

Ecological site R022AZ044CA COARSE LOAMY 16-20 P.Z.

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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): 022A–Sierra Nevada and Tehachapi Mountains

This ESD was developed using older policy requirements which have been improved with the intent of improving ESD products overall. Users should approach these materials with some caution as the content herein, while likely useful for some purposes, was developed within parameters now recognized as needing varying levels of improvement. As always, a site-specific investigation is highly recommended when site-specific management alternatives are to be developed and/or management decisions are to be made.

Each ESD is an interpretation of the ecological relationships between biotic and abiotic aspects of the landscape. Users of this document should be aware of the limitations of this tool to the extent that specific local conditions may not be entirely captured within the ESD. In particular, management decisions should be supported by site-specific inventories, assessments and planning processes based on the best available information including and extending beyond the ESD.

An ESD is not a permanent determination of ecological dynamics. Rather, each ESD is an evolving body of work intrinsically tied to the soil surveys and data associated with soil map unit components of correlated soil-ecological site relationships. As new information becomes available, updates may be made or may be underway at any given time. Minor updates may be made without announcement when such changes do not modify the ecological site concept, the soils correlated or the state-and-transition model.

Associated sites

R022AY020NV	PRUNUS POCKET
R022AY022NV	LOAMY SLOPE 14-16 P.Z.
R022AY023NV	LOAMY SLOPE 16-20 P.Z.
R022AY025NV	MAHOGANY THICKET
R022AY028NV	CLAYPAN 16+ P.Z.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> (2) <i>Purshia tridentata</i>
Herbaceous	(1) <i>Achnatherum occidentale</i>

Physiographic features

This site occurs on mountain sideslopes on all aspects. Slopes range from 10 to 45 percent, but slope gradients of 15

to 30 percent are most typical. Elevations are 7000 to about 8000 feet.

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Elevation	7,000–8,000 ft
Slope	10–45%

Climatic features

The climate on this site is subhumid-continental, characterized by cold, moist winters, and cool dry summers. The average annual precipitation ranges from 16 to 20 inches, mostly occurring as snow. The linear to convex slope shapes associated with this site cause some of the precipitation to be removed from the site because of wind action, thus reducing the moisture available for plant growth. The mean annual air temperature ranges from 36 to 39 degrees F. The average frost free growing season is 30 to 60 days. Climate data used to support this section were derived from PRISM and is not specifically tied to any dominant climate station.

Table 3. Representative climatic features

Frost-free period (average)	60 days
Freeze-free period (average)	0 days
Precipitation total (average)	20 in

Influencing water features

There are no influencing water features associated with this site

Soil features

The soils associated with this site are moderately deep to very deep, well drained and derived from mixed sources. The soils have an argillic horizon and a mollic epipedon and are skeletal throughout the profile. The soils are moist in the moisture control section during late fall, winter, and spring. Soils are dry from July through October.

Soil series associated with this site include: Burchfat, and Murain.

CA729 Toiyabe National Forest Area, California
 222;Hardtil-Alpinco-Rock outcrop complex, warm, 8 to 30 percent slopes;Murain
 392;Heenlake-Loope association;Burchflat;Murain
 480;Aspetill association;Murain
 490;Cloudburst-Murain association;Murain
 491;Cloudburst-Murain-Hardtil association;Murain
 531;Elaero association;Elaero
 580;Murain-Shorthike association;Murain
 581;Murain association;Murain
 590;Loope-Heenlake-Carshal association;Murain
 591;Loope-Heenlake-Celeridge association;Murain
 770;Sweetmount-Hawkinspeak-Hawkridge association;Burchflat

Table 4. Representative soil features

Surface texture	(1) Very gravelly sandy loam (2) Extremely stony coarse sandy loam (3) Very gravelly coarse sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained

Permeability class	Moderate to moderately rapid
Soil depth	20–72 in
Surface fragment cover ≤3"	20–35%
Surface fragment cover >3"	6–20%
Available water capacity (0-40in)	1.7–4.5 in
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.1–7.3
Subsurface fragment volume ≤3" (Depth not specified)	18–41%
Subsurface fragment volume >3" (Depth not specified)	2–25%

Ecological dynamics

The fire return interval in mountain big sagebrush communities ranges from 15 to 40 years. Very frequent fire suppresses mountain big sagebrush establishment, while long fire return intervals promote tree invasion into mountain big sagebrush communities. Mountain big sagebrush is highly susceptible to injury from fire. Plants are readily killed in all seasons, even by light severity fires. Mountain big sagebrush plants top-killed by fire will not resprout. Regeneration of mountain big sagebrush is from on-site or off-site seed. Depending on circumstances of the environment and seed source, mountain big sagebrush seeds may sprout profusely the spring after burning, or very sparsely.

Antelope bitterbrush is highly susceptible to fire. Some ecotypes sprout following fire, either from dormant buds encircling an aboveground root crown, from calluses of meristematic tissue beneath the bark, or from dormant buds on a belowground lignotuber. Very young and very old plants (younger than 5 or older than 40-60 years) do not sprout well.

