

Ecological site F127XY005WV

Alluvial Land

Last updated: 9/27/2024
Accessed: 09/15/2026

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.

MLRA notes

Major Land Resource Area (MLRA): 127X—Eastern Allegheny Plateau and Mountains

This site occupies alluvial lands in the Allegheny Mountain Section of the Appalachian Highlands of the Appalachian Plateau Province. The deeply dissected plateau in this area terminates in a high escarpment, the Allegheny Front, in the eastern part of the area. Steep slopes are dominant, but level to gently rolling plateau remnants are conspicuous in the northern part of the area. This ecosite is found in better developed alluvial plains, and river valleys within hills, mountains and plateaus in MLRA 127 Eastern Allegheny Plateau and Mountains.

Classification relationships

USDA-NRCS (USDA, 2006): Land Resource Region (LRR): N—East and Central Farming and Forest Region Major Land Resource Area (MLRA): 127—Eastern Allegheny Plateau and Mountains USDA-FS (Cleland et al., 2007) Province: 211 – Northeastern Mixed Forest Province (in Part) Section: 211G - Northern Unglaciaded Allegheny Plateau Subsection: 211Ga – Allegheny High Plateau 211Gb – Allegheny Deep Valleys Province: 221 - Eastern Broadleaf Province (in part) Section: 221E - Southern Unglaciaded Allegheny Plateau (in part) Subsection: 221Ea - Pittsburgh Low Plateau Province: M221 – Central Appalachian Broadleaf Forest – Coniferous Forest - Meadow Province (in part) Section: M221B - Allegheny Mountains Subsection: M221Ba – Northern High Allegheny Mountains M221Bb – Western Allegheny Mountains M221Bc – Southern High Allegheny Mountains M221Bd – Eastern Allegheny Mountain and Valley M221Be – Western Allegheny Mountain and Valley M221Bf – Allegheny Mountain Plateau Section: M221C - Northern Cumberland Mountains Subsection: M221Ca – Western Coal Fields This site crosswalks to Landfire biophysical setting (BpS) Central Interior and Appalachian Riparian Systems. Not all the component associations are applicable to MLRA 127. NatureServe (2007) describes this as an aggregated system including the following standard ecological systems (for MLRA 127): • Central Appalachian Stream and Riparian (CES202.609) Component Associations (all not applicable to MLRA 127) Association Unique ID Association Name CEGL003896 Platanus occidentalis - Betula nigra - Salix (caroliniana, nigra) Woodland CEGL003901 Salix nigra Temporarily Flooded Shrubland CEGL004031 Platanus occidentalis / Dichanthelium clandestinum - Festuca subverticillata Woodland CEGL004033 Southern Appalachian Bedrock Scour Herbaceous Vegetation CEGL004073 Platanus occidentalis - Acer negundo - Juglans nigra / Asimina triloba / Mertensia virginica Forest CEGL004103 Carex torta Herbaceous Vegetation CEGL004286 Justicia americana Herbaceous Vegetation CEGL004331 Podostemum ceratophyllum Herbaceous Vegetation CEGL006004 Pinus strobus - Betula populifolia / Comptonia peregrina / Schizachyrium scoparium Woodland CEGL006065 Salix nigra / Phalaris arundinacea - Apocynum cannabinum Temporarily Flooded Shrubland CEGL006232 Hudsonia tomentosa - Paronychia argyrocoma Dwarf-shrubland CEGL006251 Alnus serrulata - Physocarpus opulifolius Shrubland CEGL006255 Liriodendron tulipifera - Platanus occidentalis - Betula lenta / Liriodendron benzoin / Circaea lutetiana ssp. canadensis Forest CEGL006283 Andropogon gerardii - Panicum virgatum - Baptisia australis Herbaceous Vegetation CEGL006284 Andropogon gerardii - Campanula rotundifolia - Solidago simplex Sparse Vegetation CEGL006391 Pinus rigida - Hudsonia tomentosa - Pityopsis falcata Sparse Vegetation CEGL006406 Acer rubrum - Fraxinus (pennsylvanica, americana) / Liriodendron benzoin / Symplocarpus foetidus Forest CEGL006447 Carex trichocarpa Herbaceous Vegetation CEGL006461 Leersia oryzoides - Sagittaria latifolia Herbaceous Vegetation CEGL006476 Platanus occidentalis - Acer saccharinum - Betula nigra - Fraxinus pennsylvanica / Boehmeria cylindrica - Carex emoryi Woodland CEGL006477 Panicum virgatum - Andropogon gerardii Gravel Wash Herbaceous Vegetation CEGL006478 Fraxinus americana / Andropogon gerardii - Sorghastrum nutans - Schizachyrium scoparium - Pycnanthemum tenuifolium Herbaceous Vegetation CEGL006480 Verbena alternifolia - Elymus riparius - Solidago gigantea - (Teucrium canadense) Herbaceous Vegetation CEGL006481 Eupatorium serotinum - Polygonum (lapathifolium, punctatum, pensylvanicum) Herbaceous Vegetation CEGL006483 Eragrostis hypnoides - Ludwigia palustris - Lindernia dubia - Cyperus squarrosus Herbaceous Vegetation CEGL006492 Liriodendron tulipifera - Acer (rubrum, negundo) - (Platanus occidentalis) / Carpinus caroliniana / Polygonum virginianum Forest CEGL006497 Quercus palustris - Quercus bicolor / Carex tribuloides - Carex radiata - (Carex squarrosa) Forest CEGL006536 Carex torta - Apocynum cannabinum - Cyperus spp. Herbaceous Vegetation CEGL006554 Lysimachia ciliata - Apocynum cannabinum Sparse Vegetation CEGL006598 Rhododendron arborescens / Marshallia grandiflora - Triantha glutinosa - Platanthera flava var. herbiola Herbaceous Vegetation CEGL006624 Pinus virginiana - (Pinus rigida) - Nyssa sylvatica / Xanthorhiza simplicissima / Euphorbia corollata Forest CEGL006969

