USDA Natural Resources
Conservation Service

Ecological site R022AZ043CA
SOUTH SLOPE 14-16 P.Z.

Accessed: 05/11/2025

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

R022AY022NV	**LOAMY SLOPE 14-16 P.Z.**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Artemisia tridentata ssp. vaseyana* (2) *Purshia tridentata*
Herbaceous	(1) *Achnatherum*

Physiographic features

This site occurs on mountain sideslopes and moraines. Slopes range from 25 to 65 percent, but slope gradients of 30 to 50 percent are most typical. Elevations are 6500 to over 8500 feet

Table 2. Representative physiographic features

Landforms	(1) Mountain slope
Elevation	6,500–8,500 ft

Slope	30–50%
Aspect	SE, S, SW

Climatic features

Average annual precipitation is 16 inches to 24 inches. Mean annual air temperature is 39 to 45 degrees F. The average growing season is about 40 to 70 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)	70 days
Freeze-free period (average)	0 days
Precipitation total (average)	24 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, and well drained to somewhat excessively drained. The soils are formed in residuum and colluvium derived from granitic, igneous, or metamorphic rocks. The soils are skeletal throughout the profile and have a mollic epipedon. The soils are usually moist in the moisture control section during late fall, winter, and spring and dry from July through early October.
Soil series associated with this site include: Elaero and Shorthike.

CA729 Toiyabe National Forest Area, California
122;Toiyabe-Corbett-Rock outcrop complex, 50 to 75 percent slopes;Elaero
460;Toejom-Pimogran-Rock outcrop association;Elaero
461;Toejom-Pimogran-Rock outcrop association, 50 to 75 percent slopes;Elaero
530;Elaero-Lockgate-Granhogany association;Elaero
531;Elaero association;Elaero
532;Elaero-Granidry-Rock outcrop association;Elaero
580;Murain-Shorthike association;Shorthike
581;Murain association;Shorthike
660;Delhew-Grandridge-Bakscratch association;Elaero
740;Jackflat-Grandridge association;Elaero
780;Granhogany-Rock outcrop complex, 15 to 50 percent slopes;Elaero
800;Grandridge-Delhew association;Elaero
810;Corbett-Toiyabe-Rock outcrop complex, 15 to 50 percent slopes;Elaero

NV773 Douglas County Area, Nevada
660;Delhew-Grandridge-Bakscratch association;Elaero
800;Grandridge-Delhew association;Elaero

Table 4. Representative soil features

Surface texture	(1) Very gravelly loamy coarse sand
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid

Soil depth	20–72 in
Surface fragment cover <=3"	20–30%
Surface fragment cover >3"	12–30%
Available water capacity (0-40in)	1.3–3.3 in
Calcium carbonate equivalent (0-40in)	0%
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)	16–40%
Subsurface fragment volume >3" (Depth not specified)	2–26%

Ecological dynamics

Fire Ecology:

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.

Thurber's 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 Thurber 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 Thurber needlegrass contributes to fire damage regardless of season. Post burn regeneration usually occurs by seed. Thurber 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 and Thurber's needlegrass, Indian ricegrass and mountain big sagebrush. Potential vegetative composition is about 40% grasses, 5% forbs, and 55% shrubs. 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	330	550	770
Grass/Grasslike	240	400	560
Forb	30	50	70
Total	**600**	**1000**	**1400**

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**			200–450	
	western needlegrass	ACOCO	*Achnatherum occidentale ssp. occidentale*	75–175	–
	Thurber's needlegrass	ACTH7	*Achnatherum thurberianum*	75–175	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	50–100	–
2	**Secondary Perennial Grasses**			50–100	
	mountain brome	BRMA4	*Bromus marginatus*	10–30	–
	sedge	CAREX	*Carex*	10–30	–
	squirreltail	ELEL5	*Elymus elymoides*	10–30	–
	big squirreltail	ELMU3	*Elymus multisetus*	10–30	–
	needle and thread	HECO26	*Hesperostipa comata*	10–30	–
	basin wildrye	LECI4	*Leymus cinereus*	10–30	–
	spike fescue	LEKI2	*Leucopoa kingii*	10–30	–
Forb					
3	**Perennial Forbs**			20–80	
	basin wildrye	LECI4	*Leymus cinereus*	8–20	–
	rockcress	ARABI2	*Arabis*	10–20	–
	northwestern Indian paintbrush	CAAN7	*Castilleja angustifolia*	10–20	–
	tapertip hawksbeard	CRAC2	*Crepis acuminata*	10–20	–
	lupine	LUPIN	*Lupinus*	10–20	–
	phlox	PHLOX	*Phlox*	10–20	–
Shrub/Vine					
4	**Primary Shrubs**			250–500	
	mountain big sagebrush	ARTRV	*Artemisia tridentata ssp. vaseyana*	150–250	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	100–250	–
5	**Secondary Shrubs**			20–100	
	curl-leaf mountain mahogany	CELE3	*Cercocarpus ledifolius*	10–20	–
	yellow rabbitbrush	CHVI8	*Chrysothamnus viscidiflorus*	10–20	–
	slender buckwheat	ERMI4	*Eriogonum microthecum*	10–20	–
	desert peach	PRAN2	*Prunus andersonii*	10–20	–
	currant	RIBES	*Ribes*	10–20	–
	roundleaf snowberry	SYRO	*Symphoricarpos rotundifolius*	10–20	–

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	
Township/Range/Section	T5N R24E S5
Latitude	38° 18′ 57″
Longitude	119° 20′ 41″
General legal description	Toiyabe National Forest, near Huntoon Creek.

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:**