USDA Natural Resources
Conservation Service

Ecological site R023XY023NV
WET CLAY BASIN

Last updated: 4/10/2025
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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

Currently there is only a draft of the initial concept for this ecological site. The initial concept for this site places it within the Seasonally Flooded Closed Clay Basins Ecological Site Group. To view the General STM and other information available for this ESG please go to https://edit.jornada.nmsu.edu/catalogs/esg/023X/R023XY912NV

The Wet Clay Basin (023XY023NV) ecological site is the modal site for this group. This site occurs on nearly level enclosed basins. Slopes range from 0 to 4 percent, but slope gradients of 0 to 2 percent are most typical. Elevations are 5500 to 7500 feet. Average annual precipitation is 10 to 14 inches. A seasonally high water table is at or near the surface in most years and the soils are typically ponded through most of the growing season. The soils in this site are deep, dark colored and clayey. When dry, the soils are subject to extensive cracking that damages the root systems of many species of plants. The plant community is dominated by species that can tolerate seasonal ponding: Mat muhly, suncup, sedges, spikerush, and rushes. Silver sagebrush may be present, and povtertyweed (Iva axillaris) may become dominant in dry areas. Production ranges from 0 lb/ac in wet, ponded years, to 1,500 lb/ac in drier years. Normal year annual production is 400 lb/ac.

Associated sites

R023XY015NV	**STONY LOAM 12-14 P.Z.**
R023XY016NV	**SOUTH SLOPE 12-16 P.Z.**
R023XY020NV	**LOAMY 10-12 P.Z.**

Similar sites

R023XY003NV	**CLAY BASIN** A stable plant community; water recedes yearly

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Muhlenbergia richardsonis*

Physiographic features

This site occurs on nearly level enclosed basins, lake plains, and depressions. Slopes range from 0 to 2 percent. Elevations are 5300 to 7200 feet.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Lake plain
Flooding frequency	None
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Ponding frequency	Occasional to frequent
Elevation	1,615–2,195 m
Slope	0–2%
Ponding depth	0–30 cm
Water table depth	0–213 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate associated with this site is semiarid and characterized by cool, moist winters and warm, dry summers. Average annual precipitation is 10 to 14 inches. Mean annual air temperature is 43 to 47 degrees F. The average growing season is about 80 to 100 days.

Nevada’s climate is predominantly arid, with large daily ranges of temperature, infrequent severe storms, heavy snowfall in the higher mountains, and great location variations with elevation. Three basic geographical factors largely influence Nevada’s climate: continentality, latitude, and elevation. Continentality is the most important factor. The strong continental effect is expressed in the form of both dryness and large temperature variations. Nevada lies on the eastern, lee side of the Sierra Nevada Range, a massive

mountain barrier that markedly influences the climate of the State. The prevailing winds are from the west, and as the warm moist air from the Pacific Ocean ascend the western slopes of the Sierra Range, the air cools, condensation occurs and most of the moisture falls as precipitation. As the air descends the eastern slope, it is warmed by compression, and very little precipitation occurs. The effects of this mountain barrier are felt not only in the West but throughout the state, with the result that the lowlands of Nevada are largely desert or steppes. The temperature regime is also affected by the blocking of the inland-moving maritime air. Nevada sheltered from maritime winds, has a continental climate with well-developed seasons and the terrain responds quickly to changes in solar heating. Nevada lies within the mid-latitude belt of prevailing westerly winds which occur most of the year. These winds bring frequent changes in weather during the late fall, winter and spring months, when most of the precipitation occurs. To the south of the mid-latitude westerlies, lies a zone of high pressure in subtropical latitudes, with a center over the Pacific Ocean. In the summer, this high-pressure belt shifts northward over the latitudes of Nevada, blocking storms from the ocean. The resulting weather is mostly clear and dry during the summer and early fall, with scattered thundershowers. The eastern portion of the state receives significant summer thunderstorms generated from monsoonal moisture pushed up from the Gulf of California, known as the North American monsoon. The monsoon system peaks in August and by October the monsoon high over the Western U.S. begins to weaken and the precipitation retreats southward towards the tropics (NOAA 2004).

