can vary from Douglas fir dominance to white oak or pine dominance.  
Soils: Takilma.
5. White Oak/I. Fescue-L. Needlegrass (*minor* slopes of incised drainages and terrace fronts).  
Soils: shallow stony (underscribed).

### *Terraces and Fans with Serpentine Soils*

There are four plant associations extensive enough to be recognized here that can be correlated with the soil survey. Minor inclusions also occur here representing variations of these communities on un-correlated soils. One soil map unit, Brockman, cannot be classified without field checking, because of subtle soil variability.

1. Jeffery Pine/Idaho fescue-Oniongrass Savanna (low terrace)  
Soils: Takilma variant.
2. Douglas fir-J. and P. Pine-I. Cedar/Calif. Fescue Forest (alluvial fans)  
Soils: Cornutt, Dubakella, Eightlar, Brockman (also below because of soil variability)
3. Douglas fir-Sugar Pine-I. Cedar/Calif. Fescue Forest (high terrace)  
Soils: Brockman Variant
4. White Oak/Ponderosa Pine/Idaho Fescue - Calif. Oatgrass (alluvial fans)  
Soils: Brockman (also above because of soil variability).

### *Flood Plains with Well Drained Soils*

There are three plant associations recognized here. Variations in soil texture, frequency of flooding and seasonal water table influence plant composition. At least two of the three communities would be riparian plant associations.

1. Cottonwood-Ash/Willow (coarse sand/gravel adjacent to rivers)  
Soils: Riverwash
2. P. Pine-Mixed Oak-I. Cedar/Myrtle/Snowberry (sandy loam)  
Soils: Camas, Newberg
3. Douglas Fir-Madrone-I. Cedar-P. Pine/Snowberry (loam)

Soils: Evans

### *Flood Plains, Basins and Drainageways With Poorly Drained Soils*

Five somewhat variable plant associations are recognized here, one which is generally a minor inclusion within other map units. Variability is mainly due to differences in seasonal water tables and gradation or zonation of wetness.

1. Ash/Willow/Spirea-Ninebark/Sedge  
Soils: Cove, Wapato (also below)
2. Ash-Cottonwood/Hawthorn/Sedge  
Soils: Wapato (also above)
3. Mixed Oak-Douglas fir-Pine/Serviceberry-Hazel-Snowberry  
Soils: Copsey
4. White Oak Ash/Serviceberry/C. Oatgrass-I. Fescue  
Soils: Banning, (also drainageways within Takilma and Brockman)
5. Calif. Oatgrass Meadow sometimes with J. Pine or P. Pine overstory (inclusions in swales, drains)  
Soils: deep clayey, seasonally wet (undescribed inclusions within Brockman)

### *Wetland Communities of Minor Extent*

There are other unique wetland communities of minor extent in this valley which have not been described and have not been mapped or correlated to soil map units. This paper has mainly dealt with the more common soil/vegetation types and others are treated as inclusions within the more extensive units. This is in no way meant to diminish their importance or value as components of the landscape. Some examples are:

- 1-Azalea and/or Pitcher Plant Bogs
- 2-Tufted Hairgrass Meadow
- 3-Vernal pools and wet microsites
- 4-Bottomland sloughs, channels, drainageways (i.e. willow, sedge, rush, oatgrass, hardwoods, etc.)

### EXTENT AND COVERAGE OF POTENTIAL NATIVE VEGETATION

Combining soils and landform information along with vegetation sampling in the valley allowed us to attempt mapping the *historic potential* for native vegetation, using two possible approaches. The first approach is just to convert the soil map to a vegetation map, by changing every map unit to the most likely plant association related to the soil. Next, using GIS (Geographic Information System) we have produced an

interpretive map of vegetative potential. We know this approach is not 100% accurate but it is a major step towards developing this information.

