Table Mountain / Peoria Wildlife Area - Vegetation Mapping Classification

Photo Interpretive Guidelines for Mapping Vegetation

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For

California Native Plant Society

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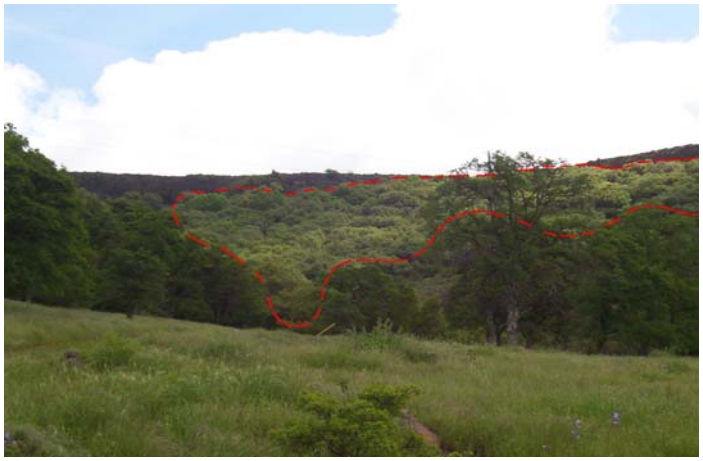
1201 – Interior Live Oak Alliance



Mapping Descriptions: Mapped where interior live oak dominates the canopy with at least 90% relative cover. Stands are generally dense but occasionally open with an understory of poison oak and grasses.

Environmental Parameters: Generally protected mid and low slopes trending north. More common just north of the tabletop.

Key Photo Signature Notes: Dark green on the natural color photography; generally dark gray on the DOQQ's. Variability primarily due to spring flush noted on some stands.

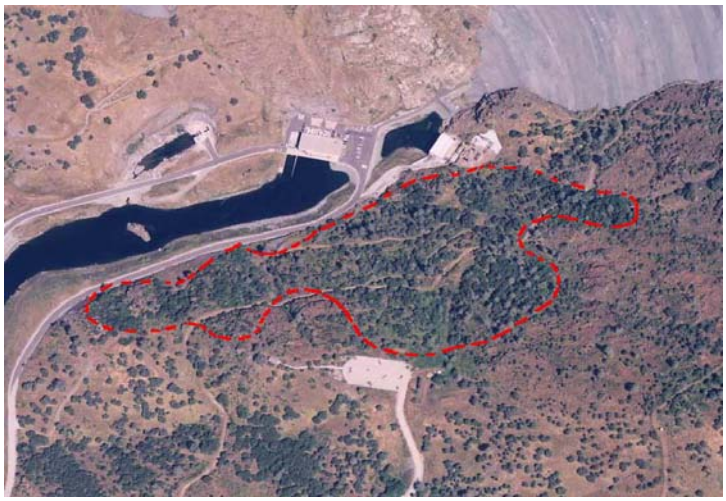
1202 – Interior Live Oak – Blue Oak Mapping Unit

Mapping Descriptions: Mapped where either species of oak contain at least 10% to 15% relative cover, generally in moderately dense to dense stands. Most stands contain a higher blue oak component.

Environmental Parameters: Dry mesic; intermediate between pure stands of blue oak and pure stands of interior oak, often in low to mid slope above intermittent streams.

Key Photo Signature Notes: Stands generally more open than pure interior oak; more closed than pure stands of blue oak. Signature is highly variable depending on species dominance and stand density.

1203 – Interior Live Oak – Buckeye Mapping Unit



Mapping Descriptions: Mapped in relative sparse to moderately dense settings where either species contain at least 10-15% relative cover. Sparser, rockier settings generally contain more buckeye.

Environmental Parameters: Moderately steep to steep, generally rocky on north trending lower to upper slopes.

Key Photo Signature Notes: DOQQ's yield leaf-off signature to the buckeye; aerial photography in leaf-on conditions. Leaf-on conditions of buckeye is similar to interior oak on the aerial photography although the crown is usually smaller and a bit darker green.