Average annual precipitation is 16 to over 20 inches. Mean annual air temperature is 41 to 44 degrees F. The average growing season is about 50 to 70 days.

Mean annual precipitaion at the Bear Creek, Nevada SNOTEL station (170501020301) is 37.69 inches.

monthly mean precipitation is:
January 3.84; February 3.75; March 4.38; April 4.9;
May 3.99; June 2.82; July .95; August 1.66;
September 1.22; October 2.12;
November 3.67; December 4.38.

Table 3. Representative climatic features

Frost-free period (average)	90 days
Freeze-free period (average)	
Precipitation total (average)	305 mm

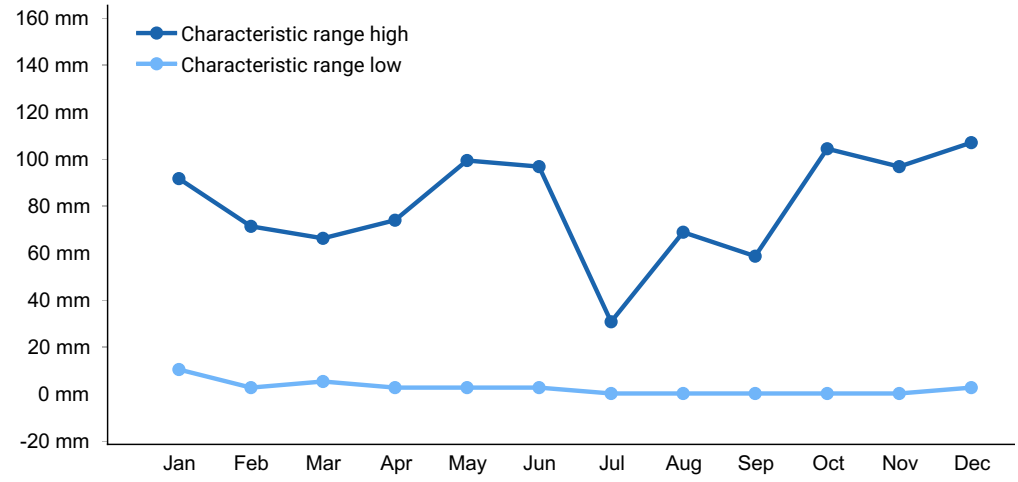


Figure 1. Monthly precipitation range

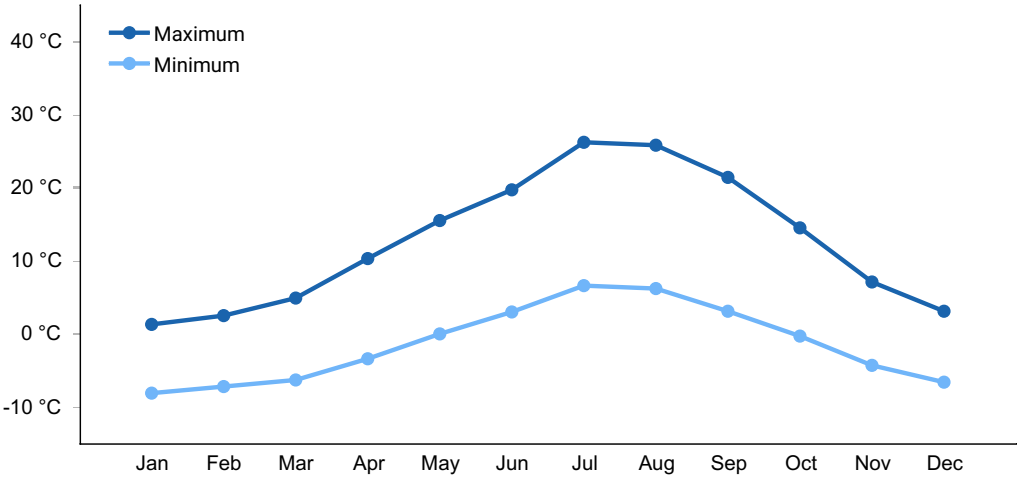


Figure 2. Monthly average minimum and maximum temperature

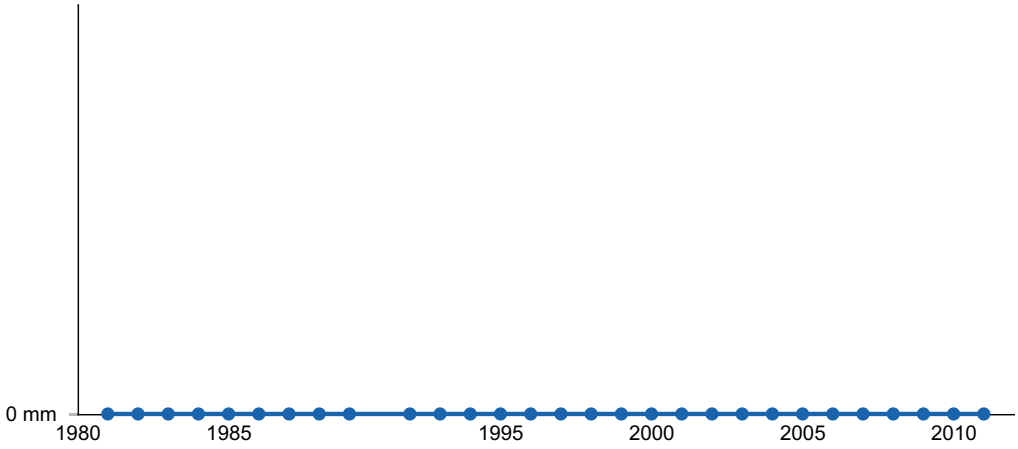


Figure 3. Annual precipitation pattern

Influencing water features

A seasonally high water table is at or near the surface in most years. The soils are typically ponded through most of the growing season from runoff from adjacent landscapes.

Soil features

The soils associated with this site are very deep, dark colored and clayey. The permeability is very slow, runoff is negligible, and the soils are somewhat poorly to poorly drained. When dry, the soils are subject to extensive cracking that damages the root systems of many species of plants. The dry, cracked condition persists long enough in most years for appreciable surface sloughing to take place, and a hummocky (gilgai) relief is not produced. A seasonally high water table is at or near the surface in most years and the soils are typically ponded through most of the growing season. The soil series associated with this site include: Boulder Lake and Weimer.

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Silty clay (3) Clay
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to poorly drained
Permeability class	Very slow
Soil depth	183–213 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	14.99–18.29 cm
Calcium carbonate equivalent (0-101.6cm)	0–3%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1
Soil reaction (1:1 water) (0-101.6cm)	6.1–9.6
Subsurface fragment volume <=3" (Depth not specified)	0–1%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

This is not a stable plant community. This plant community may be completely water

