

United States Department of Agriculture Natural Resources Conservation Service Ecological Site Description

Section I: Ecological Site Characteristics

Ecological Site Identification and Concept

Site stage: Provisional

Provisional: an ESD at the provisional status represents the lowest tier of documentation that is releasable to the public. It contains a grouping of soil units that respond similarly to ecological processes. The ESD contains 1) enough information to distinguish it from similar and associated ecological sites and 2) a draft state and transition model capturing the ecological processes and vegetative states and community phases as they are currently conceptualized. The provisional ESD has undergone both quality control and quality assurance protocols. It is expected that the provisional ESD will continue refinement towards an approved status.

Site name: Shallow Loamy 10-14" p.z.

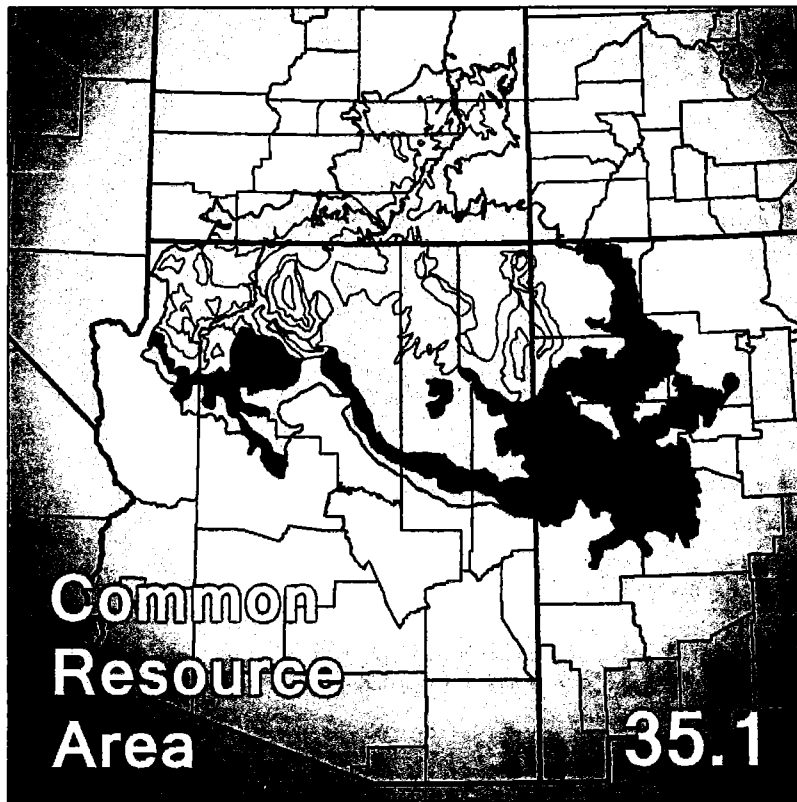
*Juniperus / Atriplex canescens - Artemisia bigelovii / Hesperostipa comata ssp. comata -
Hesperostipa neomexicana*

(*Juniperus* / fourwing saltbush - Bigelow sagebrush / needle and thread - New Mexico
feathergrass)

Site type: Rangeland

Site ID: R035XA119AZ

Major land resource area (MLRA): 035-Colorado Plateau



351 CRA Map

This ecological site occurs in Common Resource Area 35.1 - the Colorado Plateau Mixed Grass Plains

Elevations range from 4800 to 6300 feet and precipitation averages 10 to 14 inches per year. Vegetation includes *Stipa* species, Indian ricegrass, galleta, and blue grama, fourwing saltbush, winterfat, and cliffrose. The soil temperature regime is mesic and the soil moisture regime is ustic aridic. 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.

Physiographic Features

This site occurs in an upland position on structural benches, mesas and ridges. Slopes generally range from 0-15% with occasional steeper slopes. It does not benefit significantly from run-in moisture or suffer from excessive run-off.