2101 – Foothill Pine / Herbaceous

Mapping Descriptions: Only several examples mapped; generally in open stands where foothill pine dominates with at least 85-90% relative cover over a grassy setting. Blue oak is a minor component to mapped stands.

Environmental Parameters:

Key Photo Signature Notes: Light gray to white on DOQQ's; smaller individuals hard to see or may be mistaken for oak. Signature from aerial photography is generally gray-blue and easy to distinguish.

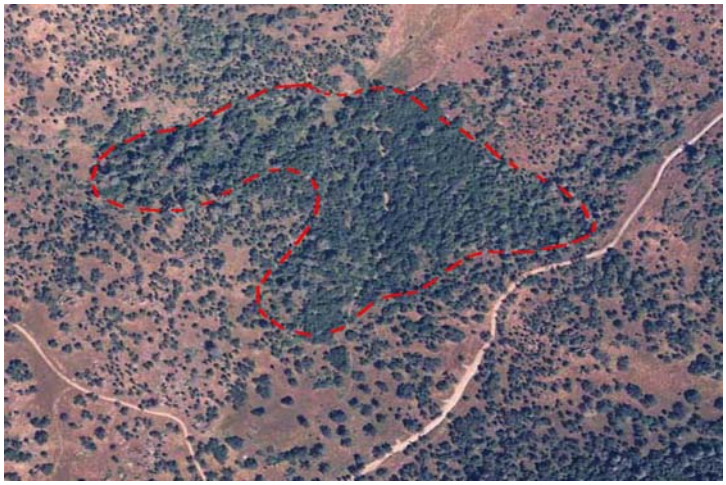
2102 – Foothill Pine – Blue Oak Mapping Unit

Mapping Descriptions: Mapped in open to moderately closed settings where foothill pine is an emergent to the oak canopy generally at least 2-5% absolute cover. Blue oak dominates the canopy layer with at least 85-90% relative cover. Mesic edges tend to contain some interior oak. Foothill pine is generally a very minor component to this woodland type.

Environmental Parameters: Dry mesic settings, generally on somewhat moister settings than pure stands of blue oak. Slopes are variable but rarely trend south.

Key Photo Signature Notes: Most stands are sparse which make it difficult to distinguish the presence/absence of foothill pine on the DOQQ's. Aerial photography yields a blue-gray signature for the pine and lighter green signature on the blue oak. Most blue oak individuals have an open crown.

2103 – Foothill Pine – Interior Live Oak Mapping Unit



Mapping Descriptions: Mapped in moderate to dense settings with an emergent canopy of at least 2-5% foothill pine. Interior live oak dominates the canopy with at least 85-90% relative cover. Emergent pine cover ranges from sparse to up to 25% absolute cover in the emergent layer.

Environmental Parameters: Rather mesic conditions; slopes trend north and are usually moderately steep. Generally more closed than other pine-oak types; especially foothill pine – blue oak.

Key Photo Signature Notes: DOQQ's yield a dark signature from the interior live oak with foothill pine contrasting as light. Generally a bit easier to see than emergent foothill pine to blue oak. Aerial photography yields a dark green signature with blue-gray scattered throughout the stand representing the pine.

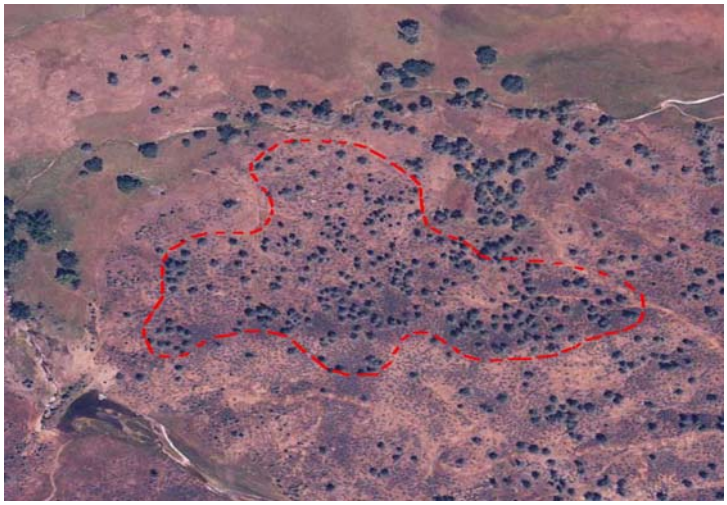
2104 – Foothill Pine – Blue Oak – Interior Oak Mapping Unit