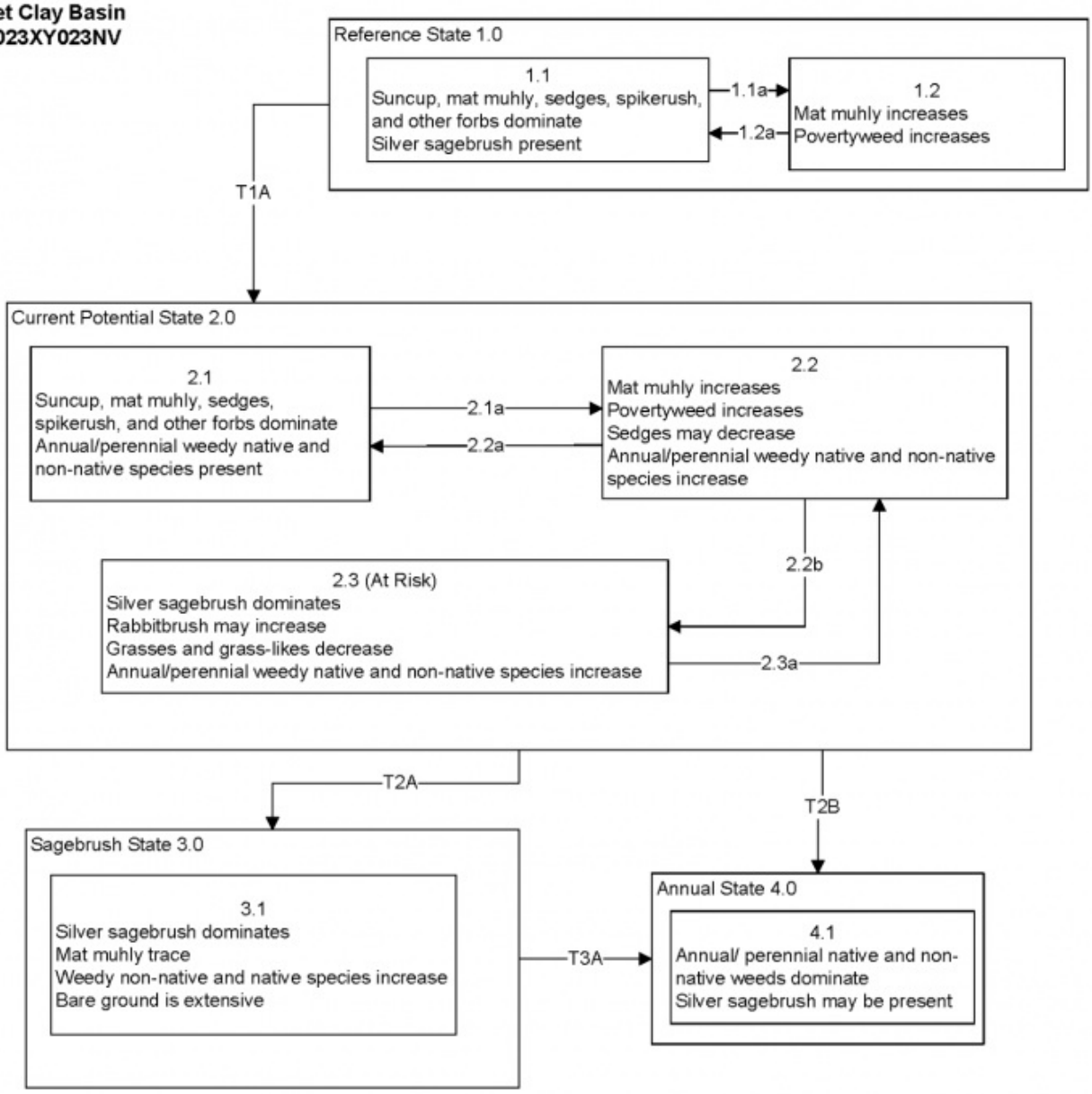
covered during the growing season, or it can be a very productive site, dominated by annual forbs, in drier years.

Determinations of ecological condition and a similarity index are not appropriate for this site.

Fire Ecology:
Mat muhly communities are only slightly affected by fire. They are at the highest susceptibility is during late spring and early summer. It takes 5 to 10 years for it to recover to pre fire frequency. Mat muhly is top killed be fire. Fire does not harm mat muhly to any great extent because the rhizome buds are insulated by the soil.

State and transition model

MLRA 23
Group 12
Wet Clay Basin
R023XY023NV



MLRA 23
Group 12
Wet Clay Basin
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KEY

Reference State 1.0 Community Phase Pathways
1.1a: Drought that reduces seasonal ponding will reduce suncup, sedges, and rushes and increase grasses and silver sagebrush. Povertyweed may increase. May be coupled with herbivory.
1.2a: Release from long-term drought allows suncup, sedges, and rushes to return to dominance.

Transition T1A: Introduction of weedy species.

Current Potential State 2.0 Community Phase Pathways
2.1a: Drought reduces suncup, sedges, and rushes and increases grasses and silver sagebrush.
2.2a: Release from long-term drought allows understory species to recover over time.
2.2b: Continued chronic drought coupled with inappropriate grazing management facilitates an increase in silver sagebrush, rabbitbrush and weedy species while all grasses decline in production.
2.3a: Fire, release from long-term drought, or release from grazing pressure allows understory species to recover.

Transition T2A: Long-term chronic drought, may be coupled with inappropriate grazing management. Extent of this phase may be exacerbated by surface alterations that lower the water table.
Transition T2B: Long-term chronic drought, coupled with at least one of the following: inappropriate grazing management, severe trampling, off-site or on-site water diversion, or combinations of these disturbances. Hydrology has permanently changed.

Shrub State 3.0 Community Phase Pathways
None.

Transition T3A: Long-term chronic drought, inappropriate grazing management coupled with severe trampling, off-site or on-site water diversion, repeated fire, or combinations of these disturbances. Hydrology has permanently changed.

Annual State 4.0 Community Phase Pathways
None.

State 1
Reference Plant Community

Community 1.1
Reference Plant Community

The reference plant community is dominated by annual and perennial forbs, particularly poverty weed. These enclosed basins are generally flooded during much of the growing season. Potential vegetative composition is about 10% grasses, 85% forbs, and up to 5% shrubs. Approximate ground cover (basal and crown) is 0 to over 30 percent. Total foliar cover can exceed 80 percent. Production is related to the length of growing season remaining as ponding recedes.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Forb	1	381	1429
Grass/Grasslike	–	45	168
Shrub/Vine	–	22	84
Total	**1**	**448**	**1681**

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**			22–45	
	mat muhly	MURI	*Muhlenbergia richardsonis*	22–45	–
2	**Secondary Perennial Grasses/Grasslikes**			9–45	
	sedge	CAREX	*Carex*	2–22	–
	spikerush	ELEOC	*Eleocharis*	2–22	–
	rush	JUNCU	*Juncus*	2–22	–
3	**Annual Grasses**			1–45	
Forb					
4	**Perennial**			45–143	
	povertyweed	IVAX	*Iva axillaris*	22–45	–
	evening primrose	OENOT	*Oenothera*	9–22	–
	dock	RUMEX	*Rumex*	4–9	–
5	**Annual**			9–336	
Shrub/Vine					
6	**Primary Shrub**			1–22	
	silver sagebrush	ARCA13	*Artemisia cana*	4–9	–

Animal community

Livstock Interpretations:
This site can be suitable for livestock grazing. Grazing management should be keyed to perennial grass production. Young mat muhly is readily eaten by livestock. Plants become less palatable as they mature. Mat muhly plants usually grow in scattered patches, so they are seldom sufficiently abundant to be of major importance to livestock. In the northern part of its range, mat muhly is rated as good to very good forage for cattle and horses and fairly good for domestic sheep.

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:
The palatability of mat muhly for wildlife species has been rated as fair to poor.

Hydrological functions

Runoff is negligible. Permeability is very slow.

Recreational uses

Aesthetic value is derived from the diverse floral and faunal composition and the colorful flowering of wild flowers during early summer. This site offers rewarding opportunities to photographers and for nature study. This site has potential for upland and big game hunting.

Type locality

Location 1: Washoe County, NV	
Township/Range/Section	T35N R18E S12
UTM zone	N
UTM northing	254972
UTM easting	4534253
Latitude	40° 55′ 21″
Longitude	119° 54′ 35″
General legal description	NW 1/4, Garden Lake Flat, Washoe County, Nevada. This site also occurs in Humboldt County, Nevada.

Other references

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

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

Contributors

BH/SW/GKB

Approval

Kendra Moseley, 4/10/2025

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	05/21/2025
Approved by	Kendra Moseley
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):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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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:**