USDA Natural Resources Conservation Service

Ecological site DX035X03B625
Loamy Upland (PIED, JUOS) 13-17" p.z. (Provisional)

Accessed: 05/21/2025

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.

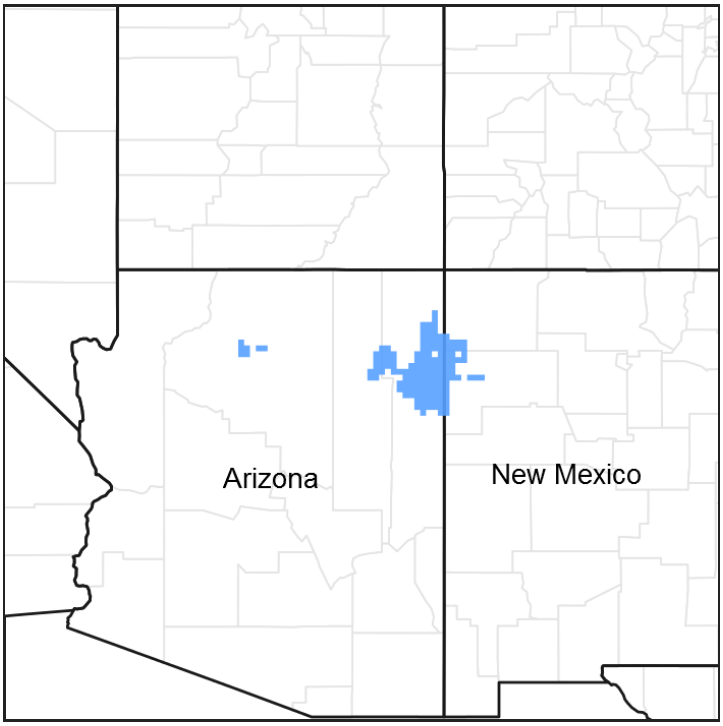

Figure 1. Mapped extent

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 Land Resource Unit 35.6 - Colorado Plateau Pinyon-Juniper-Sagebrush

The Land Resource Unit occurs within the Colorado Plateau Physiographic Province. Elevations range from 5800 to 7300 feet and precipitation averages 14 to 18 inches per year. Vegetation includes pinyon, juniper, big sagebrush, cliffrose, Mormon tea, muttongrass, prairie junegrass, squirreltail, western wheatgrass, and blue grama. 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.

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

DX035X03B628	**Sandy Loam Upland (JUOS, PIED) 13-17" p.z.** Deep to very deep upland forest sites with coarse textured soils

Table 1. Dominant plant species

Tree	(1) *Pinus edulis* (2) *Juniperus osteosperma*
Shrub	(1) *Artemisia tridentata ssp. wyomingensis* (2) *Gutierrezia sarothrae*
Herbaceous	(1) *Poa fendleriana* (2) *Bouteloua gracilis*

Legacy ID

F035XF625AZ

Physiographic features

This site occurs mainly on summits, mesas, and plateaus derived from eolian deposits, slope alluvium and/or residuum from sandstone and shale. Slopes are generally 1 to 15%, but can occasionally range up to 25 percent on sideslopes and shoulders of hills and

plateaus. Soils are moderately deep to deep to any plant root restrictive layer. The soil surface textures range from fine sandy loam to clay loam.

Table 2. Representative physiographic features

Landforms	(1) Mesa (2) Plateau (3) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	1,768–2,225 m
Slope	1–15%
Aspect	Aspect is not a significant factor

Climatic features

The climate of this land resource unit is semiarid with warm summers and cool winters. The mean annual precipitation ranges from 13-17 inches, but it is very erratic, often varying substantially from year to year. The majority of the precipitation comes 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 then a few inches of snow accumulates, melting within a few days, but may last a week or more. The remaining precipitation comes 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 air temperature ranges from 47 to 49 degrees Fahrenheit (F). The frost-free periods (air temperature > 32 degrees F) range from 113 to 144 days (@ 50 percent probability). Strong winds are common, especially in the spring.

Table 3. Representative climatic features

Frost-free period (average)	144 days
Freeze-free period (average)	160 days
Precipitation total (average)	432 mm

Influencing water features

Soil features

The soils on this site are moderately deep to deep. Surface textures range from loam to

clay loam. Parent materials are eolian deposits and/or residuum weathered from sandstone and shale. There may be up to 15% gravels on the surface. Some soils may have a gravelly substratum. Effervescence increases with depth. Depth to restrictive layers is 26 to 60 inches.