Landform: (1) Mesa
 (2) Ridge
 (3) Structural bench

	<u>Minimum</u>	<u>Maximum</u>
<i>Elevation (feet):</i>	4800	6300
<i>Slope (percent):</i>	0	15
<i>Flooding</i>		
<i>Frequency:</i>	None	Rare
<i>Ponding</i>		
<i>Runoff class:</i>	Medium	High
<i>Aspect:</i>	No Influence on this site	

Climatic Features

50-60% of moisture falls as rain Jul-Sept and is the most effective moisture for plant growth. The remaining moisture comes as snow during the winter. Mean temperatures for the hottest month (Jul) is 72 degrees F; for the coldest month (Jan) is 32 degrees F. Extreme temperatures of 105 degrees F and -26 degrees F have been recorded. Long periods with little or no effective moisture are relatively common. Cool season plants begin growth in early spring and mature in the early summer. Warm season plants take advantage of the summer rains and grow and retain their nutrition from July through September.

	<u>Averaged</u>
<i>Frost-free period (days):</i>	145
<i>Freeze-free period (days):</i>	165
<i>Mean annual precipitation (inches):</i>	13.00

Monthly Precipitation (Inches):

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
<i>High</i>	0.73	0.72	1.01	0.42	0.59	0.33	1.75	2.44	1.64	1.25	0.93	0.89
<i>Low</i>	0.54	0.54	0.73	0.45	0.38	0.27	1.39	1.59	1.04	0.84	0.69	0.54

Monthly Temperature (°F):

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
<i>High</i>	36.5	42.7	49.5	56.7	65.5	75.9	80.5	77.9	70.8	58.9	45.6	36.1
<i>Low</i>	34.5	39.1	44.3	50.7	58.6	67.7	73.4	71.5	65.0	53.9	42.4	34.8

Climate stations: (1) AZ8012, Snowflake, AZ. Period of record 1971-2000
(2) AZ9542 Wupatki Natl. Monument Period of Record 1971-2000

Influencing Water Features

It does not benefit significantly from run-in moisture or suffer from excessive run-off.

Representative Soil Features

Soils in this site are very shallow and shallow (5-20 inches) to limestone, sandstone or basalt bedrock or other plant root restricting layers. The surface soil ranges in texture from a gravelly light clay loam to stony sandy loam about 2-12 inches thick over a weakly to strongly lime cemented layer or bedrock. Soil pH ranges from 7.0 to 8.4. The soils contain coarse fragments from 10 to more than 50 percent by volume. Lime content of the soil varies from 5 to more than 40 percent. Available water capacity is low, and there is medium to rapid runoff.

Typical taxonomic units include:

Coconino County Central part (AZ631) MU's Apache-8; Boysag-62; Cross-3, 8; Daze-9; Deama-9; Winona-60, 61, 62, 64 & 66:

Navajo County Central part (AZ633) MU's Bisoodi fsl-7, 33, 34; Mellenthin-39 & 57:

Yavapai County Western part (AZ637) MU's Apache-As, At, CzC; Boysag-PuC, Cabezon-CzC; Cross-CzC; Dye-DgC, DrC, PvD; Purner-PrC, PsC, PsD, PuC, PvD & PwD; Tortugas-TIB, TmD & TnF;
 Little Colorado River Area (AZ707) MU's Cross 2, Mellenthin 25 & 27, Winona 66;
 Fort Defiance area (AZ715) MU's Teesto-117; Tekapo family-50; Reef family-50, Tesihim 118.

Parent materials

Kind: Pyroclastic flow, Colluvium, Residuum

Origin: Basalt, Limestone, Sandstone

Surface texture: (1)Gravelly Clay loam

(2)Stony Sandy loam

(3)Very stony Fine sandy loam

Subsurface texture group: Loamy

	<u>Minimum</u>	<u>Maximum</u>
<i>Surface fragments <=3" (% cover):</i>	5	15
<i>Surface fragments >3" (% cover):</i>	10	25
<i>Subsurface fragments <=3" (% volume):</i>	10	20
<i>Subsurface fragments >3" (% volume):</i>	5	15

Drainage class: Moderately well drained to well drained

Permeability class: Slow to moderate

	<u>Minimum</u>	<u>Maximum</u>
<i>Depth (inches):</i>	5	20
<i>Available water capacity (inches):</i>	2.50	5.00
<i>Electrical conductivity (mmhos/cm):</i>	0	2
<i>Sodium adsorption ratio:</i>	0	5
<i>Calcium carbonate equivalent (percent):</i>	15	50
<i>Soil reaction (1:1 water):</i>	7.0	8.4

Plant Communities

Ecological Dynamics of the Site

The plant communities found on an ecological site are naturally variable. Composition and production will vary with yearly conditions, location, aspect, and the natural variability of the soils. The historical climax plant community represents the natural potential plant communities found on relict or relatively undisturbed sites. Other plant communities described here represent plant communities that are known to occur when the site is disturbed by factors such as grazing, fire, or drought.