Mapping Descriptions: Mapped in moderately open to closed settings where foothill pine is generally a sparse emergent with at least 2-5% absolute cover. Several stands contain as much as 25% absolute cover of pine. Mapped where either species of oak contain at least 10-15% relative cover. Oak dominance is variable with drier more open stands usually having blue oak as dominant.

Environmental Parameters: Mapped in similar settings to blue oak – interior oak woodlands.

Key Photo Signature Notes: Similar to blue oak interior oak signatures with foothill pine yielding a light signature off the DOQQ's. Sparse foothill pine stands are easily confused with blue oak. Aerial photography depicts emergent pine quite easily yielding a blue-green signature.

2106 – Foothill Pine / Wedgeleaf Ceanothus (Ceanothus cuneatus) Serpentine Mapping Unit



Mapping Descriptions: Sparse to extremely sparse stands of emergent foothill pine of at least 2-5% absolute cover (maximum about 10%) over sparse to moderately dense stands of wedge-leaf ceanothus cover a sparse herbaceous layer.

Environmental Parameters: On serpentine soils of varying intensity

Key Photo Signature Notes: Texture variances are evident on the DOQQ where sparse soil interfaces with rock. Ceanothus yields a light gray color. Aerial photography depicts higher detail in the pine overstory with presence of other shrubs such as toyon or yerba-santa.

3101 – Black Oak Alliance

Mapping Descriptions: Dense stands of black oak probably with a significant component of interior live oak towards the edges of the stands make up the several polygons mapped in the study area. Black oak makes up at least 50% of the relative canopy cover.

Environmental Parameters: Shady upper slopes just below the north side of the table top cliff extend in part down to the road.

Key Photo Signature Notes: On the DOQQ's it is nearly impossible to distinguish from mixed oak, although the signature is very dark and the texture is high. Texture and a somewhat lighter green color separates it out from interior oak on the aerial photography.

3102 – Mixed Valley Oak – (Foothill Pine – Blue Oak – Interior Oak – Buckeye)

Mapping Descriptions: Three stands mapped in the study. May actually be a minor component to a mixed valley-blue oak stand.

Environmental Parameters: Riparian

Key Photo Signature Notes: Only larger crown size indicates possible presence of valley oak on the DOQQ's; slightly more open crown and a brighter green color usually distinguishes this tree from adjacent blue oaks on the aerial photography.

3103 – Blue Oak / Herbaceous

Mapping Descriptions: Mapped where blue oak makes up at least 85-90% of the relative cover generally in sparse to moderately dense stands in a variety of stand sizes. Understory herbaceous is not distinguishable to association levels.

Environmental Parameters: Xeric to dry mesic settings; more mesic stands tend to have a higher cover and are usually on more north trending aspects.

Key Photo Signature Notes: Variable herbaceous understory colors or tones off both the aerial photography and DOQQ's. Blue oak is generally a lighter gray than interior oak. Blue oak tends to have a more open crown and is a lighter green than most interior oaks using the aerials.

3105: Blue Oak / Grass Post Burn Mapping Unit

Mapping Descriptions: See 3103

Environmental Parameters: Drier variant generally on upper and south trending slopes. Gold signature often corresponds to the edge of the woodland.

Key Photo Signature Notes: Aerial photography yields a gold signature to the herbaceous understory which may possibly depict an association within the blue oak alliance. Note: This understory signature for the most part corresponds to pure stands of blue oak only. Not distinguishable off the DOQQ's.