Typical taxonomic units on this site include:

SSA-701 Grand Canyon Area MU's 130 Tovar loam and 131 Tovar;
SSA-692 McKinley County, NM MU's 310,320,350,354,360,555,575 Parkelei; 310,320,350,555 Bryway; 310,320,555 Evpark
SSA-712 Canyon de Chelly NM MU 9 Evpark family;
SSA-713 Chinle Area MU 25 Kachina & Evpark;
SSA-715 Fort Defiance Area AZ/NM MU's 31 Evpark, 32 Evpark, 42 Nomrah, 75, 76 , 77 & 86 Parkelei family.

Table 4. Representative soil features

Parent material	(1) Eolian deposits–sandstone (2) Residuum–calcareous sandstone (3) Slope alluvium–sandstone and shale
Surface texture	(1) Loam (2) Fine sandy loam (3) Clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderately rapid
Soil depth	66–152 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	9.91–25.91 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.3
Subsurface fragment volume <=3" (Depth not specified)	0–15%

Subsurface fragment volume >3" (Depth not specified)	0–5%

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 described 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.

Deterioration of the plant community, hydrology, or soil site stability on an ecological site can result in crossing a threshold or potentially irreversible boundary to another state, or equilibrium. This can occur as a result of the loss of soil surface through erosion, the loss of the stability of the site due to disturbances that cause active erosion on the site, increases in the amounts and/or patterns or runoff from rainstorms, changes in availability of surface and subsurface water, significant changes in plant structural and functional types, or the introduction of non-native species. When these thresholds are crossed, the potential of the ecological site to return to the historic climax plant community can be lost, or restoration will require significant inputs . 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 across this ecological site. The state and transition model is intended to help land users recognize the current plant community on the ecological site, and the management options for improving the plant community to the desired plant community.

Plant production information in this site description is standardized to the annual production on an air-dry weight basis in near normal rainfall years.