Production data provided in this site description is standardized to air-dry weight at the end

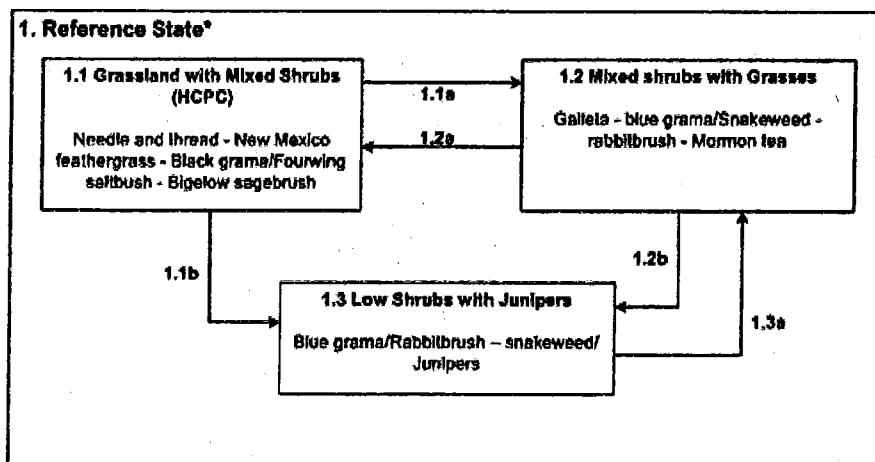
of the summer growing season. The plant communities described in this site description are based on near normal rainfall years.

NRCS uses a Similarity Index to compare existing plant communities to the plant communities described here. Similarity Index is determined by comparing the production and composition of a plant community to the production and composition of a plant community described in this site description. To determine Similarity Index, compare the production (air-dry weight) of each species to that shown in the plant community description. For each species, count no more than the maximum amount shown for the species, and for each group, count no more than the maximum shown for the group. Divide the resulting total by the total normal year production shown in the plant community description. If rainfall has been significantly above or below normal, use the total production shown for above or below normal years. If field data is not collected at the end of the summer growing season, then the field data must be corrected to the end of the year production before comparing it to the site description. The growth curve can be used as a guide for estimating production at the end of the summer growing season.

The State and Transition model shows the most common occurring plant communities likely to be encountered on this ecological site. This model may not show every possible plant community, but only those that are most prevalent and observed through field inventory. As more data is collected and research is available, these plant communities may be revised, removed, and even added to reflect the ecological dynamics of this site.

State-and-Transition Diagram

35.1AZ Shallow Loamy 10-14" p.z. (R035XA119AZ)



*introduced annuals may or not be present in minor amounts

State 1: Reference State

The reference state which includes the Historic Climax Plant Community has been determined by study of relict areas or areas protected from excessive disturbances. Trends in plant communities going from heavily grazed areas to lightly grazed areas, seasonal use

pastures and historical accounts have also been used.

This reference state is characterized as a grassland dominated by cool season grasses with scattered shrubs, forbs and junipers. In this plant community there may be trace amounts, less than 3% by weight, of non-native annuals present; however, they do not change the sites ecological processes in these minor amounts

Community Phase 1.1: Grassland with Mixed Shrubs (HCPC)



Shallow Loamy 10-14" p.z.



Shallow Loamy 10-14" p.z. High precipitation site



Shallow Loamy 10-14" p.z. Low precipitation site

This plant community is made up primarily of mid and short grasses, shrubs and a relatively small percentage of forbs and a scattered overstory of junipers. There is a mixture of both cool and warm season grasses.

