

Ecological site R030XB121CA Calcareous Hill 5-7" 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.

Ecological site concept

This site occurs on summits and sideslopes of low hills and mountains. Elevations are 3000 to 4500 feet. Slopes range from 2 to 50 percent, but slopes of 15 to 50% are most typical. The soils that characterize this site are very shallow and shallow to bedrock. Please refer to group concept R030XA055CA to view the provisional STM.

Associated sites

R030XB139CA	Shallow Dry Hill 4-6 P.Z. Limy Hill 5-7
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Similar sites

R030XB141CA	Loamy 5-7" P.Z. Loamy 5-7
R030XB122CA	Calcareous Loam 3-5" P.Z. Calcareous Loam 3-5

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Atriplex confertifolia</i> (2) <i>Larrea tridentata</i>
Herbaceous	(1) <i>Achnatherum speciosum</i>

Physiographic features

This site occurs on summits and sideslopes of low hills and mountains. Elevations are 3000 to 4500 feet. Slopes range from 2 to 50 percent, but slopes of 15 to 50% are most typical.

Table 2. Representative physiographic features

Landforms	(1) Mountain (2) Hill
Flooding duration	Extremely brief (0.1 to 4 hours)
Flooding frequency	None to rare
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to rare
Elevation	910 – 1,370 m
Slope	0 – 50 %
Aspect	Aspect is not a significant factor

Climatic features

The climate on this site is arid, characterized by warm, moist winters (30 to 60 degrees F) and hot, dry summers (70 to 100 degrees F). The average annual precipitation ranges from 4 to 7 inches with most falling as rain from November to March. Approximately 25% of the annual precipitation occurs from July to September as a result of summer convection storms. Mean annual air temperature is 61 to 66 degrees F.

"Maximum precipitation" data represents average precipitation by month from Goldstone Echo 2, CA, weather station ID 043498.

Available temperature data is taken from China Lake Armitage, CA, weather station ID 041733.

The average frost-free period is 240 to 300 days.

Table 3 Representative climatic features

Frost-free period (average)	300 days
Freeze-free period (average)	
Precipitation total (average)	

Influencing water features

Soil features

The soils that characterize this site are very shallow and shallow to bedrock. They are well drained to somewhat excessively drained. They are formed in residuum and colluvium mainly from volcanic sources. Surface textures are extremely cobbly loams and extremely gravelly sandy loams. Subsurface textures are gravelly loams to extremely gravelly sandy loams. Available water capacity is very low and permeability is moderate. Wind erosion hazard is negligible due to surface coarse fragments. Effective rooting depth is 0 to 15 inches to

bedrock.

This ecosite is found on soil map units such as:

161 Marsite-Haleburu complex, 15-50% slopes

181 Stonegold extremely cobbly loam, 2-8% slopes

Table 4. Representative soil features

Surface texture	(1) Extremely cobbly loam (2) Extremely gravelly sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate
Soil depth	0 – 50 cm
Surface fragment cover <=3"	40 – 80 %
Surface fragment cover >3"	20 – 60 %
Available water capacity (0-101.6cm)	0.61 – 3.71 cm
Calcium carbonate equivalent (0-101.6cm)	0 – 10 %
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	7.4 – 8.6

Ecological dynamics

Please refer to group concept R030XA055CA to view the provisional STM.

Successive years of below-average precipitation may result in considerable die-off of many species of native shrubs, especially shadscale (*Atriplex confertifolia*). Defoliation and death of branches of creosotebush (*Larrea tridentata*) may occur as a result of long periods of intense moisture stress. With a loss of perennial cover, non-native annual grasses and forbs such as red brome (*Bromus rubens*), schismus (*Schismus arabicus*), and redstem stork's bill (*Erodium cicutarium*) will readily invade this site. Burrobrush (*Hymenoclea salsola*) is also an invader on this site.

Other disturbances to this site include livestock grazing, off-highway vehicle use, and military operations. Consequences of these activities may include a reduction in native species abundance and cover, and increased erosion.

Desert communities are usually unaffected by fire because of low fuel loads, though a year of exceptionally heavy winter rains can generate fuels by producing a heavy stand of annual forbs and grasses. When fires do occur, the effect on the ecosystem may be extreme due to the harsh environment and the slow rate of recovery. White bursage (*Ambrosia dumosa*) and creosotebush possess limited sprouting ability, thus, can be killed by fire. White bursage, however, can rapidly re-establish from seed. Saltbush species are generally resistant to fire because of a low volatilization rate.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Shrub/Vine					
1	Shrubs			123-420	
	shadscale saltbush	ATCO	<i>Atriplex confertifolia</i>	56-101	–
	creosote bush	LATR2	<i>Larrea tridentata</i>	39-78	–
	burrobrush	AMDU2	<i>Ambrosia dumosa</i>	17-62	–
	desert pepperweed	LEFR2	<i>Lepidium fremontii</i>	0-22	–
	water jacket	LYAN	<i>Lycium andersonii</i>	0-22	–
	beavertail pricklypear	OPBA2	<i>Opuntia basilaris</i>	0-22	–
	Mojave cottonthorn	TEST2	<i>Tetradymia stenolepis</i>	0-22	–
	Mojave woodyaster	XYTO2	<i>Xylorhiza tortifolia</i>	0-22	–
	Joshua tree	YUBR	<i>Yucca brevifolia</i>	0-22	–
	cottontop cactus	ECPO2	<i>Echinocactus polycephalus</i>	0-22	–
	Nevada jointfir	EPNE	<i>Ephedra nevadensis</i>	0-22	–
	spiny hopsage	GRSP	<i>Grayia spinosa</i>	0-22	–
	littleleaf ratany	KRER	<i>Krameria erecta</i>	0-22	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0-22	–
Grass/Grasslike					
2	Grasses			28-84	
	desert needlegrass	ACSP12	<i>Achnatherum speciosum</i>	17-39	–
	Grass, annual	2GA	<i>Grass, annual</i>	0-22	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0-11	–
	big galleta	PLRI3	<i>Pleuraphis rigida</i>	0-11	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	0-11	–
Forb					
3	Forbs			17-56	
	brittle spineflower	CHBR	<i>Chorizanthe brevicornu</i>	0-11	–
	desert trumpet	ERIN4	<i>Eriogonum inflatum</i>	0-11	–
	pygmy poppy	ESMI	<i>Eschscholzia minutiflora</i>	0-11	–
	desert Indianwheat	PLOV	<i>Plantago ovata</i>	0-11	–
	desert globemallow	SPAM2	<i>Sphaeralcea ambigua</i>	0-11	–
	brownplume wirelettuce	STPA4	<i>Stephanomeria pauciflora</i>	0-11	–

Animal community

This site provides habitat for small mammals such as antelope ground squirrels; pocket mice; Merriam and Great Basin kangaroo rats; and black-tailed jackrabbits and coyotes. Shadscale seeds are used by several species of small mammals. The twigs and foliage provide forage for jackrabbits and some small mammals. Feral burros also occur on this site. This site provides habitat for lizards such as the western whiptail, side-blotched lizard, chuckwalla and desert horned lizard. The depth of bedrock may be a limiting factor for burrowing reptiles such as desert tortoise. Birds common to this site include common ravens, black-throated and sage sparrows, and rock wrens.(Brown and Nagy 1995; Brydolf 1996; Recht 1995) **HABITAT MANAGEMENT AND REVEGETATION** Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Close roads and trails no longer being used and revegetate using native species indigenous to this site. Vehicle activity off of designated roads and tank trails can result in destruction of desert tortoise and small mammal burrows. Water developments would increase the species diversity of this site. Shadscale, white bursage and creosotebush are effective shrubs for revegetation of disturbed sites. Transplanting seedlings is more effective than direct seeding. Planting in late fall or early spring allows for acclimation to summer conditions. Transplants that are dormant during the hot, dry season are best maintained that way rather than attempting to force them to break dormancy and undergo new vegetative growth out of season. Supplemental irrigation is recommended for the first growing season, especially if winter rainfall has been sparse. Protection from rodents is also recommended. **LIVESTOCK GRAZING:** Shadscale is considered valuable browse for cattle and sheep. Shadscale is often eaten during the early spring before spines mature. The seeds are also readily eaten by livestock. White bursage is fair browse for cattle and horses, and fair to good browse for goats. Sheep also use this shrub, feeding primarily on new growth and seeds. White bursage is one of the major forage species of feral burros, especially in winter. Feral burros can eliminate this shrub through browsing and trampling. Creosotebush is unpalatable to livestock. Domestic sheep use creosotebush primarily for shade. During favorable years, perennial and annual forbs and grasses provide additional forage. General guide to initial stocking rate. Before making specific recommendations, an on-site evaluation must be made. Production in an average year: 350 lbs/acre

Hydrological functions

Runoff is medium to very high. Hydrologic group D (Haleburu, Marsite, Stonegold) - soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. Hydrologic conditions: good - >70% ground cover (includes litter, grass and brush overstory) fair - 30 to 70% ground cover poor 30% ground cover. Soil group D hydrologic conditions and runoff curves for Haleburu, Marsite, and Stonegold: Good-Fair-Poor = 84-86-88

Recreational uses

This site is highly valued for open space and those interested in desert ecology. Flowering wildflowers and shrubs may also attract visitors during the spring.

Wood products

There are no wood products derived from this ecosite.

Other information

MILITARY OPERATIONS The steep rocky slopes restrict extensive vehicle and foot traffic. Management for this site would be to protect it from excessive disturbance and maintain existing plant cover. Land clearing or other disturbances that destroy the vegetation and the soil crust and structure can result in soil compaction, reduced infiltration rates, accelerated erosion, soil blowing and barren areas. Rest or protect sites from further disturbance. **POISONOUS PLANTS and/or NON-NATIVE PLANTS:** There are no poisonous plants found on this ecosite. Non-native plants occurring on this site include schismus, red brome, and redstem stork's bill.

Inventory data references

This ecological site description is based on the following documentation: Sampling technique: _3_ NV-ECS-1 _2_ SCS-Range 417 _1_ Other

Type locality

Location 1: San Bernardino County, CA	
Township/Range/Section	T15N R1E S31

UTM zone	N
UTM northing	3911876
UTM easting	507523
Latitude	35° 21'00"
Longitude	116° 55'10"
General legal description	Datum = NAS-C; SW1/4 Sec. 31; West of Goldstone Lake (Goldstone Quadrangle).

Other references

This ecosite was developed in cooperation with: Directorate of Public Works, National Training Center, Fort Irwin, and the Mojave Desert Resource Conservation District

Brown, T.K. and K. A. Nagy with R.D. Nieuhaus, Inc. 1995. Final Report, Herpetological Surveys and Physiological Studies on the Western Portion of Fort Irwin NTC.

Brydolf, B. with R.D. Nieuhaus, Inc. 1996. Final Report, 1994 Avian Survey at the National Training Center, Fort Irwin, CA.

Recht, M.A. with R.D. Nieuhaus, Inc. 1995. Final Report, 1994 Small Mammal Surveys of Selected Sites at the National Training Center Fort Irwin, California.

Western Regional Climate Center Historical Climate Information. <http://www.wrcc.dri.edu/CLIMATEDATA.html>. Accessed 17 July 2006.

Contributors

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Approval

Sarah Quistberg, 2/26/2025

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	08/29/2026
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):

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:
