

Ecological site R035XH821AZ **Meadow 17-25" p.z.**

Accessed: 05/18/2024

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.

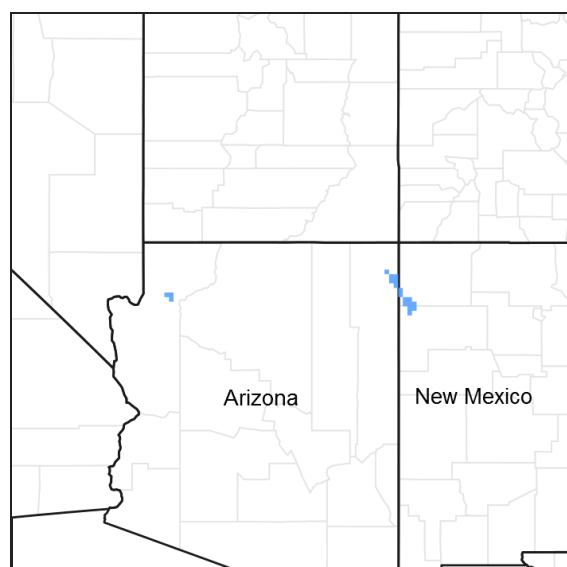


Figure 1. Mapped extent

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

This ecological site occurs in Common Resource Area 35.8 - the Colorado Plateau Ponderosa Pine Forests

The Common Resource Area occurs within the Colorado Plateau Physiographic Province. Elevations range from 6800 to 8500 feet and precipitation averages 17 to 25 inches per year. Vegetation includes ponderosa pine, white fir, aspen, pinyon, juniper, Gambel oak, big sagebrush, ceanothus, blue elderberry, muttongrass, upland sedge, and big wildrye, mountain muhly, Arizona fescue, pine dropseed, and blue grama. The soil temperature regime ranges from mesic to frigid and the soil moisture regime is typic 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.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Poa pratensis</i> (2) <i>Carex duriuscula</i>

Physiographic features

This site occurs on the toeslopes of undulating high plateaus and calderas. It has a seasonal watertable at 2 to 4 feet. Slopes generally less than 5 percent, but can range to 10 percent.

Table 2. Representative physiographic features

Landforms	(1) Caldera (2) Plateau (3) Depression
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	Occasional to frequent
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to rare
Elevation	2,377–2,591 m
Slope	1–5%
Water table depth	61–122 cm
Aspect	Aspect is not a significant factor

Climatic features

Winter-Summer moisture ratios are typically 70:30 on the west side of this CRA and shift to 60:40 on the east side. Late spring is usually the driest period and early fall moisture can be sporadic. Summer rains fall from June through September; moisture originates in the Gulf of Mexico and creates convective, usually brief, intense thunderstorms. Cool season moisture from October through May tends to be frontal; it originates in the Pacific and the Gulf of California and falls in widespread storms with longer duration and lower intensity. Precipitation generally comes as snow from October into April. Snowpack can persist for 3-4 months, although it may disappear in exposed areas during prolonged dry weather. Summer daytime temperatures are typically 80-90 F but can exceed 95 F. Winter temperatures around 0 F are common and can reach -25 F.

Table 3. Representative climatic features

Frost-free period (average)	100 days
Freeze-free period (average)	130 days
Precipitation total (average)	635 mm

Influencing water features

The soil moisture on this ecological site comes from precipitation and run-on moisture from adjacent sites. The site also benefits from shallow groundwater flows for extended periods of time. This ecological site has a seasonal watertable at 2 to 4 feet. This additional moisture allows this site to produce significantly more vegetation than upland sites that depend entirely on rainfall.

Soil features

The soils are moderately deep to very deep and somewhat poorly drained. They formed in slope alluvium derived mainly from sedimentary and igneous parent materials. The surface soils are generally dark colored and high in organic matter content. Textures range are loam, silt loam, and silty clay. The seasonal water table fluctuates between 12 to 60 inches most of the growing season

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

SSA-623 Shivwits Area MU 91 Yellow Horse family;

SSA-715 Fort Defiance Area AZ/NM MU's 17 Bikeyah family, 115 Cumulic Endoaquolls, 123 Owlspring, 125 Umbarg, 125 Millpaw;

SSA-717 Shiprock MU's 602 Camburn, 702 Bikeyah, and 706 Owlspring.

Table 4. Representative soil features

Parent material	(1) Slope alluvium–sandstone (2) Marine deposits–basalt
Surface texture	(1) Loam (2) Silt loam (3) Silty clay
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Slow to moderately slow
Soil depth	102–152 cm
Surface fragment cover <=3"	0–5%
Available water capacity (0-101.6cm)	20.32–23.37 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–1
Soil reaction (1:1 water) (0-101.6cm)	5.6–6.5

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

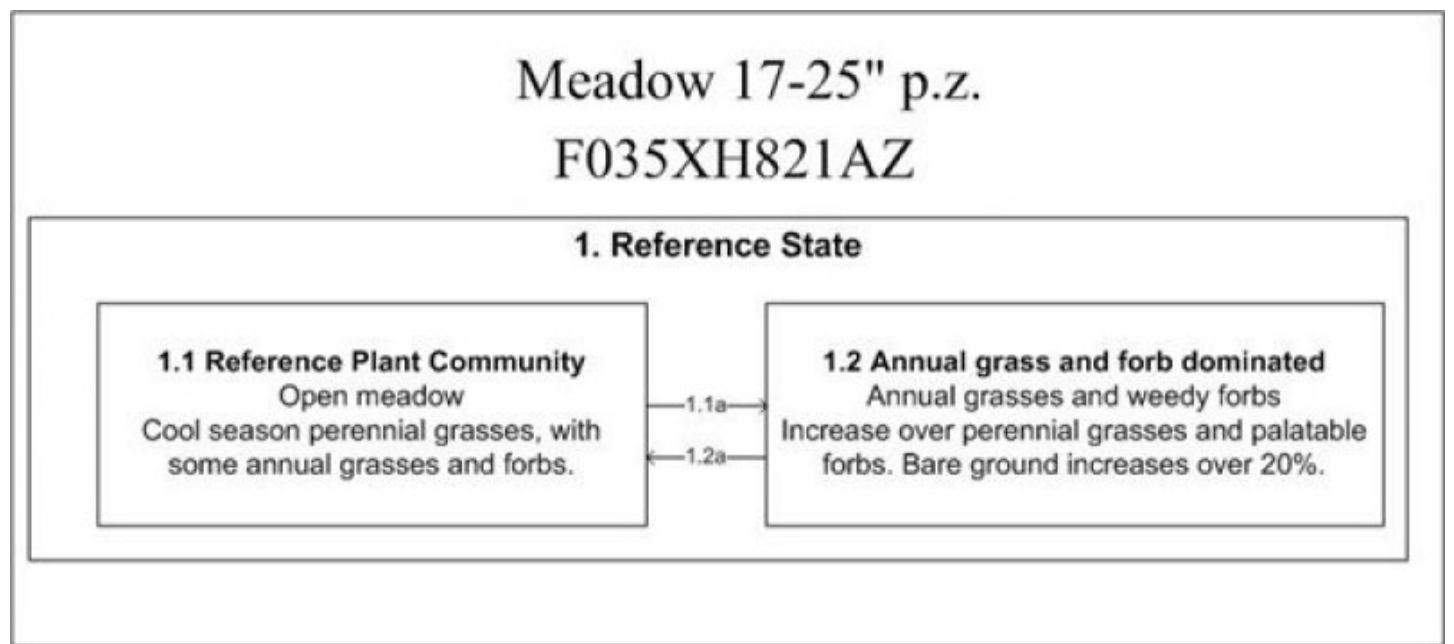


Figure 4. 358 Meadow S&T

State 1 Historic Climax Plant Community

Community 1.1 Historic Climax Plant Community



The dominant aspect of this site is a grass dominated meadow free of trees and shrubs. These open meadows are surrounded by Ponderosa Pine forests mixed with occasional Aspen and Douglas-Fir trees. These loamy poorly drained soils are wet for a majority of the year, and prohibit the colonization of trees into these sites. The reference

state is a mix of grasses, grasslikes and forbs, with very little bare ground (<10%). The grasses are dominated by native cool season perennials such as wheatgrass, muttongrass and tufted hairgrass, with non-native cool season annual grasses such as Kentucky blue grass, and redtop mixed in. In addition many grass-like plants such as spikerush sedge and Baltic rush are important components of this site. The dominate forbs are iris, yarrow, and rock dandelion, clover and common sheep sorrel. Shrubs are are short and scarce, consisting mostly snowberry and stunted Gamble's oak. The annual grass and forb dominated communities have an increased cover over perennial grasses, and an increase in weedy non palatable forbs such as field mint. These sites also have an increase in the amount of bare ground (+20%).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1177	1345	1513
Forb	168	252	336
Shrub/Vine	17	34	50
Tree	—	17	34
Total	1362	1648	1933

Figure 6. Plant community growth curve (percent production by month).
AZ3581, 35.8 17-25" p.z. all sites. Growth begins in the spring, most growth occurs during the summer rainy season..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	4	10	24	21	23	13	5	0	0

Figure 7. Plant community growth curve (percent production by month).
AZ3903, 35.8 17-25" p.z. western wheatgrass. Growth begins in the spring, most growth occurs in the summer. Seed set occurs in the fall..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	15	25	30	10	5	0	0

Community 1.2

Annual grass and forb dominated

Annual grasses and weedy forbs Increase over perennial grasses and palatable forbs. Bare ground increases over 20%. Forbs make up to 50 percent plant community composition.

Pathway 1.1a

Community 1.1 to 1.2

Drought and continuous heavy grazing push reference state to annual dominated state.

Pathway 1.2a

Community 1.2 to 1.1

A combination of rest and targeted grazing, in combination favorable climate brings back cool season perennials.

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	Dominate Grasses/Grasslike			1177–1513	
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	252–420	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	168–336	–
	mountain rush	JUARL	<i>Juncus arcticus ssp. littoralis</i>	84–252	–
	timothy	PHPR3	<i>Phleum pratense</i>	84–252	–
	redtop	AGGI2	<i>Agrostis gigantea</i>	84–252	–
	tufted hairgrass	DECE	<i>Deschampsia cespitosa</i>	17–84	–
2	Occasional Grasses			84–252	
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus ssp. trachycaulus</i>	84–168	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	84–168	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0–84	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	17–84	–
	squirreldtail	ELELE	<i>Elymus elymoides ssp. elymoides</i>	0–84	–
Forb					
3	Forbs			168–336	
	Rocky Mountain iris	IRMI	<i>Iris missouriensis</i>	0–84	–
	clover	TRIFO	<i>Trifolium</i>	0–84	–
	silverweed cinquefoil	ARAN7	<i>Argentina anserina</i>	0–84	–
	common sheep sorrel	RUAC3	<i>Rumex acetosella</i>	0–84	–
	ragwort	SENEC	<i>Senecio</i>	0–50	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–50	–
	yarrow	ACHIL	<i>Achillea</i>	0–50	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–50	–
	pingue rubberweed	HYRI	<i>Hymenoxys richardsonii</i>	0–50	–
	silvery lupine	LUAR3	<i>Lupinus argenteus</i>	0–50	–
	wild mint	MEAR4	<i>Mentha arvensis</i>	0–34	–
	sagebrush	ARTEM	<i>Artemisia</i>	0–34	–
	aspen fleabane	ERSP4	<i>Erigeron speciosus</i>	0–34	–
	goldenrod	SOLID	<i>Solidago</i>	0–34	–
	rock dandelion	TALA2	<i>Taraxacum laevigatum</i>	0–34	–
Shrub/Vine					
4	Shrubs			17–50	
	Gambel oak	QUGA	<i>Quercus gambelii</i>	0–50	–
	mountain snowberry	SYOR2	<i>Symphoricarpos oreophilus</i>	0–50	–
Tree					
5	Trees			0–34	
	Rocky Mountain juniper	JUSC2	<i>Juniperus scopulorum</i>	0–34	–
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	0–34	–
	quaking aspen	POTR5	<i>Populus tremuloides</i>	0–34	–

Animal community

Site is favorable for grazing throughout most of the year except when snow cover restricts availability of forage. Planned grazing systems adapt well to use on this site.

The potential plant community produced by this site provides food for those species of wildlife that utilize grass as a major portion of their diet.

Recreational uses

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

Activities include hunting, cross-country riding, photography, hiking, rock collecting, and wildlife observation

Wood products

Gambel oak and Ponderosa pine provide opportunities for firewood collection when dead and down.

Type locality

Location 1: San Juan County, NM	
Township/Range/Section	T22N R20W S13
General legal description	Approximately 7 miles southwest of Toadlena, Navajo Indian Reservation, NM

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)	Dean Schlichting and Ken Gishi
Contact for lead author	NRCS State Rangeland Management Specialist, Phoenix AZ
Date	10/27/2010
Approved by	Steve Barker
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None. Very minor rill development may occur in sparsely vegetated areas or steeper slopes. If rills are present, they should be widely spaced and not connected (<3% cover).

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2. **Presence of water flow patterns:** None. Site is typically nearly level, water flow patterns are not expected to form.
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3. **Number and height of erosional pedestals or terracettes:** None are expected.
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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 1 to 15% bare ground. Litter and other ground cover will fill most plant interspaces.
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5. **Number of gullies and erosion associated with gullies:** None expected. However, some gullies can occur near disturbed areas such as road crossings, animal trails and near drainage outlets from adjacent slopes or uplands.
-
6. **Extent of wind scoured, blowouts and/or depositional areas:** None
-
7. **Amount of litter movement (describe size and distance expected to travel):** The majority of fine litter will stay in place, while a few small fines (<1/8") may accumulate in small depressions adjacent to plants.
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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):** Soil surface is moderately stable and would give high values of 5 or 6, due to high clay content and organic matter.
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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Soil surface horizon is typically 5 to 7 inches deep. Structure is typically weak fine or medium granular structure. Some pedons will have a weak thick platy structure parting to moderate granular structure. Color is typically black (10YR 2/1), but will range from 7.5YR to 10YR. Surface textures include loam and silt loam.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Perennial cool season grasses and grasslikes when dominant improve soil infiltration and reduce runoff. Grasses/grasslikes comprise about 85% of plant composition, 10-15% perennial forbs and a trace of shrubs. Spatial distribution of vascular plants (fetch 1") and interspaces provide detention storage and surface roughness that slows runoff allowing time for infiltration. Since site is nearly level and well covered (canopy 50-75%), infiltration is moderate and runoff very low.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None. Subsurface soil horizons may have a higher clay content and appear harder than the surface and should not be considered as compaction layers.
-
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: Cool season perennial grasses

Sub-dominant: sedges and rushes > perennial forbs

Other: (0-3%) annual forbs > shrubs

Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Low mortality in perennial grasses & grasslikes, due to consistent moisture.
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14. **Average percent litter cover (%) and depth (in):** Litter amounts increase during the first few years of drought, then decrease in later years.
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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 1400-1600 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:** Wild mint, foxtail barley, Douglas knotweed, and cheatgrass.
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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.
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