State and transition model

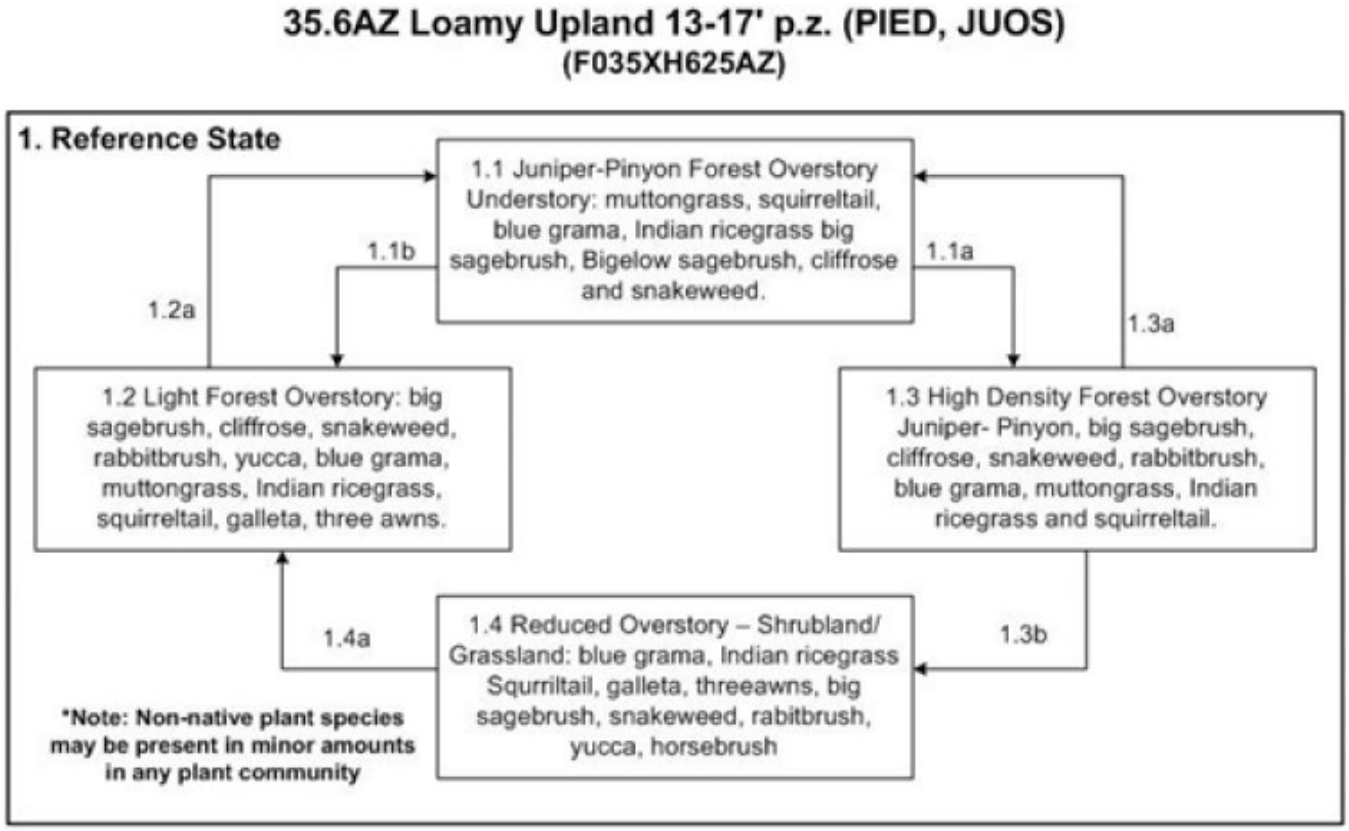

Figure 4. 35.6 Loamy Upaland 13-17"p.z. (PIED, JUOS)

State 1
Reference State

This is a forest site. Utah juniper and pinyon are the dominant overstory species. The understory is dominated by a grass/shrub mixture. When disturbance occurs the shrub and tree component can increase while grasses decrease. Non-native plant species may be present in minor amounts.

Community 1.1
Reference Community - Juniper Pinyon Forest Overstory

This forested site has an overstory canopy cover of 35% to 55% of pinyon and juniper species. The plant community understory is a grass and shrub mixture with small amounts of forbs and trees shorter than 4.5'. The understory plant community composition is comprised of approximately 45-55% grasses, 25-35% shrubs, 5-15% forbs and 5-15% trees (under 4.5 feet tall). Common grasses include blue grama, muttongrass, Indian ricegrass and squirreltail. Dominant shrubs include big sagebrush, cliffrose, snakeweed and Bigelow sage.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	224	308	398
Shrub/Vine	123	185	252
Tree	34	62	95
Forb	39	62	95
Total	**420**	**617**	**840**

Community 1.2
Light Forest Overstory

This plant community is characterized by a reduced amount of overstory tree species. The crown canopy is less than 35%, ranging from 25-35%. The understory has more production than the reference plant community (1.1) with an increase of grasses and forbs and reduced shrubs. Common grasses include blue grama, muttongrass, Indian ricegrass, squirreltail and galleta. Dominant shrubs include big sagebrush, cliffrose, snakeweed and rabbitbrush.

Community 1.3
Dense Tree Overstory

Figure 6. Loamy Upland 13-17" - Community 1.3

This site has a denser overstory of tree species with a crown canopy greater than 55%. The understory has less production than the reference plant community (1.1) with an decrease of grasses, forbs and shrubs. The shrub component moves to become co-dominanat to dominant. Dominant shrubs include big sagebrush, broom snakeweed, Bigelow sage and cliffrose. Common grasses include muttongrass, Indian ricegrass, squirreltail and bluegrama.

Community 1.4
Reduced Tree Overstory-Grassland/Shrubland

This plant community is characterized by a reduced overstory of tree species. The crown canopy is usually less than 20%, ranging from 5-25%. The understory has more production than the reference plant community with an increase of grasses, forbs and shrubs. The understory plant community is dominated by grasses, then shrubs, forbs and trees (under 4.5 feet tall). Common grasses include muttongrass, blue grama, Indian ricegrass and squirreltail. Dominant shrubs include big sagebrush, snakeweed and Bigelow sagebrush.

Pathway 1.1b
Community 1.1 to 1.2

Drought, insect infestation, and/or woodcutting

Pathway 1.1a
Community 1.1 to 1.3

Fire exclusion/Lack of natural fire, favorable precipitation, unmanaged grazing.

Pathway 1.2a
Community 1.2 to 1.1

Favorable precipitation, trees compete with shrubs/grass, fire exclusion.

Pathway 1.3a
Community 1.3 to 1.1

Drought, insect infestation, fire

Pathway 1.3b
Community 1.3 to 1.4

Drought in combination with severe disturbance such as major insect infestation and/or intense fire.

