

Ecological site group R017XY905CAESG

Dry Alluvial Fans

Last updated: 06/03/2024
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Key Characteristics

- Landform Not As Above
- Not As Above
- Site Is Not Sub-Irrigated
- MAP \geq 10"

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.

Physiography

This site is on alluvial fans formed by streams originating in the Coast Range, Sierra Nevada, and Cascade Mountains. It may intergrade with similar sites on foothills adjacent to the Central Valley.

Climate

The average annual precipitation is 5 to 12 inches (125 to 305 millimeters) in the San Joaquin Valley. The Tulare Basin, at the southern end of this MLRA, typically receives less than 6 inches (150 millimeters) of rainfall per year. The average annual precipitation is 12 to 30 inches (305 to 760 millimeters) in most of the Sacramento Valley. It is 40 inches (1,015 millimeters) at the higher elevations on the edges of the valley at the north end. Summers are long, hot, and dry, and winters are cool and rainy. Most of the rainfall occurs as low- or moderate intensity, Pacific frontal storms from October to May. Snow is very rare in this MLRA but has occurred in the Sacramento Valley from Sacramento to points farther north. The average annual temperature is 59 to 67 degrees F (15 to 20 degrees C), decreasing from south to north. The freeze-free period averages 325 days and ranges from 280 to 365 days, decreasing in length with elevation and from south to north.

Soil features

These sites are shallower, coarser, or otherwise more droughty than the Deep Alluvial Soils of 17X Group 4, and are associated with Hydologic Soils Groups C and D. They lack the mound and swale topography and the duripan of 17X Group 3.

Some soil series associated with these sites are Corning, Atwater and Hanford.

Vegetation dynamics

This site has been entirely converted or invaded and there are no historic descriptions of it available. There is an ongoing debate as to whether it was principally dominated by perennial grasses or annual forbs. Most of the known early accounts of this site describe it as being dominated by oat grass, an introduced annual.

The principal natural disturbance for the site is seasonal drought cycles, which in conjunction with soil awc, governs the spatial and temporal distribution of plants. Species composition may vary significantly within and between years (Barbour et. al, 2007 and Sawyer and Keeler-Wolf, 1995) and many metrics applied to grasslands in other regions are unsuited to the California annual grassland type.

Rainfall is principally from December to March and the vegetation communities shift in response to available

moisture with one phase senescing and being replaced by the next as the dry season progresses.

During the wet season the dominant vegetation is introduced annual forbs including bur clover (*Medicago polymorpha*), hairy vetch (*Vicia vilosa*) and filaree (*Erodium* spp). Shortly after the last rainfall, the community shifts towards annual grasses including wild oat (*Avena* spp) soft chess brome (*Bromus hordeaceus*) and Italian ryegrass (*Lolium perenes*) (Barbour et.al., 2007). A suite of native forbs are adapted to the dry summers and dominate open ground in July and August, including tarweed (*Hemizonia* and *Holocarpha* spp.) vinegarweed (*Trichostema lanceolatum*), and turkey mullen (*Croton setigerus*) (Ozeran, 2018). After the summer annuals set seed there is no living vegetation until winter rains return and soil moisture levels rise.

These sites are frequently grazed which may affect species composition at the site, though the annual plant community has been shown to be very resilient to grazing to appropriate levels of Residual Dry Matter and grazing is unlikely to cause a transition across a threshold by itself (Bartolome and McClaran, 1992). However, inappropriate grazing, especially in conjunction with severe drought may cause a transition. Removal of livestock, for extended periods, has been shown to promote a medusahead monoculture in the adjacent MLRA 18 (Brownsey et. al., 2016).

Historically Native people and early 20th century ranchers burned this site to promote new growth by removing thatch. This may affect annual species composition but is not currently tied to a threshold.

Restoration efforts are often able to restore annual grassland communities, especially when efforts are focused on site preparation. However, these sites are susceptible to invasion and weed management is necessary.

References/Citations:

Barbour, M., Keeler-Wolf, T., & Schoenherr, A. A. (Eds.). 2007. Terrestrial vegetation of California. Univ of California Press.

Bartolome, J. W., & McClaran, M. P. 1992. Composition and production of California oak savanna seasonally grazed by sheep. *Journal of Range Management*, 45(1), 103-107.