### *Vegetation Extent by Geomorphic Surface*

Figure 6 shows the potential for upland vegetation (slopes over 20%) within the Interior Valley Vegetation Zone (43% of the zone). Gray represents ultrabasic, serpentine-peridotite slopes and related vegetation. Black represents the non-serpentine slopes and their Mixed Conifer-Hardwood vegetation.

Figures 7-10 display vegetation potential for the valley floor portion of the Interior Valley Zone where slopes are 20% or less. The proportion (%) of each plant association is calculated based on the *valley floor* only, not the entire Interior Valley Zone.

Figure 7 shows vegetation potential on non-serpentine terrace/fan soils of the valley floor (63%). Black represents low terrace Douglas fir forest (12%). Light gray represents Douglas fir forest with sugar pine potential which is probably the climatic climax for the valley floor (39%). Dark Gray represents the very gravelly Takilma soil with dominance of either Douglas fir or oak (12%).

Figure 8 shows vegetation of serpentine affected terraces/fans (17% of the valley floor). Light gray represents the outwash fan where Jeffery Pine/Fescue-Oniongrass savanna is so characteristic such as at the Illinois Valley Airport (3.5%). Two map units represent Douglas fir forest associations, one with sugar pine (4%) and one without (5%). Medium gray represents the Brockman soil map unit (5%) where dominance is variable (oak or Douglas fir).

Areas showing the vegetation potential for flood plain and drainageway soil cover about 20% of the valley floor. In addition, numerous minor occurrences of these soil/vegetation units are found as inclusions throughout the valley which are not accounted for here. Figure 9 shows only the well drained flood plain soils and 3 map units representing cottonwood (4%), ponderosa pine (6%) and Douglas fir (3%). Figure 10 shows only flood plain vegetation on poorly drained soils with four wetland vegetation map units (7%).

It was stated earlier that this approach was not 100% accurate, and on some soils it may be only 75 - 85% accurate at best. Consequently, a second method, on-site inspection for ecosystem mapping, was used which is more reliable for ecological classification of landscapes when combined with soil interpretation. It will certainly raise the degree of accuracy from that of the first approach.

For this reason, some corrections in potential vegetation are being made on a second interpretive map,

where field observations show differences, as a follow-up to the GIS generated map presented in this paper. Unfortunately, limited field time will prevent checking some of the area. Also, sizeable areas have been converted to urban, agricultural or commercial uses where the only source of data for classification will be the soil mapping.

### HISTORIC VEGETATION

A composite map of the Illinois Valley was assembled from the original 1855 township cadastral survey for the General Land Office. Both the map (not included here) and surveyor's field notes, provided references to native vegetation, as also noted by Borgias (1997) in his study of the French Flat area south of Cave Junction.

Interpreting this map is very interesting. Homestead fields as you would expect, were primarily on soils with the more open vegetation types which were easier to graze or prepare for farming than the surrounding, heavily wooded areas. About 75% of the prairie areas delineated on the map match soils supporting oak/bunchgrass, and mixed oak-conifer savanna types of potential native vegetation. Several grassy swale areas mapped in 1855, apparently represent drainageway vegetation within Wapato and Takilma soil map units. Indian burning probably originated periodically from the more open prairie vegetation areas which would have made them even more open. Some fires would have entered into adjacent forest, increasing the size of openings and thinning adjacent forest understories. However, not all fires may have run deep into adjacent forests, depending on current weather conditions and the flammability of forest cover at the time.

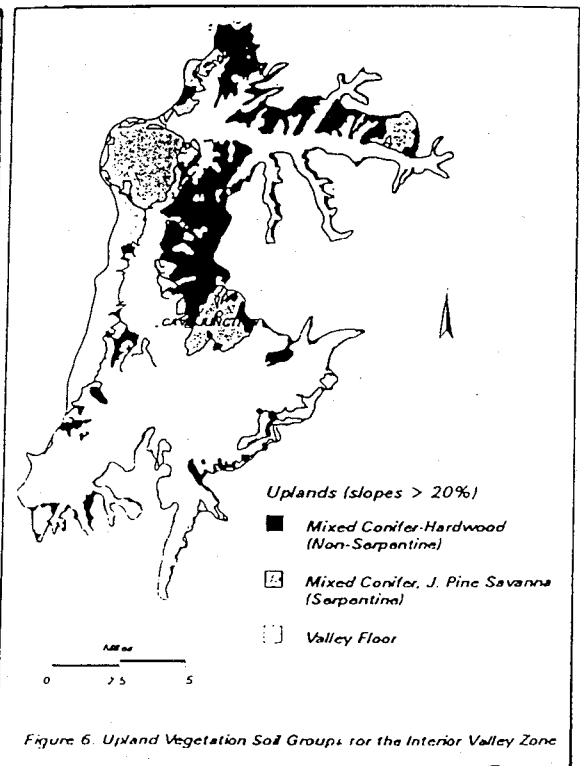
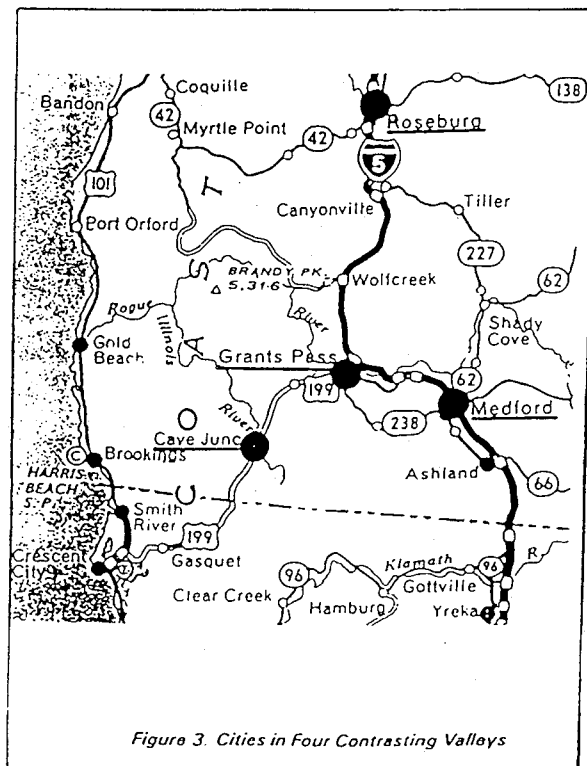
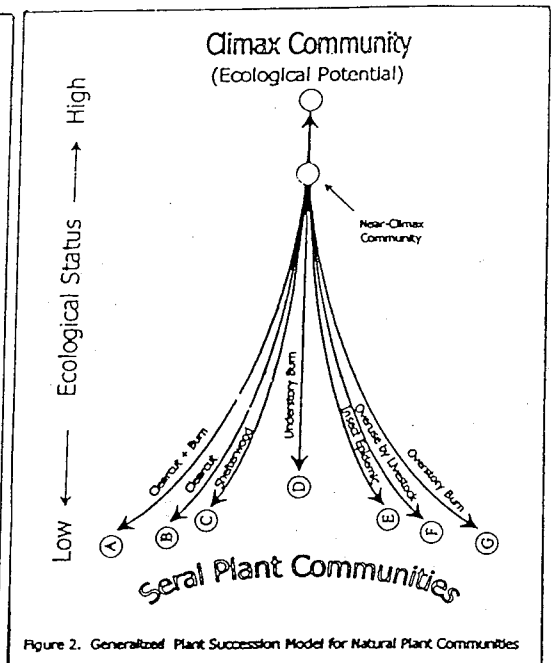
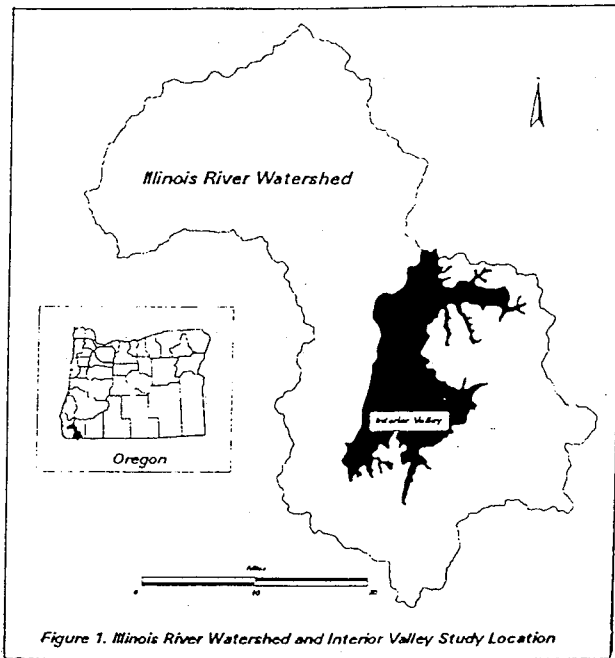
### CLOSING