Plants most likely to invade or increase on this site are broom snakeweed, wooly groundsel,

pingue, juniper, rabbitbrush and annuals. Unmanaged grazing during the winter and spring periods will decrease the cool season grasses, which are replaced by warm season, lower forage value grasses and shrubs. In this plant community there may be trace amounts of non-native annuals present. They do not change the sites ecological processes in these minor amounts

Community Phase Pathway 1.1a

Drought, unmanaged grazing

Community Phase Pathway 1.1b

Drought, unmanaged grazing, seed source for juniper increase.

Grassland with Mixed Shrubs (HCPC) Plant Species Composition

Grass/Grasslike				Annual Production (pounds per acre)		Foliar cover (percent)	
Group							
Group name	Common name	Symbol	Scientific name	Low	High	Low	High
1 -Dominant grasses				250	395		
	sideoats grama	BOCU	<u>Bouteloua</u> <u>curtipendula</u>	25	50		
	black grama	BOER4	<u>Bouteloua eriopoda</u>	50	75		
	blue grama	BOGR2	<u>Bouteloua gracilis</u>	50	75		
	squirreltail	ELELE	<u>Elymus elymoides</u> <u>subsp. elymoides</u>	25	50		
	needle and thread	HECOC8	<u>Hesperostipa</u> <u>comata subsp.</u> <u>comata</u>	55	100		
	New Mexico feathergrass	HENE5	<u>Hesperostipa</u> <u>neomexicana</u>	55	100		
	galleta	PLJA	<u>Pleuraphis jamesii</u>	25	50		
2 -Other Cool Season Grasses				35	110		
	Grass, annual	2GA		0	5		
	Indian ricegrass	ACHY	<u>Achnatherum</u> <u>hymenoides</u>	0	30		
	prairie Junegrass	KOMA	<u>Koeleria macrantha</u>	0	20		
	western wheatgrass	PASM	<u>Pascopyrum smithii</u>	0	30		
	littleseed ricegrass	PIMI7	<u>Piptatherum</u> <u>micranthum</u>	5	20		
	muttongrass	POFE	<u>Poa fendleriana</u>	0	20		
3 -Other Warm Season Grasses				35	80		
	Grass, annual	2GA		0	10		
	Aristida	ARIST	<u>Aristida</u>	0	10		
	fluffgrass	DAPU7	<u>Dasyochloa</u> <u>pulchella</u>	0	15		
	ring muhly	MUTO2	<u>Muhlenbergia torreyi</u>	0	15		
	spike dropseed	SPCO4	<u>Sporobolus</u> <u>contractus</u>	0	15		
			<u>Sporobolus</u>				

	sand dropseed	SPCR	<u>cryptandrus</u>	0	15		
Forb				<u>Annual Production</u> (pounds per acre)		<u>Foliar cover</u> (percent)	
<u>Group name</u>	<u>Common name</u>	<u>Symbol</u>	<u>Scientific name</u>	<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
4 -All forbs				33	65		
	Forb, annual	2FA		0	15		
	Forb, perennial	2FP		0	30		
	sego lily	CANU3	<u>Calochortus nuttallii</u>	0	5		
	whitemargin spurge	CHAL11	<u>Chamaesyce albomarginata</u>	0	5		
	rose heath	CHER2	<u>Chaetopappa ericoides</u>	0	5		
	Eriogonum	ERIOG	<u>Eriogonum</u>	0	5		
	whitestem stickleaf	MEAL6	<u>Mentzelia albicaulis</u>	0	5		
	notchleaf scorpionweed	PHCR	<u>Phacelia crenulata</u>	0	5		
	common purslane	POOL	<u>Portulaca oleracea</u>	0	5		
	Sphaeralcea	SPHAE	<u>Sphaeralcea</u>	0	5		
Shrub/Vine				<u>Annual Production</u> (pounds per acre)		<u>Foliar cover</u> (percent)	
<u>Group name</u>	<u>Common name</u>	<u>Symbol</u>	<u>Scientific name</u>	<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
5 -Dominant shrubs				65	98		
	Bigelow sagebrush	ARBI3	<u>Artemisia bigelovii</u>	7	35		
	fourwing saltbush	ATCA2	<u>Atriplex canescens</u>	15	55		
	Ephedra	EPHED	<u>Ephedra</u>	5	25		
	shrubby buckwheat	ERWR	<u>Eriogonum wrightii</u>	5	25		
	winterfat	KRLA2	<u>Krascheninnikovia lanata</u>	5	25		
6 -Other shrubs				33	65		
	Subshrub (<.5m)	2SUBS		0	10		
	fernbush	CHMI2	<u>Chamaebatiaria millefolium</u>	0	10		
	Chrysothamnus	CHRY9	<u>Chrysothamnus</u>	0	20		
	Whipple cholla	CYWH	<u>Cylindropuntia whipplei</u>	0	5		
	Apache plume	FAPA	<u>Fallugia paradoxa</u>	0	20		
	Gutierrezia	GUTIE	<u>Gutierrezia</u>	0	20		
	Fremont barberry	MAFR3	<u>Mahonia fremontii</u>	0	10		
	Opuntia	OPUNT	<u>Opuntia</u>	0	5		
	woolly groundsel	PACA15	<u>Packera cana</u>	0	10		
	Mexican cliffrose	PUME	<u>Purshia mexicana</u>	0	20		
	gray horsebrush	TECA2	<u>Tetradymia canescens</u>	0	20		

