

Ecological site F122XY005KY

Moderately Deep Well Drained Uplands

Last updated: 5/14/2025
Accessed: 09/14/2026

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): 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). Bloomington, Indiana, is in the small part of this area that extends into southern Indiana. **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” (Talbot 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). Udufts 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: Southern Interior Low Plateau Dry-Mesic Oak Forest, Unique Identifier: CES202.898 Possible NatureServe Association(s): white oak - black oak - hickory forest *Quercus velutina* - *Quercus alba* - *Carya* (glabra, ovata) Forest, CEGLO02076

Ecological site concept

Moderately Deep Well-Drained Uplands MLRA 122 Ecological Dynamics: This PES describes hypotheses based on available data of many different scales and sources. This PES also does not encompass the entire complexity or diversity of these sites. Field studies would be required to develop a comprehensive and science-based native plant restoration plan for these sites. Ecological Dynamics This PES describes an oak-hickory forest community on moderately-deep, well-drained, soils formed in residuum of limestone or interbedded limestone/shale. The range of variation in plant composition on these sites vary mainly due to soil depth, available water, and aspect. State 1. Forestland Only two tree species can be selected for entry into the database as dominants; however, multiple tree species may be dominant on these sites and it will vary depending on aspect, soil depth, seed sources, management, and disturbance history. Phase 1.1: black oak – white oak / coralberry - Carolina buckthorn / bedstraw- bignonia (*Quercus velutina* – *Quercus alba* / *Symphoricarpos orbiculatus* - *Frangula caroliniana* / *Gallium* spp. -*Bignonia capreolata*) These sites are characterized by moderately-deep soils predominately influenced by parent materials of limestone, calcareous shale, or interbedded limestone and shale. Soil depths of 20 to 40 inches provide an adequate moisture and growing environment for a wide range of quality hardwood trees, including various species of oaks and hickories. White oak, black oak, shagbark hickory, chinkapin oak, and sugar maple are likely to be on these sites. Remaining wooded sites on these soil are generally located on hillsides and ridges, and are oak-hickory or oak-hickory-sugar maple forests with a robust and diverse herbaceous layer. Understory species may include agrimony, bedstraws, black snakeroots, white snakeroot, Virginia

creeper, bignonia, smooth Solomon's seal, and false Solomon's seal. The shrub layer usually consisted of coralberry, Carolina buckthorn, and/or northern spicebush. Other States and phases are described in the Community Phase Data Section.

Similar sites

F122XY004KY	Loess Veneered Uplands Loess Veneered Uplands
--------------------	---

Table 1. Dominant plant species

Tree	(1) <i>Quercus velutina</i> (2) <i>Quercus alba</i>
Shrub	(1) <i>Symphoricarpos orbiculatus</i> (2) <i>Frangula caroliniana</i>
Herbaceous	(1) <i>Galium</i> (2) <i>Bignonia capreolata</i>

Physiographic features

These soils are located on uplands and are well drained and moderately deep.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Knob (3) Ridge
Runoff class	Very low to very high
Flooding frequency	None
Ponding frequency	None
Elevation	110 – 400 m
Slope	0 – 60 %
Water table depth	150 cm
Aspect	W, NW, N, NE, E, SE, S, SW

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)	160-170 days
Freeze-free period (characteristic range)	190-200 days
Precipitation total (characteristic range)	1,270-1,450 mm
Frost-free period (actual range)	150-170 days
Freeze-free period (actual range)	180-200 days
Precipitation total (actual range)	1,190-1,500 mm
Frost-free period (average)	160 days
Freeze-free period (average)	190 days
Precipitation total (average)	1,350 mm

- (1) GREENSBURG [USC00153430], Greensburg, KY
- (2) CLARKSVILLE WWTP [USC00401790], Clarksville, TN
- (3) COOKEVILLE [USC00402009], Cookeville, TN
- (4) SALEM [USC00127755], Salem, IN
- (5) WAYNESBORO [USC00409502], Waynesboro, TN

Influencing water features

There are no influencing water features for this group.

Soil features

These uplands soils are moderately deep and well drained.

Table 4. Representative soil features

Parent material	(1) Residuum – limestone (2) Loess – cherty limestone
Surface texture	(1) Sandy loam (2) Silty clay loam (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Slow to moderate
Soil depth	150 – 200 cm
Surface fragment cover <=3"	0 – 20 %
Surface fragment cover >3"	0 – 20 %
Available water capacity (0-101.6cm)	7.62 – 17.78 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)	4.6 – 10

Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	0 – 20 %

Ecological dynamics

5 - Moderately Deep Well-Drained Uplands

Individual sites deserve a detailed understanding before conservation and restoration practices are implemented; therefore, it should be noted that 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. Therefore, 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 also does not encompass the entire complexity or diversity of these sites. Additional field studies are required to develop a comprehensive and science-based ESD.