Brownsey, P., Davy, J., Becchetti, T., Easley, M. L., James, J. J., & Laca, E. A. 2016. Barb Goatgrass and Medusahead: Timing of Grazing and Mowing Treatments.

Keeler-Wolf, T., J.O. Sawyer, and J. Evans. 2009. A Manual of California Vegetation. Edition, 2. California Native Plant Society Press.

Ozeran, R. Sticky, Pungent, and Abundant: Three Summer Range Weeds. UC Weed Science Blog, UC Extension. Accessed at: <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=28417>. [2023, December 12].

Major Land Resource Area

MLRA 017X

Sacramento and San Joaquin Valleys

Subclasses

- R017XD086CA–SHALLOW LOAMY
- R017XD089CA–ACID TERRACE
- R017XD092CA–LOAMY (BLUE OAK/ANNUAL GRASS)
- R017XE001CA–CLAYEY
- R017XE020CA–FINE LOAMY
- R017XE041CA–Fine Loamy 8-10" P.Z.
- R017XE061CA–Loamy Fan Remnant 8-10" P.Z.
- R017XE080CA–SANDY
- R017XE097CA–SHALLOW SANDY
- R017XE109CA–SHALLOW LOAMY
- R017XE111CA–CLAYEY 12-16"

- R017XE112CA–GRANITIC 14-18"
- R017XE117CA–COBBLY CLAYEY
- R017XE118CA–CALCAREOUS LOAMY
- R017XF072CA–DRY COARSE LOAMY
- R017XF077CA–Loamy Upland 8-10" P.Z.
- R017XY905CA–Dry Alluvial Fans and Terraces