3106: Blue Oak / Poison Oak / Herbaceous Mapping Unit

Mapping Descriptions: Mapped where poison oak is visible (present) in the understory. Understory shrub cover varies significantly, at times up to 30-40% absolute cover. Rock outcroppings may or may not be present.

Environmental Parameters: Possibly fire or disturbance related or in context with rock outcroppings; otherwise generally a more mesic variant of the blue oak alliance.

Key Photo Signature Notes: Dark green understory, variable height and density, at times shrubby, poison oak understory to the blue oak is co-dominant with a dense herbaceous ground cover. Not distinguishable off the DOQQ's.

3110: Blue Oak – California Buckeye Tentative Mapping Unit

Mapping Descriptions: Several mapped units in the northern edge of the study by the reservoir generally have a high component of poison oak in the understory. Interior live oak may also be present in the mapped stands.

Environmental Parameters: Not presently known from a mapping perspective.

Key Photo Signature Notes: Difficult to separate out from adjacent woodlands; may be a mosaic of blue oak and buckeye in different micro-environments. Not distinguishable off the DOQQ's.

3109 – California Buckeye

Mapping Descriptions: Sparse to moderately dense stands of buckeye usually in pure stands but occasionally with a minor component of interior live oak. Understory may have poison oak; herbaceous understory is variable.

Environmental Parameters: Rockiness is key to most stands of buckeye; larger stands occur on steep north trending slopes that may not always be associated with rock.

Key Photo Signature Notes: Leaf off conditions noticeable on the DOQQ's; very dark color and smaller crown size usually distinguish it from interior live oak off the aerial photos.

4301 – Chamise Alliance

Mapping Descriptions: Usually occurs in dense to closed stands of chamise in pure stands or with less than 10 – 15% relative cover of other shrubs such as common manzanita or toyon.

Environmental Parameters: Post burn – or soil related? Xeric settings generally north of the table top in the eastern half of the study area.

Key Photo Signature Notes: DOQQ's yield a very smooth signature – medium gray; other shrub components are probably not distinguishable unless at least 25-40% of the relative cover. Aerial photography yields a greenish-brown signature depending on purity of the stand. Texture increases with species diversity.

4303 – Chamise – Manzanita (A. manzanita, A. viscida, A. glauca) Mapping Unit

Mapping Descriptions: Mapped in dense stands generally where common manzanita makes up at least 10-15% of the relative shrub cover. All stands were dominated by chamise.

Environmental Parameters: Adjacent to purer stands of chamise in slightly more mesic settings.

Key Photo Signature Notes: Aerial photography may depict significant components (at least 10%?) of common manzanita as a stippled white signature in an overall brownish background. Not distinguishable off the DOQQ's.

4304 – Wedge Leaf Ceanothus/ Lasthenia - Plantago Serpentine Mapping Unit

Mapping Descriptions: Usually sparse but occasionally moderately dense stands of wedge-leaf ceanothus over a generally sparse herbaceous understory of serpentine endemics characterize the stands of this type. Emergent foothill pine is less than 2-5% absolute cover.

Environmental Parameters: Serpentine soils of varying severity. Generally fairly rocky.

Key Photo Signature Notes: Light gray stipple pattern over a very light tone depicting the sparse herbaceous layer characterizes the signature from the DOQQ's. Rockiness easier to detect from the aerial photograpy.

4306 – Wedge Leaf Ceanothus

Mapping Descriptions: Small stands between the table mountain top and the reservoir occur as open shrublands within the oak woodland. Mapped polygons are under 5 acres in size.

Environmental Parameters: Post fire? Remnant of larger stands?

Key Photo Signature Notes: Noticeable on DOQQ's because they occur within oak woodlands; easier to recognize on the aerial photography, wedge-leaf ceanothus yields a gray-bluish signature similar to the ceanothus on the serpentine in the southern portion of the study.

4005 – Toyon Mapping Unit

Mapping Descriptions: More common as a component to other types, shrub stands dominated by toyon occur in only a few areas within the study.

Environmental Parameters:

Key Photo Signature Notes: Aerial photography yields a shrub in a dense setting with a very dark green signature. Somewhat smaller crown size than the buckeye.

