Ecological site R035XG724AZ
Semi-Riparian Canyon Bottom
14-18" p.z.

Last updated: 5/19/2025
Accessed: 06/17/2026

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): 035X–Colorado Plateau

MLRA CHARACTERISTICS-THESE ARE GENERAL STATEMENTS AZ CRA 35.7 – Colorado Plateau Woodland – Grassland Elevations range from 5000 to 7000 feet and precipitation averages 14 to 18 inches per year. Vegetation includes one-seed juniper, Colorado pinyon, Stansbury cliffrose, Apache plume, four-wing saltbush, green Mormon tea, needle and thread, sideoats grama, blue grama, black grama, galleta, bottlebrush squirreltail, and muttongrass. The soil temperature regime is mesic and the soil moisture regime is aridic ustic. This unit occurs within the Colorado Plateau Physiographic Province and is characterized by a sequence of flat to gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. SITE FEATURES The type location for this site occurs in Walnut Canyon National Monument near Flagstaff, Arizona. This semi-riparian site is a relict channel and floodplain of Walnut Creek. This stream was historically ephemeral, and recently water has been diverted away from the channel, causing previously riparian sites with a high water table to become more similar to an upland dryland site

Ecological site concept

Soils grouped on this site are deep and well drained. Surface textures are predominantly loam. This ecological site occurs on relict stream terraces. Slopes generally range from 2 to 8 percent.

Associated sites

F039XA139AZ	**Limestone/Sandstone Upland 17-22"**
R035XG723AZ	**Limestone/Sandstone Upland (Pinyon-Juniper) 14-18" p.z.**
R039XA140AZ	**Canyon Bottom (Riparian) 18-22" p.z.**

Similar sites

R039XA140AZ	**Canyon Bottom (Riparian) 18-22" p.z.** This site is part of the stream channel on Walnut Canyon National Monument that crosses the current MLRA boundaries of MLRA 35 and MLRA 39.

Table 1. Dominant plant species

Tree	(1) *Chrysothamnus* (2) *Bouteloua gracilis*
Shrub	(1) *Acer negundo* (2) *Populus*
Herbaceous	Not specified

Physiographic features

This site occurs on relict stream terraces on the west end of Walnut Canyon National Monument.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Stream terrace
Flooding frequency	Occasional
Elevation	1,890 – 1,910 m
Slope	0 – 10 %
Aspect	Aspect is not a significant factor

Climatic features

The climate of the land resource unit is semiarid with warm summers and cool winters. The mean annual precipitation ranges from 14 to 18 inches, but is very erratic, often varying substantially from year to year. The majority of the precipitation is received from October through April. This precipitation comes as gentle rain or snow from frontal storms coming out of the Pacific Ocean. Snow is common from November through February. Generally no more than a few inches of snow accumulates, melting within a few days, but may last a week or more. The remaining precipitation, approximately 40 percent, is received from July through September as spotty, unreliable and sometimes violent thunderstorms. The moisture for this precipitation originates in the Gulf of Mexico (and the Pacific Ocean in the fall) and flows into the area on the north end of the Mexican monsoon. Late May through late June is generally a dry period. The mean annual temperature ranges from 46 to 52 degrees Fahrenheit (F). The frost-free period (air temperature > 32 degrees F) ranges from 108 to 151 days (@ 50 percent probability). Strong winds are common, especially in the spring.

Table 3 Representative climatic features

Frost-free period (average)	120 days
Freeze-free period (average)	
Precipitation total (average)	560 mm

Influencing water features

Most of the soil moisture on this ecological site comes from precipitation. It occasionally benefits from run-in moisture.

Soil features

Soils grouped on this site are deep and well drained. Surface textures are predominantly loam. These soils formed in alluvium derived from limestone and sandstone.

This site occurs on terraces. All mapunits for this ecological site are from Walnut Canyon National Monument Soil Survey.

MU 38 Whiskey loam, 2 to 8 percent slopes
MU 39 Vosburg sandy loam, 2 to 8 percent slopes

Table 4. Representative soil features

Parent material	(1) Alluvium – limestone and sandstone
Surface texture	(1) Loam
Drainage class	Well drained
Permeability class	Moderate
Soil depth	150 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	18.8 cm

Ecological dynamics

This site occurs across two MLRAs. This site has both Riparian Canyon Bottoms and Semi-Riparian Canyon bottoms. Due to acreage limitations, the sites were combined to demonstrate hydrology differences due to anthropogenic disturbance, moisture, and temperature differences. There has been a change in the hydrology of the site. Walnut Canyon historically ran as an ephemeral stream. In 1940-1941 Upper Lake Mary dam was constructed upstream as a drinking water reservoir for the city of Flagstaff. In the canyon bottoms the riparian vegetation is maintained by seepage and runoff from the steep canyon walls. Since the building of Upper Lake Mary dam the channel is no longer periodically scoured and the riparian vegetation has been allowed to flourish unchecked. In the areas affected by the dam upstream, which have limited availability of water from seepage from the canyon sides, the vegetation has turned either semi-riparian or almost fully upland. The semi-riparian indicators are limited to a few box-elders (Acer negundo) and scattered shrubs. The majority of the upland vegetation is blue grama (Bouteloua gracilis) and other upland species. There is now only flooding in the area when there is sufficient precipitation as either rain or snowmelt cause an overflow at Lake Mary. There is an additional dam at the east end of Walnut Canyon National Monument built by the Santa Fe Railroad in 1885-1886 but it appears to have little effect on the hydrology of the area has failed to hold water for any length of time. Lower Lake Mary Dam was completed in 1905 but again appears to have little influence on the hydrology.

State and transition model

Figure 3. Model R035XG724AZ

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Forb					
1	**Forb**			6-11	
Grass/Grasslike					
2	**Grass/Grasslike**			224-392	
	blue grama	BOGR2	*Bouteloua gracilis*	112-224	–
	western wheatgrass	PASM	*Pascopyrum smithii*	112-168	–
	Arizona fescue	FEAR2	*Festuca arizonica*	0-6	–
Shrub/Vine					
3	**Shrub/Vine**			39-112	
	rabbitbrush	CHRYS9	*Chrysothamnus*	56-101	–
	Pamirian winterfat	KRCE2	*Krascheninnikovia ceratoides*	6-39	–
Tree					
4	**Tree**			0-112	
	oneseed juniper	JUMO	*Juniperus monosperma*	0-112	–

Type locality

Location 1: Coconino County, AZ	
UTM zone	N
UTM northing	3891393
UTM easting	452123
General legal description	This site is located on Walnut Canyon National Monument and has limited public access.

Contributors

Jennifer Puttere

Approval

Kendra Moseley, 5/19/2025

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)	Jennifer Puttere
Contact for lead author	Flagstaff MLRA SSO
Date	04/03/2013
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** **No rills on this site**

2. **Presence of water flow patterns:** **2 or 3 water flow patterns on a 150 foot tape**

3. **Number and height of erosional pedestals or terracettes:** **Some slight pedestalling around grasses espcially when the grasses are spaced far apart**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** **0 to 5 percent bare groundn this site**

5. **Number of gullies and erosion associated with gullies:** **No gullies on this site**

6. **Extent of wind scoured, blowouts and/or depositional areas:** **Some deposition under shrubs**

7. **Amount of litter movement (describe size and distance expected to travel):** Minimal litter movement-may move up to 1 foot from where dropped from wind disturbance

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** 1 to 2; there are extensive bare areas which may contribute to erosion. However due to the relict nature of this site (abandoned stream terrace and channel) there are still areas of decomposed organic matter which help contribute to the continuing stability of the site.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Weak thin platy structure, brown (10YR 4/3) dry and very dark grayish brown(10YR 3/2 moist)

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Patchy grasses and shrubs with lots of bare ground causes pedestalling, increased erosion, water flow patterns, decreased infiltration and increased runoff.

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer 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: Grasses>>shrubs>trees

    Sub-dominant:

    Other:

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** This site is still transitioning from a bottom site to an upland site, and depends on the height and duration of the water table over time. In the relict stream channel are declining cottonwoods which depend on seasonal water tables, and on the relict terrace are dead ponderosa pines, which may be due to a periodically seasonally increased water table.

---

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):** 1000 lb/acre average production on this site

---

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:** **There are a few broom snakeweeds, extensive rabbitbrush. The presence of ponderosa pines and oneseed juniper may be an indicator that these native species have invaded onto a previously flooded site.**

---

17. **Perennial plant reproductive capability:** **All plants are reproducing normally on site.**