Western needlegrass is classified as "moderately" resistant, but depending on the season of burn, phenology, and fire severity, this perennial bunchgrass is moderately to severely damaged by fire. Aboveground vegetation of western needlegrass is often consumed by fire. The distribution of fuels within the plant influences the severity and length of burn time. Fire in the many leafy vegetative culms can promote burning beneath the soil surface, producing subsurface charring. The abundant dead material which is sometimes present with western needlegrass contributes to fire damage regardless of season. Post burn regeneration usually occurs by seed. Western needlegrass has also adapted to fire by regenerating by fire-enhanced flowering.

State and transition model

Ecosystem states

1. Reference Plant Community

State 1 submodel, plant communities

1.1. Reference Plant Community

State 1 Reference Plant Community

Community 1.1 Reference Plant Community

The reference plant community is characterized by an open canopy of soft-woody shrubs and a dense understory of perennial grasses. The plant community is dominated by western needlegrass and mountain big sagebrush. Potential vegetative composition is about 35% grasses, 5% forbs and 60% shrubs and trees. Approximate ground cover(basal and crown) is 40 to 60 percent.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Shrub/Vine	480	840	1080
Grass/Grasslike	280	490	630
Forb	40	70	90
Total	800	1400	1800

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Primary Perennial Grasses			350–490	
	western needlegrass	ACOCO	<i>Achnatherum occidentale</i> ssp. <i>occidentale</i>	350–490	–
2	Secondary Perennial Grasses			140–210	
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	7–42	–
	Letterman's needlegrass	ACLE9	<i>Achnatherum lettermanii</i>	7–42	–
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	7–42	–
	Thurber's needlegrass	ACTH7	<i>Achnatherum thurberianum</i>	7–42	–
	squirreltail	ELEL5	<i>Elymus elymoides</i>	7–42	–
	needle and thread	HECO26	<i>Hesperostipa comata</i>	7–42	–
	basin wildrye	LECI4	<i>Leymus cinereus</i>	7–42	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	7–42	–
Forb					
4	Perennial Forbs			28–112	
	rockcress	ARABI2	<i>Arabis</i>	7–28	–
	tapertip hawksbeard	CRAC2	<i>Crepis acuminata</i>	7–28	–
	buckwheat	ERIOG	<i>Eriogonum</i>	7–28	–
	mule-ears	WYAM	<i>Wyethia amplexicaulis</i>	7–28	–
Shrub/Vine					
5	Primary Shrubs			700–980	
	mountain big sagebrush	ARTRV	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	350–490	–
	antelope bitterbrush	PUTR2	<i>Purshia tridentata</i>	350–490	–
6	Secondary Shrubs			70–140	
	yellow rabbitbrush	CHVI8	<i>Chrysothamnus viscidiflorus</i>	7–28	–
	mormon tea	EPVI	<i>Ephedra viridis</i>	7–28	–
	slender buckwheat	ERMI4	<i>Eriogonum microthecum</i>	7–28	–
	gilia	GILIA	<i>Gilia</i>	7–28	–
	desert peach	PRAN2	<i>Prunus andersonii</i>	7–28	–
	currant	RIBES	<i>Ribes</i>	7–28	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	7–28	–

Animal community

Mountain big sagebrush is eaten by domestic sheep and cattle, but has long been considered to be of low palatability to domestic livestock, a competitor with more desirable species, and a physical impediment to grazing.

Domestic livestock and mule deer may compete for antelope bitterbrush in late summer, fall, and/or winter. Cattle prefer antelope bitterbrush from mid-May through June and again in September and October. Antelope bitterbrush is palatable to all types of livestock.

Wildlife Interpretations:

Mountain big sagebrush is highly preferred and nutritious winter forage for mule deer.

In northwestern Nevada and northeastern California, antelope bitterbrush is a critical winter food for mule deer. Antelope bitterbrush seed is a large part of the diets of rodents, especially deer mice and kangaroo rats. Antelope bitterbrush is palatable to all types of wildlife.

Other information

Mountain big sagebrush is easily propagated from seed under greenhouse, nursery, and common garden conditions and has been successfully seeded directly into field sites. Mountain big sagebrush has also been successfully planted in field sites using nursery-grown bareroot and containerized stock.

Type locality

Location 1: Mono County, CA	
Latitude	38° 24' 17"
Longitude	119° 24' 50"
General legal description	Toiyabe National Forest

Other references

Fire Effect Information System (Online; <http://www.fs.fed.us/database/feis/plants/>).

USDA-NRCS Plants Database (Online; <http://plants.usda.gov/>).

Contributors

ALM/GKB

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	
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):**
-
5. **Number of gullies and erosion associated with gullies:**
-
6. **Extent of wind scoured, blowouts and/or depositional areas:**
-
7. **Amount of litter movement (describe size and distance expected to travel):**
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**
-
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**
-
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:
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
-
14. **Average percent litter cover (%) and depth (in):**

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

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:**

17. **Perennial plant reproductive capability:**
