Ecological site F018XE201CA
Granitic Hills and Mountains

Last updated: 4/24/2024
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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 018X–Sierra Nevada Foothills

Major Land Resource Area (MLRA): 018X–Sierra Nevada Foothills Major Land Resource Area (MLRA) 18, Sierra Nevada Foothills is located entirely in California and runs north to south adjacent to and down-slope of the Sierra Nevada Mountains (MLRA 22A). MLRA 18 includes rolling to steep dissected hills and low mountains, with several very steep river valleys. Climate is distinctively Mediterranean (xeric soil moisture regime) with hot, dry summers, and relatively cool, wet winters. Most of the precipitation comes as rain; average annual precipitation ranges from 15 to 55 inches in most of the area (precipitation generally increases with elevation and from south to north). Soil temperature regime is thermic; mean annual air temperature generally ranges between 52 and 64 degrees F. Geology is rather complex in this region; there were several volcanic flow and ashfall events, as well as tectonic uplift, during the past 25 million years that contributed to the current landscape.

LRU notes

LRU 18XE is located on moderate to steep mountains and hills in the Tehachapi Foothills east of Bakersfield. This LRU covers the lower slopes around the southern end of the Greenhorn Mountains, the western sides of Breckenridge Mountain and the Tehachapi Mountains. The elevation ranges from 500 to 6500 feet above sea level and the geology of the region is predominately granitoid (both unaltered and metamorphosed). Similar to LRU 18XC to the north, vegetation series include blue oak, needlegrass and annual grasslands, as well as chamise, ceanothus, mixed oaks, and foothill pine, although this LRU tends to be more arid than with an annual precipitation range of only 8 to 31 inches per year. The lower precipitation and higher evaporative losses mean that these soils may not be able to completely leach excess salts, leading to a build-up of calcium and/or sodium in the subsoil. The soil temperature regime in this LRU is thermic and the soil moisture regimes are both xeric and aridic.

Classification relationships

CLASSIFICATION RELATIONSHIPS This site is located within M261F, the Sierra Nevada Foothills Section, (McNab et al., 2007) of the National Hierarchical Framework of Ecological Units (Cleland et al., 1997), M261Fb, the Lower Foothills Metamorphic Belt Subsection. Level III and Level IV ecoregions systems (Omernik, 1987, and EPA, 2011) are: Level III, Central California Foothills and Coastal Mountains and Level IV, Ecoregion 6ae, Tehachapi Foothills.

Ecological site concept

This site is characterized by shallow to deep soils occurring on steep hills and mountains formed from granitic or schist parent material. Slopes typically range from 10 to 63%. Annual precipitation typically ranges from 12 to 17 inches per year. Elevation typically ranges from 3600 to 5000 feet. Generally, this concept occurs at the interface between thermic and mesic soil temperature regimes; this site generally occurs at the interface between the thermic and mesic areas, and it includes both cool thermic and warm mesic areas. The main drivers of plant communities in this site (relative to the ecological sites found at lower elevations) are the high available water capacity associated with the deeper soils, and cooler soil temperatures associated with borderline mesic soil temperature regimes. These conditions support closed-canopy oak woodlands with a high diversity of trees and shrubs. Common soil series correlated to this ecological site include Tweedy (Fine-loamy, mixed, superactive, mesic Typic Argixerolls), Edmundston (Coarse-loamy, mixed, superactive, mesic Pachic Haploxerolls) and Sorrell (Coarse-loamy, mixed, superactive, mesic Typic Argixerolls) Vegetation includes closed oak woodland with interior live oak (Quercus wislizeni), California buckeye (Aesculus californica), California foothill pine (Pinus sabiniana) and blue oak (Quercus douglasii). Buckbrush (Ceanothus cuneatus), rubber rabbitbrush (Ericameria nauseosa), and alderleaf mahogany (Cercocarpus montanus) are common shrubs in the understory. Herbaceous plants such as soft chess (Bromus hordeaceus), cheatgrass (Bromus tectorum), blue grass (Poa spp.), and California buckwheat (Eriogonum fasciculatum) may occur in the understory, especially where there

are canopy gaps, but herbaceous production is low (1000 to 2000 lbs per acre) due to low amounts of sunlight penetrating to the woodland floor. Understory production may be higher at the low end of the elevation range for this site where the canopy cover is more open.

Associated sites

F022AW003CA	**Shallow Mesic Mountains <40"ppt** This site commonly occurs nearby.