Deschampsia caespitosa - Carex viridula Herbaceous Vegetation CEG007056 Pinus rigida / Osmunda cinnamomea - Carex stricta - Eriophorum virginicum / Sphagnum spp. Woodland CEG007853 Acer rubrum - Nyssa sylvatica / Ilex verticillata - Vaccinium fuscum / Osmunda cinnamomea Forest CEG008416 Acer rubrum - Fraxinus americana - Fraxinus nigra - Betula alleghaniensis / Veratrum viride - Carex bromoides Forest CEG008533 Tsuga canadensis - Betula alleghaniensis / Veratrum viride - Carex scabrata - Oclemea acuminata Forest • South-Central Interior Small Stream and Riparian (CES202.706)(all not applicable to MLRA 127) Component Associations Association Unique ID Association Name CEG002086 Betula nigra - Platanus occidentalis Forest CEG002263 Carex crinita - Osmunda spp. / Sphagnum spp. Herbaceous Vegetation CEG002386 Nuphar advena - Nymphaea odorata Herbaceous Vegetation CEG002392 Carex crinita - Osmunda spp. / Physocarpus opulifolius Seep Herbaceous Vegetation CEG003725 Platanus occidentalis - Betula nigra / Cornus amomum / (Andropogon gerardii, Chasmanthium latifolium) Woodland CEG003836 Arundinaria gigantea ssp. gigantea Shrubland CEG003866 Scirpus cyperinus Seasonally Flooded Southern Ruderal Herbaceous Vegetation CEG003894 Alnus serrulata Interior Shrubland CEG003895 Alnus serrulata - Xanthorhiza simplicissima Shrubland CEG003896 Platanus occidentalis - Betula nigra - Salix (caroliniana, nigra) Woodland CEG003901 Salix nigra Temporarily Flooded Shrubland CEG004031 Platanus occidentalis / Dichanthelium clandestinum - Festuca subverticillata Woodland CEG004098 Quercus (alba, coccinea, falcata, velutina) / Kalmia latifolia Temporarily Flooded Forest CEG004103 Carex torta Herbaceous Vegetation CEG004112 Juncus effusus Seasonally Flooded Herbaceous Vegetation CEG004145 Alnus maritima ssp. georgiensis - (Decodon verticillatus) / Hibiscus moscheutos - Sparganium americanum Spring-run Marsh Shrubland CEG004149 (Salix spp.) / Andropogon gerardii - Panicum virgatum - Salvia azurea Cahaba Riverwash Herbaceous Vegetation CEG004285 Hymenocallis coronaria - Justicia americana Herbaceous Vegetation CEG004286 Justicia americana Herbaceous Vegetation CEG004290 Polygonum (hydropiperoides, punctatum) - Leersia spp. Herbaceous Vegetation CEG004331 Podostemum ceratophyllum Herbaceous Vegetation CEG004418 Liquidambar styraciflua - Liriodendron tulipifera / Liriodendron benzoin / Arisaema triphyllum Forest CEG004425 Acer rubrum var. trilobum - Nyssa sylvatica / Rhododendron canadense - Viburnum nudum var. nudum / Woodwardia areolata Forest CEG004510 Sparganium americanum - (Sparganium erectum ssp. stoloniferum) - Epilobium leptophyllum Herbaceous Vegetation CEG004620 Vitis rotundifolia - Ampelopsis arborea - Campsis radicans Successional Vine-Shrubland CEG004626 Salix nigra - Platanus occidentalis Forest CEG004690 Acer negundo - (Platanus occidentalis, Populus deltoides) Forest CEG004691 Platanus occidentalis - Liriodendron tulipifera - Betula (alleghaniensis, lenta) / Alnus serrulata - Leucothoe fontanesiana Forest CEG004725 Potamogeton