In closing, it must be emphasized that work here on this

watershed assessment is still incomplete. However, most ecological work always seems incomplete, just one more approximation of a very complex system. Interpretive maps of vegetation at larger scales are being prepared in color which can be coordinated with soil maps and topographic maps. Vegetation plot data is being analyzed to validate the vegetation groups and summarize plant composition. More could be learned from further study of historical records. And no doubt there are other unsampled relic stands in the valley that if discovered, could give more insight for the interpretation of landscape vegetation potential.

### LITERATURE CITED

- Borgias, Darren, 1997. Woodland Succession over 140 years at French Flat: evidence from a time series of Cadastral Surveys. Unpublished Manuscript. The Nature Conservancy. Portland, Oregon.
- Daubenmire, Rexford. 1968. Plant Communities. Harper & Row Publishers, New York, New York. 300 pp.
- Hickman, O. Eugene, 1992. Plant Checklist for Range and Forest Inventories in Southwestern Oregon (Eastern Siskiyou and Southern Cascade Mountains). (2nd ed.) Rangeland Science Series No. 1 (Dept. Rangeland Resources), Oregon State University, Corvallis, Oregon.
- USDA Forest Service, 1996. Field Guide to Forested Plant Associations of Southwestern Oregon. Pacific Northwest Region. Portland, Oregon.
- USDA Natural Resources Conservation Service. 1994 (field work completion date). Soil Survey of Curry County Oregon.
- USDA Soil Conservation Service. 1983. Soil Survey of Josephine County Oregon. Portland, Oregon.
- Waring, R. H. 1969. Forest Plants of the Eastern Siskiyou: Their Environmental and Vegetational Distribution. Northwest Science, 43 (1): 1-17.



