USDA Natural Resources Conservation Service

Ecological site F124XY100OH
Mine Spoil (reserved)

Last updated: 9/26/2024
Accessed: 05/14/2025

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.

MLRA notes

Major Land Resource Area (MLRA): 124X–Western Allegheny Plateau

Major Land Resource Area (MLRA): 124—Western Allegheny Plateau (USDA-NRCS, 2006)
MLRA 124, Western Allegheny Plateau extends from and includes western PA just north of Pittsburgh through southeastern OH to and includes northeastern KY. This area is primarily in the Kanawha Section of the Appalachian Province of the Appalachian Highlands. This MLRA is on an unglaciated dissected plateau with narrow level valley floors, rolling ridgetops, and hilly to steep slopes with dendritic stream drainages. A notable exception is the broad, Teays Valley, and other glacio-fluvial and glacio-lacustrine features attributed to nearby Pleistocene glaciation. Elevation ranges from 660 to 1310 feet (200 to 400 meters). The geology is predominantly cyclic beds of sandstone, siltstone, clay, shale and coal of Pennsylvanian age. Soils are dominated by Udalfs, Udults, and Ochcrepts with a mesic temperature regime in combination with five parent materials, residuum, colluvium, alluvium, eolian, and extra-glacial material of glacio-fluvial and glaciolacustrine mesic materials. The climate is predominately a humid continental to temperate, with 940 to 1145 millimeters (37 to 45 inches) of precipitation. Average annual temperature is 8 to 13 degree C (46 to 56 degrees F) with a freeze-free period averaging 185 days. Much of the areas is either forest or in farms, principally for hay and pasture, with fruits and vegetables grown locally. Coal and gas extraction are important industries in the northern part of the MLRA.

Classification relationships

USDA-NRCS (USDA 2006):
Land Resource Region (LRR): N—East and Central Farming and Forest Region
Major Land Resource Area (MLRA): 124—Western Allegheny Plateau

USDA-FS (Cleland et al. 2007):
Province: 221 - Eastern Broadleaf Province
Section: 221E - Southern Unglaciated Allegheny Plateau
Subsection: 221Ea - Pittsburgh Low Plateau
221Eb - Teays Plateau
221Ee - Unglaciated Muskingam Plains
221Ef - Western Hocking Plateau
221Eg - Lower Scotio River Plateau
221En - Kinniconick and Licking Knobs
Section: 221H - North Cumberland Plateau (in Part)
Subsection: 221Hb - Kinniconick and Licking Knobs
221He - Miami - Scioto Plain - Tipton Till Plain

Ecological site concept

Representative soils include: Barkcamp, Bethesda, Enoch, Fairpoint, Farmerstown, Fiveblock, Kaymine, Itmann, Pinegrove, Sewell.

Associated sites

F124XY100OH	**Mine Spoil (reserved)** Mine Spoils are extremely varied ecological sites and can be associated ion the landscape.

Similar sites

F124XY100OH	**Mine Spoil (reserved)** Mine Spoils are extremely variable yet some are more similar in parent materials.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

Mine spoils are extremely variable physiographically, occupying many different landforms ranging from plateaus to mountains.

Table 2. Representative physiographic features

Landforms	(1) Plateau > Plateau (2) Hills > Hillslope (3) Mountains > Mountain slope
Runoff class	Very low to very high
Elevation	162–765 m
Slope	1–80%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

The regional climate of the unglaciated Western Allegheny Plateau is predominately a humid continental climate grading at the extreme southwestern corner a to humid temperate climate with hot summers and cool winters (Beck et al., 2018; Bailey, 2014). However, the local climate is highly influenced by the dissected terrain, where climatic variations may be greater at the local scale, e.g., cooler temperatures and shorter growing season at higher elevations and more northerly latitudes. Winter precipitation is mostly snow.

Climate change is occurring, and the resiliency of any ecological site will depend upon the direct and indirect effects upon component species and shifting atmospheric and soil conditions.

On these ecological sites, forests may have a low vulnerability risk to climate change with some impacts considered positive. Large gap disturbances from greater storm events, drier summer and fall conditions, and a potential increase in fire frequency, can favor oaks and hickories and more southern plant species. Greater frequency and magnitude of storm events may increase large gap disturbances coupled with drier conditions in summer and fall may increase wildfires (Butler et al., 2015).