4307 – Mimulus A. – Mixed Shrub / Spike Moss Mapping Unit

Mapping Descriptions: One polygon mapped based on plot data in talus-rocky setting below the cliff face of table mountain.

Environmental Parameters: Rocky

Key Photo Signature Notes: Not established

4308 – Chamise on Volcanics

Mapping Descriptions: Generally sparse stands of chamise with a strong herbaceous component.

Environmental Parameters: Mapped exclusively on the table top.

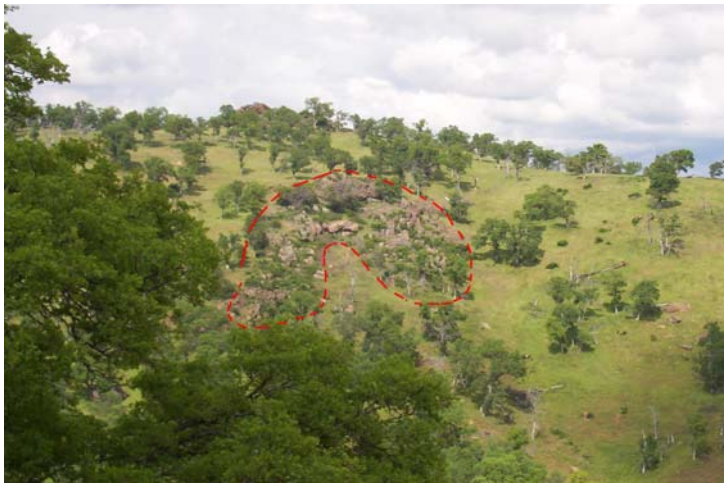
4401 – Eriodiction Mapping Unit

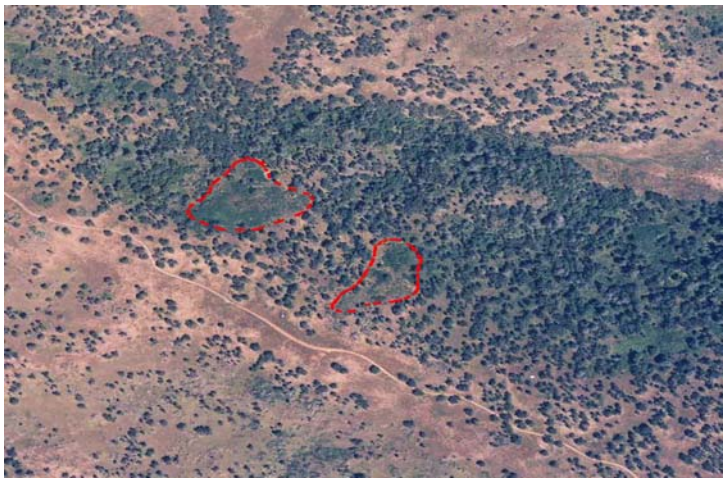
Mapping Descriptions: Sparse to dense stands of yerba santa (possibly more than one species) in medium to small polygons; generally as pure stands or mixing with a minor component of wedge-leaf ceanothus.

Environmental Parameters: Disturbance related; occurs in two settings; several examples occurring adjacent to the serpentine contact, and a couple of patches near the dam site.

Key Photo Signature Notes: Dark green signature; denser areas extremely dark green; patchy and often at the edge of serpentine areas.

5401 – Poison Oak Alliance





Mapping Descriptions: Sparse to nearly closed stands of poison oak, usually with a herbaceous understory. Emergent oak is generally under 2-5%. Occurs as openings to dense woodlands or in post burn settings, or in steep rocky areas associated with buckeye.

Environmental Parameters: Disturbance related?

Key Photo Signature Notes: Dark smooth signature on the DOQQ's; especially noticeable in as openings to the woodland canopy. Aerial photography yields highly variable textures depending on density and life form growth and colors which range from medium to very dark green.

