USDA Natural Resources
Conservation Service

Ecological site R030XA096NV
COARSE SILTY 3-5 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 alluvial flats, lake plains, and lake terraces. Slopes range from 0 to 4 percent. Slopes most typically occur as 0 to 2 percent. Elevations are from 2200 to about 4000 feet. The soils associated with this site are very deep, coarse silty, alluvium derived from mixed rock sources. Water intake rates are moderate and available water capacity is moderate.

This is a group concept and provisional STM that also covers the following ecological sites: (R030XA070NV, R030XA062NV, R030XA097NV, R030XY013NV,

Associated sites

R030XA011NV	**SILTY TERRACE 5-7 P.Z.**
R030XA097NV	**CLAY TERRACE 3-5 P.Z.**
R030XY013NV	**SHALLOW SILTY**
R030XY045NV	**DUNES 3-7 P.Z.**
R030XY047NV	**ALLUVIAL PLAIN**

Similar sites

R030XA011NV	**SILTY TERRACE 5-7 P.Z.** ATTO-ATCA2 codominant shrubs; ATCO not codominant.
R030XA097NV	**CLAY TERRACE 3-5 P.Z.** ATCO-ATCA2 codominant shrubs
R030XY013NV	**SHALLOW SILTY** ATCO dominant plant

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Atriplex canescens* (2) *Atriplex confertifolia*
Herbaceous	(1) *Sporobolus airoides*

Physiographic features

This site occurs on alluvial flats, lake plains, and lake terraces. Slopes range from 0 to 4 percent. Slopes most typically occur as 0 to 2 percent. Elevations are from 2200 to about 4000 feet.

Table 2. Representative physiographic features

Landforms	(1) Alluvial flat (2) Lake plain (3) Lake terrace
Flooding duration	Very brief (4 to 48 hours) to extremely brief (0.1 to 4 hours)
Flooding frequency	Very rare to rare
Ponding frequency	None
Elevation	671–1,219 m
Slope	0–4%
Aspect	Aspect is not a significant factor

Climatic features

The climate is low-latitude desert, with mild winters and very hot summers. Precipitation is greatest in the winter with a lesser secondary peak in summer typical of the Mojave Desert. Average annual precipitation is 3 to 5 inches. Mean annual air temperature is 65 to 72 degrees F. The average growing season is about 240 to 320 days.

Table 3. Representative climatic features

Frost-free period (average)	320 days
Freeze-free period (average)	
Precipitation total (average)	127 mm

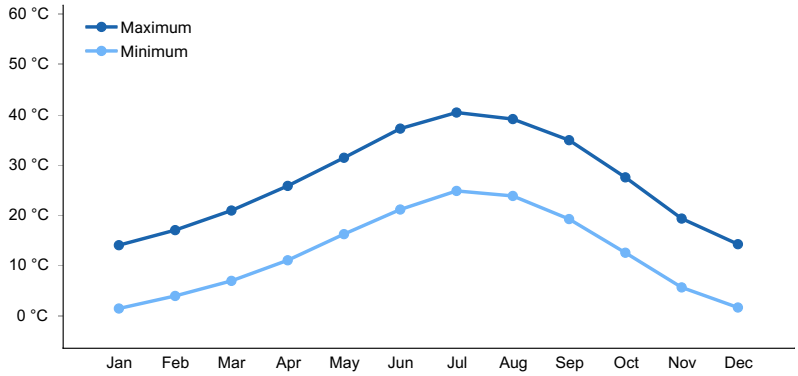


Figure 1. Monthly average minimum and maximum temperature

Influencing water features

There are no influencing water features associated with this site.