Table 3. Representative climatic features

Frost-free period (characteristic range)	122-142 days
Freeze-free period (characteristic range)	156-178 days
Precipitation total (characteristic range)	1,016-1,118 mm

Frost-free period (actual range)	115-148 days
Freeze-free period (actual range)	148-184 days
Precipitation total (actual range)	965-1,168 mm
Frost-free period (average)	132 days
Freeze-free period (average)	167 days
Precipitation total (average)	1,067 mm

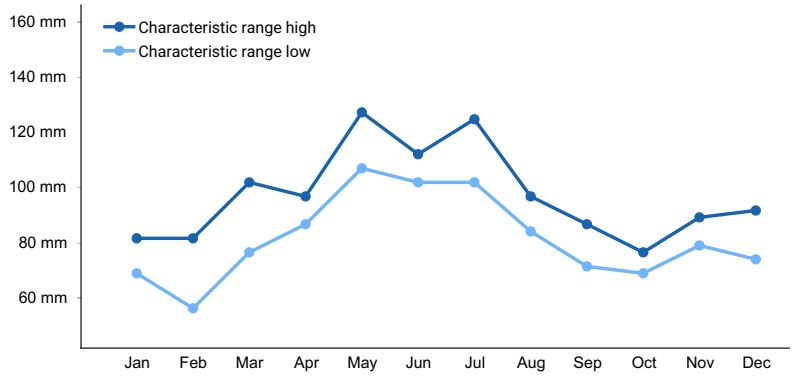


Figure 1. Monthly precipitation range

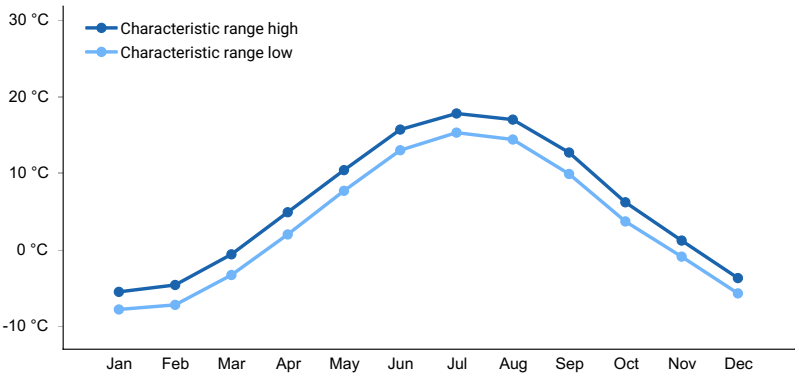


Figure 2. Monthly minimum temperature range

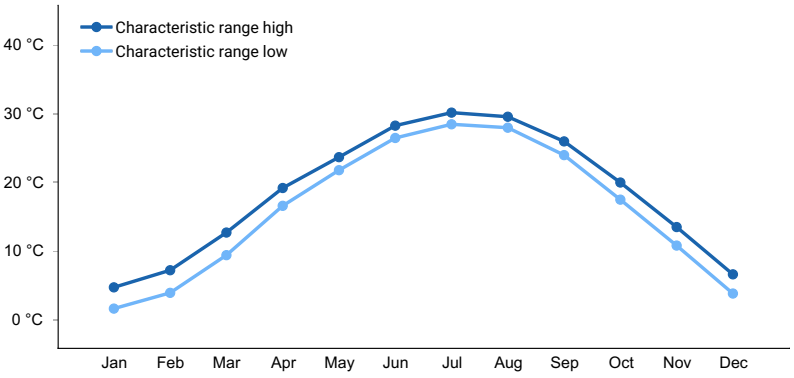


Figure 3. Monthly maximum temperature range

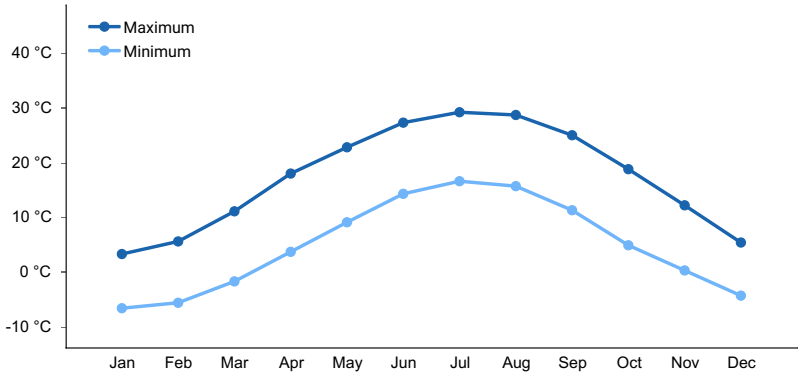


Figure 4. Monthly average minimum and maximum temperature

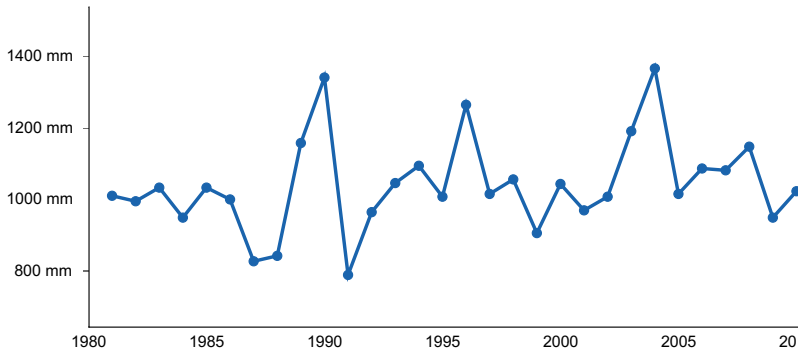


Figure 5. Annual precipitation pattern

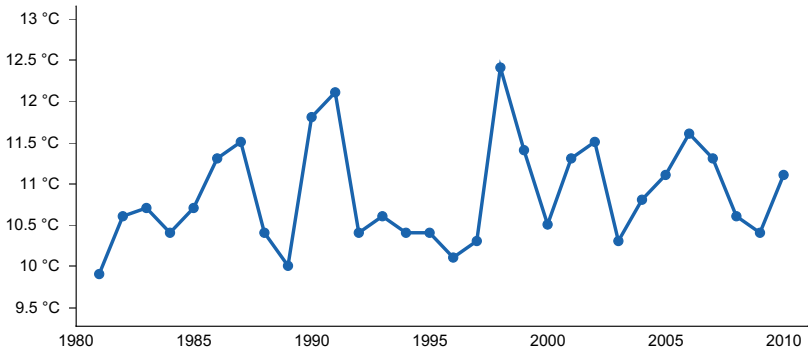


Figure 6. Annual average temperature pattern

Climate stations used

- (1) PUTNEYVILLE 2 SE DAM [USC00367229], Dayton, PA
- (2) FORD CITY 4 S DAM [USC00362942], Ford City, PA
