Natural Resources
Conservation Service

Ecological site F122XY015KY
Ponded Sites

Last updated: 5/14/2025
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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.

MLRA notes

Major Land Resource Area (MLRA): 122X–Highland Rim and Pennyroyal

MLRA 122 is in Tennessee (47 percent), Kentucky (43 percent), Indiana (7 percent), and Alabama (3 percent). It makes up about 21,530 square miles (55,790 square kilometers).

SOILS:
Many of the soils in this MLRA are Udalfs. The moderately deep to very deep, well drained, clayey soils formed in limestone residuum. They are dominantly in rolling to steep areas of the “Outer Basin” (Mimosa, Braxton, Gladdice, and Hampshire series) and the undulating to hilly areas of the “Inner Basin” (Talbott and Bradyville series). The most agriculturally productive soils are the very deep, well drained, clayey or loamy soils that formed in alluvium and/or loess over alluvium or limestone residuum in nearly level to undulating areas (Armour, Cumberland, Harpeth, Lomond, and Maury series). The less extensive soils generally are moderately well drained to somewhat poorly drained and formed in loamy or clayey alluvium and/or residuum (Byler, Capshaw, Colbert, and Tupelo series). This MLRA has a significant acreage of Mollisols. Shallow or moderately deep, well drained, clayey Udolls (Ashwood and Barfield series) formed in limestone residuum dominantly in rolling to steep areas. Very shallow, well drained, clayey Rendolls (Gladeville series) formed in limestone residuum dominantly in undulating to rolling areas of the “Inner Basin.” Very deep, well drained or moderately well drained Udolls (Arrington, Egam, Lynnville, and Staser series) and somewhat poorly drained or poorly drained Aquolls (Agee, Godwin, and Lanton series) formed in loamy or clayey alluvium derived from limestone on flood plains. Most of the remaining soils on flood plains are moderately well drained or well drained Udepts (Lindell and Ocana series). Udults are of small extent in this area. Most are very deep, well drained, and loamy and formed in gravelly colluvium or colluvium and the underlying residuum on steep hillsides (Dellrose soils). Rock outcrops

are common on uplands.

BIOLOGICAL RESOURCES:
This area supports mixed oak forest vegetation. White oak, black oak, northern red oak, and some scarlet oak are the dominant tree species. Shagbark hickory, bitternut hickory, pignut hickory, and mockernut hickory also occur. Oak, blackgum, flowering dogwood, sassafras, Virginia pine, pitch pine, and shortleaf pine grow mostly on ridgetops.

(Excerpt from United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.)

Classification relationships

Scientific Name: Central Interior Highlands and Appalachian Sinkhole and Depression Pond
Unique Identifier: CES202.018

Ponded mapunits compose this PES grouping. Vegetation on ponded mapunits will vary depending on their landscape position - upland depressions versus floodplains. Flooding regime and length of flooding will also influence vegetation. For this initial PES effort, all flooded mapunits have been placed into this group and future field work will result in more than one ESD.

Ecological site concept

The communities described in this provisional document reflect plant communities that are likely to be found on these soils and have not been field verified. This PES describes hypotheses based on available data of many different scales and sources and has not been developed utilizing site-specific ecological field monitoring. This PES does not encompass the entire complexity or diversity of these sites. Additional field studies would be required for detailed conservation planning or to develop a comprehensive and science-based restoration plan.

State 1, Phase 1.1: Forestland.
Plant species dominants will vary depending on the depth of ponding, period and frequency of ponding, drainage class of the soils, flooding regimes, and topographic setting (floodplains versus sinkholes).

Melvin soils are poorly drained and the ponded mapunits are usually characterized in floodplains and as swamps. Nolin soil mapunits are often upland sinkhole bottoms. Nolin and Grigsby are well-drained even though the mapunits included in this project are classified as “ponded” in NASIS.

Future field work and ESD development is required to specifically differentiate vegetative differences on individual mapunits.

This PES is a generalized description that is likely to be found on many sites.