spp. - Ceratophyllum spp. - Elodea spp. Permanently Flooded Herbaceous Vegetation CEG005014 Fagus grandifolia - Quercus spp. - Acer rubrum - Juglans nigra Forest CEG006283 Andropogon gerardii - Panicum virgatum - Baptisia australis Herbaceous Vegetation CEG006463 Salix nigra - Betula nigra / Schoenoplectus pungens Wooded Herbaceous Vegetation CEG006480 Verbena alternifolia - Elymus riparius - Solidago gigantea - (Teucrium canadense) Herbaceous Vegetation CEG006483 Eragrostis hypnoides - Ludwigia palustris - Lindernia dubia - Cyperus squarrosus Herbaceous Vegetation CEG007059 Alnus serrulata Saturated Southern Interior Shrubland CEG007143 Tsuga canadensis - Liriodendron tulipifera - Platanus occidentalis / Rhododendron maximum - Xanthorhiza simplicissima Temporarily Flooded Forest CEG007312 Betula nigra - Platanus occidentalis / Alnus serrulata / Boehmeria cylindrica Forest CEG007330 Liquidambar styraciflua - (Liriodendron tulipifera) Temporarily Flooded Ruderal Forest CEG007340 Platanus occidentalis - Liquidambar styraciflua / Carpinus caroliniana - Asimina triloba Forest CEG007373 Salix caroliniana Temporarily Flooded Forest CEG007443 Acer rubrum var. trilobum - Nyssa sylvatica / Osmunda cinnamomea - Chasmanthium laxum - Carex intumescens / Sphagnum lescurei Forest CEG007546 Pinus taeda - Liriodendron tulipifera / Liriodendron benzoin / Carex crinita Successional Forest CEG007696 Peltandra virginica - Saururus cernuus - Boehmeria cylindrica / Climacium americanum Herbaceous Vegetation CEG007709 Quercus alba - Carya (alba, ovata) - Liriodendron tulipifera - (Quercus phellos) / Cornus florida Forest CEG007880 Liquidambar styraciflua - Liriodendron tulipifera - (Platanus occidentalis) / Carpinus caroliniana - Halesia tetraptera / Amphicarpaea bracteata Forest CEG008404 Osmunda regalis var. spectabilis Seepage Scour Herbaceous Vegetation CEG008428 Quercus alba - (Liriodendron tulipifera, Liquidambar styraciflua) / Calycanthus floridus / Athyrium filix-femina Forest CEG008429 Platanus occidentalis - Celtis laevigata - Liriodendron tulipifera / Liriodendron benzoin - Arundinaria gigantea / Amphicarpaea bracteata Forest CEG008433 Juncus effusus - Chelone glabra - Scirpus spp. Southern Blue Ridge Beaver Pond Ruderal Herbaceous Vegetation CEG008449 Pinus virginiana - Juniperus virginiana var. virginiana - Quercus stellata / Amelanchier stolonifera / Danthonia spicata / Leucobryum glaucum Woodland CEG008455 Schizachyrium scoparium - Andropogon ternarius - Liatris microcephala - (Pityopsis rufii) Herbaceous Vegetation CEG008474 Alnus serrulata Southeastern Seasonally Flooded Shrubland CEG008480 Orontium aquaticum Permanently Flooded Herbaceous Vegetation CEG008487 Quercus shumardii - Quercus michauxii - Quercus nigra / Acer barbatum - Tilia americana var. heterophylla Forest CEG008496 Schizachyrium scoparium - Schoenoplectus americanus - Juncus marginatus - Eupatorium serotinum Herbaceous Vegetation CEG008551 Fagus grandifolia - Quercus alba / Kalmia latifolia - Rhododendron canadense - Symplocos tinctoria Forest

Ecological site concept

This site contains moderately well, well, and somewhat excessively drained soils on alluvial land deposited during the Quaternary period. The flooding frequency ranges from rare to frequent. From Landfire <http://www.landfire.gov/index.php>: These riverscours-influenced systems occur on moderately to very high-gradient streams over a wide range of elevations. It develops on small floodplains and shores along river channels that lack a broad, flat floodplain due to steeper sideslopes, higher gradient, or both (NatureServe 2007). The fluvial features (river terraces, oxbows, alluvial flats, point bars, and streamside levees) typical of river floodplains occur less frequently and on a smaller scale along these small streams. Fine-scale alluvial floodplain features are abundant. In pre-European settlement forests, community diversity in these streamside systems was much more complex than in the modified landscapes of today. Fire, beaver activity, and flooding of varied intensity and frequency created a mosaic whose elements included canebrake, grass and young birch / sycamore beds on reworked gravel or sand bars, beaver ponds, and grass-sedge meadows in abandoned beaver clearings, as well as the streamside zones and mixed hardwood and/or pine forests that make up more than 95% of the cover that exists today. These systems have little to no floodplain development (i.e., floodplains, if present, are not differentiated into levees, sloughs, ridges, terraces, and abandoned channel segments) and are typically higher gradient than larger floodplains, experiencing periodic, strong flooding of short

duration (NatureServe 2007).

Associated sites

F127XY004WV	Wet Alluvial Lands Wet Alluvial Lands
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Table 1. Dominant plant species

Tree	(1) <i>Platanus occidentalis</i> (2) <i>Acer rubrum</i>
Shrub	(1) <i>Ostrya virginiana</i> (2) <i>Carpinus caroliniana</i>
Herbaceous	(1) <i>Sorghastrum nutans</i> (2) <i>Toxicodendron radicans</i>

Physiographic features

This area is generally composed of mountain ranges oriented in a northeast-southwest direction, with deep valleys intervening. The area of the site terminates in the eastern part in a high escarpment known as the Allegheny Front. Steep slopes are dominant but level to gently rolling plateau remnants are present.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Mountain valley (3) Alluvial fan
Runoff class	Very low to medium
Flooding duration	Extremely brief (0.1 to 4 hours) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	30 – 910 m
Slope	0 – 10 %

Ponding depth	0 – 40 cm
Water table depth	50 – 150 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is characteristic of other ecological sites of high elevation areas in the Eastern Allegheny Plateau and Mountains with a warm to hot, humid summers climate with cold winters and moderate snowfall. Rainfall occurs mostly as high intensity convective thunderstorms.