- (3) BUTLER 2 SW [USC00361139], Butler, PA
- (4) DENISON WTR WKS [USC00332160], Dennison, OH
- (5) NEW PHILADELPHIA FLD [USW00004852], New Philadelphia, OH
- (6) MILLERSBURG [USC00335297], Millersburg, OH
- (7) DANVILLE 2 W [USC00332044], Danville, OH
- (8) COSHOCTON AG RSCH STN [USC00331905], Fresno, OH
- (9) COSHOCTON WPC PLT [USC00331890], Coshocton, OH
- (10) ZANESVILLE MUNI AP [USW00093824], Zanesville, OH
- (11) PHILO 3 SW [USC00336600], Philo, OH
- (12) NEW LEXINGTON 2 NW [USC00335857], New Lexington, OH
- (13) LOGAN [USC00334672], Logan, OH
- (14) JACKSON 3 NW [USC00334004], Jackson, OH
- (15) WAVERLY [USC00338830], Waverly, OH
- (16) PORTSMOUTH-SCIOTOVILLE [USC00336781], South Shore, OH

- (17) WARNOCK2 [USC00158432], Greenup, KY
- (18) GRAYSON 2 E [USC00153389], Grayson, KY
- (19) OLIVE HILL 5NE [USC00156012], Olive Hill, KY
- (20) GRAYSON 3 SW [USC00153391], Grayson, KY
- (21) GIMLET 9N [USC00153230], Olive Hill, KY
- (22) CAVE RUN LAKE [USC00152791], Morehead, KY
- (23) ASHLAND [USC00150254], South Point, KY

Influencing water features

Water features are not typically associated with this ecological site, but can be incidental.