Soil features

The soils associated with this site are very deep, coarse silty, alluvium derived from mixed rock sources. Water intake rates are moderate and available water capacity is moderate. the soils have a typic-aridic moisture regime. The soils receive extra moisture as run-in from higher landscapes. The soil series associated with this site include Haymont, a coarse-silty, mixed, superactive, calcareous,thermic Typic Torriorthent and Vegastorm, a coarse-loamy, carbonatic, thermic, Petronodic Haplocalcid.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Loam
Family particle size	(1) Loamy

Drainage class	Well drained
Permeability class	Moderate
Soil depth	183–213 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	11.94–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	15–65%
Electrical conductivity (0-101.6cm)	2–32 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	1–45
Soil reaction (1:1 water) (0-101.6cm)	7.9–9.5
Subsurface fragment volume <=3" (Depth not specified)	0–26%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This salt-desert shrub community is dominated by fourwing saltbush and shadscale saltbush. It is stable and long-lived. Saltbush persists throughout the successional process. Fourwing saltbrush is able to establish early in the successional process from seed and some ecotypes are able to sprout from the root crown (Howard 2003). Shadscale is most common the arid southwest part of the Intermountain region and is characterized by a wider ecological amplitude than most Atriplex species. It reproduces solely from seed and flowers are wind pollinated. Large pulses of shadscale seedling recruitment are commonly observed after a large die-off of mature shadscale plants (Simonin 2001).

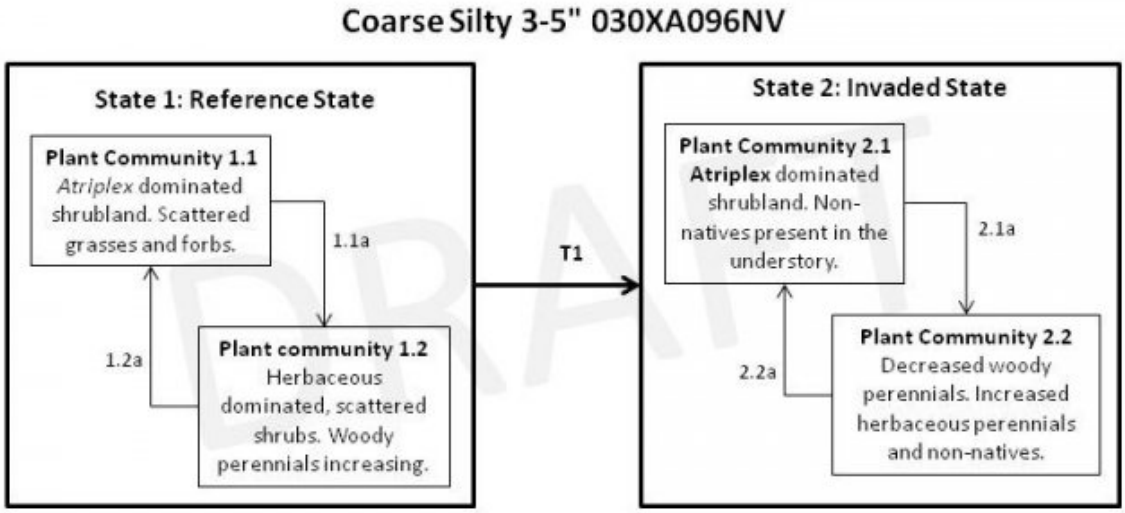
The root systems of desert shrubs generally have equal amounts of resources dedicated to lateral and tap root production (Osmond et al 1990). An extensive tap root allows shrubs to extract water from deep in the soil profile, while shallow lateral roots can utilize water in the upper profile. Production of herbaceous vegetation is relatively low, but is dominated alkali sacaton and inland saltgrass, both warm-season grasses. Warm-season grasses have higher light and temperature requirements to begin photosynthesis, therefore grow most actively during the summer. Vegetation plays an important role in reducing the erodibility of the soil surface. Incorrect management actions may result in reduced vegetative cover and increased soil erosion. Atriplex species are tolerant of saline, alkali, boron and gypsum soils but are not a good indicator of such conditions. Soil pH in saltbush communities can range to slightly acidic to slightly alkaline. Germination of Atriplex species is strongly tied to salt concentrations of the soil. Germination is generally highest at low salinities with increasing suppression as salinity increases (Mikhiel et al. 1992)

