

## Ecological site F035XC332AZ Sandy Bottom 10-14" (PODEW, SAEX), Perennial (Provisional)

Accessed: 05/05/2024

### 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.

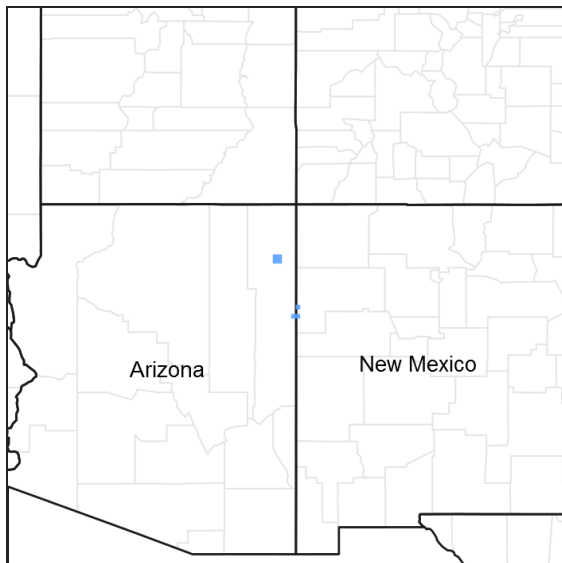


Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

### MLRA notes

Major Land Resource Area (MLRA): 035X–Colorado Plateau

Land Resource Unit 35.3 – Colorado Plateau Sagebrush – Grasslands

This Land Resource 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. Elevations for the Common Resource Area where this ecological site may occur range from 4800 to 6700 feet and precipitation averages 10 to 14 inches. The elevation range is lower (about 4500 to 6000 ) on the western edge of the Colorado Plateau along the Grand Canyon, and moves up about 500 to 800 feet higher on the eastern side in the areas of the Navajo and Hopi Indian Reservations due to rain shadow effects from the Kaibab Plateau and Mogollon Rim. Common vegetation in this region includes Wyoming big sagebrush, Utah juniper, Colorado pinyon - cliffrose, Mormon tea, fourwing saltbush, blackbrush Indian ricegrass, needle and thread, western wheatgrass Galleta, black grama, blue grama, and sand dropseed. Sedimentary rock classes dominate the plateau with volcanic fields occurring for the most part near its margin. The soil temperature regime is mesic and the soil moisture regime is ustic aridic.

### Ecological site concept

“ATTENTION: This ecological site meets the requirements for PROVISIONAL (if not more). A provisional ecological site is established after ecological site concepts are developed and an initial state-and-transition model is drafted. A

provisional ecological site typically will include literature reviews, land use history information, legacy data (prior approved range site descriptions, forage suitability groups, woodland suitability groups, etc.), and includes some soils data, and estimates for canopy and/or species composition by weight,. A provisional ecological site provides the conceptual framework of soil-site correlation for the development of the ESD. For more information about this ecological site, please contact your local NRCS office.”

### Associated sites

R035XC302AZ	<b>Sedimentary Cliffs 10-14" p.z.</b> This site is located on cliff faces and talus slopes above the referenced site.
R035XC317AZ	<b>Sandy Loam Upland 10-14" p.z.</b> This site is located on non-flooded uplands that may be found adjacent to this ecological site.

### Similar sites

F035XF637AZ	<b>Loamy Bottom 13-17" p.z.</b> This site has similar dominant vegetation as the referenced site, but is found in common resource area 35-6 with higher precipitation, cooler temperatures and shorter growing seasons. It may be located upstream from the referenced site.
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**Table 1. Dominant plant species**

Tree	(1) <i>Populus deltoides ssp. wislizeni</i>
Shrub	(1) <i>Salix exigua</i>
Herbaceous	Not specified

### Physiographic features

This site occurs on floodplains and low floodplain terraces of perennial or intermittent streams with perennial or seasonal subsurface flows. The site receives additional moisture from occasional, very brief periods of flooding. Depth to a seasonal high water table is 0 inches to 48 inches that also benefits the site.

**Table 2. Representative physiographic features**

Landforms	(1) Flood plain (2) Stream terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding frequency	None
Elevation	1,463–2,042 m
Slope	0–5%
Water table depth	25–152 cm
Aspect	Aspect is not a significant factor

### Climatic features

The soil temperature regime is mesic and the soil moisture regime is typic aridic. Annual precipitation usually ranges from 10 to 14 inches per year. Approximately 60 percent of the rainfall comes from October through May as gentle rain and snow from Pacific storms which may last for a couple of days. The rest of the rainfall comes during the summer monsoon season from June through September as spotty, brief, intense thunderstorms. The mean annual air temperature ranges from 50 to 55 degrees F.

Cool season plants start growth in mid-spring and mature in early summer. Warm season plants start growth in mid-summer and stay green until the late fall to take advantage of summer rains.

**Table 3. Representative climatic features**

Frost-free period (average)	180 days
Freeze-free period (average)	207 days
Precipitation total (average)	356 mm

## Influencing water features

The natural stream type for this site was most likely a Rosgen type “E” channel. Historic photographic evidence shows that the streams within this site were Rosgen type “D” channels at the turn of this century. That is they have slopes less than 4%, were braided with high bedloads and bank erosion. Stream channels are wide and relatively shallow.

## Soil features

The soils are very deep and moderately well drained. They are formed in alluvium derived from sandstone, granite and quartzite. Surface textures normally range from sandy loam to very fine sandy loam, but can include coarser textures. Subsurface textures include loam, fine sandy loam, and loamy sand. Stratified layers below 40 inches may have greater than 35% rock fragments and more than 15% clay. Hazard of water erosion is moderate to high and hazard of wind erosion is moderate to high. Soil surface rock fragments are uncommon unless the surface has eroded to a coarse alluvial layer. Rock fragments are more common on surface of active stream channel.

This ecological site has been correlated to the following soil map unit components:

Canyon de Chelly (AZ712) Soil Map Unit Components 5-Bebeevor

Fort Defiance Area (AZ715) Soil Map Unit Components 97-Bebeevor

**Table 4. Representative soil features**

Parent material	(1) Alluvium–sandstone
Surface texture	(1) Loamy coarse sand (2) Sand (3) Fine sandy loam
Family particle size	(1) Sandy
Drainage class	Moderately well drained
Permeability class	Moderately rapid
Soil depth	152–203 cm
Surface fragment cover <=3"	0–20%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	20.83 cm
Calcium carbonate equivalent (0-101.6cm)	1–5%
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.1
Subsurface fragment volume <=3" (Depth not specified)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0–10%

## **Ecological dynamics**

An ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure. The historic climax plant community for this ecological site has been estimated by sampling relict or relatively undisturbed sites and/or reviewing historic records. The historic climax plant community is the plant community that evolved over time with the soil forming process and long term changes in climatic conditions of the area. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site.

Natural disturbances, such as drought, fire, grazing of native fauna, and insects, are inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the ecological site. Fluctuations in plant community structure and function caused by the effects of natural disturbances help establish the boundaries and characteristics of an ecological site. They are accounted for as part of the range of characteristics of the ecological site. Recognizable plant community phases are identified in the reference state of the ecological site. Some sites may have a small range of variation, while others have a large range. Some plant community phases may exist for long periods of time, while others may only occur for a couple of years after a disturbance.

If there is significant loss of soil surface through erosion, if there a loss of the soil stability on the site due to active erosion on the site, if the hydrology of the site is significantly modified by increasing runoff amounts and/or patterns, if there are changes in availability of surface and subsurface water, or if the biotic integrity of the site is altered though changes in plant structural and functional types or the introduction of non-native species, then potential of the ecological site to return to the historic climax plant community can be lost, or restoration would require significant inputs . The site deterioration results in the crossing of a threshold or irreversible boundary to another state, or equilibrium, for the ecological site. There may be multiple states possible for an ecological site, determined by the type and or severity of disturbance.

The known states and transition pathways for this ecological site are described in the state and transition model. Within each state, there may be one or more known plant community phases. These community phases describe the different plant community that can be recognized and mapped on this ecological site. The state and transition model is intended to help land users determine the current plant community phase on the ecological site, and the management options for improving the plant community to the desired plant community.

## **State and transition model**

### 35.3 Sandy Loam Bottom (PODEW, SAEX)

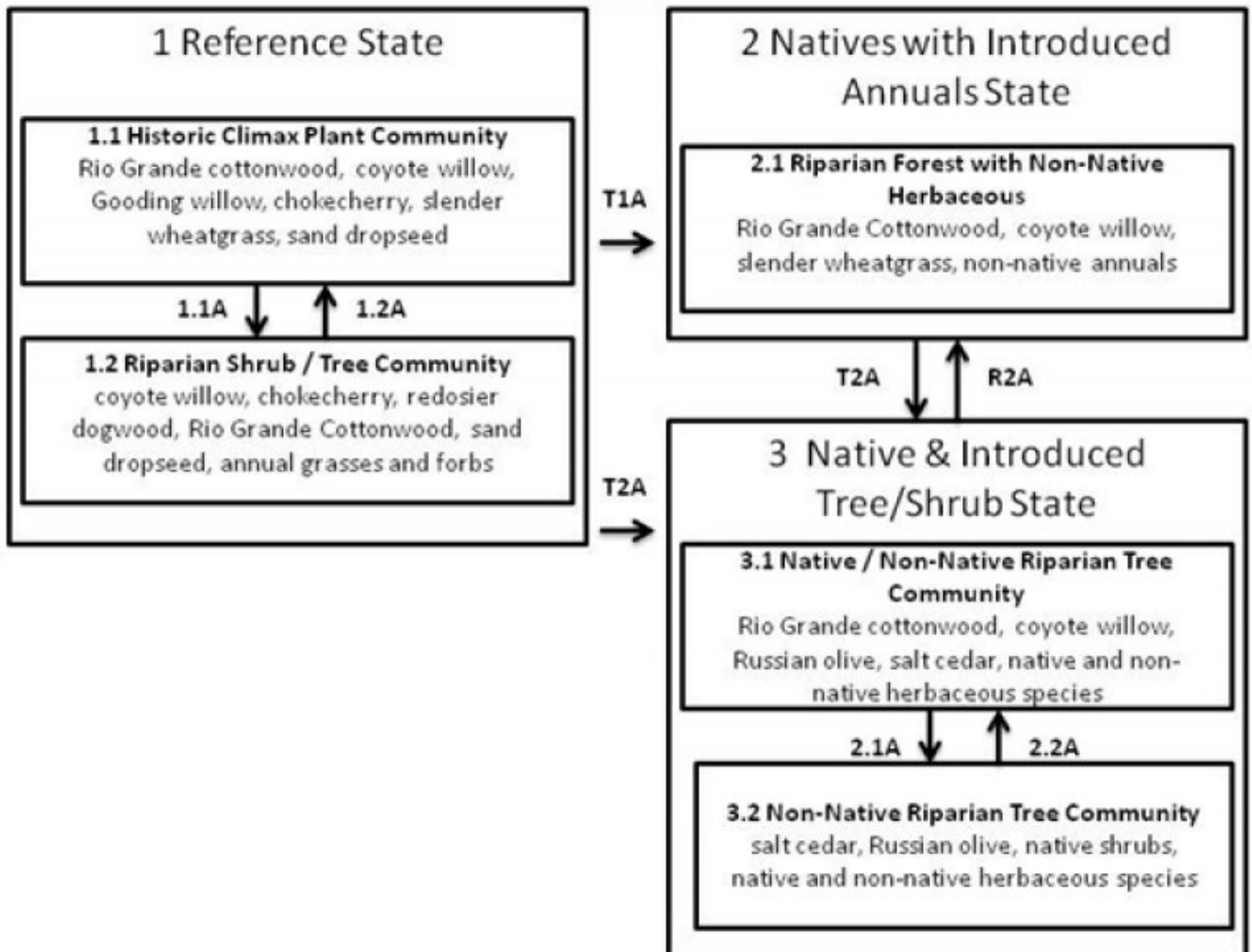


Figure 4. 353 Sandyloam Bottom Forest S&T

**State 1**  
**Reference State**

**Community 1.1**  
**Historic Climax Plant Community**



Figure 5. Sandy Loam Bottom

The Historic Climax Plant Community (HCPC) is dominated by a canopy of Rio Grande cottonwood ( *Populus deltoides* ssp. *wislizenii*, with lesser amounts of red willow ( *Salix laevigata*) and other native willows. The understory is a mix of shrubs such as redbud dogwood ( *Cornus sericea*) and chokecherry ( *Prunus* spp.) with cool-season and warm season grasses and forbs. Overstory canopy cover can come close to 90 percent, but will fluctuate with flood events under natural conditions. These fluctuations allow gaps in the canopy that are important for the recruitment of young cottonwoods and willows into the overstory.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Shrub/Vine	168	280	560
Tree	224	336	448
Grass/Grasslike	56	123	168
Forb	6	11	34
<b>Total</b>	<b>454</b>	<b>750</b>	<b>1210</b>

Table 6. Ground cover

Tree foliar cover	10-80%
Shrub/vine/liana foliar cover	0-5%
Grass/grasslike foliar cover	1-5%
Forb foliar cover	1-5%
Non-vascular plants	0%
Biological crusts	0%
Litter	1-25%
Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	5-20%

Table 7. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	0-1%
Grass/grasslike basal cover	0-1%

Forb basal cover	0-4%
Non-vascular plants	0-1%
Biological crusts	0%
Litter	35-60%
Surface fragments >0.25" and <=3"	0-1%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	35-65%

Figure 7. Plant community growth curve (percent production by month). AZ3531, 35.3 10-14" p.z. all sites. Growth begins in the spring and continues through the summer..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	3	17	18	10	19	20	10	1	1	0

## Community 1.2 Riparian Shrub / Tree Community

The overstory is dominated by coyote willow. There may be some mature and decadent cottonwood and other willows in the community, but they do not dominate the overstory. There is an understory of cottonwood, and other shrubs. There are scattered cool-season and warm season grasses and forbs in the understory.

### Pathway 1.2A Community 1.2 to 1.1

Natural regrowth of native trees such as cottonwood and willow.

#### Conservation practices

Prescribed Grazing
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## State 2 Natives with Introduced Annuals State

### Community 2.1 Riparian Forest with Non-Native Herbaceous

The overstory consists primarily of cottonwood and some willow species. The herbaceous understory consists of a mix of the native herbaceous species with non-native grasses, including ripgut brome (*Bromus diandrus*), cheatgrass (*Bromus tectorum*) and Kentucky bluegrass (*Poa pratensis*).

## State 3 Native and Introduced Tree/Shrub State

### Community 3.1 Native / Non-Native Tree Shrub Community

The overstory consists of a mix of cottonwood and some willow species, with non-native trees including Russian olive and/or saltcedar. There are few understory plants but they include a mix of native and non native perennial and annual grasses and forbs. Non native grasses include ripgut brome, cheatgrass and Kentucky bluegrass.

## **Community 3.2**

### **Non-Native Riparian Tree Community**

This is a riparian plant community dominated by non-native trees such as salt cedar and/or Russian olive. The understory includes a mix of native and non-native shrubs and herbaceous species.

#### **Pathway 3.1A**

##### **Community 3.1 to 3.2**

Loss of native trees from flooding, fire, or drought.

#### **Pathway 3.2A**

##### **Community 3.2 to 3.1**

Control of non-native trees and shrubs, and planting of native trees. Grazing by livestock and wildlife must be managed.

#### **Conservation practices**

Forest Stand Improvement
Prescribed Grazing

#### **Transition T1A**

##### **State 1 to 2**

Introduction of non-native herbaceous species into the plant community.

#### **Transition T2A**

##### **State 1 to 3**

Introduction of non-native trees into the plant community.

#### **Transition T2A**

##### **State 2 to 3**

Introduction of non-native trees into the plant community.

#### **Transition T2A**

##### **State 2 to 3**

Introduction of non-native trees into the plant community.

#### **Restoration pathway R2A**

##### **State 3 to 2**

Control of non-native trees and planting of native trees. Grazing by livestock and wildlife must be properly managed.

#### **Conservation practices**

Brush Management
Riparian Forest Buffer
Prescribed Grazing

### **Additional community tables**

Table 8. Community 1.1 plant community composition



Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Perennial Cool Season Rizomatous Grass</b>			22–112	
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	22–112	–
	mountain rush	JUARL	<i>Juncus arcticus</i> ssp. <i>littoralis</i>	1–22	–
	Mexican rush	JUME4	<i>Juncus mexicanus</i>	1–22	–
2	<b>Perennial Bunchgrass</b>			6–34	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	6–22	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	1–6	–
3	<b>Perennial Warm Season Rhizomatous Grass</b>			1–11	
	scratchgrass	MUAS	<i>Muhlenbergia asperifolia</i>	1–11	–
4	<b>Annual Grasses</b>			1–6	
	sixweeks grama	BOBA2	<i>Bouteloua barbata</i>	1–6	–
	mouse barley	HOMU	<i>Hordeum murinum</i>	1–6	–
	sixweeks fescue	VUOC	<i>Vulpia octoflora</i>	1–6	–
<b>Forb</b>					
5	<b>Perennial Forbs</b>			1–6	
	common yarrow	ACMI2	<i>Achillea millefolium</i>	1–6	–
	milkvetch	ASTRA	<i>Astragalus</i>	1–6	–
	thistle	CIRSI	<i>Cirsium</i>	1–6	–
	horsetail	EQUIS	<i>Equisetum</i>	1–6	–
	fleabane	ERIGE2	<i>Erigeron</i>	1–6	–
	ragwort	SENEC	<i>Senecio</i>	1–6	–
	water speedwell	VEAN2	<i>Veronica anagallis-aquatica</i>	1–6	–
6	<b>Annual Forbs</b>			1–6	
	flatspine bur ragweed	AMAC2	<i>Ambrosia acanthicarpa</i>	1–6	–
	sandmat	CHAMA15	<i>Chamaesyce</i>	1–6	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	1–6	–
	American bugseed	COAMA2	<i>Corispermum americanum</i> var. <i>americanum</i>	1–6	–
	Canadian horseweed	COCA5	<i>Conyza canadensis</i>	1–6	–
	Texas croton	CRTE4	<i>Croton texensis</i>	1–6	–
	western tansymustard	DEPI	<i>Descurainia pinnata</i>	1–6	–
	wedgeleaf draba	DRCUC	<i>Draba cuneifolia</i> var. <i>cuneifolia</i>	1–6	–
	kiss me quick	POPI3	<i>Portulaca pilosa</i>	1–6	–
	globemallow	SPHAE	<i>Sphaeralcea</i>	1–6	–
	dandelion	TARAX	<i>Taraxacum</i>	1–6	–
	golden crownbeard	VEENE2	<i>Verbesina encelioides</i> ssp. <i>exauriculata</i>	1–6	–
<b>Shrub/Vine</b>					
7	<b>Young Coyote Willow</b>			112–448	
	narrowleaf willow	SAEX	<i>Salix exigua</i>	112–448	–
8	<b>Other tall Shrub</b>			22–56	

	redosier dogwood	COSES	<i>Cornus sericea ssp. sericea</i>	6–28	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	6–28	–
	Woods' rose	ROWO	<i>Rosa woodsii</i>	6–17	–
9	<b>Halfshrub</b>			6–28	
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	6–28	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	1–6	–
<b>Tree</b>					
10	<b>Cottonwood, Tall Willow</b>			224–448	
	Rio Grande cottonwood	PODEW	<i>Populus deltoides ssp. wislizeni</i>	112–224	–
	narrowleaf willow	SAEX	<i>Salix exigua</i>	112–224	–
	red willow	SALA3	<i>Salix laevigata</i>	112–224	–
	arroyo willow	SALA6	<i>Salix lasiolepis</i>	56–112	–
	Goodding's willow	SAGO	<i>Salix gooddingii</i>	56–112	–
	peachleaf willow	SAAM2	<i>Salix amygdaloides</i>	56–112	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–56	–

## Animal community

This site is suitable for grazing by livestock and wildlife during most of the grazing periods except when snow cover restricts availability of forage. Grazing must be managed to allow for periodic reproduction of cottonwood and willow species. Seeds germinate in beds of alluvium left after spring or summer floods. Spring seedlings require one full season to grow out of reach of grazing stock. Summer seedlings may require two seasons to reach a height where the terminal bud is out of reach. Seedlings of both species are very palatable to cattle.

This wetland site attracts many species of upland and wetland wildlife Which use this site for nesting, feeding and resting. Competition with livestock can be year-round.

The "Plant Preference By Animal Kind" Table Information below was compiled from information from similar riparian sites in Arizona and a summary table compiled for all sites in MLRA 35 in Utah.

## Hydrological functions

This site is very important in the hydrology of southwestern stream systems. Large amounts of coarse woody debris form dams in large floods and spread waters over the floodplain. Beavers helped maintain a mosaic of marshy areas. Dense vegetation shade floodplains and stream channels to reduce evaporation. Vegetation traps sediment improving water quality and building floodplains.

## Recreational uses

The cottonwood trees, understory shrubs and grasses, and perennial or intermittent stream beds provide an aesthetically pleasing site on the low floodplains.

The winters are cold and the springs tend to be dry and windy. Late spring, summer and fall are the most pleasant seasons for outdoor activities such as bird watching, wildlife observation, hunting, and camping.

## Wood products

Wood cutting should be limited to flood-damaged and fallen trees and driftwood.

**Table 9. Representative site productivity**

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
Rio Grande cottonwood	<i>PODEW</i>	130	150	75	100	–	–	–	

## Type locality

Location 1: Apache County, AZ	
UTM zone	N
UTM northing	4001219
UTM easting	631747
General legal description	The typical site is located within Canyon de Chelly National Monument, on Navajo tribal lands. It is located just west of "The Window" a natural arch that is approximately 2.75 miles west of Spider Rock in Canyon de Chelly canyon.

## Contributors

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## 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:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not**

bare ground):

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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):**

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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:**

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17. **Perennial plant reproductive capability:**

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