6101 – Serpentine Native Wet Perennial Grassland (Hordeum brachyantherum, Carex spp., Juncus spp.) Mapping Unit

Mapping Descriptions: Primarily native temporarily flooded perennials including……., with or without a component of non-native annuals.

Environmental Parameters: Adjacent to or on serpentine soils in temporarily flooded swales or draws.

Key Photo Signature Notes: Appears dark gray on the DOQQ's; dark green on the aerial photography. Not distinguishable from other wet meadows off serpentine on either data sets. Mapped in conjunction with serpentine.

7101 – California Annual Grasslands Alliance

Mapping Descriptions: Generally dense stands of annuals grasses or grasses and forbs generally with under 2-5% emergent oaks.

Environmental Parameters: Grasslands are xeric to dry mesic and possibly related to disturbances from grazing or fire. Primarily occurs as openings in the woodland canopy.

Key Photo Signature Notes: Smooth light gray signature on the DOQQ's; highly variable colors on the aerial photography depending on forb content and species.

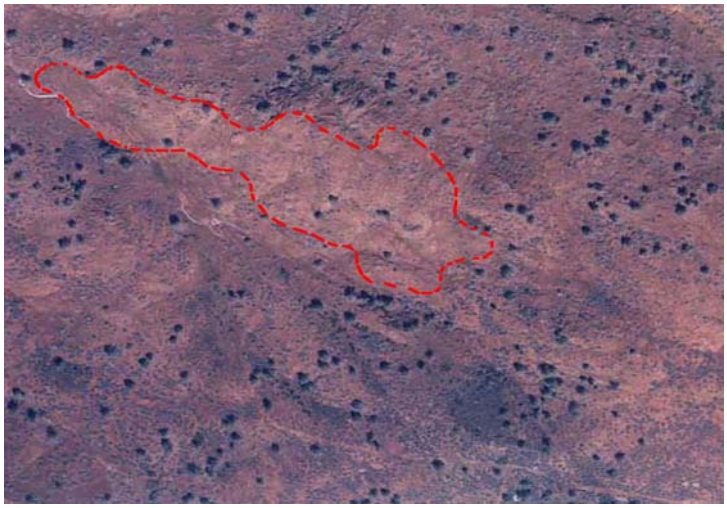
7102 – Volcanic Upland Herbaceous Matrix (Table Mountain top) Mapping Unit

Mapping Descriptions: Predominant herbaceous type on the table top – upland grasses and forbs; approximately 10 polygons mapped.

Environmental Parameters:

Key Photo Signature Notes: Variable depending on forb component; similar to upland annuals off the table top.

7103 – Serpentine Native Xeric Annual Herbaceous Mapping Unit



Mapping Descriptions: Small depressions and swales on ultra mafic serpentine derived soils; approximately 20 small polygons primarily in the southern portion of the study.

Environmental Parameters: Mapped on serpentine environments

Key Photo Signature Notes: Not distinguishable from herbaceous types off serpentine; mapped based on adjacent serpentine shrubs and trees.

7110 – Lupine Mapping Unit

Mapping Descriptions: Mapped on the table top adjacent to upland volcanic matrix where forb (primarily lupine) vegetation dominates the herbaceous component.

Environmental Parameters: Mapped exclusive on the table top

Key Photo Signature Notes: Yields a slightly darker signature than the sparser adjacent herbaceous vegetation.

7111 – Star Thistle Mapping Unit

Mapping Descriptions: Several very small polygons mapped throughout the non serpentine portions of the study.

Environmental Parameters:

Key Photo Signature Notes: Some stands yield a slightly greener signature than adjacent grasslands; this type generally occurs below the MMU and is extremely difficult to map.