Increased surface disturbance will reduce the overall cover of Atriplex. Deep-rooted perennial bunchgrasses decrease and bare ground will also increase. Following mechanical disturbance or wildfire, introduced annual grasses and forbs readily invade or increase on this site. Disturbances, including wildfire, can increase resource availability by reducing the amount of resources (moisture, nutrients) used by resident vegetation through mortality or injury (Zouhar et al. 2008). The increased resource availability can make the system even more susceptible to invasion by non-natives.

Fire Ecology:
It appears that wildfire was not historically a dominating influence in salt-desert shrub landscapes. The mean fire return interval ranges from 35 to 100 years. Fuels are comprised primarily of woody shrubs, but it is the fine fuels from annuals and perennial grasses that facilitate the ignition and spread of wildfires. Native annual plants usually break down rapidly during the summer and do not create a long-lived fuelbed. Fine fuels from non-native annual

grasses currently represents the most important fuelbed component. Fire top-kills or kills saltbush species. Some varieties of fourwing saltbush may sprout after top-kill. Fourwing saltbush is well adapted to survive in early post-fire communities. Shadscale is fire intolerant and it does not readily recover from fire, except for establishment through seed. Alkali sacaton is classified as tolerant of, but not resistant to fire. Top-killing by fire is probably frequent, and the plants can be killed by severe fire.

State and transition model



State 1
Reference State

The reference state is representative of the natural range of variability under pristine conditions. Plant communities are dynamic in response to changes in disturbance regimes and weather patterns. Plant community phase changes are primarily driven by long-term drought. Historically, fire had little impact in this system due to low fuel loading and widely spaced vegetation.

Community 1.1
Reference Plant Community

The reference plant community is representative of a healthy climax condition. The reference plant community is dominated by fourwing saltbush and shadscale. Alkali sacaton is the most common perennial grass. This plant community is stable and long-lived. Potential vegetative composition is about 10 percent grasses, 5 percent perennial and annual forbs and 85 percent shrubs. Total vegetative cover (basal and crown), is 15 to 30 percent.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	95	286	381
Grass/Grasslike	11	34	45
Forb	6	17	22
Total	**112**	**337**	**448**

Community 1.2
Plant Community 1.2

This plant community is characteristic of an early seral, post- disturbance plant community. Initially, this plant community phase is heavily dominated by herbaceous vegetation. Perennial grasses provide favorable sites for the establishment of shrub seedlings. This plant community is considered at risk of invasion by non-native annuals. Non-natives take advantage of increased availability of critical resources following a fire or other disturbance.

Pathway 1.1a
Community 1.1 to 1.2

Wildfire, prolonged drought, disease and/or insect attack.

Pathway 1.2a
Community 1.2 to 1.1

Absence from disturbance and natural regeneration over time.

State 2
Invaded State

The Invaded State is characterized by the presence of non-native annuals in the understory. Ecological resilience of the site is reduced by the presence of non-natives. A biotic threshold is crossed, with the introduction of non-native annuals that are difficult to remove from the system and have the potential to alter disturbance regimes significantly from their natural or historic range of disturbances. Introduced annuals such as red brome and redstem stork's bill have invaded the reference plant community and have become a dominant component of the herbaceous cover. These non-natives annuals are highly flammable and promote wildfires where fires historically have been infrequent.

Community 2.1
Invaded Plant Community 2.1

Plant community composition is similar to the reference plant community with the trace of non-natives in the understory. Ecological processes have not been compromised at this time, but ecological resilience is reduced by the presence of non-natives. This plant community will respond differently following a disturbance, when compared to the reference plant community. Non-natives likely to invade this site include red brome and Mediterranean grass. Increased fine fuels provided by non-native annuals can drastically change the natural fire return interval.

Community 2.2
Invaded Plant Community 2.2

This plant community is characteristic of an early seral, post-disturbance plant community and may or may not be dominated by non-native annuals. Perennial native bunchgrasses recover quickly and provide favorable sites for the establishment of shrub seedlings. Disturbance may result in increased bare ground, increasing the risk of soil erosion. This plant community is considered at-risk, due to the increased fuel loading from herbaceous biomass. Management should be focused on minimizing the threat of wildfire and reducing anthropogenic impacts to protect soil and ecological resources.

Pathway 2.1a
Community 2.1 to 2.2

Surface disturbance or fire removes mature shrubs and favors an increase of herbaceous vegetation, native and non-native.

Pathway 2.2a
Community 2.2 to 2.1

Recovery of woody perennials and absence from disturbance.

Transition T1
State 1 to 2

Introduction of non-native species due to a combination of factors including: 1) surface disturbance, 2) changes in the kinds of animals and their grazing patterns, 3) drought and/or 4) changes in fire history.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Primary Perennial Grasses**			7–27	
	alkali sacaton	SPAI	*Sporobolus airoides*	7–27	–
2	**Secondary Perennial Grasses**			7–27	
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	2–10	–
	saltgrass	DISP	*Distichlis spicata*	2–10	–
3	**Annual Grasses**			1–10	
Forb					
4	**Perennial**			1–17	
	desert globemallow	SPAM2	*Sphaeralcea ambigua*	2–10	–
5	**Annual**			1–17	
Shrub/Vine					
6	**Primary shrubs**			219–353	
	fourwing saltbush	ATCA2	*Atriplex canescens*	151–219	–
	shadscale saltbush	ATCO	*Atriplex confertifolia*	67–135	–
7	**Secondary shrubs**			17–50	
	cattle saltbush	ATPO	*Atriplex polycarpa*	3–17	–
	Torrey's saltbush	ATTO	*Atriplex torreyi*	3–17	–
	seepweed	SUAED	*Suaeda*	3–17	–

Animal community

Livestock Interpretations:
This site is poorly suited to livestock grazing due to low forage production. Grazing management should be keyed to alkali sacaton and palatable shrub production. Alkali sacaton is a valuable forage species in arid and semiarid regions. Plants are tolerant to moderate grazing and can produce abundant herbage utilized by livestock. Fourwing saltbush is one of the most palatable shrubs in the West. Its protein, fat, and carbohydrate levels are comparable to alfalfa. It provides nutritious forage for all classes of livestock. Palatability is rated as good for domestic sheep and domestic goats; fair for cattle; fair to good for horses in winter, poor for horses in other seasons.

Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of livestock. Shadscale provides good browse for domestic sheep. Shadscale leaves and seeds are an important component of domestic sheep and cattle winter diets.

Stocking rates vary over time depending upon season of use, climate variations, site, and previous and current management goals. A safe starting stocking rate is an estimated stocking rate that is fine tuned by the client by adaptive management through the year and from year to year.

Wildlife Interpretations:
Fourwing saltbush provides valuable habitat and year-round browse for wildlife. Fourwing saltbush also provides browse and shelter for small mammals. Additionally, the browse provides a source of water for black-tailed jackrabbits in arid environments. Granivorous birds consume the fruits. Wild ungulates, rodent and lagomorphis readily consume all aboveground portions of the plant. Palatability is rated good for deer, elk, pronghorn and bighorn sheep.
Shadscale is a valuable browse species, providing a source of palatable, nutritious forage for a wide variety of wildlife particularly during spring and summer before the hardening of spiny twigs. It supplies browse, seed, and cover for birds, small mammals, rabbits, deer, and pronghorn antelope.

Hydrological functions

Runoff is low. Permeability is moderate. Rills are not typical and water flow patterns are often numerous on lake plains. The sparse shrub canopy and associated litter provide some protection from raindrop impact.

Recreational uses

Aesthetic value is derived from the flowering of wildflowers and shrubs during the spring and early summer.