Wetland description

N/A

Soil features

Representative soils include: Barkcamp, Bethesda, Enoch, Fairpoint, Farmerstown, Fiveblock, Kaymine, Itmann, Pindgrove, Sewell.

Table 4. Representative soil features

Parent material	(1) Coal extraction mine spoil–sandstone and shale (2) Coal extraction mine spoil–interbedded sedimentary rock (3) Coal extraction mine spoil–limestone, sandstone, and shale
Surface texture	(1) Channery silt loam (2) Gravelly loamy sand (3) Gravelly sandy loam (4) Loam (5) Silt loam (6) Clay loam
Drainage class	Somewhat poorly drained to excessively drained
Permeability class	Very slow to rapid
Depth to restrictive layer	183 cm
Soil depth	183 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	6–44%
Subsurface fragment volume >3" (Depth not specified)	2–59%

Ecological dynamics

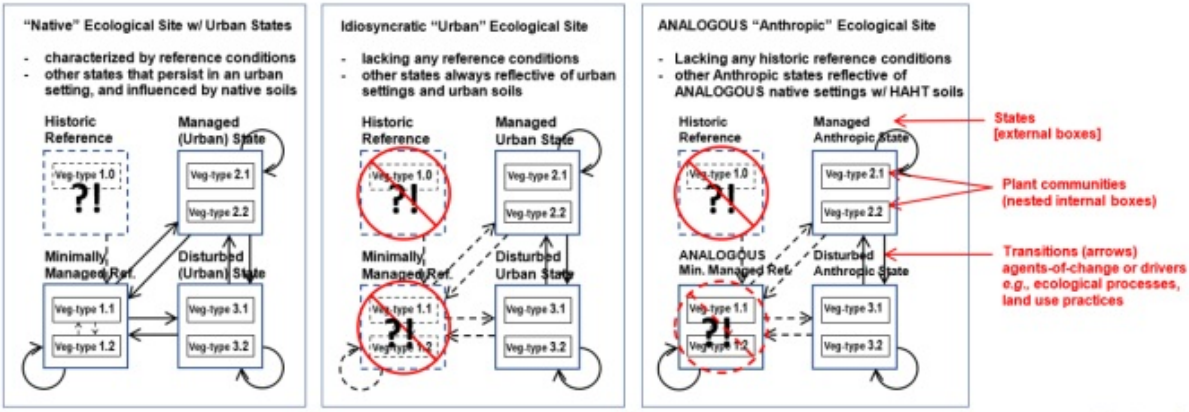
The ecological dynamics of the Mine Spoil ecological site requires further study including field investigations. While the extraction of coal, mineral, and other soil materials is a common feature of mine spoil sites, the nature of these sites are still quite variable. Although there is no certain reference condition, following reclaimation/restoration, conditions analogous to native soil conditions can be made ranging from semi-natural conditions supporting native plants to transformed cultural landscapes, such as croplands.

State and transition model

USDA United States Department of Agriculture

"Anthropic" Ecological Site

- "Native" ES - native soils in urban settings = urban states
- "Urban" ES - HAHT soils in urban settings = urban sites (no reference conditions)
- "Anthropic" ES – HAHT soils in any setting = anthropic ES (maybe w/ analogous* reference conditions – more generalized. (*analogous = similar function, different origin) *e.g.*, Anthropic Wet Terrace ES occur on built terraces as "analogs" of native Wet Terrace ES by emulating the character of the native minimally-manged reference conditions.

