

High Speed Rail Corridor Mapping Standards

Prepared by the Geographical Information Center, California State University, Chico

for the Strategic Growth Council
December 31, 2014



GEOGRAPHICAL
INFORMATION
CENTER

CALIFORNIA STATE UNIVERSITY, CHICO

Introduction

The Geographical Information Center (GIC) at California State University, Chico has completed a map of the natural vegetation of the proposed Tehachapi Pass High Speed Rail Corridor, which was funded by the Strategic Growth Council (SGC), with in-kind contributions from the Department of Fish and Wildlife (DFW). The map was developed for land managers, regional planners, and stakeholders to facilitate conservation, restoration, and regional planning. The High Speed Rail Mapping Project boundary was created by the Department of Fish and Wildlife, using elevation to help guide their boundary decisions. The elevation ranges from approximately 700 feet to just over 5,800 feet, which leads to a wide diversity of vegetation types. The northern boundary starts about four miles southwest of Bakersfield and extends south to the Mojave Desert, where other similar mapping has already been completed. The total area mapped for this project was 199,740 acres. This document describes the standards used for mapping vegetation within the High Speed Rail Mapping Project boundary.

Minimum Mapping Resolution

All vegetation was digitized at a scale of 1:2,000 using National Agricultural Inventory Program 2012 aerial imagery (USDA Summer 2012). Additional imagery and layers such as Google maps, Bing maps, Normalized Data Vegetation Index, and Color Infrared assisted in photo interpretation. The minimum mapping unit (MMU) for a vegetation polygon was one acre with an average width of >10 meters. Exceptions to the MMU rules were allowed for important or special stand types, such as *Celtis reticulata*. One other exception was for polygons that were on the edge of the mapping boundary.

Minimum Categorization Level

Vegetation Types

Vegetated polygons were mapped to the “Alliance” level of the National Vegetation Classification System (NVCS) hierarchy if it was possible to discern the vegetation type at the given resolution of the imagery. Otherwise, vegetation was mapped more broadly to the “Group” level. The mapping units (i.e., groups and alliances) were based on the vegetation classification key created by the Vegetation Classification and Mapping Program (VegCAMP) (Klein and Keeler-Wolf 2014) and in *A Manual of California Vegetation* (Sawyer et al. 2009). All of the mapping units presented at the end of this document in the “Vegetation Map Classes” section have been mapped at least once in the study area.

Vegetation Cover

All vegetation cover was estimated using “Birdseye Total Cover,” i.e. what can be seen on the aerial photo excluding understory layers when covered by an overstory layer. Polygons were delineated following the cover class rules listed below. Boundaries and breaks in polygons within the same alliance

were determined by significant changes in density, species composition, size, and disturbance. These boundaries and breaks were often driven by changes in slope, aspect, and/or soil type.

Absolute cover: The actual percentage of the surface area of a polygon that is covered by a species. When surveying from the ground the total percentage can actually exceed 100%, due to overlapping layers of vegetation types. When doing aerial estimates, the overlapping layers are not accounted for and the maximum value for a polygon is 100%. Typically this value is far lower due to the porosity of vegetation.

Relative cover: The percentage of surface area within a polygon that is covered either by one species relative to other species within the same physiognomic stratum (tree, shrub, herbaceous) or one stratum relative to the total vegetation cover in a polygon. Thus, 50 percent relative cover of *Quercus douglasii* in the tree layer means that *Q. douglasii* comprises half the cover of all tree species within a polygon; 50 percent relative shrub cover means that shrubs make up half the cover of all vegetation within a polygon. Relative cover values are proportional numbers that, when added together, total 100 percent for each species within a stratum or each stratum within a stand of vegetation.

Tree type alliances were mapped when trees were $\geq 5\%$ of the polygon. The trees that were exempt from this rule were *Juniperus californica*, *Yucca brevifolia*, and *Pinus monophylla* (threshold values can be found at the end of this document in the "Mapping Thresholds" section). The percent of absolute tree cover was estimated taking into account the porosity of the tree canopy. Tree canopies over water, were digitized following the canopy line (as opposed to estimating the shore line beneath the canopy). If there was a change in canopy overstory density or size class within the same alliance, the polygon was segregated if it was >5 acres. If it was the understory layer that changed and the alliance remained the same, the polygon was segregated if >10 acres.

Shrub vegetation alliances were mapped when tree cover was $<5\%$, and shrub cover was $\geq 10\%$. The percent of absolute shrub cover was estimated taking into account the porosity of the shrub layer. There are several exceptions to this rule when in desert or transitional desert eco-regions, and select shrub alliances were mapped when evenly dispersed down to 2% (threshold values can be found at the end of this document in the "Mapping Thresholds" section).

Most of the herbaceous polygons were left at the group level due to the limits of aerial photo interpretation and resolution. Herbaceous vegetation types were mapped to the group/alliance level when tree cover was $< 5\%$, shrub cover was $<10\%$, and the herbaceous plant cover was $\geq 10\%$. The percent of absolute herbaceous cover was estimated taking into account the porosity of the herbaceous layer.

Agriculture, Urban, Water, Barren Gravel, Sand, Pastures, and Roads

The MMU for agricultural polygons (AGR) was 10 acres.

The MMU for urban polygons (URB) was 10 acres.

The MMU for water (WAT) was 1 acre.

The MMU for Quarry, Mine, Gravel (QMG) was 1 acre.

Pasture and grazing land that didn't appear to be irrigated was mapped as CAI, the California Introduced Annual and Perennial Herbaceous group, if over 1 acre in size. If pasture was less than 5 acres and appeared to be irrigated, it was usually grouped with AGR, unless it was in an urban setting, when it was grouped with URB (for example, pastures around ranchettes). If it was irrigated and over 5 acres, it was mapped as AGR. When mapping urban or transitional urban settings, agriculture and grasslands were pulled out when over 5 acres.

Bare Gravel and Sand (BGS) polygons were delineated when the polygon consisted of < 5% tree cover, <10% shrub cover, <10% herbaceous plant cover, and was over one acre in size.

Roads less than 10 meters wide were dissolved into other polygon types, while roads wider than 10 meters were labeled as Urban or Agriculture depending on their adjacency/proximal location. Tree canopy hanging over roads, regardless of road width, was mapped as the tree type.

Wind power installations were mapped as Quarry, Mine, Gravel when polygons were greater than one acre.

Attributes and Associated Rules

NVCSNAME

The standardized name of the vegetation description used in the National Vegetation Classification System. Since the NVCS does not have categories for human land use or otherwise unvegetated land, those descriptions were drawn from the California Wildlife Habitat Relationship.

NVCSLEVEL

The level of the National Vegetation Classification System to which the vegetation type corresponds.

MAPCLASS

The finest level of vegetation type mapped (alliance, group or macrogroup); or land use for polygons that are not natural vegetation, per the mapping classification. Polygons were mapped to the alliance level following the membership rules defined in A Manual of California Vegetation (Sawyer et al. 2009); Vegetation Alliances and Associations of the Great Valley Ecoregion, California (Buck-Diaz et al. 2012); Hierarchical Field and Mapping Key to the Vegetation Map of the Proposed Tehachapi Pass High Speed Rail Corridor (Klein and Keeler-Wolf 2014).

HT_CODE

Tree heights were estimated and coded using the following ranges:

- 4 = 2 – 5 meters
- 5 = 5 – 10 meters
- 6 = 10 – 15 meters
- 7 = > 15 meters

SIZE_CATEGORY

Tree diameters at breast height were estimated and categorized following *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer, Jr. 1988).

- 1 = Seedlings (<1")
- 2 = Saplings (1-6")
- 3 = Pole (6-11")
- 4 = Small (11-24")
- 5 = Medium – large (>24")
- 6 = Multi layered medium/large over small

Note: All of the following vegetation cover classes were estimated using "Birdseye Total Cover," i.e. what can be seen on the aerial photo excluding understory layers when covered by an over-story layer.

PER_HARDWOOD

The percentage of hardwood tree cover was estimated using absolute cover. This is the proportion of the entire polygon that trees occupy taking into account the porosity of the canopy. Understory portions of trees, shrubs and grasses covered by the overstory layers are not accounted for, as they are not visually observable via aerial photos. The absolute cover value could range from 0-100, with a value over 60 being rare due to vegetative porosity and natural tree growth patterns. A value of 0.2 was used when hardwood cover totaled only a fraction of a percent.

PER_CONIFER

The same method was used to estimate the percentage of conifers as was used for hardwoods.

PER_TREE

This value represents the total absolute cover of trees in a polygon which equals the sum of hardwoods plus conifers. In Agricultural (AGR), Urban (URB), and Quarry, Mine, Gravel (QMG) polygons PER_TREE was coded with '333'.

PER_SHRUB

Absolute cover was used to estimate the percentage of shrubs present in a polygon. Shrub values were recorded in 1% increments. **The forty percent rule:** If the overstory layer(s) were greater or equal to 40% then the understory layer(s) would not be visible in the aerial photo and would not be estimated. If tree cover was greater than or equal to 40%, '99' was entered for the shrub value. In Agricultural (AGR) and Urban (URB) polygons PER_SHRUB was coded with '333'. Table 1 summarizes this rule.

HERB_CODE

Herb cover was estimated in percent cover ranges, when total tree and shrub cover was <40% and herbs were ≥10%. If tree and shrub cover was greater than or equal to 40%, '99' was entered as the herb cover value. For AGR and URB polygons the herb class was left null.

Herb cover coded as:

- 1 = <2%
- 2 = 2-9%
- 3 = 10-39%
- 4 = 40-59%
- 5 = >60%

TYPE	>40%	>40% Tree &/or Shrub	<40% Tree &/or Shrub
Tree	1% Increment	1% Increment	1% Increment
Shrub	99	1% Increment	1% Increment
Herb	99	99	Cover class

Table 1 Shows how the >40% cover rule is used to code Shrub and Herb categories

PER_TOTAL_COVER

The percent of total cover was calculated by adding the total tree, shrub, and the mean of the herbaceous layers. Mean values for the range of the herbaceous layer were rounded to the values of 1, 5, 25, 50, and 80.

Note: Due to taking the mean value for the herbaceous layer, for some of the polygons, total cover may be slightly over or underestimated.

ISOLATED_TREE

“Yes” indicates presence of natural or semi-natural isolated trees in agricultural, shrub, and herbaceous polygons when the presence of trees is <5%. Actual percentage of tree cover is reported in the PER_TREE field. HT_CODE and SIZE_CATEGORY are NULL.

Null indicates no natural or semi-natural isolated trees are present.

JOHSUA_TREE The presence of Joshua trees was recorded using the following categories:

N/A Not applicable, outside of the range of Joshua tree

None or Not Observable

0-1%

1-5%

Greater than 5%

RESTORATION

If a portion, or the entirety of a polygon, was interpreted as a restoration site, then a “Yes” (Y) value was entered, otherwise the field was left null. A compilation layer of restored lands from 2007 was also used to assist this decision.

CLEARING_DISTURBANCE

Clearing disturbance codes were assigned to each natural or semi-natural mapped polygon using the following categories:

High Disturbance: Over 50% of the polygon is affected by roads, trails, disk activity, or scrapes.

Moderate Disturbance: Between 25% and 50% of the polygon is affected by roads, trails, disk activity, or scrapes.

Minimal Disturbance: At least 5% and less than 25% of the polygon is affected by roads, trails, disk activity or scrapes.

No Disturbance: Less than 5% of the polygon is affected by roads, trails, disk activity or scrapes.

INVASIVE_PLANT

Invasive plant codes were determined using absolute cover estimates and assigned to each natural or semi-natural polygon using the following categories:

High Invasive Plant Content: Over 50% of the polygon is covered with invasive plants

Moderate Invasive Plant Content: Between 25% and 50% of the polygon is covered with invasive plants.

Minimal Invasive Plant Content: Between 5% and 25% of the polygon is covered with invasive plants.

No Invasive Plant Content: Less than 5% of the polygon is covered with invasive plants.

Note: The only invasive species recorded were those that were clearly interpretable using aerial imagery. There may be invasive species present that are not mapped or recorded. California introduced annual and perennial herbaceous (CAI) polygons are weedy by definition and were coded assuming that the majority of the vegetation was not indigenous.

UID

Unique identifier for each polygon.

CALVEGNAME

A crosswalk to the Classification and Assessment with Landsat of Visible Ecological Groupings (CalVeg) vegetation system (USDA Forest Service). Note that there may be a one-to-many relationship between CalVeg and NVCS.

CALVEGCODE

The CalVeg code.

CWHRTYPE

A crosswalk to the California Wildlife Habitat Relationships system. Note that there is usually a one-to-many relationship between CWHR and NVCS.

CWHRCODE

The CWHR code.

GLOBALRANK

The global rarity rank of the plant community (only for polygons mapped to the Alliance level)

- G1 fewer than 6 viable occurrences and/or 2000 acres worldwide
- G2 6–20 viable occurrences and/or 2000–10,000 acres worldwide
- G3 21–100 viable occurrences and/or 10,000–50,000 acres worldwide
- G4 greater than 100 viable occurrences and/or greater than 50,000 acres worldwide
- G5 community demonstrably secure due to secure worldwide abundance

STATERRANK

The state rarity rank of the plant community (only for polygons mapped to the Alliance level). The state rank will always be less than (more rare) or equal to the global rank.

- S1 fewer than 6 viable occurrences and/or 2000 acres statewide

- S2 6–20 viable occurrences and/or 2000–10,000 acres statewide
- S3 21–100 viable occurrences and/or 10,000–50,000 acres statewide
- S4 greater than 100 viable occurrences and/or greater than 50,000 acres statewide
- S5 community demonstrably secure due to secure statewide abundance

RARE

Rarity of the vegetation type

- Y alliances and associations with state rank S1–S3
- N not rare

CACODE

California Natural Community Code - unique code assigned to Alliances and Associations.

NVCSALLIANCE

The standardized name for the alliance within the National Vegetation Classification System.

NVCSGROUP

The standardized name for the group within the National Vegetation Classification System.

NVCSMG

The standardized name for the macrogroup within the National Vegetation Classification System.

Vegetation Map Classes

Following is a list of Groups (beginning with their map codes and bolded) with their associated Alliances based on Buck-Diaz et al. (2012) and Sawyer et al. (2009). There are several mapping units that do not correspond to NVCS types.

Notes: As the project evolved it was decided not to lose the detail that was discovered when field work was being completed. For this reason, there are a few types determined not to be recognizable via aerial interpretation that were observed in the field and have reported acreages.

AGP – Alkali Grassland Playa/Pool Matrix

This mapping unit is used for areas that contain below-MMU sparsely vegetated playas/pools and small stands of *Suaeda*, *Allenrolfea*, and/or *Atriplex* species, and native or non-native herbaceous vegetation.

CAI - California Introduced Annual and Perennial Herbaceous

Centaurea (solstitialis, melitensis) Semi-natural Stands

CCC – Central California Coast Ranges Cliff and Canyon

Selaginella bigelovii Alliance

CCS – Central and South Coastal Californian Coastal Sage Scrub

Eriogonum fasciculatum Alliance

Eriogonum wrightii Alliance

Hesperoyucca whipplei Provisional Alliance

CFG - California Annual Forbs and Grasses

Amsinckia (menziesii, tessellata) Alliance

Artemisia dracunculus Alliance

Eschscholzia (californica) Alliance

Holocarpha (heermannii, virgata) Provisional Alliance

Lasthenia californica-Plantago erecta-Vulpia (=Festuca) microstachys Alliance

Lotus purshianus (=Acmispon americanus) Alliance

Plagiobothrys nothofulvus Alliance

CMC - Californian Mesic Chaparral

Cercocarpus betuloides Alliance

CMF - California Montane Conifer Forest

Abies concolor Alliance

Pinus ponderosa Alliance

CSS - Central and South Coastal California Seral Scrub

Corethrogyne filaginifolia Provisional Alliance

Ericameria linearifolia-Peritoma arborea Alliance

Gutierrezia californica Provisional Alliance

Isocoma acradenia Provisional Alliance

Lotus scoparius (=Acmispon glaber) Alliance

Lupinus albifrons Alliance

CXC - California Xeric Chaparral

Arctostaphylos viscida Alliance

Ceanothus cuneatus Alliance

DAM - Western North American Disturbed Alkaline Marsh and Meadow

DCO – North American Warm Desert Bedrock Cliff and Outcrop

Eriogonum (clavatum, inflatum) Provisional Alliance

DUP – Dry Upland Perennial Grassland

Poa secunda Alliance

DWS – Sonoran/Coloradan Semi-Desert Wash Woodland/Scrub

Prosopis glandulosa Alliance

ECW – California Evergreen Coniferous Forest and Woodland

Juniperus californica Alliance

Pinus sabiniana Alliance

FEM - Freshwater Emergent Marsh

Schoenoplectus (californicus, acutus) Mapping Unit

Typha (angustifolia, domingensis, latifolia) Mapping Unit

IDS – Intermontane Deep or Well-Drained Soil Scrub

Ephedra nevadensis Alliance

Ephedra viridis Alliance

Grayia spinosa Alliance

Lycium andersonii Alliance

IMF - Introduced North American Mediterranean Forest

Ailanthus altissima Provisional Semi-natural Stands

Eucalyptus (globulus, camaldulensis) Semi-natural Stands

Ornamental Trees Mapping Unit

ISS – Intermontane Seral Scrub

Encelia virginensis Alliance

Ericameria cooperi Alliance

Ericameria nauseosa Alliance

Ericameria teretifolia Alliance

Gutierrezia sarothrae Alliance

LDS – Lower Bajada and Fan Mojavean/Sonoran Desert Scrub

Ambrosia dumosa Alliance

Ambrosia salsola Alliance

Atriplex polycarpa Alliance

Larrea tridentata Alliance

Larrea tridentata–*Ambrosia dumosa* Alliance

MCW – Western Great Basin Montane Conifer Woodland

Pinus monophylla Alliance

MDS – Western Cordilleran Montane Deciduous Scrub

Prunus virginiana Provisional Shrubland Alliance

Rhus trilobata Provisional Alliance

Ribes quercetorum Alliance

MRC - Mogollon Rim Chaparral

Ceanothus greggii Shrubland Alliance

MSC – Western Mojavean and Western Sonoran Desert Borderland Chaparral

Quercus john-tuckeri Alliance

MWS – Mojavean Semi-Desert Wash Scrub

Ephedra californica Alliance

Lepidospartum squamatum Alliance

Prunus fasciculata Alliance

NRW - Naturalized Warm-Temperate Riparian/Wetland

NTF - Naturalized Temperate Pacific Freshwater Vegetation

Eichhornia crassipes Provisional Semi-natural Stands

Ludwigia (hexapetala, peploides) Semi-natural Stands

Myriophyllum spp. Alliance

PMC – Californian Pre-montane Chaparral

Ceanothus leucodermis Alliance

Quercus wislizeni shrub Alliance

RIS - Riparian Introduced Scrub

Tamarix spp. Semi-natural Stands

RWF - Riparian Evergreen and Deciduous Woodland

Platanus racemosa Alliance

Populus fremontii Alliance

Quercus lobata riparian Alliance

Salix gooddingii Alliance

Salix laevigata Alliance

RWS - Southwestern North American Riparian Wash/Scrub

Baccharis salicifolia Alliance

Celtis reticulata Provisional Special Stand

Forestiera pubescens Alliance

Salix exigua Alliance

Salix lasiolepis Alliance

Sambucus nigra Alliance

SCS – Intermountain Shallow/Calcareous Soil Scrub

Purshia tridentata Alliance

SDG – Southern Great Basin Semi-Desert Grassland

Stipa speciosa Alliance

SSB - Southwestern North American Salt Basin and High Marsh

Frankenia salina Alliance

SSS – Shadscale/Saltbush Cool Semi-Desert Scrub

Atriplex canescens Alliance

TSS – Inter-Mountain West Mesic Tall Sagebrush Shrubland and Steppe

Artemisia tridentata Alliance

UDS – Mojavean Upper Desert Scrub

Eriogonum fasciculatum-(*Viguiera parishii*) Provisional Alliance

Salazaria mexicana Alliance

Yucca brevifolia Alliance

VCS – Vancouverian Coastal Deciduous Scrub

Toxicodendron diversilobum Alliance

VPG - California Vernal Pool and Grassland Matrix Mapping Unit

This mapping unit is used for areas that contain below-MMU vernal pools and swales (VPG) in an upland matrix of California Annual Forbs and Grasses (CFG).

WTM - California Warm Temperate Marsh/Seep

Carex densa Provisional Alliance

Juncus arcticus (var. *balticus*, *mexicanus*) Alliance

Elymus triticoides Alliance

Mimulus (guttatus) Alliance

WVO - California Broadleaf Forest and Woodland

Aesculus californica Alliance

Quercus chrysolepis Alliance

Quercus douglasii Alliance

Quercus kelloggii Alliance

Quercus lobata upland Alliance

Quercus wislizeni Alliance

Non-Vegetation Map Classes

AGR - Agriculture

BGS - Bare Gravel and Sand

CRO - Cliffs and Rock Outcrops

QMG – Quarry, Mining, Gravel

URB - Urban

WAT - Open Water

Mapping Thresholds

Trees

ECW: *Juniperus californica* $\geq 2\%$ when evenly distributed in a desert environment

MCW: *Pinus monophylla* $> 1\%$ when with non-desert shrubs (such as *Adenostoma*, *Ceanothus*, *Arctostaphylos*, or *Quercus john-tuckeri*)

UDS: *Yucca brevifolia* $\geq 1\%$ when evenly distributed in a desert environment. If *Juniperus californica* is present, *Yucca brevifolia* must be 2x the cover of *Juniperus*. If *Pinus monophylla* is present, it must be less than 1% or unevenly distributed.

Shrubs

CCS: *Eriogonum fasciculatum* $\geq 2\%$

Eriogonum wrightii $\geq 2\%$

Hesperoyucca whipplei $\geq 2\%$ (if with *Eriogonum fasciculatum*, *Hesperoyucca whipplei* must be strongly dominant)

CMC: *Cercocarpus betuloides* $\geq 10\%$

CSS: *Corethrogyne filaginifolia* $\geq 2\%$

Ericameria linearifolia-*Peritoma arborea* $\geq 2\%$

Gutierrezia californica $\geq 2\%$

Isocoma acradenia $\geq 2\%$

Lupinus albifrons $\geq 2\%$

Peritoma arborea $\geq 2\%$

CXC: *Arctostaphylos viscida* $\geq 10\%$

- Ceanothus cuneatus* ≥10%
- DWS: *Prosopis glandulosa* ≥2%
- IDS: *Ephedra nevadensis* >2%
- Ephedra viridis* ≥2%
- Grayia spinosa* ≥2%
- Lycium andersonii* ≥2%
- ISS: *Encelia virginensis* ≥2% (unless mixed with *Eriogonum fasciculatum*, *Ephedra nevadensis*, or other desert species, then these go into the desert mixed *Eriogonum fasciculatum* Alliance)
- Ericameria cooperi* ≥2%
- Ericameria nauseosa* ≥2%
- Ericameria teretifolia* ≥2%
- LDS: *Ambrosia dumosa* ≥2%
- Ambrosia salsola* ≥2%
- Atriplex polycarpa* >2%
- Larrea tridentata* ≥ 2%
- Larrea tridentata*-*Ambrosia dumosa* ≥2%
- MDS: *Rhus trilobata* ≥10%
- Ribes quercetorum* ≥10%
- Prunus virginiana* ≥10%
- MRC: *Ceanothus greggii* ≥10% (if no other shrubs have higher cover and *Ceanothus greggii* is evenly distributed, the value can go as low as 2%)
- MWS: *Ephedra californica* ≥1%
- Lepidospartum squamatum* ≥1%
- Prunus fasciculata* ≥2%
- MSC: *Quercus john-tuckeri* ≥10%
- PMC: *Ceanothus leucodermis* ≥10%

RIS: *Tamarix* spp. $\geq 3\%$

RWS: *Baccharis salicifolia* $\geq 10\%$ (unless it is the only shrub in a rocky riparian setting - then it can go down to 7 or 8%)

Forestiera pubescens $\geq 10\%$

Sambucus nigra $\geq 10\%$ (unless it is the only shrub in a rocky riparian setting - then it can go down to 7 or 8%)

Celtis reticulata $\geq 10\%$ (unless it is the only shrub in a rocky riparian setting - then it can go down to 7 or 8%)

Salix lasiolepis $\geq 10\%$

SCS: *Purshia tridentata* $\geq 2\%$

SSB: *Frankenia salina* $\geq 2\%$

SSS: *Atriplex canescens* $> 2\%$

TSS: *Artemisia tridentata* $\geq 2\%$

UDS: *Eriogonum fasciculatum*-(*Viguiera parishii*) Provisional $\geq 2\%$

Salazaria mexicana $\geq 2\%$ (as long as *Ephedra nevadensis* or *Ephedra viridis* do not co-dominate)

VCS: *Toxicodendron diversilobum* $\geq 10\%$

Map Verification

This map was independently verified by staff of the California Department of Fish and Wildlife. The producers (GIC) scored an 84.7% on the accuracy of the assessed polygons. A report discussing the map accuracy can be found here: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=100932>

Literature Cited

Buck-Diaz, J., S. Batiuck and J. Evens. 2012. Vegetation Alliances and Associations of the Great Valley Ecoregion, California. California Native Plant Society.

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=64011>

Klein, A. and T. Keeler Wolf. 2014. Hierarchical Field and Mapping Key to the Vegetation Map of the Proposed Tehachapi Pass High Speed Rail Corridor. California Department of Fish and Wildlife.

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=101349>.

Mayer, K. and W. Laudenslayer, Jr. (eds.) 1988. A Guide to Wildlife Habitats of California. State of California, Resources Agency, Department of Fish and Game Sacramento, CA. 166 pp.

Sawyer, J.O., T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation, 2nd Edition. California Native Plant Society, Sacramento, CA.

Vegetation Classification and Mapping Program (VegCAMP). 2013. Accuracy assessment of the East Sacramento Valley Natural Vegetation Map. California Department of Fish and Wildlife. Sacramento, Ca. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=58678>