Forest Vegetation as listed in Official Series Descriptions (OSD):

Caneyville: Native forests are oaks, hickory, elm, hackberry, and redbud as the dominant species.

Fredonia: Native forests have redcedar, oaks, hickory, elm, ash, walnut, and redbud as common species.

Needmore: The native vegetation is forests consisting of dominantly of oaks, hickories, elms, maples, beech, and dogwood.

Ecological Dynamics

This PES describes an oak-hickory forest community on moderately-deep, well-drained, soils formed in residuum of limestone or interbedded limestone/shale.

Only two tree species can be selected for entry into the database as dominants; however, multiple tree species may be dominant on these sites and it will vary depending on aspect, soil depth, seed sources, management, and disturbance history.

State 1. Forestland

Phase 1.1:

black oak – white oak / coralberry - Carolina buckthorn / bedstraw- bignonia

(*Quercus velutina* – *Quercus alba* / *Symphoricarpos orbiculatus* - *Frangula caroliniana* / *Gallium* spp. - *Bignonia capreolata*)

These sites are characterized by moderately-deep soils predominately influenced by parent materials of limestone, calcareous shale, or interbedded limestone and shale. Soil depths of 20 to 40 inches provide an adequate moisture and growing environment for a wide range of quality hardwood trees, including various species of oaks and hickories. White oak, black oak, shagbark hickory, chinkapin oak, and sugar maple are likely to be on these sites. Understory communities, while influenced by differences in soil depths and soil parent materials, will exhibited similarities in species composition.

Remaining wooded sites on these soil are generally located on hillsides and ridges, and are oak-hickory or oak-hickory-sugar maple forests with a robust and diverse herbaceous layer. Understory species may include agrimony, bedstraws, black snakeroots, white snakeroot, Virginia creeper, bignonia, smooth Solomon's seal, and false Solomon's seal. The shrub layer usually consisted of coralberry, Carolina buckthorn, and/or northern spicebush.

State: 2. Pasture

Phase 2.1: Managed Pasture.

Plant species dominants: *Schedonorus arundinaceus* (tall fescue)

Pasture plant species are dependent on seeding, weed control, concurrent land uses, on-going levels of disturbance, and landowner goals. Individual site and soil characteristics, along with management activities, will influence production levels.

Many species of grass, both warm and cool season, are available and suitable for these sites. Common forage species include tall fescue, orchard grass, Kentucky bluegrass, Johnson grass, timothy, and various species of clover.

Management of pasture sites should follow conservation planning standards and protocols which include watershed protection, soil health, and adequate forage species.

Transitioning this state to a reference condition would require long-term timber stand improvement practices to control non-native vegetation and manage for desired hardwood species.

State: 3. Transitional Field

Phase 3.1: Plant species dominants: Eastern red cedar / berries / ironweed- tall fescue

Eastern red cedar would likely be the dominant successional tree species on these sites. Seedlings and saplings of *Acer* spp, (especially red maple, sugar maple, and boxelder), *Sassafras albidum* (sassafras), *Robinia pseudoacacia* (black locust), *Celtis occidentalis* (hackberry), *Fraxinus* spp. (ash), *Quercus* spp., and *Carya* spp. may be present depending on management and adjacent seed sources. Shrubs may include sumac, blackberries, dewberries, multiflora rose, Carolina rose, and other successional species.

Tree regeneration on these sites will depend on the severity and duration of disturbance, soil characteristics, adjacent plant communities and seed sources, post-disturbance management inputs, presence or absence of continued site disturbances (grazing, fire, timber cutting), slope, and aspect.

Transitioning this state to a reference condition would likely require timber stand improvement practices to control non-native vegetation and manage for desired tree species.

State 4: Phase 4.1. Abandoned Croplands

Plant species dominant:

henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (*Cerastium L.*)

Abandonment of cropland would result in many weed species taking over the site. Initially, annual weeds would be predominate followed by grasses, shrubs and finally, pioneers trees.

It would require years of management, plantings, and weed control to establish successional communities that could transition to a reference community.

State 5: Phase 5.1. Cropland

Dependent upon seeding and management. Most common crops are corn and soybeans.

It would require years of management, plantings, and weed control to establish successional communities that could transition to a reference community.

TO VALIDATE THE INFORMATION IN THIS PROVISIONAL ECOLOGICAL SITE DESCRIPTION FUTURE FIELD WORK IS NEEDED. This will include field inspection and data collection including medium to high intensity sampling, soil correlations, and analysis of that data.

A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce a document to be utilized for on-site conservation planning.

State and transition model

Figure 7. group 5

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.

Other references

Abrams, M.D. 1992. Fire and the development of oak forests. *BioScience*, 42: 346–353.

Abrams, M.D. and G.J.Nowacki. 2008. Native Americans as active and passive promoters of mast and fruit trees in the eastern USA. *The Holocene* 18.7. pp. 1123-1137.

Alexander, H.D. and M.A. Arthur, D.L. Loftis, and S.R. Green. 2008. Survival and growth of upland oak and co-occurring competitor seedlings following single and repeated prescribed fires. *Forest Ecology and Management* 256: 1021–1030.

Anderson, Michelle D. 2003. *Juniperus virginiana*. In: Fire Effects Information System, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, and Fire Sciences Laboratory.

- Anderson, R.C. & Brown, L.E. 1983. Comparative effects of fire on trees in a Midwestern savannah and an adjacent forest. *Bulletin of the Torrey Botanical Club*, 110: 87–90.
- Baskin, J.M., C.C. Baskin, and E.W. Chester. 1994. The Big Barrens of Kentucky and Tennessee: Further observations and considerations. *Castanea* 59:226-254.
- Black, B.A., Abrams, M.D. 2001. Influence of Native Americans and surveyor biases on metes and bounds witness tree distribution. *Ecology*. 82:2574-2586.
- Braun, E.L. 1950. *Deciduous forests of Eastern North America*. Blakinston Co., Pennsylvania. Reprinted in 2001 by Blackburn Press, Caldwell, New Jersey.
- Carmean, W.H. 1970. Site quality for eastern hardwoods. The silviculture of oaks and associated species. USDA Forest Service Research paper, Northeast. Forest Exp. Sta., Upper Darby, PA, NE-144: 36-56.
- Carmean, W.H. 1971. Soil-site relationships of the upland oaks. Oak Symp. Proc. USDA Forest Service Research Paper. Northeast. Forest Exp. Sta., Upper Darby, PA. p. 23-29.
- Carmean, Willard H.; Hahn, Jerold T.; Jacobs, Rodney D. 1989. Site index curves for forest species in the eastern United States. Gen. Tech. Rep. NC-128. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*. NatureServe, Arlington, Virginia.
- Curtis, J. T., 1959. *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*. NatureServe, Virginia. .
- Denevan, W.M. 1992. The pristine myth: the landscape of the Americas in 1492. *Annals of the Association of American Geographers*, 82 (3), 369–385.
- DeSelm, H. R. 1994. Tennessee barrens. *Castanea* 59(3):214-225.
- Faber-Langendoen, D., editor. 2001. *Plant communities of the Midwest: Classification in an ecological context*. Association for Biodiversity Information, Arlington, VA. 61 pp. + appendix (705 pp.).
- Fenneman, N.M. 1917. Physiographic subdivisions of the United States. *Proceedings of the National Academy of Sciences of the United States of America*. Vol. 3(1). pp. 17 -22.
- Gleason, H.A. and A. Cronquist. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*. 2nd edition. The New York Botanical Garden, Bronx.
- Griffith, G. E., J. M. Omernik, and S. H. Azevedo. 1998. *Ecoregions of Tennessee*. (Two-sided color poster with map, descriptive text, summary tables, and photographs). U.S. Geological Survey, Reston, VA. Scale 1:940,000.
- Kartesz, J.T., The Biota of North America Program (BONAP). 2011. North American Plant Atlas (<http://www.bonap.org/MapSwitchboard.html>). Chapel Hill, N.C. [maps generated from Kartesz, J.T. 2010. Floristic Synthesis of North America, Version 1.0. Biota of North America Program (BONAP). (in press)].
- Keever, C. 1978. A study of the mixed mesophytic, western mesophytic, and oak chestnut regions of the eastern deciduous forest including a review of the vegetation and sites recommended as potential natural landmarks. Millersville State College, Pennsylvania.
- Kuchler, A.W. 1964. Potential natural vegetation of the conterminous United States. Spec. Publ. 36 New York, NY: American Geographical society.
- Land Resource Regions and Major Land Resource Areas of the United States. United States Department of Agriculture Soil Conservation Service Handbook 296. Dec. 1981. 87-88.
- Landfire [Landfire National Vegetation Dynamics Database]. 2007a. Landfire National Vegetation Dynamics Models. Landfire Project, USDA Forest Service, U.S. Department of Interior. (January - last update)
- Lawless, P. J., Baskin, J. M. and C. C. Baskin. 2006. Xeric Limestone Prairies of Eastern United States: Review and Synthesis. *The Botanical Review* 73(4): 303–325. The New York Botanical Garden.

Lunt, I.D. & Spooner, P.G. 2005. Using historical ecology to understand patterns of biodiversity in fragmented agricultural landscapes. *Journal of Biogeography*, 32:1859–1873.

McNab, W.H. and P.E. Avers. 1994. Ecological subregions of the United States. U.S. Forest Service. Prepared in cooperation with Regional Compilers and the ECOMAP Team of the Forest Service.

Miller, J.H., Chambliss, E.B. and Loewenstein, N.J. 2010. A field guide for the Identification of Invasive Plants in Southern Forests. US Forest Service Southern Research Station, General Technical Report SRS-119.

Parker, G.R. 1989. Old-growth forests of the Central Hardwood Region. *Nat. Areas J.* 9(1): 5-11.

Quarterman, E. and R.L. Powell. 1978. Potential ecological/geological natural landmarks on the Interior Low Plateaus. pp. 7-73. U.S. Department of the Interior, Washington, D.C. Quarterman,

Stritch, L.R. 1990. Landscape-scale restoration of barrens-woodland within the oak-hickory forest mosaic. *Restoration & Management Notes* 8: 73-77.

Somers, P., L. R. Smith, P. B. Hamel, and E. L. Bridges. 1986. Preliminary analyses of plant communities and seasonal changes in cedar glades of middle Tennessee. *ASB Bulletin* 33:178-192.

U.S. Department of Agriculture (USDA), Natural Resources Conservation Service.
Soil surveys of Tennessee counties in MLRA 123.

U.S. Department of Agriculture-Forest Service, Agriculture Handbook 654, Silvics of North America.

Zollner, D., M.H. MacRoberts, B.R. MacRoberts, & D. Ladd. 2005. Endemic vascular plants of the Interior Highlands, U.S.A. *Sida* 21:1781-1791.

Websites:

Cleland, D. T., J. A. Freeouf, J. E. Keys, Jr., G. J. Nowacki, C. A. Carpenter, and W. H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Conterminous United States.
GTR-WO-76C-1. http://fsgeodata.fs.fed.us/other_resources/ecosubregions.html

Ecosystem classification of the United States; Ecological Subregions of the United States.1994. Compiled by W. Henry McNab, Peter E. Avers, et al. Forest Service, U.S. Department of Agriculture [USDA], Washington, DC., USA: <http://www.fs.fed.us/land/pubs/ecoregions>

Environmental Mapping and Assessment Program (EMAP). 2004. Washington, DC., USA: <http://www.epa.gov/docs/emap/>

Geospatial Data Gateways: <https://gdg.sc.egov.usda.gov/>

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

NatureServe. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia.
<http://www.natureserve.org/explorer>

Nashville Basin Limestone Glade and Woodland, Ecological System Comprehensive Report
http://explorer.natureserve.org/servlet/NatureServe?searchSystemUid=ELEMENT_GLOBAL.2.723170

Official Soil Series Descriptions, USDA-NRCS: <https://soilseries.sc.egov.usda.gov/osdname.asp>

Silvics of North America, US Forest Service. http://www.na.fs.fed.us/spfo/pubs/silvics_manual/table_of_contents.htm

USDA Plants: <http://plants.usda.gov/java/>

U.S. Geological Survey (USGS), Center for Biological Informatics (CBI) 2004. U.S. Department of the Interior: <http://biology.usgs.gov/cbi>

Vascular Plant Image Library: <http://botany.csd.tamu.edu/FLORA/imaxxara.htm>

Vegetation Mapping Program, National Vegetation Classification Standard. 2004.
Vegetation Classification Standard, Vegetation Subcommittee, U.S. Geological Survey [USGS; U.S. Department of the Interior], Reston, Virginia, USA. <http://www.fgdc.gov/standards/projects/FGDC-standards-projects/vegetation>

Vegbank: www.vegbank.org

Web Soil Survey, USDA-NRCS: <http://websoilsurvey.nrcs.usda.gov/app/>

Woodland Wildflowers of Illinois: http://www.illinoiswildflowers.info/woodland/woodland_index.htm

U.S. Department of Agriculture, Forest Service. 1994. Ecosystem classification of the United States; Ecological Subregions of the United States. Compiled by W. Henry McNab, Peter E. Avers, et al., Washington, DC. <http://www.fs.fed.us/land/pubs/ecoregions>

U.S. Department of the Interior. 2004. Vegetation Mapping Program, National Vegetation Classification Standard. <http://biology.usgs.gov/npsveg>

U.S. Geological Survey (USGS), Center for Biological Informatics (CBI) 2004. U.S. Department of the Interior. <http://biology.usgs.gov/cbi>

Approval

Matthew Duvall, 5/14/2025

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	09/14/2026
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:
-