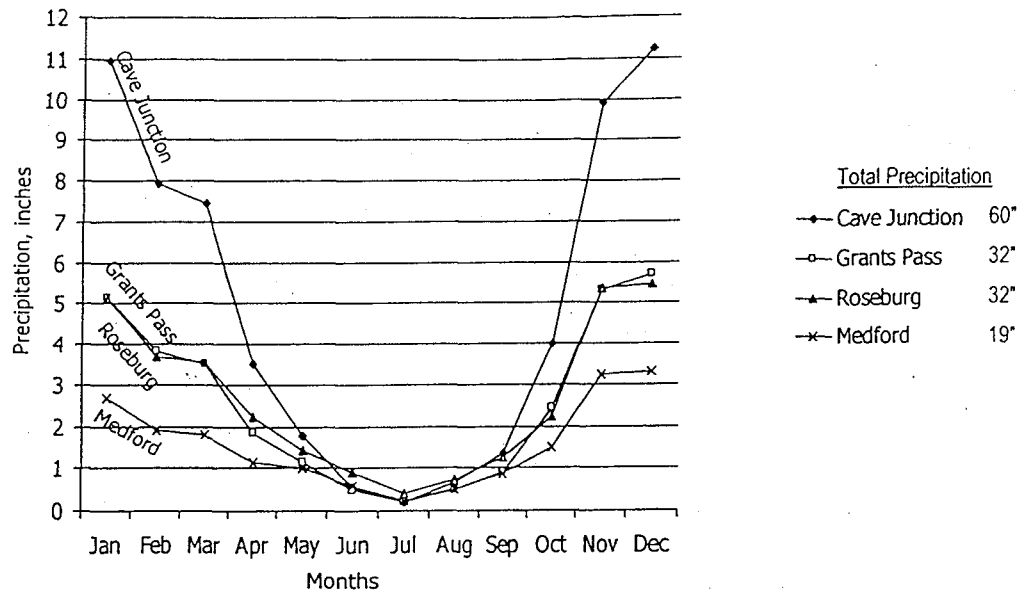


Figure 4: Average Monthly Precipitation in Four SW Oregon Valleys (1960-1990)