State 1.0. Phase 1.1. Forestland:
Sinkhole depressions: maple (Acer spp.)- willow (Salix spp.) / common buttonbush (*Cephalanthus occidentalis*) / sedges (Carex spp.)

Floodplain mapunits in western MLRA 122 may closer resemble:
bald cypress (*Taxodium distichum*) – black willow (*Salix nigra*) / common buttonbush (*Cephalanthus occidentalis*) – swamp rose (*Rosa palustris*) / sedges (Carex spp.)

Future ESD development will refine this group.

Associated sites

F122XY018KY	**Poorly Drained Alluvium** Poorly Drained Alluvium

Table 1. Dominant plant species

Tree	(1) *Acer* (2) *Salix*
Shrub	(1) *Cephalanthus occidentalis*
Herbaceous	(1) *Carex*

Physiographic features

These ponded sites may be located in floodplains or on upland depressions.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Sinkhole (3) Flood plain
Flooding duration	Brief (2 to 7 days) to very long (more than 30 days)
Flooding frequency	None to frequent
Ponding duration	Very brief (4 to 48 hours) to very long (more than 30 days)
Ponding frequency	None to frequent
Elevation	400–900 ft
Slope	0–3%

Ponding depth	2–30 in
Water table depth	0–54 in
Aspect	Aspect is not a significant factor

Climatic features

Climate
The average annual precipitation in this area is 43 to 63
inches (1,090 to 1,600 millimeters), increasing to the south. The maximum precipitation occurs in winter and early in spring, and the minimum occurs in fall. Most of the rainfall occurs as high-intensity, convective thunderstorms. Snowfall may occur in winter. The average annual temperature is 52 to 60 degrees F (11 to 16 degrees C), increasing to the south. The freeze-free period averages 210 days and ranges from 185 to 235 days. The longer freeze-free periods occur in the more southerly parts of the area.

(Excerpt from United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.)

Table 3. Representative climatic features

Frost-free period (characteristic range)	162-169 days
Freeze-free period (characteristic range)	191-201 days
Precipitation total (characteristic range)	51-57 in
Frost-free period (actual range)	159-170 days
Freeze-free period (actual range)	188-205 days
Precipitation total (actual range)	51-59 in
Frost-free period (average)	165 days
Freeze-free period (average)	196 days
Precipitation total (average)	54 in

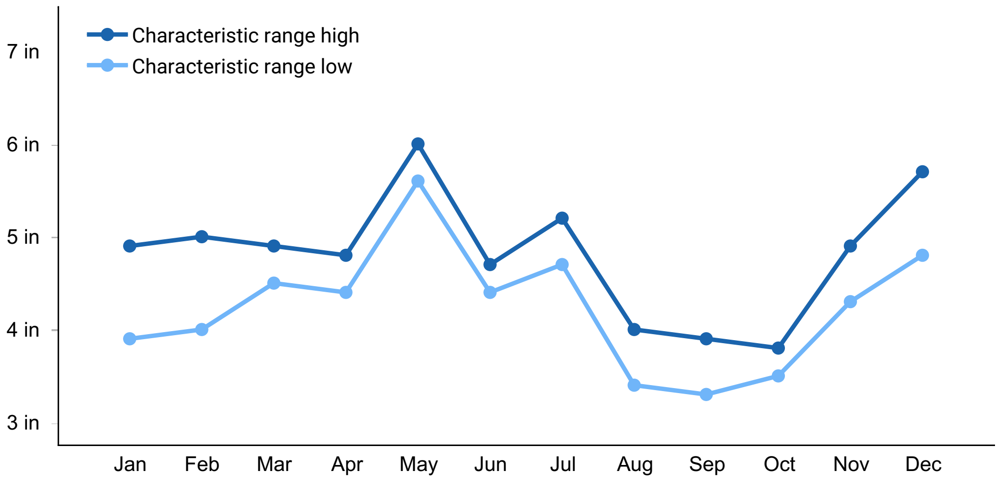

Figure 1. Monthly precipitation range

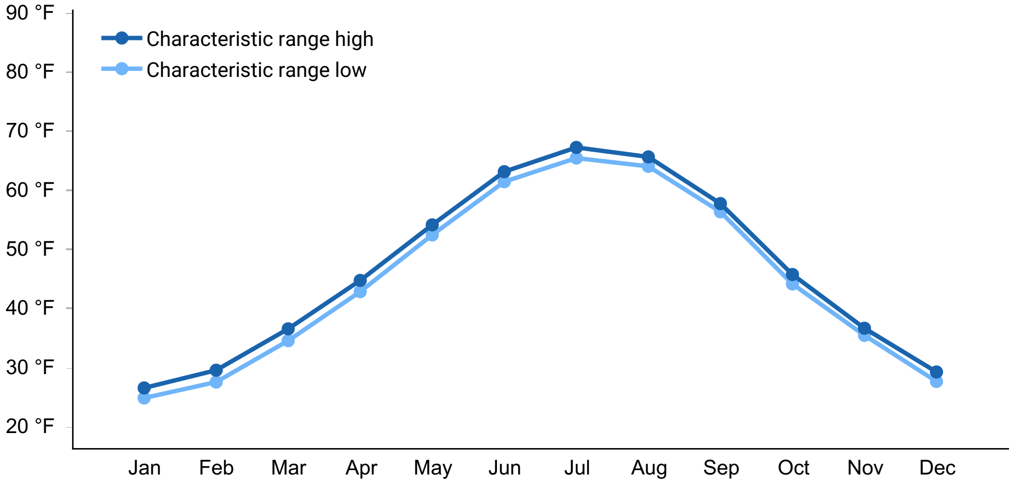

Figure 2. Monthly minimum temperature range

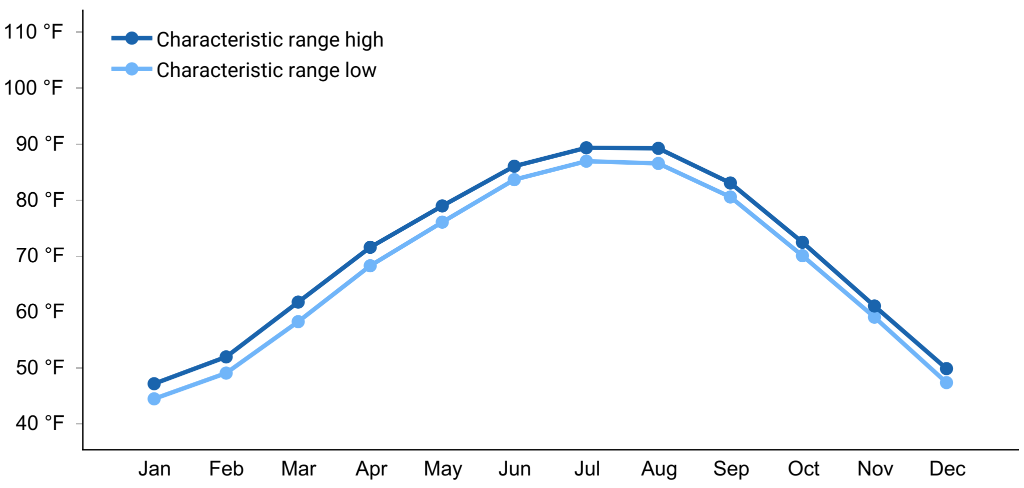

Figure 3. Monthly maximum temperature range

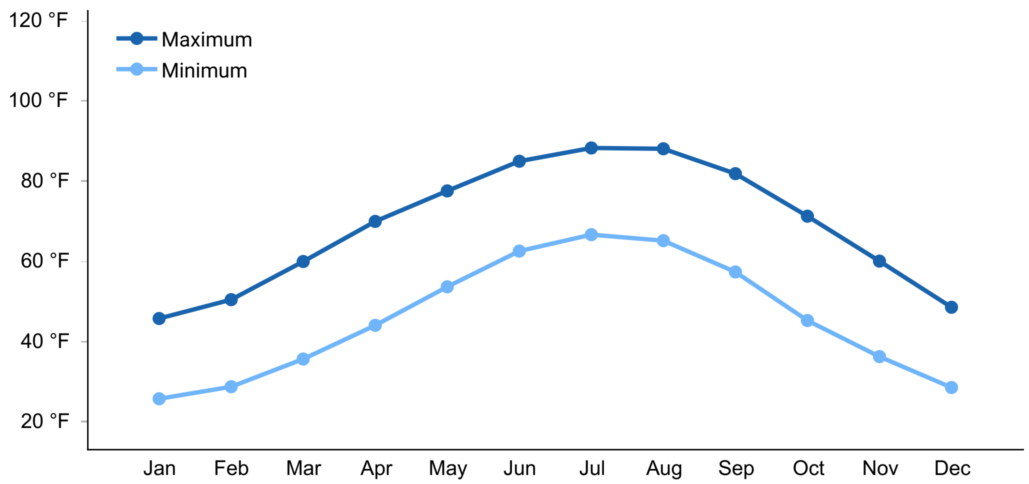

Figure 4. Monthly average minimum and maximum temperature

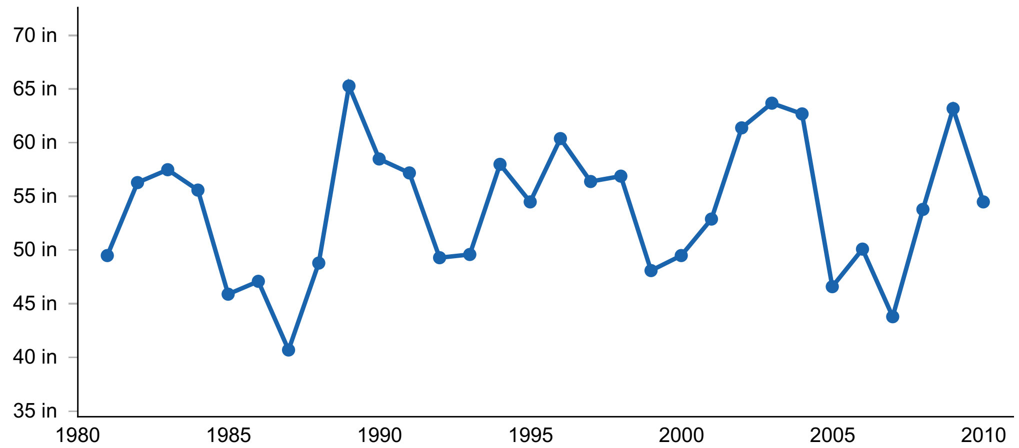

Figure 5. Annual precipitation pattern

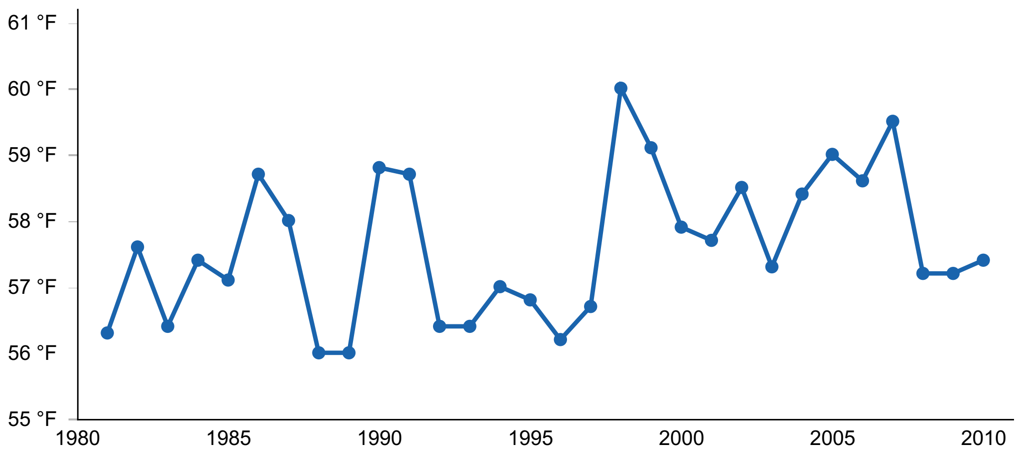

Figure 6. Annual average temperature pattern

Climate stations used

- (1) COOKEVILLE [USC00402009], Cookeville, TN
- (2) ELIZABETHTOWN WP CS [USC00152512], Elizabethtown, KY
- (3) WAYNESBORO [USC00409502], Waynesboro, TN
- (4) CLARKSVILLE WWTP [USC00401790], Clarksville, TN

Influencing water features

Mapunits included in this group are "ponded".

Soil features

Mapunits in this group are listed in NASIS as ponded. Series include Melvin, Newark, Nolin, and Robertsville ponded mapunits.

Table 4. Representative soil features

Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to well drained
Permeability class	Slow to moderate
Soil depth	20–80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5.8–12 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–9%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The communities described in this provisional document reflect plant communities that are likely to be found on these soils and have not been extensively