7200 – Seasonally Flooded Grasslands & Forbs

Mapping Descriptions: Small wet depressions on non-serpentine soil around small farm ponds or depressions; eight polygons mapped in all

Environmental Parameters:

Key Photo Signature Notes:

7202 – Marsh Vegetation (Cattail – Bullrush- Scirpus

Mapping Descriptions: One polygon mapped in the eastern portion of the study

Environmental Parameters:

Key Photo Signature Notes:

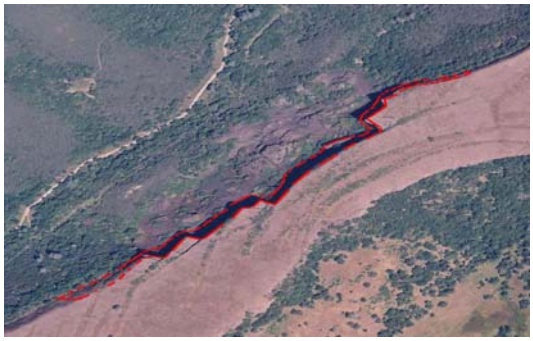
7203 – Wet Swales on the Table Top

Mapping Descriptions: Wet swales on the table top; approximately 20 polygons usually small narrow mapping units.

Environmental Parameters:

Key Photo Signature Notes:

9001 – Rock Outcrop – Cliff Face



9100 – Urban or Built Up

9200 – Agriculture

SPECIFICATIONS & COMPARISONS BETWEEN THE TWO MAPPING METHODOLOGIES

DOQQ APPROACH – (Heads-up Approach)

This methodology involves one primary step: Delineating the vegetation polygons directly onto the digital ortho-photo quad base using an ARC Edit session.

Specifications: Digital ortho-photo quarter quad USGS topo base. 1 meter pixel resolution derived from aerial photography rectified to USGS standard mapping protocols. Black & white dry-season imagery.

Advantages: More cost effective; eliminates the labor intensive step of rectifying the linework from a non digital to digitally rectified base. Photo interpreters delineate directly onto the computer screen in an Arc Edit session thus eliminating the entire geo-referencing process. Allows the photo interpreter to "zoom" to large scale close-ups and provides extremely high spatial accuracy and resolution.

Disadvantages: Black and white imagery allows for only the most basic floristic separation; especially in herbaceous communities. Foothill pine presence is difficult to detect in the oak canopy. Additional use of supplementary aerial photography slows the process with some increase in floristic accuracy.

Results: Approximately 535 polygons mapped using this approach with extremely high spatial accuracy and resolution but with floristic distinctions generally at the alliance level or above.

AIR-PHOTO INTERPRETATION APPROACH

This methodology involves three primary steps: 1) Interpreting the vegetation polygons onto mylar overlays to 9x9 stereo-paired 1:12000 aerial photos. 2) Digitizing – transforming the linework to the digital ortho-photo quad base. 3) Fine-tuning the rectified linework to the DOQQ photo signature.

Specifications: DOQQ digital base – as described above. 1:12000 (1 inch = approximately 1000 feet) color negatives with 60-70% overlap between photos and 30-50% overlap across the flightline path (sidelap). May photography (leaf on late spring conditions) - early season for deciduous trees (some leaf flush); mid season for flowering shrubs and late season for herbaceous.

Advantages: Allows for a higher separation of floristic breaks; generally at sub alliance and association level, except for herbaceous types. Allows for photo interpreter to view stereo using 3x or 6x magnification. Photo resolution is sub meter (approximately 10 to 16 inches)

Disadvantages: Much more labor intensive involving the rectifying of the final product to the DOQQ base. Input delineations are limited to the 1:12000 scale and are not quite as spatially accurate as direct heads-up input; although this difference is probably very minimal.

Results: Approximately 925 polygons mapped using this approach. Generally allows for a higher confidence between oak types, oak-pine to oak types and chaparral communities. Herbaceous divisions are also enhanced using the aerial photography.

Overall mapping trends among classes between the two methodologies generally were not noticeable. In some areas, the foothill pine component was over-mapped using the DOQQ approach (narrow crowned blue oak was mistaken as foothill pine); other areas it was under-mapped where not detected as a non-emergent component to the oak community. Floristic separation to higher levels however increased significantly (this is hard to quantify – but there were about 10 new categories discernable using the aerial photography). No accuracy assessment was performed on the DOQQ approach so an accuracy comparison between mapped types in both approaches is difficult to quantify.