

Ecological site group R021XG901CA

Dry Shallow Clayey

Last updated: 08/26/2024
Accessed: 05/10/2025

Key Characteristics

- Upland sites
- < 12" ppt
- < 20" depth
- Clayey Texture

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 ESG is on hills, mountains, ridges, and summits with variable slopes at variable elevations that receive less than 305 millimeters of precipitation.

Climate

The average annual precipitation in MLRA 21 is 9 to 25 inches (241 to 635 millimeters). It is highest, up to 57 inches (1,450 millimeters), in small areas at high elevations on the western and southwestern edges of this MLRA. Other high precipitation zones are in the scattered mountain ranges throughout the rest of this area. Most of the rainfall occurs as low- or moderate-intensity Pacific frontal storms during winter. At higher elevations, rain generally turns to snow. Snow may fall at lower elevations in winter but does not last. Summers are dry. The average annual temperature is 37 to 53 degrees F (3 to 12 degrees C). The average summer maximum temperature is 83 to 95 degrees F (28 to 35 degrees C). The average winter minimum temperature is 8 to 27 degrees F (-13 to -3 degrees C). The frost-free period is 70 to 185 days, with an average of 130 days.

Soil features

This ESG includes soils that are moderately deep to very deep, fine textured smectitic soils that are well drained. Subsurface soil horizons typically have gravelly or cobbly textural modifiers. Clay-rich soils yield much of their snowmelt as runoff, making them very important watershed areas. Soils with perched water tables in the spring cause poor aeration in the root zone of low sagebrush and play a significant role in the ecology of this ESG.

Representative soils include the Ager (very-fine, smectitic, mesic Chromic Haploxererts), Ravendale (fine, smectitic, mesic Chromic Haploxererts), Tunnison (very-fine, smectitic, mesic Aridic Haploxererts), and Barnard (fine, smectitic, mesic Argiduridic Durixerolls) series.

Vegetation dynamics

This habitat is generally dominated by broad-leaved evergreen shrubs 4 to 19 inches (0.1 to 0.5 meters) tall. Average shrub cover is typically 15 percent, but sometimes crowns touch (Cheatham and Haller 1975). There may be deciduous shrubs and small trees sparsely scattered in some areas. Ground cover of grasses and forbs is typically sparse, at 5 to 15 percent.

The habitat may be dominated by either low sagebrush or black sagebrush, often in association with yellow rabbitbrush, antelope bitterbrush, or big sagebrush. Black sagebrush is also commonly associated with winterfat and mormon tea. Western juniper may be sparsely scattered in stands dominated by low sagebrush. Utah juniper

and singleleaf pinyon are sometimes scattered in stands dominated by black sagebrush. Common grass species include Sandberg bluegrass, bluebunch wheatgrass, squirreltail, Thurber's needlegrass, and Idaho fescue. A rich variety of forbs is typically present. The abundance and distribution of associated plants are highly influenced by soils and precipitation.

This type commonly forms ecotones with sagebrush, pinyon-juniper, and juniper habitats in northeastern California. Thus, it may be difficult to determine the correct classification of some sites. For example, *A. arbuscula* communities are common as openings within coniferous forests on the Modoc Plateau. *A. arbuscula* communities may thus be found adjacent to mixed conifer, Jeffrey pine, or ponderosa pine stands. Climatic changes cause periodic shifts of ecotones, a relationship that is further complicated by invasion of coniferous woodlands into sagebrush habitats in response to fire suppression and grazing by domestic livestock.

Low sagebrush stands are "usually found on shallow soils with impaired drainage in the transition zone between the wetter bottom and open timber on the mountainsides". The type is also on terraces with hardpan or heavy clay soils. Where low sagebrush and antelope bitterbrush communities are mosaiced, low sagebrush grows on harsher sites (i.e., shallow, well-drained soils), antelope bitterbrush grows on areas with deeper soils. Black sagebrush stands typically grow on shallow, carbonate-rich, gravelly soils derived from limestone.

