

Major Land Resource Area 018X Sierra Nevada Foothills

Accessed: 05/16/2026

Ecological site keys

MLRA 18

I. Azonal, ecological sites defined by hydrology rather than soil properties (ie riparian) (LRUX)

A. Soils in a thermic temperature regime

1 Site receives surface water flow or has a water table associated with stream hydrology

i. Site occurs along perennial streams and rivers

a. Stream gradient steep (exceeding 15%) ... R018XX100CA – Intermittent Steep A Channels

b. Lower stream gradient, often higher order stream (4th or above) ... R018XX101CA – Mid Gradient Riparian Complex, 4Th Order Stream

ii. Site associated with ephemeral streams or drainages - R018XX999CA

2 Site not as above

i. Site occurs on concave landscape positions- dominated by Juncus, Carex and forbs - follow key for LRU I

ii. Site not as above

a. Site occurs in a meadow or near a stream riparian complex- but on soils which support upland plant species- Valley oak common in overstory - follow key for LRU I

b. Site not as above, may be another type of wetland not associated with streams - R018XX999CA

B. Soils in a mesic temperature regime

1 Site occurs in alluvial floodplains, but vegetation is more upland: oaks, Valley oak dominates the site - LRU 22AI

2 Site is clearly riparian. - LRU 22AX

II. Not as above,

A. Geology consists of young (Tertiary) volcanic flows originating in Southern Cascades (north & west of Lake Oroville) (LRU A)

1 Soil temperature regime thermic

i. Riparian systems (lentic, lotic, floodplains, etc.) - R018XX999CA

ii. Site not as above, primarily bedrock controlled soils

a. Occur on plateau formations. Soils within a swale/mound microtopography complex ... R018XA101CA – Basalt Flow Plateaus

b. Site not as above

1) Landform a lower foothill position or strath terrace, generally water shedding positions ... R018XA102CA – Clayey Thermic Terraces

2) Not as above

a) Soils on volcanic ridges or rocky, undulating foothills

(1) Soils very shallow to shallow (AWC < 3) ... R018XA103CA – Shallow Thermic Volcanic Ridges

(2) Soils not as above

(a) Soil occurs on volcanic cone, in a mesic pocket (otherwise thermic dominated area) and with infrequent plant communities of knobcone pine/incense cedar/ ponderosa pine ... CX018XA203 – Mesic Volcano Cones

(b) Site not as above ... R018XA999CA – Miscellaneous - Cannot Be Correlated

b) Soils occur in concave landscape position on hills, or undulating plateaus with deep to very deep soils F018XA201 ... F018XA201CA – Deep Thermic Hillslopes

2 Soil temperature regime mesic

i. Soil texture class medial or with an isotic mineralogy class (vegetation tends to be dominated by coniferous forest, including sugar pine, douglas fir, knobcone pine) - F018XA203CA ... CX018XA203 – Mesic Volcano Cones

ii. Site not as above

a. Soils are very shallow to shallow - support open blue oak with annual herbaceous communities ... R018XA104CA – Shallow Mesic Volcanic Ridges

b. Soils are moderately deep to deep - support closed oak woodland with scattered pine. ... F018XA202CA – Deep Mesic Mountain Slopes & Summits

B. Geology older (generally Mesozoic Era) or mixed ages associated with Sierra Nevada (beginning around Lake Oroville)

1 Geology is dominated by granitoid almost exclusively. Break between Valley (MLRA 17) and the foothills abrupt, with steep slopes occurring from the lowest foothills to the MLRA 18/22A break.

i. Subhumid climate. Soil moisture regime is xeric and only aridic at the lowest elevations (usually in conjunction with the valley). (LRU C)

a. Soil chemistry a key factor in defining site- ultramafic soils with reduced productivity ... R018XC106CA – Thermic Ultramafic Foothills

b. Soil chemistry a lesser contributing factor

1) Mean Annual Precipitation (MAP) < 23 "

a) Soils have shrink-swell properties and clayey PSC

(1) Slope percent < 25, on terraces and low hills ... R018XC101CA – Thermic Clayey Terraces and Hills

(2) Slope percent ? 25, on upper foothills and mountains ... R018XC102CA – Steep Thermic Clayey Shallow

b) Site not as above

(1) Soils shallow depth class

(a) Soils occurring on lower foothill position, slope < 25% ... R018XC103CA – Lithic Thermic Foothills

(b) Soils occurring on steep slopes (? 25%), with rock outcrop area > 25% ... R018XC104CA – Thermic Free Face Foothills

(2) Soils moderately deep to deeper ... R018XC105CA – Thermic Foothills

2) MAP ? 23

a) MAP ? 30

(1) Site occurs in shallow to moderately deep soils

(a) Soils on granite and support dense chaparral - R018XC107CA ... R018XC107CA – Thermic Granitic Foothills south-facing

(b) Soils on other parent materials

(1) Soils are on marble, often on canyon walls, yucca-chamise associations are common - R018XC109CA ... R018XC109CA – Steep Marble Canyon Walls

(2) Soils not as above ... R018XC999CA – Miscellaneous - Cannot Be Correlated

(2) Site occurs in deep to very deep soils on concave positions

(a) Site occurs in steep narrow drainages, often metamorphic PM, dominated by California buckeye and mesic chaparral shrubs (Mahogany, flannelbush) - R018XC110CA ... R018XC110CA – Cool Thermic Shallowly Dissected Slopes

(b) Site occurs on broadly concave mountain slopes, generally in granite PM, closed canopy (interior/canyon live oak) and buckeye, often with California bay. - F018XC203CA ... F018XC203CA – Cool Thermic Slopes

b) MAP < 30 inches

(1) Soils occur on south to southwest aspects, shallow to moderately deep soils- chaparral ... R018XC107CA – Thermic Granitic Foothills south-facing

(2) Site occurs on all aspects, generally on moderately deep to very deep soils. Vegetation consists of blue oak woodland and savannas - F018XC201CA ... F018XC201CA – Thermic Granitic Foothills

ii. Semi-arid climate with interchanging soil moisture regimes (xeric & aridic). Moderately to steep hills & mountains at southern end of Great Central Valley.

a. Mean elevation > 3,200 ft (soil temperature regime thermic to mesic). This LRU occurs at the crossroads of several MLRA's. Vegetation patterns reflect the confluence of desert (MLRA 29), mountains (MLRA 22A), and foothills (MLRA 18) vegetation, to include juniper/ blue oak woodlands, yucca and other species from adjacent regions. (MLRA 22AO)

b. Mean elevation < 3,200 ft (Vegetation patterns conform to vegetation classes and ecosystem dynamics of other LRU's in MLRA 18 with annual grasslands/ blue oak savannas being most common plant community.) (LRU E)

1) Riparian (driven by hydrological features) - R018XX999CA

2) Site is an upland

a) Soil temperature regime is solidly thermic and landform is hills or terraces

(1) Soils are calcareous and very deep, pH ranges into alkaline (> 8 pH) - R018XE101CA ... R018XE101CA – Very Deep Alkaline Alluvium

(2) Soils not as above

(a) Soils have heavy texture or exhibit cracks with seasonal wetting-drying cycles - R018XE102CA ...
R018XE102CA – Steep Clayey Shallow

(b) Site not as above

(1) Soils are shallow (AWC 1-2 inches); vegetation is annual forbs/grasses with very few trees -
R018XE103CA ... R018XE103CA – Loamy Low Hills

(2) Soils are moderately deep to deep (AWC 3-5 inches), often with mollic epipedons; vegetation
includes oak woodland with dense annuals. - R018XE104CA ... R018XE104CA –
Thermic Granitic Hills

b) Soil temperature regime is borderline mesic and landform is hills or mountains (buckeye, foothill pine, and
interior live oak indicator species) -F018XE201 ... F018XE201CA – Granitic Hills and
Mountains

**2 Geology highly complex, interfingering of volcanic, sedimentary (metamorphosed), and some granitics. The break between MLRA
17 and MLRA 18 is more gradual than in the southern LRU's, lower foothill slopes gently to strongly sloping. (LRU I)**

i. Site occurs on ultramafic soils

a. Site with very low Ca:Mg ratios (0.5) indicated by greater cover of barren soil/rock ... R018XI102CA –
Thermic Ultramafic Foothills Extremely High Magnesium Content (Ca:Mg Ratio
Less Than 0.5)

b. Site not as above

1) Sites with Ca:Mg ratios greater than 0.5 (but rarely than 2.0) continuous vegetation with only minor breaks ...
R018XI103CA – Thermic Ultramafic Foothills Moderately High Magnesium
Content (Ca:Mg Ratio 0.5 To 2)

2) Sites on north-facing slopes greater in shrub diversity ... R018XI104CA – Thermic Ultramafic
North-Facing Steep Slopes

ii. Site not as above

a. Site occurring on lava plateaus or erosion remnants, and skirting the adjacent hillslopes

1) Soils very shallow to shallow (annual forbs & grasses) ... R018XI101CA – Shallow Latite
Ridgetops

2) Soils moderately to very deep (oak/shrub savannahs) ... F018XI207CA – Deep Volcanic
Plateaus and Hills

b. Site occurs on a hill or hillslope (various geologies)

1) Mean Annual Precipitation (MAP) is generally well below 18 inches

a) Sites consist of ridges and or terraces or alluvial fan remnants

(1) Sites occurring on shallow to moderately deep soils, sometimes rocky

(a) Soils are shallow (often over tuffaceous parent materials) ... R018XI163CA – Thermic
Low Rolling Hills

(b) Soils not as above ... R018XI999CA – Miscellaneous - Cannot Be
Correlated

(2) Sites occur on deeper soils located on backslopes to footslopes ... F018XI208CA – Deep Low Rolling Hills and Terraces

b) Sites are low, rolling dissected erosional surfaces, concave and accumulation of fine particles ...
R018XI164CA – Clayey Dissected Swales

2) MAP is at least 18 inches

a) MAP ? 25 inches

(1) Concave-Concave microsite positions - generally dominated by *Juncus-Carex* and annual forbs ...
R018XI111CA – Low Gradient, Concave Depressions

(2) Site on upland, bedrock controlled

(a) Shallow to moderately deep soils, parent material derived from metavolcanic, slate, or granitic lithologies. ... F018XI200CA – Low Elevation Foothills

(b) Soils towards shallow end and very low AWC (< 2)- volcanic PM ... R018XI107CA – Shallow, Undulating Volcanic Hills

b) MAP > 25 inches

(1) Site is steep AND aspect dependent, generally occurring on north-facing slopes on lower elevations, and on reverse aspects (s-facing) as elevation increases

(a) Site approaching mesic STR but still thermic, generally annual ppt > 34 ... R018XI105CA – Mesic Steep Convex Slopes bordering thermic

(b) Site definitely thermic STR, ppt < 34

(1) Slope exceed 55 %, often occurring on canyon walls, herbaceous plants are diverse and dominate the site ... R018XI125CA – Very Steep Skeletal Hillslopes

(2) Slopes less than 55 %, chamise and other chaparral shrubs dominate site, generally thick. Very low cover of forbs and grasses ... R018XI106CA – Steep Thermic Hillslopes and Canyon Walls

(2) Not as above

(a) Site in thermic soil temperature regime

(1) PM intrusive igneous, excluding footslope and toeslope positions (depositional areas)

(a) South to west-facing aspects, usually chamise dominated - R018XI106CA ...

R018XI106CA – Steep Thermic Hillslopes and Canyon Walls

(b) Cooler aspect. Blue oak/interior live oak woodland ... F018XI205CA – Thermic Granitic Foothills

(2) Site not as above

(a) Trees and vegetation stunted due to high Ca content (PM ~ marble) ... F018XI206CA – Clayey Thermic Marble Hills

(b) Site not as above

(1) Site dominated by volcanic bedrock

(a) Soil depth shallow (Inks, Pentz, Amador soils) annuals dominate the site, AWC 1-4 - R018XI107CA ... R018XI107CA – Shallow, Undulating Volcanic

Hills

(b) Soil depth deep to deeper, oak woodland or savannah, AWC 3-7 - F018XI207CA ...

F018XI207CA – Deep Volcanic Plateaus and Hills

(2) Site not as above

(a) Site occurs on moderately deep soils on slopes generally < 30%- blue oak, foothill

pine, annual grasses, moderate density of shrubs. ... F018XI201CA –

Moderately Deep Thermic Foothills

(b) Soils are generally deeper, live oak dominated and dense overstory - F018XI202CA

... F018XI202CA – Deep Thermic Steep Hillslopes

(b) Site in a mesic STR

(1) Site on sideslopes and often steeper and/or north-facing (California black oak dominant tree and

high density of shrubs and a few conifers) ... F018XI204CA – North-facing Steep

Draws and Hillslopes

(2) Site occurs along edges of MLRA 22A break, mesic STR more common

(a) Site generally shallow occurring on narrow ridges or sideslopes below prominent ridges,

vegetation consists of annuals forbs and grasses and scattered shrubs/foothill pine - R022AI101CA

(b) Site not as above, slope gradient generally steep

(1) Soils shallow to moderately deep (rarely deep) on S-facing slopes. Vegetation consists of

chaparral shrubs - R018XI105CA ... R018XI105CA – Mesic Steep

Convex Slopes bordering thermic

(2) Soils generally deeper and occur on all aspects, PIPO-oak-shrubland - F022AI201CA