Other products

Fourwing saltbush is traditionally important to Native Americans. They ground the seeds for flour. The leaves, placed on coals, impart a salty flavor to corn and other roasted food. Top-growth produces a yellow dye. Young leaves and shoots were used to dye wool and other materials. The roots and flowers were ground to soothe insect bites.
Seeds of shadscale were used by Native Americans of Arizona, Utah and Nevada for bread and mush.

Other information

Alkali sacaton is one of the most commonly used species for seeding and stabilizing disturbed lands. Due to alkali sacaton’s salt tolerance, it is recommended for native grass seedings on subirrigated saline sites.
Fourwing saltbush is widely used in rangeland and riparian improvement and reclamation projects, including burned area recovery. It is probably the most widely used shrub for restoration of winter ranges and mined land reclamation.

Type locality

Location 1: Clark County, NV	
Township/Range/Section	T25S R57E S8
General legal description	Mesquite Valley area, near the California-Nevada state line, about 2 miles southwest of Sandy, Clark County, Nevada. This site also occurs in southeast Nye County, Nevada.

Other references

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Osmond, C.B., L.F. Pitelka and G.M. Hidy. 1990. Plant Biology of the Basin and Range. Ecological Studies. Vol. 80.

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Zouhar, K., J.K. Smith and S. Sutherland. 2008. Effect of Fire on Nonnative Invasive Plants and Invasibility of Wildland Ecosystems. USDA Forest Service Gen. Tech. Rep. RMRS GTR-42-Vol. 6.

Contributors

BLS/GKB

Approval

Kendra Moseley, 2/18/2025

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)	P.Novak-Echenique/E.Hourihan
Contact for lead author	State Rangeland Management Specialist
Date	10/17/2011
Approved by	Kendra Moseley
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None

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2. **Presence of water flow patterns:** Water flow patterns are often numerous on lake plains that receive run-in moisture from higher landscape positions.

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3. **Number and height of erosional pedestals or terracettes:** Pedestals are rare with occurrence typically limited to areas within water flow patterns.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground >50% depending on amount of rock fragments.

5. **Number of gullies and erosion associated with gullies:** None

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Fine litter (foliage from grasses and annual & perennial forbs) expected to move distance of slope length during intense summer convection storms or rapid snowmelt events. Persistent litter (large woody material) will remain in place except during large rainfall events.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability values should be 1 to 3 on most soil textures found on this site. (To be field tested.)

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Structure of soil surface will be thick platy or massive. Soil surface colors are pale or yellowish browns and soils are typified by an ochric epipedon. Organic matter of the surface 2 to 3 inches is less than 1 percent. Surface soils are typically very fine sandy loams and loams.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Sparse shrub canopy and associated litter provide some protection from raindrop impact.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** Compacted layers are none. Massive or calcic subsurface horizons are not to be interpreted as compacted layers.

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: Reference Plant Community: Salt desert shrubs (Atriplex) >>

    Sub-dominant: deep-rooted, warm season, perennial bunchgrass > deep-rooted, cool season, perennial forbs > deep-rooted, cool season, perennial bunchgrasses > fibrous, shallow-rooted, cool season, annual and perennial forbs

    Other: Warm season rhizomatous grasses.

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Dead branches within individual shrubs common and standing dead shrub canopy material may be as much as 30% of total woody canopy; mature bunchgrasses commonly (<20%) have dead centers.

14. **Average percent litter cover (%) and depth (in):** Between plant interspaces and under canopy (10-20%) and depth (± ¼ in.)

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** For normal or average growing season (February thru April [May])±300 lbs/ac; Spring moisture significantly affects total production. Favorable years 400 lbs/ac and unfavorable years 100 lbs/ac.

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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:** Potential invaders are cheatgrass, red brome, Mediterranean grass and redstem filaree.

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17. **Perennial plant reproductive capability:** All functional groups should reproduce in average and above average growing season years.