Information directly copied from:
California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group
By Jared Verner

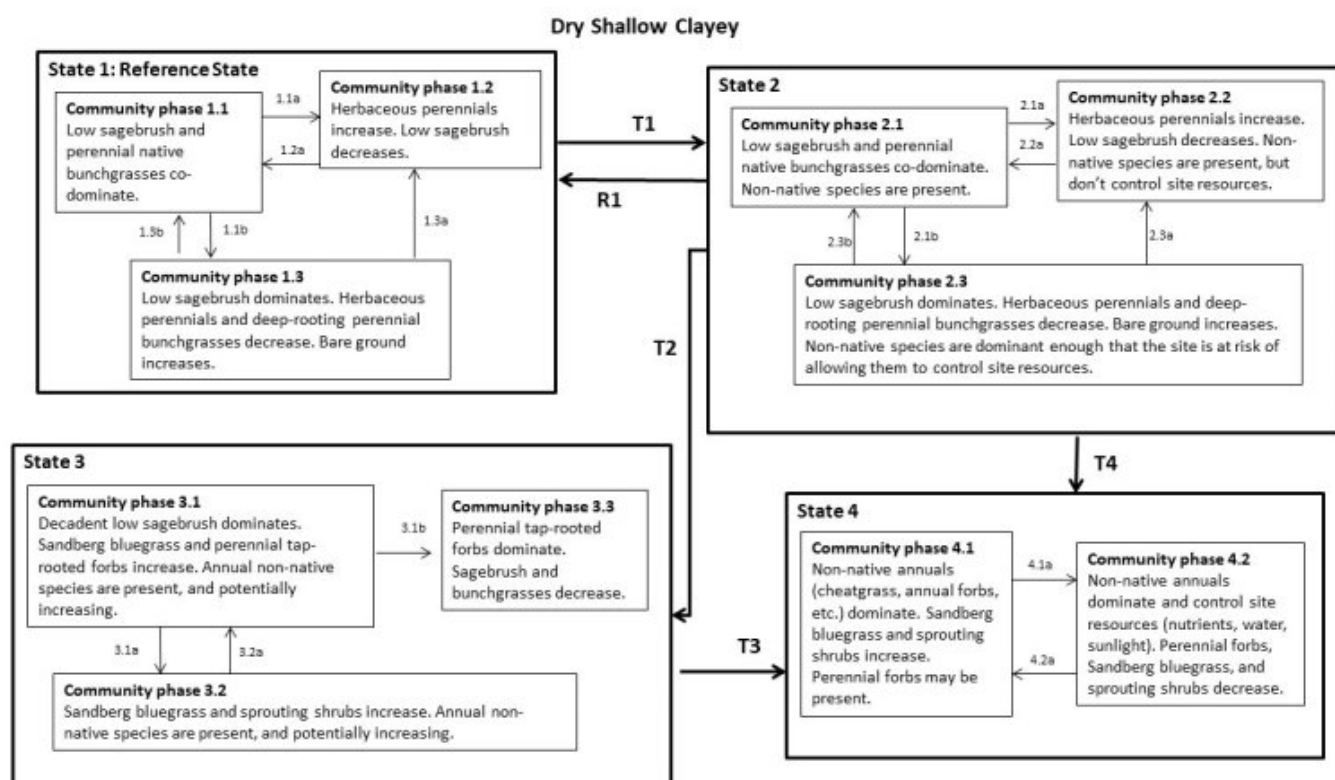
Major Land Resource Area

MLRA 021X
Klamath and Shasta Valleys and Basins

Stage

Provisional

State and transition model



State 1: The reference state represents the natural range of variability in pre-European settlement conditions. Natural disturbances impacting this site include wildfire, weather fluctuations, diseases, and insects.

Community Phase 1.1: Site is co-dominated by low sagebrush and native perennial bunchgrasses and forbs.

Community Pathway 1.1a: Low-intensity wildfire reduces low sagebrush cover. Low sagebrush cover is patchy. Cover and abundance of herbaceous vegetation increases. Sagebrush moth (*Arora* spp.) infestation may also reduce cover of low sagebrush. Thus, more nutrient, water, and sunlight resources are available to deep-rooted perennial plants. Nutrient availability, infiltration, and species composition differ depending on how the low sagebrush canopy was removed.

Community Pathway 1.1b: This pathway occurs over time by natural regeneration in the absence of disturbance.