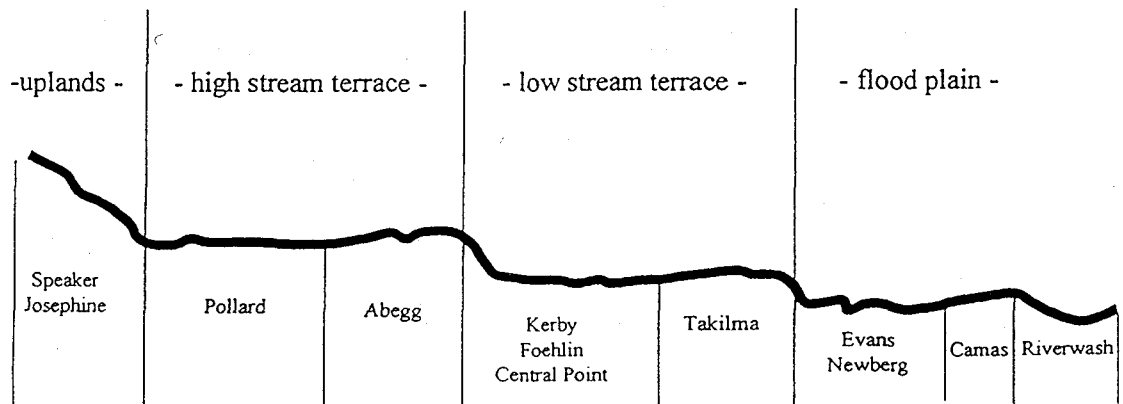
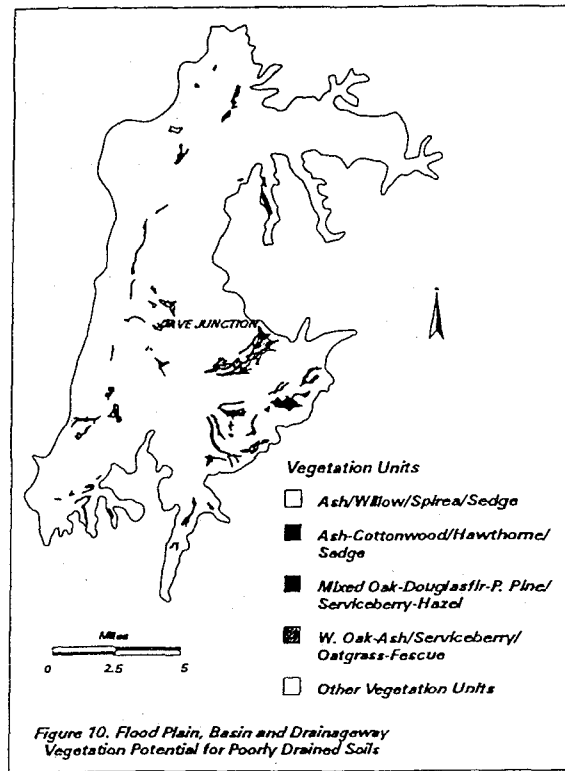
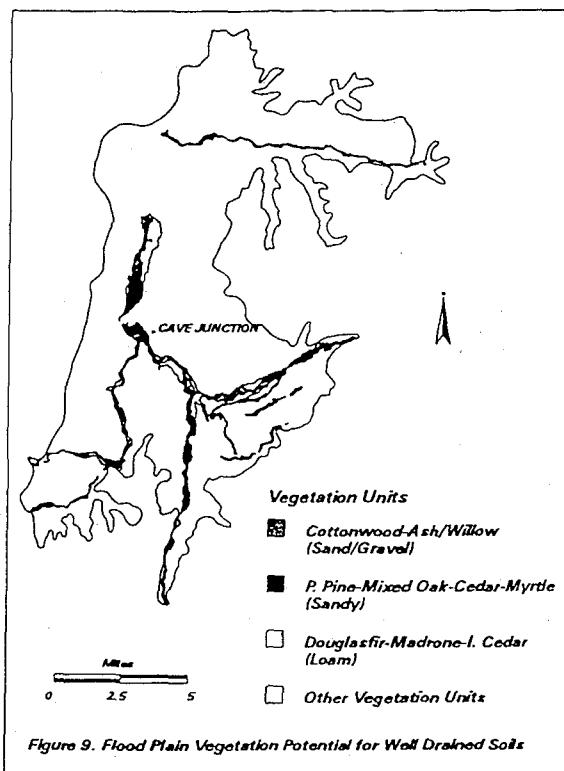
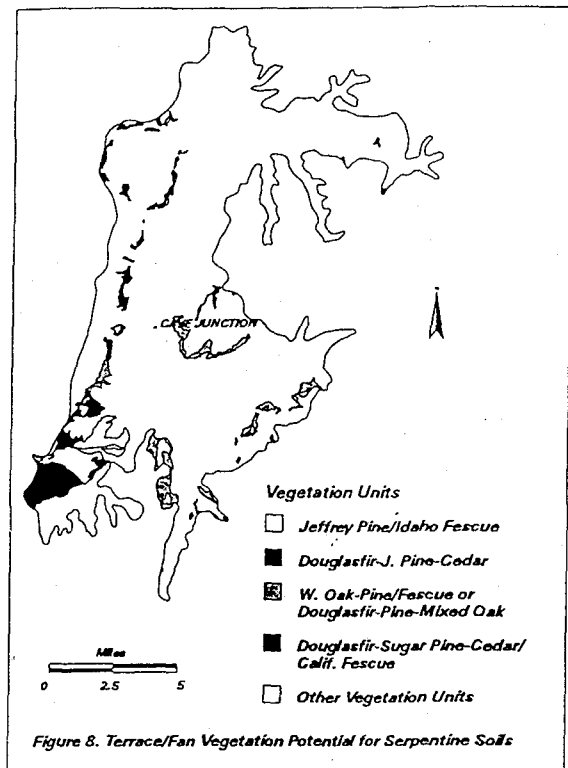
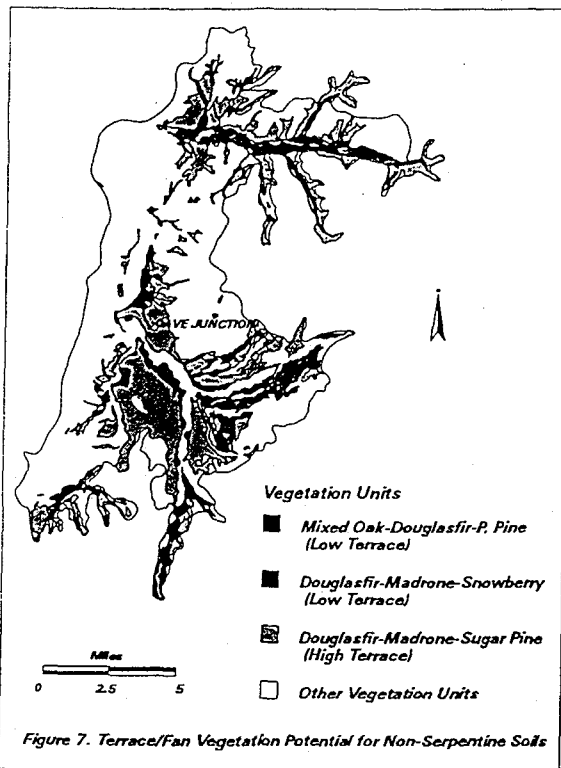


Figure 5. Idealized Landscape Profile for Non-Serpentine Soils



APPENDIX: PLANT NAMES CITED IN TEXT

| <u>COMMON NAME</u>               |                   | <u>SCIENTIFIC NAME*</u>                            |
|----------------------------------|-------------------|----------------------------------------------------|
|                                  | <i>TREES</i>      |                                                    |
| ash (Oregon)                     |                   | <i>Fraxinus latifolia</i>                          |
| black oak                        |                   | <i>Quercus kelloggii</i>                           |
| cottonwood (black)               |                   | <i>Populus balsamifera</i> var. <i>trichocarpa</i> |
| Douglas fir                      |                   | <i>Psuedotsuga menziesii</i>                       |
| hawthorn (black)                 |                   | <i>Crataegus douglasii</i>                         |
| incense cedar                    |                   | <i>Libocedrus decurrens</i>                        |
| Jeffery pine                     |                   | <i>Pinus jefferyi</i>                              |
| madrone (Pacific)                |                   | <i>Arbutus menziesii</i>                           |
| mixed oak (=white and black oak) |                   | -----                                              |
| mountain hemlock                 |                   | <i>Tsuga mertensiana</i>                           |
| mrytle (Oregon)                  |                   | <i>Umbellularia californica</i>                    |
| ponderosa pine                   |                   | <i>Pinus ponderosa</i>                             |
| Shasta fir                       |                   | <i>Abies magnifica</i> var. <i>shastensis</i>      |
| sugar pine                       |                   | <i>Pinus lambertiana</i>                           |
| tanoak                           |                   | <i>Lithocapus densiflorus</i>                      |
| white fir                        |                   | <i>Abies concolor</i>                              |
| white oak                        |                   | <i>Quercus garryana</i>                            |
|                                  | <i>SHRUBS</i>     |                                                    |
| azalea (western)                 |                   | <i>Rhododendron occidentale</i>                    |
| hazel (California)               |                   | <i>Corylus cornuta</i>                             |
| ninebark (Pacific)               |                   | <i>Physocarpus capitatus</i>                       |
| serviceberry (Pacific)           |                   | <i>Amelanchier alnifolia</i> var. <i>florida</i>   |
| snowbery (common)                |                   | <i>Symphoricarpos albus</i>                        |
| spirea (Douglas)                 |                   | <i>Spirea douglasii</i>                            |
| tall Oregongrape                 |                   | <i>Berberis aquifolium</i>                         |
|                                  | <i>HERBACEOUS</i> |                                                    |
| California fescue                |                   | <i>Festuca californica</i>                         |
| California oatgrass              |                   | <i>Danthonia californica</i> var. <i>americana</i> |
| Idaho fescue                     |                   | <i>Festuca idahoenses</i>                          |
| oniongrass (Geyer)               |                   | <i>Melica geyeri</i>                               |
| pitcher plant                    |                   | <i>Darlingtonia californica</i>                    |
| sedge                            |                   | <i>Carex</i>                                       |
| tufted hairgrass                 |                   | <i>Deschampsia cespitosa</i>                       |

\*Naming is according to PLANTS database (Oregon), USDA Natural Resources Conservation Service.