Table 3 Representative climatic features

Frost-free period (characteristic range)	110-130 days
Freeze-free period (characteristic range)	140-160 days
Precipitation total (characteristic range)	1,040-1,350 mm
Frost-free period (actual range)	90-140 days
Freeze-free period (actual range)	130-180 days
Precipitation total (actual range)	970-1,450 mm
Frost-free period (average)	120 days
Freeze-free period (average)	150 days
Precipitation total (average)	1,220 mm

- (1) KANE 1NNE [USC00364432], Kane, PA
- (2) RIDGWAY [USC00367477], Ridgway, PA
- (3) EMPORIUM [USC00362629], Emporium, PA
- (4) CLEARFIELD LAWRENCE AP [USW00054792], Clearfield, PA
- (5) PRINCE GALLITZIN SP [USC00367167], Patton, PA
- (6) LAUREL SUMMIT [USC00364839], Boswell, PA
- (7) JOHNSTOWN CAMBRIA CO AP [USW00004726], Johnstown, PA
- (8) EBENSBURG SEWAGE PLT [USC00362470], Ebensburg, PA
- (9) TERRA ALTA #1 [USC00468777], Terra Alta, WV
- (10) MC HENRY 2 NW [USC00185832], Friendsville, MD
- (11) MT DAVIS [USC00366022], Fort Hill, PA
- (12) PARSONS 1 NE [USC00466867], Hambleton, WV
- (13) KUMBRABOW [USC00464971], Huttonsville, WV

- (14) RICHWOOD 1SSE [USC00467513], Richwood, WV
- (15) MCROSS 3 E [USC00465875], Charmco, WV
- (16) BLUESTONE LAKE [USC00460939], Hinton, WV
- (17) ATHENS [USC00460355], Athens, WV

Influencing water features

The plant community is influenced by water from streams associated with the site.

Soil features

The soils associated with this site are deep to very deep, somewhat poorly drained to excessively well drained, and moderately slow to rapid permeable soils, with very acidic to slightly acidic soil reaction, that formed in Alluvium, Residuum from Acid shale, Interbedded sedimentary rock, Limestone and shale, Limestone, sandstone, and shale, Sandstone and shale, Sedimentary rock, Shale and siltstone.

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale
Surface texture	(1) Cobbly fine sandy loam (2) Gravelly loam (3) Stony silt loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderately slow to rapid
Soil depth	140 – 490 cm
Surface fragment cover <=3"	0 – 10 %
Surface fragment cover >3"	0 – 10 %
Available water capacity (0-101.6cm)	8.64 – 12.45 cm
Calcium carbonate equivalent (0-101.6cm)	Not specified
Electrical conductivity (0-101.6cm)	Not specified

Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	4.3 – 6.5
Subsurface fragment volume <=3" (Depth not specified)	0 – 50 %
Subsurface fragment volume >3" (Depth not specified)	0 – 40 %

Ecological dynamics

Ecological Dynamics: Information contained in this section was adapted from several sources. The information presented is representative of very complex vegetation communities. Key indicator plants, animals and ecological processes are described to help inform land management decisions. Plant communities will differ across the MLRA because of the naturally occurring variability in weather, soils, and aspect. The reference plant community is not necessarily the management goal. The species lists are representative and are not botanical descriptions of all species occurring, or potentially occurring, on this site. They are not intended to cover every situation or the full range of conditions, species, and responses for the site.

State Correlation: This site will be correlated in: MD,NY,PA,WV

From Landfire <http://www.landfire.gov/index.php>:

Most of the system is forest vegetation. The succession of woody plants (particularly trees) is retarded by the force of "flashy," high-velocity water traveling down the stream channels (NatureServe 2007). The canopy is usually dominated by hardwoods, with pines a small component. Species may include sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), box elder (*Acer negundo*), eastern cottonwood (*Populus deltoides*), sugarberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), Swamp Chestnut Oak (*Quercus michauxii*), Cherrybark Oak (*Quercus pagoda*), hackberry (*Celtis occidentalis*), hemlock (*Tsuga Canadensis*) or pines (*Pinus* spp).

Successional areas of zones are often dominated by sycamore (*Platanus occidentalis*) or box elder (*Acer negundo*).

Sub-canopy species included American holly (*Ilex opaca*), deciduous holly (*Ilex decidua* and *Ilex ambigua*), red mulberry (*Morus rubra*), ironwood (*Carpinus caroliniana*) and hop hornbeam (*Ostrya virginiana*). Shrubs such as spicebush (*Lindera benzoin*), beautyberry (*Callicarpa americana*) and yellowroot (*Xanthorhiza simplicissima*); cane (*Arundenaria gigantea*) and other grasses; and false nettle (*Boehmeria cylindrica*) may be present. Caric sedges may dominate some areas.