Community Phase 1.2: Site is characteristic of a post-fire plant community. Perennial native bunchgrasses, forbs, and native annuals increase. They occupy site resources and dominate ecological processes.

Community Pathway 1.2a: This pathway occurs over time by natural regeneration in the absence of disturbance, given the presence of a low sagebrush seed source.

Community Phase 1.3: Site is characterized by increased cover of decadent low sagebrush. Understory herbaceous perennials decrease. Site resources such as nutrients, light, and moisture are controlled by low sagebrush.

Community Pathway 1.3a: Wildfire removes low sagebrush canopy.

T1: An invasive seed source and/or disturbance such as fire, improper grazing, insects, disease, or pathogens trigger(s) a threshold-crossing event to an alternative state.

R1: A combination of management strategies that reduce pressures toward low sagebrush and native perennial grasses and forbs are unlikely on all but the coolest and wettest sites. Management strategies include use of fires, herbicides, mechanical treatments, and grazing management strategies that fit site-specific conditions. This restoration pathway is time, labor, and money intensive once the invasive annuals rule the ecological functions and processes on the site.

State 2: This state represents the current potential. Once introduced, cheatgrass and other non-native species cannot be removed from the system. Non-native annuals have the potential to significantly reduce ecological resistance to, and resilience following disturbance.

Community Phase 2.1: Site is co-dominated by low sagebrush and perennial bunchgrasses. Non-native species are present.

Community Pathway 2.1a: Low-intensity wildfire reduces cover of low sagebrush. Low sagebrush cover is patchy.

Community Pathway 2.1b: This community pathway occurs over time by natural regeneration in the absence of disturbance.

Community Phase 2.2: Site is characteristic of a post-fire plant community. Low sagebrush cover is reduced or patchy. Herbaceous vegetation is increasing. Non-native species are present and may be increasing but do not control site resources.

Community Pathway 2.2a: This community pathway occurs over time by natural regeneration in the absence of disturbance.

Community Phase 2.3: Site is characterized by increased cover of decadent low sagebrush. Understory herbaceous perennial cover decreases. Site resources such as nutrients, light, and moisture are controlled by low sagebrush. Non-native species are present and may increase. Bare ground areas increase. This community phase is at risk of crossing an ecological threshold.

T2: Drought, inappropriate grazing management, or both.

T3: Repeated high-intensity wildfires.

State 3: This state is characterized by the loss of deep-rooted perennial bunchgrasses. Site resources are controlled by decadent low sagebrush, shallow-rooted perennials, and perennial forbs.

Community Phase 3.1: Site is characterized by a stand of decadent low sagebrush. Regeneration is severely impaired. Understory is sparse and bare ground increases, resulting in increased runoff and soil erosion.

Community Pathway 3.1a: Wildfire removes low sagebrush canopy.

Community Pathway 3.1b: Inappropriate management results in soil erosion, which degrades surface soil horizons. As a result, shrubs and grasses experience long-term defoliation.

Community Phase 3.2: Low sagebrush canopy decreases. Herbaceous vegetation increases. Site may be dominated by a mix of Sandberg bluegrass, sprouting shrubs, or tap-rooted perennial forbs depending on the disturbance that removed the low sagebrush.

Community Pathway 3.2a: This pathway occurs over time by natural regeneration in the absence of disturbance. Considerable time (at least 30 years) will pass before low sagebrush becomes decadent.

Community Phase 3.3: Site is dominated by an almost pure stand of perennial tap-rooted forbs. Low sagebrush and bunchgrasses are present in trace amounts or absent. Non-native species may be present but are not increasing.

T4: High-intensity wildfire(s).

State 4: The annual state is characterized by the dominance of annual non-native species. The disturbance return interval is too narrow for the regeneration of low sagebrush and other native species.

Community Phase 4.1: Site is characterized by regeneration of sprouting shrubs. Herbaceous vegetation is dominated by non-native species. Annual species control site resources including nutrients, moisture, and sunlight.

Community Pathway 4.1a: Fire

Community Phase 4.2: Site is characterized by a near pure stand of non-native annuals. Site is highly susceptible to wildfire and increased soil erosion.

Community Pathway 4.2a: Absence of fire, recovery of sprouting shrubs and short-lived perennial grasses.

Citations