field verified. This PES describes hypotheses based on available data of many different scales and sources and has not been developed utilizing site-specific ecological field monitoring. This PES does not encompass the entire complexity or diversity of these sites. Field studies would be required to develop a comprehensive and science-based restoration plan for these sites.

Plant species dominants will vary depending on the depth of ponding, period and frequency of ponding, drainage class of the soils, flooding regimes, and topographic setting (floodplains versus sinkholes).

For example, Melvin soils are poorly drained and the ponded mapunits are usually characterized as floodplain swamps. Newark soils are somewhat poorly drained and located in floodplains and upland depressions. Nolin soils are well-drained and located in upland sinkhole bottoms and floodplains.

Field work is required to specifically differentiate vegetative differences on individual mapunits.

This PES is a generalized description that is likely to be found on many sites.
State 1. Phase 1.1. Forestland: Sinkhole depressions: maple (Acer spp.)- willow (Salix spp.) / common buttonbush (*Cephalanthus occidentalis*) / sedges (Carex spp.)

Floodplain mapunits in western MLRA 122 may be dominated by: bald cypress (*Taxodium distichum*) – black willow (*Salix nigra*)/ common buttonbush (*Cephalanthus occidentalis*) – swamp rose (*Rosa palustris*) / sedges (Carex spp.)

NatureServe Ecological System Comprehensive Report: Scientific Name: Central Interior Highlands and Appalachian Sinkhole and Depression Pond. Unique Identifier: CES202.018

Summary: This system of ponds and wetlands is found in the Interior Highlands of the Ozark, Ouachita, and Interior Low Plateau regions, and ranges north from the Southern and Central Appalachians to the northern Piedmont regions. Stands occur in basins of sinkholes or other isolated depressions on uplands. Soils are very poorly drained, and surface water may be present for extended periods of time, rarely becoming dry. Water depth may vary greatly on a seasonal basis and may be a meter deep or more in the winter. Some examples become dry in the summer. Soils may be deep (100 cm or more), consisting of peat or muck, with parent material of peat, muck or alluvium. Ponds vary from open water to herb-, shrub-, or tree-dominated. Tree-dominated examples typically contain Quercus species, *Platanus occidentalis*, *Fraxinus pennsylvanica*, *Acer saccharinum*, or Nyssa species, or a combination of these. In addition, *Liquidambar styraciflua* may be present in southern examples. *Cephalanthus occidentalis* is a typical shrub component. The herbaceous layer is widely variable depending on geography

NatureServe Community Description for Association CEGL002420:
Taxodium distichum / *Lemna minor* Floodplain Forest
Translated Name: Bald-cypress / Common Duckweed Floodplain Forest

Common Name: Bald-cypress Floodplain Forest

Summary: This bald-cypress swamp is found in the Atlantic and Gulf coastal plains of the United States in a variety of ecological settings. Examples may occur in oxbow lakes and ponds, and along the banks of rivers and lakes in saturated or flooded soils. This type is characterized by a monospecific canopy of straight, tall individuals of *Taxodium distichum* above shallow to deep water (depths ranging from soil saturation to approximately 6 m) during all or most of the year. Flooding is seasonal, occurring during winter and spring. Stands have a sparse to moderate subcanopy and depauperate shrub and herb layers. The trunks of the canopy trees typically form swelled buttresses. Canopy cover is variable, from at or near 100% to less than 60% in some examples. More open examples of this type tend to occur in deeper water. In the deepest water situations scattered trees grow over an open water surface covered by floating and submersed aquatic plants. *Taxodium distichum* regeneration is absent in areas of permanent inundation, as seed germination does not occur in standing water. The subcanopy and herbaceous layers are dependent upon timing, duration, and depth of flooding. *Cephalanthus occidentalis* and *Rosa palustris* may be common shrubs in some examples of this community, while *Fraxinus caroliniana* (in its range) and *Acer rubrum* var. drummondii are common in the subcanopy. Shallow water emergents, floating-leaved aquatics, such as *Azolla caroliniana*, *Brasenia schreberi*, *Cabomba caroliniana*, *Hydrocotyle ranunculoides*, *Limnobium spongia*, Spirodela punctata, *Wolffia columbiana*, Lemna spp. Nymphaea spp., and submerged hydrophytes, such as *Ceratophyllum demersum*, *Egeria densa*, *Myriophyllum aquaticum*, and *Potamogeton nodosus*, are common in permanent water zones throughout the range of *Taxodium distichum* swamps.

Additional NatureServe Associations applicable to this group of soils may be identified in the future with additional field work.

State and transition model

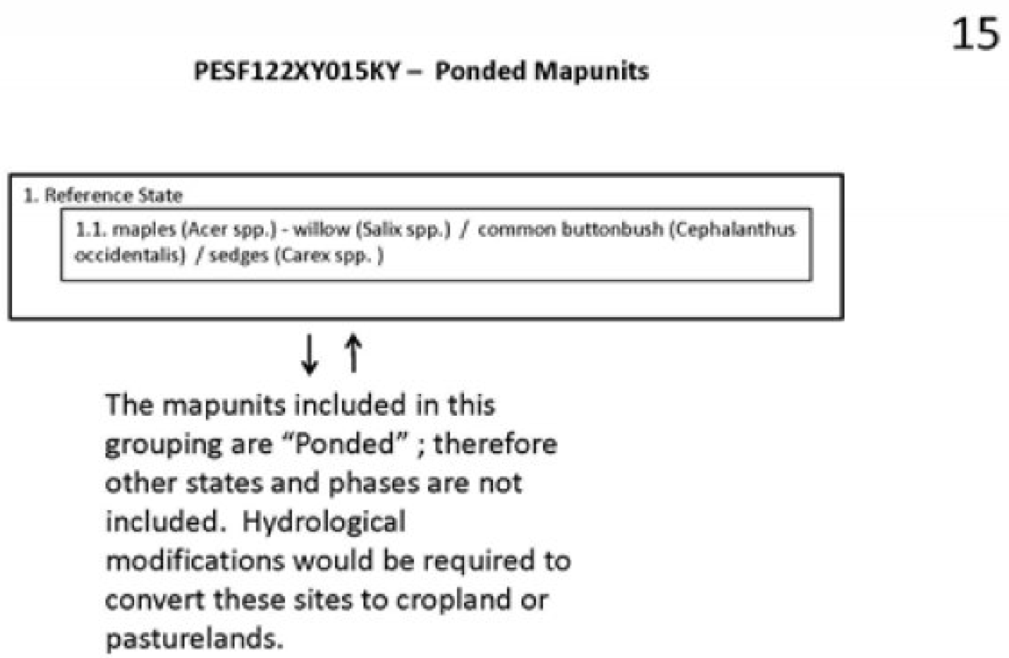

Figure 7. Group15

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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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	02/11/2026
Approved by	Matthew Duvall
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:**