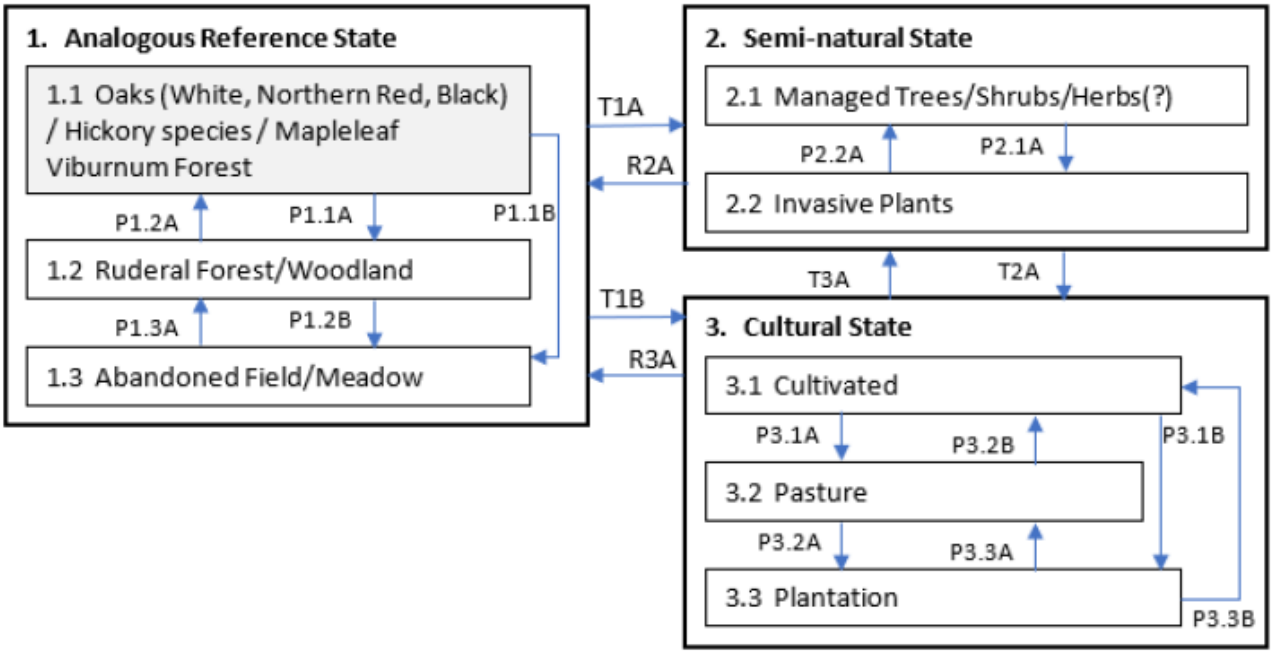


NCSS National Cooperative Soil Survey

Natural Resources Conservation Service

nrcs.usda.gov/

124XY100 – Mine Spoil



Transition	*Drivers/practices*
T1A	Forest mgmt., Disturbance
T1B, T2A	Disturbance/cutting/clearing, Brush removal
R2A, R2B	Restoration & Mgmt, Forest Stand Improvement, Early Successional Habitat Development, Upland Wildlife Mgmt, Invasive spp. Control, Plant establishment
T3A	Abandonment, Plant establishment, Forest mgmt.
P2.1A	Disturbance, Invasive species establishment
P2.2A	Invasive spp. Control, Forest mgmt..
P1.3A, P1.2A	Abandonment, succession
P3.1A, P3.2A, P3.3A, P3.1B, P3.2B, P3.3B	Changing agricultural phases
P1.1A, P1.1B, P1.2B	Disturbance, Early Successional Habitat Development

State 1
Analog of Reference (Mine Spoil)

Due to the manufactured nature of mine spoils, there is no certain reference condition. However, following reclaimation/restoration conditions analogous to native soil conditions can be made. The exact nature of the Analog to Reference needs further investigation and field studies.

Community 1.1
Chestnut Oak - (White Oak, Scarlet Oak) / Mapleleaf Viburnum - (Mountain Laurel) Forest

Quercus montana - Quercus (alba, coccinea) / *Viburnum acerifolium* - (*Kalmia latifolia*) Forest (CEGL005023) (Translated Name: Chestnut Oak - (White Oak, Scarlet Oak) / Mapleleaf Viburnum - (Mountain Laurel) Forest) [Common Name: Appalachian Chestnut Oak - Mixed Oak Forest] Canopy trees include chestnut oak (*Quercus montana* [= Quercus prinus]) and scarlet oak (*Quercus coccinea*), along with white oak (*Quercus alba*), red oak (*Quercus rubra*) and black oak (*Quercus velutina*). American chestnut (*Castanea dentata*) was a major component