Stage

Provisional

State and transition model

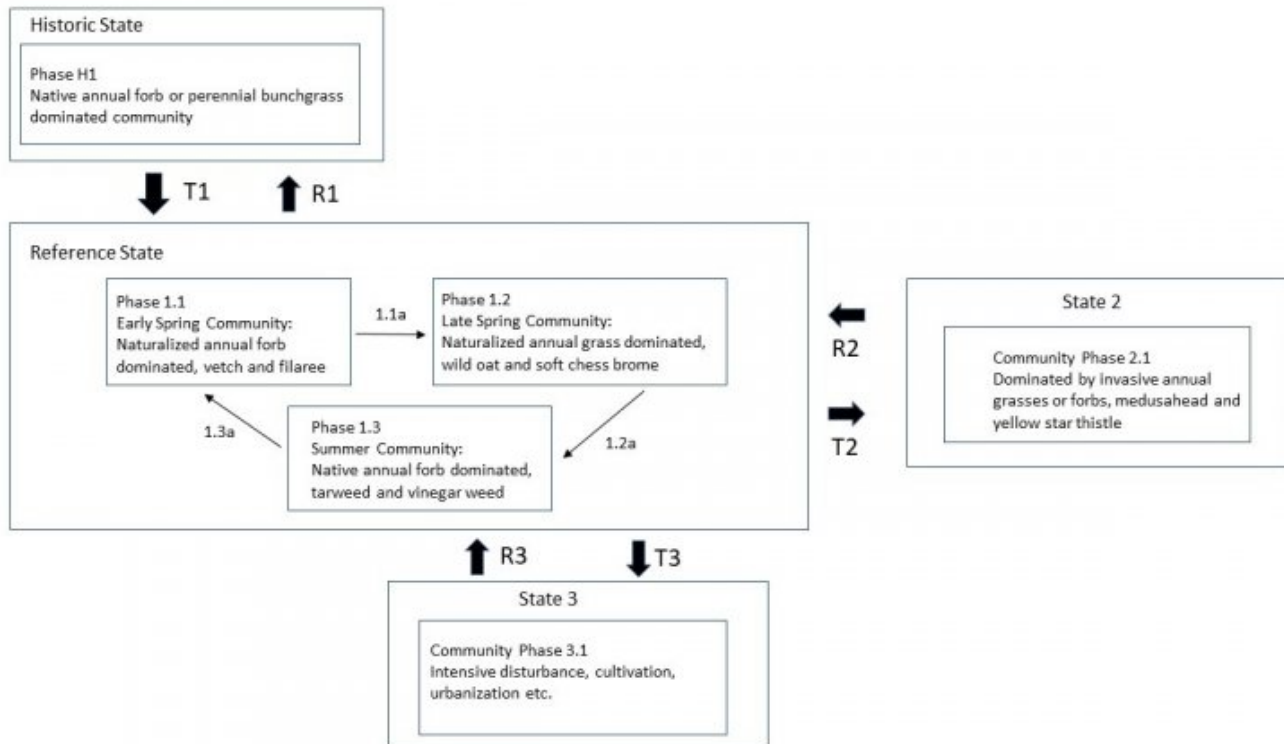


Figure . STM

Historic State Community Phase

H1- This community phase represents all the varied expressions of native vegetation prior to the introduction of Mediterranean annuals in the 1700s

Reference State Community Pathways

1.1a This community pathway occurs as late winter/early spring moisture ends, and warm temperatures begin drying out the soil profile. Yearly climatic influences, including temperatures and timing and amount of precipitation will have a distinct impact on how rapidly this change from CP 1.1 to 1.2 occurs.

1.2a This community pathway occurs as summer temperatures take hold and the site continues to dry out. Yearly climatic influences, including temperatures and timing and amount of precipitation will have a distinct impact on how rapidly this change from CP 1.2 to 1.3 occurs.

1.3a This community pathway occurs as fall/winter rains renew the soil moisture over winter. Yearly climatic influences, including temperatures and timing and amount of precipitation will have a distinct impact on how rapidly this change from CP 1.3 to 1.1 occurs.

State 2 Community Phase

Community 2.1 – This community phase represents all the varied expressions of the site when dominated by invasive species such as medusahead or yellow star thistle.

State 3 Community Phase

Community 3.1 - This community phase represents all the varied land uses that significantly alter this ecological site. This is an extremely varied community phase that includes all types of alterations that so significantly alter the ecological site that it is permanently changed and no longer has typical or even representative ecological dynamics.

Transitions

T1 This transition was caused by the introduction of Mediterranean annuals sometime prior to 1800

R1 This restoration pathway is only theoretical because the historic community is so poorly understood, though it is generally encouraged to plant native species when possible.

T2 This transition is caused when a more recent cohort of Mediterranean annuals, with undesirable traits, establish a seedbank sufficient to cross a threshold. It is associated with and accelerated by a variety of disturbances which create bare ground, such as severe drought, fire and grazing beyond recommend RDM levels. Complete removal of grazing has also been shown to cause a site where these plants are present to transition from State 2 to State 3.

R2 This restoration pathway occurs only with significant time and money inputs are focused on managing invasive species to a level appropriate for component of State 2. This requires constant maintenance and weed management. Herbicides and targeted grazing with sheep or goats have been demonstrated as effective on some invasive forb species. Fire, pre and post emergent herbicides and grazing to appropriate RDM levels have been shown to be effective on annual grasses.

T3 This transition is caused by significant human alterations that force this ecological site over a threshold and change the function and structure of this site in extensive ways.

R2 This restoration pathway may occur rapidly when time and money inputs are focused on site prep and seed bank establishment.

Figure 1. STM Narrative

State 1 Historical State

This community phase represents all the varied expressions of native vegetation prior to the introduction of Mediterranean annuals in the 1700s

Characteristics and indicators. This site is poorly understood and believed to be entirely extirpated

Community 1.1 Historic Plant Community

Native annual forb or perennial bunch grass dominated community

State 2 Reference State: CA Annual Grasslands

This State has been the dominant condition since the arrival of Europeans. It is dominated by a variety of annual grasses and forbs introduced from the Mediterranean region, which are well adapted to the local climate. The specific traits of these introduced species and the current soil moisture will govern the plant community phase and dominant vegetation over the course of a year. Scattered blue oak may be a part of this community.

Community 2.1 Early Spring Community:

Naturalized annual forb dominated, vetch and filaree

Dominant plant species

- burclover (*Medicago polymorpha*), other herbaceous
- winter vetch (*Vicia villosa*), other herbaceous
- longbeak stork's bill (*Erodium botrys*), other herbaceous
- redstem stork's bill (*Erodium cicutarium*), other herbaceous

Community 2.2

Late Spring Community:

Naturalized annual grass dominated, wild oat and soft chess brome

Dominant plant species

- wild oat (*Avena fatua*), grass
- soft brome (*Bromus hordeaceus*), grass
- Italian ryegrass (*Lolium perenne* ssp. *multiflorum*), grass
- mouse barley (*Hordeum murinum*), grass
- annual fescue (*Vulpia myuros*), grass

Community 2.3

Summer Community

Native annual forb dominated, tarweed and vinegar weed

Dominant plant species

- vinegarweed (*Trichostema lanceolatum*), other herbaceous
- tarweed (*Holocarpha*), other herbaceous
- tarweed (*Hemizonia*), other herbaceous
- dove weed (*Croton setigerus*), other herbaceous

Pathway 2.1a

Community 2.1 to 2.2

This community pathway occurs as late winter/early spring moisture ends, and warm temperatures begin drying out the soil profile. Yearly climatic influences, including temperatures and timing and amount of precipitation will have a distinct impact on how rapidly this change from CP 2.1 to 2.2 occurs.

Pathway 2.2a

Community 2.2 to 2.3

This community pathway occurs as summer temperatures take hold and the site continues to dry out. Yearly climatic influences, including temperatures and timing and amount of precipitation will have a distinct impact on how rapidly this change from CP 2.2 to 2.3 occurs.

Pathway 2.3a

Community 2.3 to 2.1

This community pathway occurs as fall/winter rains renew the soil moisture over winter. Yearly climatic influences, including temperatures and timing and amount of precipitation will have a distinct impact on how rapidly this change from CP 2.3 to 2.1 occurs.

State 3

Invaded State

This state is dominated by a newer suite of introduced species which have not yet been naturalized and have traits which make them highly undesirable, including medusahead (*Taeniatherum caput-medusae*) and yellow star-thistle (*Centaurea solstitialis*).

Dominant plant species

- medusahead (*Taeniatherum caput-medusae*), grass
- yellow star-thistle (*Centaurea solstitialis*), other herbaceous

Community 3.1

3.1

This community phase represents all the varied expressions of the site when dominated by invasive species such as medusahead or yellow star thistle.

Dominant plant species

- medusahead (*Taeniatherum caput-medusae*), grass
- barbed goatgrass (*Aegilops triuncialis*), grass
- yellow star-thistle (*Centaurea solstitialis*), other herbaceous
- Italian plumeless thistle (*Carduus pycnocephalus*), other herbaceous

State 4

Highly Altered

This State represents a highly alter landscape.

Community 4.1

4.1

This community phase represents all the varied land uses that significantly alter this ecological site. This is an extremely varied community phase that includes all types of alterations that so significantly alter the ecological site that it is permanently changed and no longer has typical or even representative ecological dynamics.

Transition Historic Transition to Reference Community

State 1 to 2

Fodder and livestock from early Europeans in Mexico is believed to have introduced Mediterranean annuals, which established during the 16th century.

Constraints to recovery. The Historic State is too poorly understood and too thoroughly removed to be successfully restored.

Transition T2

State 2 to 3

This transition is caused when a more recent cohort of Mediterranean annuals, with undesirable traits, establish a seedbank sufficient to cross a threshold. It is associated with and accelerated by a variety of disturbances which create bare ground, such as severe drought, fire and grazing beyond recommend RDM levels. Complete removal of grazing has also been shown to cause a transition from State 2 to State 3.

Transition T3

State 2 to 4

This transition is caused by significant human alterations that force this ecological site over a threshold and change the function and structure of this site in extensive ways.

Restoration pathway R1

State 3 to 2

This restoration pathway occurs only with significant time and money inputs are focused on managing invasive species to a level appropriate for component of State 2. This requires constant maintenance and weed management. Herbicides and targeted grazing with sheep or goats have been demonstrated as effective on some invasive forb species. Fire, pre and post emergent herbicides and grazing to appropriate RDM levels have been shown to be effective on annual grasses.

Transition T3

State 3 to 4

This transition is caused by significant human alterations that force this ecological site over a threshold and change the function and structure of this site in extensive ways.

Restoration pathway R3

State 4 to 2

This restoration pathway may occur rapidly when time and money inputs are focused on site prep weed management, and seed bank establishment.

Restoration pathway R2

State 4 to 3

This restoration pathway may occur rapidly when time and money inputs are focused on site prep and seed bank establishment but weed management is overlooked.

Citations