Pathway 1.4a
Community 1.4 to 1.2

Favorable precipitation, seed source for tree regeneration

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	**Dominant Grasses**			155–308	
	muttongrass	POFE	*Poa fendleriana*	62–155	–
	blue grama	BOGR2	*Bouteloua gracilis*	31–123	–
	Indian ricegrass	ACHY	*Achnatherum hymenoides*	31–93	–
2	**Miscellaneous Grasses**			31–93	
	western wheatgrass	PASM	*Pascopyrum smithii*	31–62	–
	squirreltail	ELEL5	*Elymus elymoides*	31–62	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	2–31	–
	Fendler's threeawn	ARPUF	*Aristida purpurea var. fendleriana*	7–31	–
	James' galleta	PLJA	*Pleuraphis jamesii*	7–31	–
	Sandberg bluegrass	POSE	*Poa secunda*	7–31	–
	Grass, annual	2GA	*Grass, annual*	0–19	–

	Grass, perennial	2GP	*Grass, perennial*	0–19	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	0–12	–
Forb					
3	**Forbs**			31–95	
	Forb, annual	2FA	*Forb, annual*	0–12	–
	Forb, perennial	2FP	*Forb, perennial*	0–12	–
	ragwort	SENEC	*Senecio*	0–12	–
	Carruth's sagewort	ARCA14	*Artemisia carruthii*	0–12	–
	sandwort	ARENA	*Arenaria*	0–12	–
	Wright's bird's beak	COWR2	*Cordylanthus wrightii*	0–12	–
	redroot buckwheat	ERRA3	*Eriogonum racemosum*	0–12	–
	pingue rubberweed	HYRI	*Hymenoxys richardsonii*	0–12	–
	tansyaster	MACHA	*Machaeranthera*	0–12	–
	dwarf lousewort	PECE	*Pedicularis centranthera*	0–7	–
	beardtongue	PENST	*Penstemon*	0–7	–
	dense mountain phlox	PHAUD	*Phlox austromontana ssp. densa*	0–7	–
	longleaf phlox	PHLO2	*Phlox longifolia*	0–7	–
	flatspine stickseed	LAOC3	*Lappula occidentalis*	0–7	–
	Wright's deervetch	LOWR	*Lotus wrightii*	0–7	–
	cryptantha	CRYPT	*Cryptantha*	0–7	–
	western tansymustard	DEPI	*Descurainia pinnata*	0–7	–
	wedgeleaf draba	DRCUC	*Draba cuneifolia var. cuneifolia*	0–7	–
	fleabane	ERIGE2	*Erigeron*	0–7	–
	milkvetch	ASTRA	*Astragalus*	0–7	–
	curveseed butterwort	CETE5	*Ceratocephala testiculata*	0–7	–
	Esteve's pincushion	CHST	*Chaenactis stevioides*	0–7	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–7	–
	onion	ALLIU	*Allium*	0–7	–
	Townsend daisy	TOWNS	*Townsendia*	0–1	–
Shrub/Vine					
4	**Dominant Shrubs**			93–216	

	Wyoming big sagebrush	ARTRW8	*Artemisia tridentata ssp. wyomingensis*	62–123	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	31–62	–
5	**Miscellaneous Shrubs**			31–93	
	Bigelow sage	ARBI3	*Artemisia bigelovii*	0–62	–
	Stansbury cliffrose	PUST	*Purshia stansburiana*	0–31	–
	antelope bitterbrush	PUTR2	*Purshia tridentata*	0–31	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–19	–
	black sagebrush	ARNO4	*Artemisia nova*	0–12	–
	alderleaf mountain mahogany	CEMO2	*Cercocarpus montanus*	0–12	–
	Cutler's jointfir	EPCU	*Ephedra cutleri*	0–12	–
	mormon tea	EPVI	*Ephedra viridis*	0–12	–
	pricklypear	OPUNT	*Opuntia*	0–7	–
	banana yucca	YUBA	*Yucca baccata*	0–7	–
	longflower rabbitbrush	CHDE2	*Chrysothamnus depressus*	0–7	–
	hedgehog cactus	ECHIN3	*Echinocereus*	0–7	–
Tree					
6	**Trees (<4.5')**			31–95	
	twoneedle pinyon	PIED	*Pinus edulis*	0–62	–
	Utah juniper	JUOS	*Juniperus osteosperma*	0–31	–
	Gambel oak	QUGA	*Quercus gambelii*	0–12	–

Inventory data 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.

Other references

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Contributors

Dan Carroll

Karlynn Huling
Kenneth Gishi
Kevin Williams
Larry D. Ellicott
Peter Lefebvre

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:**

   _____

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):**

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

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

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

    Sub-dominant:

    Other:

    Additional:

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

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):**

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:**