of pre-settlement vegetation. Other trees can include red maple (*Acer rubrum*), mockernut hickory (*Carya tomentosa* [=Carya alba]), blackgum (*Nyssa sylvatica*), occasionally to the southeast sourwood (Oxydendrum arboretum), and pitch pine (*Pinus rigida*), Virginia pine (*Pinus virginiana*). The woody understory can include flowering dogwood (*Cornus florida*), sassafras (*Sassafras albidum*), mapleleaf viburnum (*Viburnum acerifolium*) and, more locally, mountain laurel (*Kalmia latifolia*). Other dwarf-shrubs and vines can be black huckleberry (*Gaylussacia baccata*), eastern teaberry (*Gaultheria procumbens*), cat greenbriar (*Smilax glauca*), roundleaf greenbriar (*Smilax rotundifolia*), Blue Ridge blueberry (*Vaccinium pallidum*), and deerberry (*Vaccinium stamineum*). The herbaceous layer includes plantain-leaved pussytoes (*Antennaria plantaginifolia*), rattlesnake hawkweed (*Hieracium venosum*), common blue wood aster (*Symphyotrichum cordifolium* [=Aster cordifolius]), Pennsylvania sedge (*Carex pensylvanica*), pink lady's-slipper (*Cypripedium acaule*), forked rosette-panicgrass (*Dichanthelium dichotomum* var. dichotomum), poverty oatgrass (*Danthonia spicata*), trailing arbutus (*Epigaea repens*), *Helianthus divaricatus*, woodland sunflower (*Helianthus hirsutus*), and Christmas fern (*Polystichum acrostichoides*). Reindeer lichens (Cladonia spp.) and mosses may also be present. (Source: NatureServe 2020 [accessed April 2020], USNVC 2019 [accessed April 2020]).

Community 1.2
Ruderal Forest/Woodland

(to be determined)

Community 1.3
Abandoned/Successional Field/Meadow

(to be developed)

Pathway 1.1-1.3
Community 1.1 to 1.3

disturbance, greater fire frequency

Pathway 1.2-1.3
Community 1.2 to 1.3

disturbance, greater fire frequency

Pathway 1.3-1.1
Community 1.3 to 1.1

vegetation development/succession

Pathway 1.3-1.2
Community 1.3 to 1.2

vegetation development/succession

State 2
Semi-natural State

The Semi-natural State would expect plant communities where ecological processes are primarily operating with some land conditioning in the past or present, e.g., managed forests, or plant communities that are an artifact of land management e.g., predominately invasive plants.

Community 2.1
Managed Forest/Woodland

(to be developed)

Community 2.2
Invasive Plants

(to be developed)

Pathway 2.1-2.2
Community 2.1 to 2.2

2.1-2.2 invasive plant establishment, vegetation development/succession

Pathway 2.2-2.1
Community 2.2 to 2.1

invasive plant management, forest management

Conservation practices

Forest Stand Improvement
Invasive Plant Species Control

State 3
Cultural State

The Cultural State would expect the ecological site to be strongly conditioned by land management/converted to Cultivated/Pasture/Plantation.

Community 3.1
Cultivated

(to be developed)

Community 3.2
Pasture

(to be developed)

Community 3.3
Plantation

(to be developed)

Transition T1-2
State 1 to 2

forest management, fire suppression, disturbance, invasive plant establishment

Conservation practices

Forest Stand Improvement

Transition T1-3
State 1 to 3

cutting, land clearing, plant establishment

Conservation practices

Land Clearing

Restoration pathway R2-1
State 2 to 1

plant removal, plant establishment, successional management

Conservation practices

Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Invasive Species Pest Management

Transition T2-3
State 2 to 3

cutting, land clearing, plant establishment

Conservation practices

Land Clearing

Restoration pathway R3-1
State 3 to 1

plant removal, plant establishment, successional management

Conservation practices

Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Invasive Plant Species Control

Restoration pathway R3-2
State 3 to 2

forest management, fire suppression, disturbance, invasive plant establishment

Conservation practices

Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management

Additional community tables

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.

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Approval

Greg Schmidt, 9/26/2024

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	03/28/2022
Approved by	Greg Schmidt
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:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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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):**

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

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

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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):**

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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:

    Sub-dominant:

    Other:

    Additional:

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

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:

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17. **Perennial plant reproductive capability:**