NatureServe (2007) also notes the following common shrubs, occurring as forest/woodland understory or as non-forested shrublands: hazel alder (*Alnus serrulata*), common buttonbush (*Cephalanthus occidentalis*), silky dogwood (*Cornus amomum*), coastal plain willow (*Salix caroliniana*) and other *Salix* spp., eastern poison ivy (*Toxicodendron radicans*), and, over parts of the range, mountain witchalder (*Fothergilla major*), Virginia sweetspire (*Itea virginica*) and smooth azalea (*Rhododendron arborescens*). More southern examples may contain oakleaf hydrangea (*Hydrangea quercifolia*), bushy St. John's wart (*Hypericum densiflorum*) and wax myrtle (*Morella cerifera*).

Forbs are diverse and variable from occurrence to occurrence. Some characteristic forbs are *Baptisia australis*, *Conoclinium coelestinum* (= *Eupatorium coelestinum*), *Coreopsis pubescens*, *Coreopsis tripteris*, *Elephantopus carolinianus*, *Helenium autumnale*, *Hydrocotyle* sp., *Ludwigia leptocarpa*, *Lycopus* spp., *Orontium aquaticum*, *Osmunda regalis* var. *spectabilis*, *Oxypolis rigidior*, *Phlox carolina*, *Pityopsis graminifolia* var. *latifolia*, *Rudbeckia laciniata* and *Vernonia gigantea* (NatureServe 2007).

Periodically reworked gravel bars may be dominated by young black willow (*Salix nigra*), sycamore (*Platanus occidentalis*), or infrequently river birch (*Betula nigra*), or they may have sparse vegetation of a wide variety of annual and perennial herbs of weedy habits.

Canebrakes occurred in particular locations that had easy access for fire (i.e. bottomlands bordered by upland flats as opposed to steep

slopes) and where the uplands experienced frequent fire as the result of a combination of lightning and Native American ignitions.

Natural levee forests form on ridges of silt and sand deposited on stream margins during flood conditions. A levee's width is related to the abundance of ground vegetation present to re-enforce sediment in future deposition events. They receive more light and may be dominated by stream margin specialists such as sycamore (*Platanus occidentalis*), willows (*Salix nigra*), river birch (*Betula nigra*), box elder (*Acer negundo*) and Eastern cottonwood (*Populus deltoides*). Streamside levees support a diverse flora of other bottomland graminoids and forbs.

Open, flood-scoured rivershore prairies feature *Andropogon gerardii*, *Sorghastrum nutans*, *Schizachyrium scoparium*, *Chasmanthium latifolium*, *Tripsacum dactyloides* and/or *Panicum virgatum*. *Carex torta* is typical of wetter areas near the channel (NatureServe 2007).

Distinctive shoals with *Hymenocallis coronaria* and/or *Justicia americana* may be present as well. Small seeps and fens can often be found within these habitats, especially at the headwaters and terraces of streams. These areas are typically dominated by primarily wetland obligate species of sedges (*Carex* spp.), ferns (*Osmunda* spp.) and other herbaceous species such as *Impatiens capensis* (NatureServe 2007).

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Inventory data references

Site Development and Testing Plan Future work is needed, as described in a future project plan, to validate the information presented in this provisional ecological site description. Future work includes field sampling, data collection and analysis by qualified vegetation ecologists and soil scientists. As warranted, annual reviews of the project plan can be conducted by the Ecological Site Technical Team. A final field review, peer review, quality control, and quality assurance reviews of the ESD are necessary to approve a final document.

Other references

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C.A. Carpenter, and W.H.McNab. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. [Map. presentation scale 1:3,500,000, colored; A.M. Sloan, cartographer] Gen. Tech. Report WO-76D. U.S. Department of Agriculture, Forest Service, Washington, DC. (<https://www.fs.fed.us/research/publications/misc/73326-wo-gtr-76d-cleland2007.pdf>)

Landfire <http://www.landfire.gov/index.php>

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 15 April 2007.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. Agricultural Handbook 296. (https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051845.pdf).

Approval

Greg Schmidt, 9/27/2024

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	09/15/2026
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:
