USDA Natural Resources Conservation Service

Ecological site R035XB270AZ
Porcelanite Hills 6-10" 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.

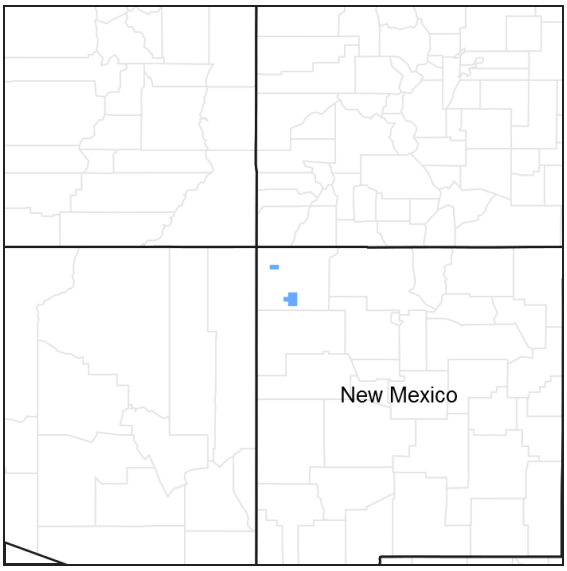

Figure 1. Mapped extent

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

This ecological site occurs in Common Resource Area 35.2 - the Colorado Plateau Shrub – Grasslands

Elevations range from 3800-5800 feet and precipitation averages 6 to 10 inches per year. Vegetation includes shadscale, fourwing saltbush, Mormon tea, blackbrush, Indian ricegrass, galleta, blue grama, and black grama. The soil temperature regime is mesic and the soil moisture regime is typic 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.

Table 1. Dominant plant species

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

Physiographic features

This site occurs on footslopes and backslopes of hills. Slopes generally range from 15 to 60 percent, but there may be small areas with flatter slopes. This site is excessively drained and is subject to significant amounts of runoff. The porcelanite (baked shale) material locally is call "red-dog".

Table 2. Representative physiographic features

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,158–1,768 m
Slope	15–45%
Aspect	Aspect is not a significant factor

Climatic features

The 35.2 Colorado Plateau Cold Desert Shrub - Grassland common resource area has a very dry and windy climate that is hot in the summer and cold in the winter. The annual precipitation averages between 6 and 10 inches. The soil moisture regime is typic aridic and the soil temperature regime is mesic. A slight majority of the precipitation arrives during the late fall, winter, and early spring. This winter season moisture originates in the Pacific Ocean and arrives as rain, or sometimes snow, during widespread frontal storms of generally low intensity. The majority of the snow (average range of 1 to 17 inches) falls from December through February, but rarely lasts more than a few days. A seasonal drought occurs from late May through early July. Summer rains occur from July through September during brief intense local thunderstorms. The rain is sporadic in intensity and location. The moisture originates from the Gulf of Mexico in the early summer and the Gulf of California in the late summer/early fall. Windy conditions are common year round, but the winds are strongest and most frequent during the spring.

Table 3. Representative climatic features

Frost-free period (average)	160 days
Freeze-free period (average)	184 days
Precipitation total (average)	254 mm

Influencing water features

The soil moisture on this ecological site comes from precipitation. The site does not benefit significantly from run-on moisture from adjacent sites. The clay loam surface texture of the soil allows the site to capture most snow and gentle rainstorms storms if the site has good vegetative cover. Because of the soil texture and slope, intense summer thunderstorms will produce runoff, reducing the amount of effective rainfall available for plant production on this site.

Soil features

The soils on this site are very deep (60+") and excessively drained. They are formed in eolian derived from sandstone and residuum from porcelanite. Surface textures include extremely channery sandy clay loam. The subsoil textures include extremely channery sandy clay loam and red porcelanite fragments. The hazard of water erosion is severe and the hazard of wind erosion is slight.

Soil survey map unit components correlated to this ecological site include:

SSA-715 Fort Defiance Area AZ/NM 22-Moncisco;

SSA 717 Shiprock Area NM/AZ - MU 150 Moncisco.

Table 4. Representative soil features

Parent material	(1) Residuum–sandstone (2) Alluvium–porcellanite
Surface texture	(1) Extremely channery sandy clay loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Moderate to very rapid
Soil depth	152–203 cm
Surface fragment cover <=3"	60–75%
Surface fragment cover >3"	0–5%
Available water capacity (0-101.6cm)	0–6.35 cm
Calcium carbonate equivalent (0-101.6cm)	5–20%
Electrical conductivity (0-101.6cm)	4–8 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	7.4–8.4
Subsurface fragment volume <=3" (Depth not specified)	60–75%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

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.

State and transition model

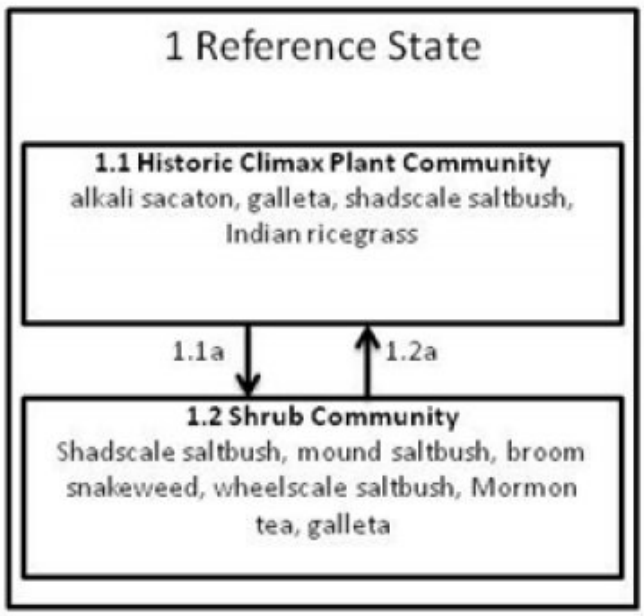

Figure 4. 352 Porcelanite Hills S&T

State 1
Reference State

Community 1.1
Historic Climax Plant Community

This site has a plant community made of primarily of a mixture of grasses and shrubs with a small percentage of forbs. In the original plant community, there is a mixture of cool and warm season plants. Plant species most likely to invade or increase on this site when it deteriorates annual forbs, mound saltbush, shadscale and broom snakeweed.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	280	308	336
Shrub/Vine	112	140	168
Forb	6	17	22
Total	**398**	**465**	**526**

Figure 6. Plant community growth curve (percent production by month). AZ3521, 35.2 6-10" p.z. all sites. Growth begins in the spring and continues through the summer. Most growth in this CRA occurs in the spring using stored winter moisture..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	9	20	27	14	10	11	5	3	0	0

Figure 7. Plant community growth curve (percent production by month). AZ5202, Indian ricegrass, 35.2 6-10" p.z.. Growth begins in spring, most growth occurs in May, goes dormant during summer heat..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	10	15	40	20	0	0	10	5	0	0

Figure 8. Plant community growth curve (percent production by month). AZ5203, 35.2 6-10" p.z. alkali sacaton. Growth begins in the spring, most growth occurs in the summer, goes dormant in the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	10	20	10	20	20	10	5	0	0

Figure 9. Plant community growth curve (percent production by month). AZ5216, 35.2 6-10" p.z. shadscale saltbush. Growth occurs mostly in the spring and early summer using stored winter moisture..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	20	50	20	5	0	0	0	0	0

Community 1.2
Shrub Community

This plant community is dominated by shrubs, including shadscale saltbush, mound saltbush, broom snakeweed, wheelscale saltbush, and Mormon tea. Grasses are not abundant, and are mostly sod forming grasses like galleta.

Pathway 1.1a
Community 1.1 to 1.2

Drought, extended periods of winter dominated moisture patterns, reduction in the natural fire frequency, and unmanaged grazing results in a reduction of perennial grasses on the site, and and increase in woody vegetation.

Pathway 1.2a
Community 1.2 to 1.1

Normal precipitation patterns with well managed grazing and/or rest will allow native perennial bunchgrasses to increase in the plant community. Allowing natural fires to burn will accelerate recovery.

Conservation practices

Prescribed Burning
Prescribed Grazing

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	**Grasses**			280–336	
	alkali sacaton	SPAI	*Sporobolus airoides*	112–151	–
	James' galleta	PLJA	*Pleuraphis jamesii*	78–101	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	28–56	–
	squirreltail	ELELE	*Elymus elymoides ssp. elymoides*	6–28	–
	Grass, perennial	2GP	*Grass, perennial*	6–28	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	6–28	–
Forb					
2	**Forbs**			6–22	
	Forb, perennial	2FP	*Forb, perennial*	6–17	–
	Forb, annual	2FA	*Forb, annual*	6–11	–
Shrub/Vine					
3	**Shrubs**			112–168	
	shadscale saltbush	ATCO	*Atriplex confertifolia*	67–101	–
	mound saltbush	ATOB	*Atriplex obovata*	6–28	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	6–28	–
	winterfat	KRLA2	*Krascheninnikovia lanata*	6–28	–
	Torrey's jointfir	EPTO	*Ephedra torreyana*	6–17	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	6–17	–
	plains pricklypear	OPPO	*Opuntia polyacantha*	0–6	–

Animal community

This site is steep and limits use by livestock. Proper distribution is often impossible to attain and heavy use occurs by livestock in the limited accessible areas. Care should be taken not to over use this site as recovery will be very slow and erosion will be accelerated.
The variety of vegetation produced attracts many species. The steep slopes and broken topography provide safety from danger for wildlife.

Recreational uses

This site is on hillslopes, backslopes, footslopes and knolls of hill, bench excarpments and mesas, this with a high diversified plant community complex of grasses, shrubs and forbs. The aesthetic appeal is excellent because of the visual effect in contrast to the surrounding topography.
Winters are cold and spring time is usually windy. Summer is relatively mild with typical southwest thunderstorms. Main activities include hiking, hunting, rock hounding, wildlife observation and photography.

Type locality

Location 1: San Juan County, NM	
Township/Range/Section	T23N R14W S1
General legal description	About 25 miles east north east of Sheep Springs, NM - Navajo Reservation, New Mexico.

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.

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)	Steve Barker
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Date	09/20/2012
Approved by	Steve Barker
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** A few rills occur throughout site (1-10% cover) at infrequent intervals, mostly in exposed areas. Rills may be 8 or more feet in length and are likely to form below adjacent exposed bedrock or areas where surface rock fragments are less than 15%. The number of rills and extent will increase on slopes greater than 35%, or sites with a decrease of herbaceous cover and/or immediately following high intensity storm events.

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2. **Presence of water flow patterns:** The occurrence of water flow patterns is frequent (5-10% cover) and occur throughout the site interspersed throughout the larger rock fragments. These water flow patterns are typically less than 6 feet long. As slope increase (>15%) water flow pattern occurrence and length increases. A temporary increase in water flow patterns in also expected following high intensity storm events.

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3. **Number and height of erosional pedestals or terracettes:** Minor pedestalling (can occur at the base of plants and rocks as a result of natural wind and water erosion in the reference state; however, terracettes are uncommon and occur only in flow paths.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 10 to 20% bare ground with 40-60% cover of porcelenite rock and gravel cover. Bare areas are small in size, and are rarely connected.

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5. **Number of gullies and erosion associated with gullies:** No gullies are present.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** No wind scoured areas are present.

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7. **Amount of litter movement (describe size and distance expected to travel):** Most herbaceous litter will be transported and concentration by wind and water in flow pathways and around obstructions, while a very small percentage stays in place. Coarse woody litter (>1/4" diameter) and duff will accumulate under shrub canopies.

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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):** This site should have an average soil stability rating of 4 throughout the site.

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Structure is generally weak thin platy. The A horizon will show minimal difference in structure and depth between interspaces and under plant canopies.

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** This site is characterized by a relatively even distribution of mostly perennial grasses and low shrubs across the landscape. Canopy and basal cover are dominated by warm season grasses and evergreen shrubs. This type of plant community along with surface rock cover and slopes are somewhat 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):** No compaction layers.

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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: Evergreen shrubs (25-35%)> Warm season colonizing grasses (15-20%) = Cool season bunch grasses (15-20%)

    Sub-dominant: Deciduous shrubs (5-15%)> Warm season bunch grasses (5-10%), forbs (5-10%)

    Other: Cacti (0-3%).

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** In a normal year up to 10 to 15% of grasses and shrubs die off. During and after drought years there can be from 10 to 25% die off of shrubs and grasses. Severe winter droughts affect shrubs, and cool season grasses the most. Severe summer droughts affect the warm season grasses the most.

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14. **Average percent litter cover (%) and depth (in):** Within plant interspaces litter ranges from 0 to 15 % cover with no real depth, while under some shrub canopies it ranges from 20 to 40% cover with depths from 1/8 to 1/2 inches thick.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Average annual production on this site is expected to be 415 lbs/ac. in a year of average annual precipitation.

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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:** Non-native species that can invade and establish on this site are cheatgrass and Russian thistle. Native species such as James' galleta, broom snakeweed, rabbitbrush and Mormon tea are native to the site, but can increase with disturbance.

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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 except during the most severe droughts.