Table 1. Dominant plant species

Tree	(1) *Quercus wislizeni* (2) *Pinus sabiniana*
Shrub	(1) *Ceanothus cuneatus* (2) *Ericameria nauseosa*
Herbaceous	(1) *Bromus hordeaceus* (2) *Bromus tectorum*

Physiographic features

This ecological site generally occurs at elevations ranging from 3600 to 5000 feet, on slopes with gradient generally ranging from 20 to 55%.

Table 2. Representative physiographic features

Landforms	(1) Foothills > Hillslope (2) Foothills > High hill (3) Foothills > Mountain slope (4) Foothills > Mountain valley
Runoff class	Medium to high
Flooding frequency	None
Ponding frequency	None
Elevation	1,100 – 1,520 m
Slope	20 – 60 %
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None
Elevation	370 – 2,440 m
Slope	0 – 80 %

Climatic features

This ecological site is characterized by hot, dry summers and cool, wet winters, a typical Mediterranean climate. Mean annual precipitation ranges from 12 to 17 inches and usually falls from October to May. Mean annual temperature ranges from 53 to 55 degrees F with 114 to 141 frost free days.

Table 4 Representative climatic features

Frost-free period (characteristic range)	110-140 days
Freeze-free period (characteristic range)	180-190 days
Precipitation total (characteristic range)	310-430 mm
Frost-free period (actual range)	110-150 days
Freeze-free period (actual range)	170-200 days
Precipitation total (actual range)	310-510 mm
Frost-free period (average)	130 days
Freeze-free period (average)	180 days
Precipitation total (average)	380 mm

- (1) TEHACHAPI 4 SE [USC00048829], Tehachapi, CA
- (2) TEHACHAPI [USC00048826], Tehachapi, CA
- (3) GLENNVILLE [USC00043463], Glennville, CA

Influencing water features

Due to the topographic position, this site does not have water features.

Wetland description

N/A

Soil features

The soils in this ecological site occur on cool thermic to mesic mountain slopes and in mountain valleys. They are formed in residuum from granitic rocks or mica schist. The soil depth class ranges from moderately deep to deep to restrictive bedrock. The particle size control section is generally coarse-loamy or fine-loamy; the surface texture is sandy loam, gravelly sandy loam, or bouldery loamy coarse sand. Gravels (3 inch diameter) on the soil surface range from 5 to 60% cover and larger fragments (=3 inch diameter) range from 0 to 30% cover. Gravels range from 5 to 20% by volume throughout the profile, and larger fragments range from 0 to 10% by volume throughout the profile. Available Water Storage (AWS) in the profile generally ranges from 2 to 6 inches. Surface pH ranges from 6.5 to 7.5 and subsurface pH ranges from 6.5 to 7.6. Common soils correlated to this ecological site include Tweedy (Fine-loamy, mixed, superactive, mesic Typic Argixerolls) and Edmunston (Coarse-loamy, mixed, superactive, mesic Pachic Haploxerolls).

Table 5. Representative soil features

Parent material	(1) Residuum – granitoid (2) Residuum – mica schist
Surface texture	(1) Sandy loam (2) Gravelly sandy loam (3) Bouldery loamy coarse sand
Drainage class	Well drained
Permeability class	Moderate to rapid
Depth to restrictive layer	40 – 150 cm
Soil depth	40 – 150 cm
Surface fragment cover <=3"	10 – 60 %
Surface fragment cover >3"	0 – 30 %
Available water capacity (0-101.6cm)	5.08 – 15.24 cm
Soil reaction (1:1 water) (0-25.4cm)	6.5 – 7.5

Subsurface fragment volume <=3" (0-152.4cm)	10 – 20 %
Subsurface fragment volume >3" (0-152.4cm)	0 – 10 %

Table 6. Representative soil features (actual values)

Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Depth to restrictive layer	30 – 150 cm
Soil depth	0 – 150 cm
Surface fragment cover <=3"	0 – 80 %
Surface fragment cover >3"	0 – 50 %
Available water capacity (0-101.6cm)	1.78 – 17.78 cm
Soil reaction (1:1 water) (0-25.4cm)	5.4 – 8.4
Subsurface fragment volume <=3" (0-152.4cm)	0 – 50 %
Subsurface fragment volume >3" (0-152.4cm)	0 – 40 %

Ecological dynamics

State and transition model

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 11. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 12. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 13. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Inventory data references

Inventory data to be collected using future projects based on priorities.

References

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Other references

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Approval

Kendra Moseley, 4/24/2024

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	09/20/2026
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

3. **Number and height of erosional pedestals or terracettes:**

   _____

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