TreeAnnual ProductionFoliar cover

<u>Group</u> <u>Group name</u>	<u>Common name</u>	<u>Symbol</u>	<u>Scientific name</u>	<u>(pounds per acre)</u>		<u>(percent)</u>	
				<u>Low</u>	<u>High</u>	<u>Low</u>	<u>High</u>
7 -Trees				13	35		
	oneseed juniper	JUMO	<i>Juniperus monosperma</i>	0	20		
	Utah juniper	JUOS	<i>Juniperus osteosperma</i>	0	20		
	Colorado pinyon	PIED	<i>Pinus edulis</i>	0	10		

Annual Production by Plant TypeAnnual Production (lbs/ac)

<u>Plant type</u>	<u>Low</u>	<u>Representative</u>	
		<u>value</u>	<u>High</u>
Grass/Grasslike	390	475	570
Forb	35	50	65
Shrub/Vine	65	100	130
Tree	10	25	35
Total	500	650	800

Structure and CoverGround CoverNonvegetative cover

	<u>Minimum</u>	<u>Maximum</u>
Litter	20%	30%
Surface fragments >0.25" and <=3"	5%	15%
Surface fragments >3"	10%	25%
Bare ground	20%	40%

Structure of Canopy Cover

<u>Height above ground</u>	<u>Grasses/grasslikes</u>		<u>Forbs</u>		<u>Shrubs/vines</u>		<u>Trees</u>	
	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Minimum</u>	<u>Maximum</u>
<=0.5 foot	0%	5%	0%	1%	0%	2%	--	--
>0.5 to <1 foot	5%	10%	0%	2%	0%	5%	--	--

>1 to <=2 feet	5%	10%	0%	1%	0%	3%	--	--
>2 to <4.5 feet	--	--	--	--	0%	2%	0%	1%
>4.5 to <=13 feet	--	--	--	--	--	--	0%	3%
>13 to <40 feet	--	--	--	--	--	--	--	--
<40 to >=80 feet	--	--	--	--	--	--	--	--
>80 to <120 feet	--	--	--	--	--	--	--	--
>=120 feet	--	--	--	--	--	--	--	--

Plant Growth Curve

Growth curve
number:

AZ3502

Growth curve
name:

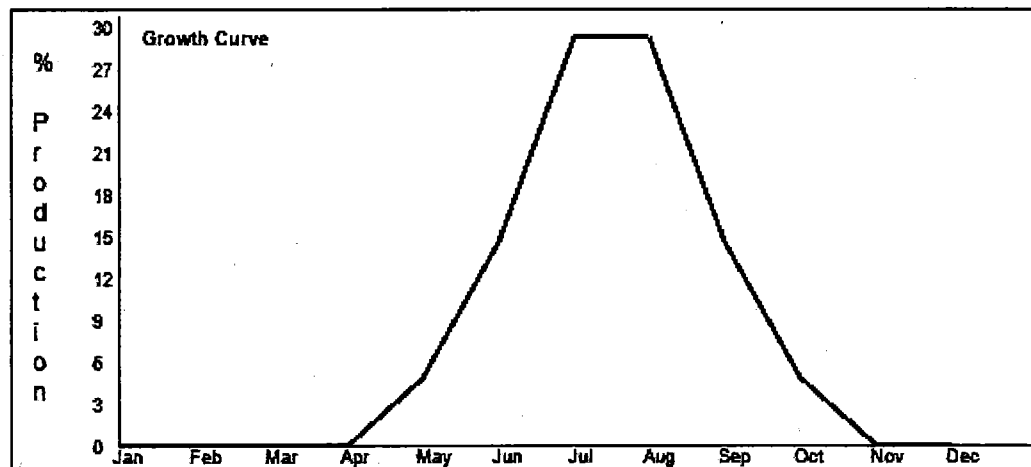
35.1 10-14" p.z. black grama

Growth curve
description:

Growth occurs mostly during the summer to early fall rainy season.

Percent Production by Month

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	0	5	15	30	30	15	5	0	0



Plant Growth Curve

Growth curve
number:

AZ3511

Growth curve
name:

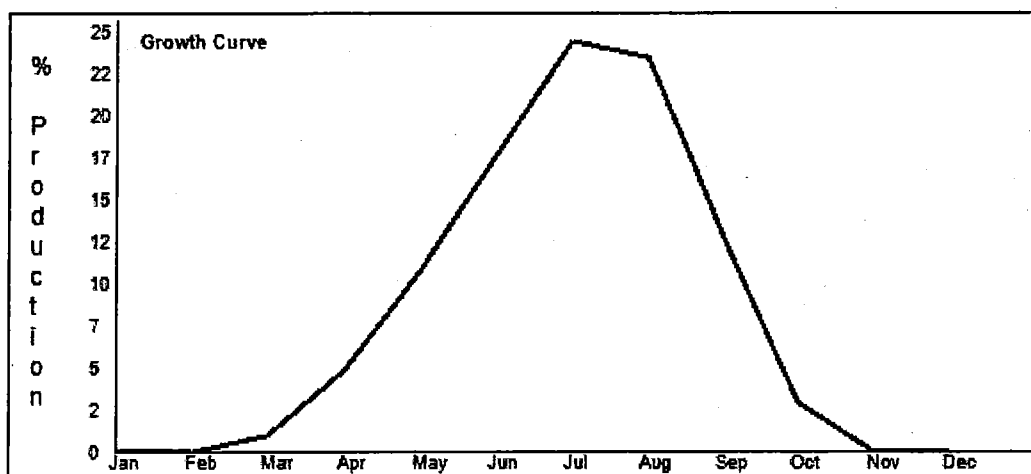
35.1 10-14" p.z. all sites

Growth curve
description:

Growth begins in the spring and continues through the summer, most growth occurs during the summer rainy season.

Percent Production by Month

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	1	5	11	18	25	24	13	3	0	0

**Plant Growth Curve**

Growth curve
number:

AZ5102

Growth curve
name:

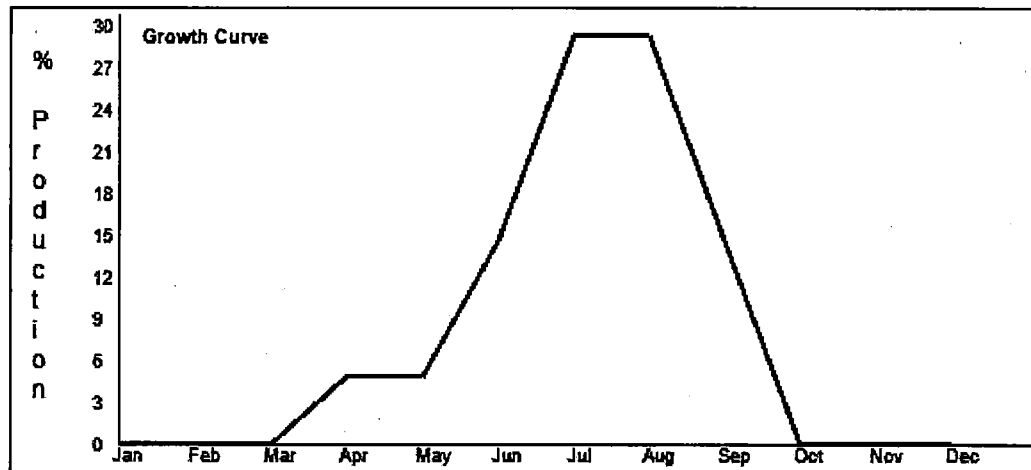
35.1 10-14" p.z. blue grama

Growth curve
description:

Growth occurs mostly in summer and early fall during the rainy season.

Percent Production by Month

<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
0	0	0	5	5	15	30	30	15	0	0	0



Community Phase 1.2: Mixed Shrubs with Grasses

This plant community is dominated by a mix of shrubs and grasses with scattered junipers. Dominant grasses include galleta, blue grama, black grama, New Mexico feather grass, and dropseeds. Common shrubs include snakeweed, rabbitbrush, Mormon tea and fourwing saltbush with some succulents present. In this plant community there may be a trace amounts, less than 3% by weight, of non-native annuals present. They do not change the sites ecological processes in these minor amounts

Community Phase Pathway 1.2a

Favorable climate (moisture), managed grazing, removal of disturbances.

Community Phase Pathway 1.2b

Lack of fire, unmanaged grazing, seed source for juniper increase.

Community Phase 1.3: Low Shrubs with Junipers

The dominant aspect of this plant community is low shrubs with a light overstory of junipers. The understory is dominated by blue grama, snakeweed, rabbitbrush and scattered succulents. Other species include galleta, Indian ricegrass, dropseeds and cliffrose.

Community Phase Pathway 1.3a

Fire, managed grazing, seed sources for grasses

Section II: Ecological Site Interpretations

Animal Community

This site is suitable for grazing during any period of the year by cows and calves, stocker cattle, sheep and horses. Prescribed grazing systems adapt well to this site.

The potential plant community provides a variety of food and cover plants for wildlife. Areas where rock outcrops occur are important cover areas for various species such as cottontail, wrens and reptiles.

Hydrology Functions

This site is particularly susceptible to water erosion.

Recreational Uses

Since this site is located on open plains and occasional broken topography showing exposed bedrock it has a variety of spring and summer flowering shrubs and forbs. Open grassland with occasional brushy thickets give the site good aesthetic appeal.

Winters are cold, however, relatively mild spring, fall and summer months are attractive to recreationists.

Hunting, rockhounding, wildlife observation, and horseback riding are activities suited to the site.

Wood Products

Personal fuelwood cutting is possible on the lesser sloping areas.

Supporting Information

State Correlation

This site has been correlated with the following states: AZ

Type Locality

State:	AZ
County:	Apache

Township: 27E
Range: 2E
Section: 12
General legal description: John Osborne Ranch

Other References

Updates and revisions for this ESD were conducted as part of a 2007-2012 Interagency Technical Assistance Agreement between the Bureau of Indian Affairs–Navajo Region and the NRCS-Arizona.

Site Authors

Ken Gishi
Larry D. Ellicott
Peter Lefebvre
Steve Barker

Quality Assurance

Provisional Status Verified in Legacy System

Reference Sheet

Author(s)/participant(s): Karlyn Huling

Contact for lead author: NRCS State Rangeland Management Specialist, Phoenix, AZ

Date: 3/23/2006 **MLRA:** 035X **Ecological Site:** Shallow Loamy 10-14" p.z. R035XA119AZ This *must* be verified based on soils and climate (see Ecological Site Description). Current plant community cannot be used to identify the ecological site.

Composition (indicators 10 and 12) based on: X Annual Production, Foliar Cover, Biomass

Indicators. For each indicator, describe the potential for the site. Where possible, (1) use numbers, (2) include expected range of values for above- and below-average years for each community and natural disturbance regimes within the reference state, when appropriate and (3) cite data. Continue descriptions on separate sheet.

1. **Number and extent of rills:** A few rills may occur on steeper slopes due to moderate

permeability, rapid runoff and shallow depth of soils. They should be very uncommon in areas that have a lot of rock fragments on the surface and in the soil profile.

2. **Presence of water flow patterns:** Water flow patterns may be common due to moderate permeability, rapid runoff, and shallow depth of soils. Flow pattern will increase after drought dieback. There will be more water flow patterns on very shallow (<10") soils and in areas adjacent to large expanses of rock outcrop.

 3. **Number and height of erosional pedestals or terracettes:** A few pedestals and terracettes may form, but they should be very short.

 4. **Bare ground from Ecological Site Description or other studies (rock, litter, standing dead, lichen, moss, plant canopy are not bare ground):** Bare ground ranges from 20-40%. Sites with a greater cover of rock fragments or bedrock have less bare ground. This site has an average water capacity of only 2 inches, so the potential to produce plant cover is very low, except in areas where plants have access to water in bedrock crops. Drought may cause an increase in bare ground.

 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):** Herbaceous and fine woody litter will be transported in water flow pathways. Coarse woody litter will remain under shrub and tree canopies. Litter movement may be greater on very shallow soils or in areas adjacent to large expanses of rock outcrop.

 8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings average 5 under plant canopy and 3 in the interspaces. Many areas are protected by blue grama root mats and rock fragments. Soil surface textures range from sandy loam to clay loam. Many soils have a significant amount of rock fragment armor on the surface and in the profile. When well vegetated or covered with rock armor, soils have a high resistance to both water and wind erosion.
-

- 9. Soil surface structure and SOM content (include type and strength of structure, and A-horizon color and thickness):** Surface structure is predominantly granular (weak fine, moderately fine and strong fine), but some soils have subangular blocky (weak to moderate, fine to medium) or massive surface structures. Some soils have a platy (weak, medium) surface structure. Surface thickness ranges from 1-12 inches. Surface colors vary depending on parent material.
-

- 10. Effect on plant community composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by a relatively uniform distribution of mostly grasses with some shrubs and a few forbs. Some locations have an open scattered tree canopy. Canopy cover averages 35% (20% grasses, 3% forbs, 10% shrubs, 2% trees). Basal cover of plants averages 10% (8% grasses, 1% forbs, 1% shrubs, trace moss/lichen). The cover (especially basal cover) is reduced by the amount of rock fragment ground cover. Both cover values (especially canopy cover) decrease during a prolonged drought. This type of plant community is moderately effective at capturing and storing precipitation.
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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):** None. These soils are not easily compacted due to large amount of rock fragments on the surface and in the profile. In areas without significant rock fragments, however, most soil types may be easily compacted when wet. One soil sometimes has a natural platy surface structure.
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- 12. Functional/Structural Groups (list in order of descending dominance by above-ground weight using symbols: >>, >, = to indicate much greater than, greater than, and equal to) with dominants and sub-dominants and "others" on separate lines:**

Dominant: cool season bunchgrasses

Sub-dominant: warm season bunchgrasses > warm season colonizing grasses > shrubs

Other: Minor: forbs > trees > cacti

Trace: cool season colonizing grasses = annual grasses

Additional:

- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** All functional groups are adapted for survival except during the most severe droughts. Severe winter droughts affect shrubs and trees the most. Severe summer droughts affect grasses the most. Very

shallow (<10") soils will show the most mortality in all functional groups.

- 14. Average percent litter cover (20-30%) and depth (1/8-1/4inches):** Mostly herbaceous litter, but up to 1/3 may be woody. There is generally less litter on rocky sites. Litter amounts increase during the first few years of drought, then decrease in later years.
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- 15. Expected annual production (this is TOTAL above-ground production, not just forage production):** 250-500 pounds per acre (dry weight) in drought years, 400-650 pounds per acre in median years, 550-800 pounds per acre in wet years.
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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 indicator, we are describing what is NOT expected in the reference state for the ecological site:** Greene rabbitbrush, Douglas rabbitbrush, broom snakeweed, baby aster and Whipple cholla re native to the site, but have the potential to increase and dominate the area after disturbance. Oneseed juniper is native to the site, but has the potential to increase and dominate after unmanaged grazing and/or fire exclusion. Russian thistle is an exotic forb that can invade the site from neighboring farm fields and disturbed lands if the soil is disturbed.
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- 17. Perennial plant reproductive capability:** All plants native to this site are adapted to the climate and are capable of producing seeds, stolons and rhizomes in all but the most severe droughts.
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Reference Sheet Approval

Approval
S. Cassady

Date
4/17/2007

Reference Sheet Revision Approval

Approval
Byron Lambeth

Date
9/13/2012