

Ecological site F146XY081ME Loamy Acidic Till

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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): 146X-Aroostook Area

This area is entirely in Maine and it makes up about 1,275 square miles (3,305 square kilometers). Presque Isle is the largest city in the area. Interstate 95 ends in the town of Houlton, at the border with New Brunswick, Canada. Aroostook State Park, Fort Kent Historic Site, and Loring Commerce Center are in this area. The Big Rock ski area is in the middle of this MLRA and is on the highest point, which is Mars Hill Mountain.

Ecological site concept

This site occurs in glacial till deposits on hill slopes, till plains, drumlins and ridges. Soils formed in lodgement till, which consists of 10-34 inches of loamy soil over a highly compacted layer of gravelly loam subsoil. This dense layer was compacted by the weight of overlying glaciers and impedes plant roots and water movement on the site. Drainage ranges from somewhat poorly to well drained. Slopes are typically moderate, but may be as high as 30 percent or higher. This site has a seasonally high water table between 16 and 41 inches in the winter and spring. During the summer and fall the water table is usually deeper, except following heavy rain events. Soil pH ranges from 3.5 to 6.5 and tends to be more acidic near the soil surface and less acidic in the dense subsoil.

Hardwoods are dominant on much of this ecological site, including yellow birch, sugar maple, red maple, American beech, and white ash. Softwood abundance tends to be higher where bedrock is within 40 inches of the soil, near drainageways, and on steeper slopes. Common understory species are intermediate woodfern, wild sarsasparilla, starflower, Canada mayflower, and striped maple.

Associated sites

F146XY032ME	Loamy Till Bottom This site often grades into Loamy Till Bottom site at the base of hillslopes, where the slopes are less and groundwater seeps at or near the soil surface.
F146XY061ME	Shallow Loamy Till The Shallow Loamy Till site grades into this site as soils become shallower, to a depth of less than 20 inches of mineral soil material. Usually the Shallow Loamy Till site is upslope of the Loamy Acidic Till site.

Similar sites

F146XY082ME	Loamy Calcareous Till
	The Loamy Calcareous Till site is very similar to this site in landscape position and most soil/site
	properties, but it has soil pH mostly above 6.0. These higher pH soils support greater amounts of sugar
	maple, basswood, American elm, and understory indicators such as Christmas fern. Higher pH soils are
	also more likely to be cultivated.

Tree	(1) Betula alleghaniensis (2) Acer rubrum
Shrub	(1) Viburnum lantanoides(2) Acer spicatum
Herbaceous	(1) Aralia nudicaulis (2) Maianthemum canadense

Physiographic features

This site occurs in glacial till deposits on hill slopes, till plains, drumlins and ridges. Slopes are typically 0-15 percent, but can be as high as 30 percent or higher. This site does not experience flooding or ponding, but does have a seasonally high water table. Typically the water table reaches its highest point from November to May typically between 16 and 41 inches. During the summer and fall the water table is usually deeper, except following heavy rain events.

Landforms	(1) Ground moraine(2) Hill(3) Till plain
Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None
Elevation	120–2,500 ft
Slope	0–30%
Water table depth	16–41 in
Aspect	Aspect is not a significant factor

Table 2. Representative physiographic features

Climatic features

The climate of this site is characterized by cold, snowy winters, and cool summers. Precipitation is nearly equally distributed throughout the year, with slightly more moisture falling in June-October. During winter months, and sometimes fall and spring, cold winds from the north bring severe weather events. The effects of a relatively short growing season are somewhat mitigated by long summer days associated with the high latitudes of the region. Occasionally high winds, microbursts, or freezing rain events damage vegetation over small portions of the landscape.

Frost-free period (characteristic range) 80-94 days Freeze-free period (characteristic range) 126-134 days Precipitation total (characteristic range) 37-42 in Frost-free period (actual range) 61-107 days Freeze-free period (actual range) 103-141 days Precipitation total (actual range) 36-42 in Frost-free period (average) 85 days 127 days Freeze-free period (average) Precipitation total (average) 39 in

Table 3. Representative climatic features



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) ALLAGASH [USC00170200], Saint Francis, ME
- (2) FT KENT [USC00172878], Fort Kent, ME
- (3) CARIBOU MUNI AP [USW00014607], Caribou, ME
- (4) BRIDGEWATER [USC00170833], Bridgewater, ME
- (5) HOULTON 5N [USC00173944], Houlton, ME
- (6) PRESQUE ISLE [USC00176937], Presque Isle, ME
- (7) HOULTON INTL AP [USW00014609], Houlton, ME

Influencing water features

Due to its landscape position, this site is not typically influenced by streams or wetlands. Small drainages are often included within this site, and they tend to influence local variations of the plant community. Higher relative abundances of white ash, sugar maple, yellow birch, and diverse ferns and other herbs coincide with these small drainageways.

Soil features

The soils of this site formed in lodgement till consisting of about 10-34 inches of loamy soil over a highly compacted layer of gravelly loam subsoil. This dense layer was compacted by the weight of overlying glaciers and impedes plant roots and water movement on the site. Drainage ranges from somewhat poorly to well drained. Soil pH ranges from 3.5 to 6.5 and tends to be more acidic near the soil surface and less acidic in the dense subsoil. The soil moisture regime is udic and the soil temperature regime is frigid.

Table 4. Representative soil features

Parent material	(1) Lodgment till-shale and siltstone
Surface texture	(1) Silt loam(2) Gravelly silt loam(3) Loam

Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow
Soil depth	10–34 in
Surface fragment cover <=3"	0–1%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	4.6–12.1 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)	3.5–6.5
Subsurface fragment volume <=3" (Depth not specified)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0-4%

Ecological dynamics

[Caveat: The vegetation information contained in this section and is only provisional, based on concepts, and future projects support validation through field work. *] The vegetation groupings described in this section are based on the terrestrial ecological system classification and vegetation associations developed by NatureServe (Comer 2003) and localized associations provided by the Maine Natural Areas Program (Gawler and Cutko, 2010).

Hardwoods are dominant on much of this ecological site, including yellow birch, sugar maple, red maple, American beech, and white ash. Softwood abundance tends to be higher where bedrock is within 40 inches of the soil, near drainageways, and on steeper slopes. Common understory species are intermediate woodfern, wild sarsaparilla, starflower, Canada mayflower, and striped maple.

This site is subject to logging, wind, insects and disease, and other natural and human disturbances resulting in a variety of alternative states. Cultivated sites occur on flatter slopes, and are mostly cropland, pasture or hay land. Abandoned farmland may transition to pine, spruce-fir, or reference hardwood-dominated forests, often with an intermediate early seral forest phase.

When managed for timber production, several different ecological states are possible. The pine forest state, reference hardwood-dominated state, and spruce-fir state are managed to maintain dominance of their respective species, and to facilitate profitable harvests along predictable timelines. Hemlock forests may also result from logging practices, though these are typically less-desirable and may result from selective harvest of more valuable species, leaving the hemlock behind. As hemlock increases on the site, it inhibits the establishment of other species by shading, reducing soil moisture availability to other plants, and especially by acidifying the soil.

With sufficient economic inputs, any of the states that occur on this site may transition from one to another, however, due to cost limitations, forests are typically managed for whatever timber species are currently present on the site.

State and transition model

F146XY081ME - Loamy Acidic Till



Transition	Drivers/practices
1.2a, 1.3a	Shifts in composition due to the presence (1.2a) or absence (1.3a) of red oak
T1A	Introduction of invasive species, pests, and/or pathogens that alter ecological site functions, dynamics, and properties
T2A, T1B	Timber management and harvesting, landscape clearing, mechanical landscape alteration, mechanical soil disturbance, planting, seeding, cultivation
R2A	Removal, remediation, or control of invasive species, pests, and/or pathogens through mechanical, biological, or chemical management; establishment of native plants through seeding and/or planting
R3A, R3B	Restoration of native plant communities, planting, seeding, removal of obstructions or barriers

State 1 Reference State (minimally-managed)

This site occurs in glacial till deposits on hill slopes, till plains, drumlins and ridges. Soils formed in lodgement till, which consists of 10-34 inches of loamy soil over a highly compacted layer of gravelly loam subsoil. This dense layer was compacted by the weight of overlying glaciers and impedes plant roots and water movement on the site. Drainage ranges from somewhat poorly to well drained. Slopes are typically moderate, but may be as high as 30 percent or higher. This site has a seasonally high water table between 16 and 41 inches in the winter and spring. During the summer and fall the water table is usually deeper, except following heavy rain events. Soil pH ranges from 3.5 to 6.5 and tends to be more acidic near the soil surface and less acidic in the dense subsoil.

Characteristics and indicators. Hardwoods are dominant on much of this ecological site, including yellow birch, sugar maple, red maple, American beech, and white ash. Softwood abundance tends to be higher where bedrock is within 40 inches of the soil, near drainageways, and on steeper slopes. Common understory species are intermediate woodfern, wild sarsasparilla, starflower, Canada mayflower, and striped maple.

Resilience management. This site is subject to logging, wind, insects and disease, and other natural and human disturbances resulting in a variety of alternative states. Cultivated sites occur on flatter slopes, and are mostly cropland, pasture or hay land. Abandoned farmland may transition to pine, spruce-fir, or reference hardwood-dominated forests, often with an intermediate early seral forest phase.

Community 1.1 Hardwood Seepage Forest

This reference state occurs on slight slopes (<15%) and adjacent bottoms where an impervious soil layer (~30 cm deep), such as marine clay or packed till, forces seepage water near the surface. Sites often occur at breaks in slope – either at the base of a slope, or on a slope bench. Soils are loamy, or grading to silty in flats, and moderately acidic to neutral (pH 5.2-7.0). Soils place this as a wetland type, but some sites may grade from wetland to upland as one moves upslope. Small sites, or 'forest seeps' (i.e., less than one acre) are frequent and are

typically considered as inclusions within the broader forest rather than distinct natural communities. These closed canopy to partial canopy forests support a mixture of mostly deciduous overstory trees with occasionally patchy local dense conifers. The understory is usually open, with few shrubs and patches of tree regeneration. The herb layer is typically patchy, and reflects the underlying seepage gradients between species inhabiting the wettest areas and species less restricted by soil moisture. Bryoids are sparse. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S3 Vulnerable – At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors. Many sites are on land with a long settlement history and have been either cleared or harvested in the past. Because these tend to occur as small forest patches, their conservation depends in part on maintaining some surrounding forest cover (both upslope and downslope) as a buffer. Like vernal pools, recognition of this type is more difficult in the winter, when snow cover and plant senescence may make it difficult to distinguish these sites from upland forest. Seeps may remain unfrozen through the winter, making it difficult to operate logging equipment. (Gawler and Cutko, 2010)

Dominant plant species

- eastern hemlock (Tsuga canadensis), tree
- green ash (Fraxinus pennsylvanica), tree
- yellow birch (Betula alleghaniensis), tree
- American beech (Fagus grandifolia), tree
- northern red oak (Quercus rubra), tree
- red spruce (Picea rubens), tree
- sugar maple (Acer saccharum), tree
- bluejoint (Calamagrostis canadensis), grass
- cinnamon fern (Osmunda cinnamomea), other herbaceous
- sensitive fern (Onoclea sensibilis), other herbaceous
- threeleaf goldthread (Coptis trifolia), other herbaceous
- Jack in the pulpit (Arisaema triphyllum), other herbaceous
- New York fern (Thelypteris noveboracensis), other herbaceous
- spinulose woodfern (Dryopteris carthusiana), other herbaceous
- common gypsyweed (Veronica officinalis), other herbaceous

Dominant resource concerns

- Aggregate instability
- Ponding and flooding
- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates
- Aquatic habitat for fish and other organisms

Community 1.2 Spruce - Northern Hardwoods Forest

These forests occur on cooler microsites from near sea level to 2200'. They are usually on hillslopes, ranging from lower to upper slopes and from gentle to steep (up to 50%). The soils are typically well drained, sometimes somewhat excessively drained, sandy to loamy in texture, with pH 5.0-5.4. This mixed forest type is characterized by hardwoods with occasional scattered large supercanopy species. The sapling/shrub layer may be fairly well developed (20-40% cover), with saplings of canopy species; shrub species vary among sites. The herb layer ranges from sparse to dense but is usually >15% cover, divided between forbs, ferns, and regenerating trees, with dwarf shrubs virtually absent. The bryoid layer is patchy and locally well developed, with bryophytes far more abundant than lichens. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S5 Secure – At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats. Nearly all forests of this type have been harvested in the past, and at many sites the spruce has been selectively removed. As a result, the canopies of such sites are more often indicative of Beech - Birch - Maple

Forests, with spruce and fir more common in the understory than in the canopy. Sites with relatively little human disturbance are rare but are moderately well represented on conservation lands. (Gawler and Cutko, 2010)

Dominant plant species

- red spruce (Picea rubens), tree
- eastern white pine (Pinus strobus), tree
- yellow birch (Betula alleghaniensis), tree
- hobblebush (Viburnum lantanoides), shrub
- spinulose woodfern (Dryopteris carthusiana), other herbaceous
- mountain woodsorrel (Oxalis montana), other herbaceous
- starflower (Trientalis borealis), other herbaceous

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition
- Plant pest pressure
- Terrestrial habitat for wildlife and invertebrates

Community 1.3 Red Oak - Northern Hardwoods - White Pine Forest

This reference state occurs on gently to somewhat steeply sloping (15-35%) mid- and lower slopes, occasionally upper slopes, but usually not highly exposed sites. Known sites are at low elevations (<1200') on moderately well drained mineral soils, often rocky but not extremely shallow (typically 25-50 cm) and loamy, with pH 5.0-5.4. This is a mixed upland forest type with red oak and northern hardwoods in the canopy. Some stands are almost entirely deciduous (typically oak - beech), while others are mixed with white pine, red spruce, hemlock, or (especially along the coast) northern white cedar. Large red oak trees are prominent. Red maple is frequent. The shrub/sapling layer is usually sparse (<25%, but occasionally up to 50% cover). The herb layer is likewise spotty (usually <10% cover, sometimes 20-50% cover), with very few dwarf shrubs and with typical forest herbs and tree regeneration. Few bryoids are found on the leaf litter covered forest floor. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S5 Secure – At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats. Most sites in Maine are on lands with a long settlement history, and have apparently been timbered, pastured, or burned in the past. Several sites occur on public lands but are not necessarily designated as areas to be set aside from timber harvest. Small and isolated protected stands (on the order of 25 acres or less) may not be viable in the long run; though larger stands, or naturally small stands protected within a managed forest matrix, could be viable. (Gawler and Cutko, 2010)

Dominant plant species

- northern red oak (Quercus rubra), tree
- sugar maple (Acer saccharum), tree
- American beech (Fagus grandifolia), tree
- paper birch (Betula papyrifera), tree
- red maple (Acer rubrum), tree
- striped maple (Acer pensylvanicum), tree
- mapleleaf viburnum (Viburnum acerifolium), shrub
- wild oat (Avena fatua), grass
- western brackenfern (Pteridium aquilinum), other herbaceous
- Canada mayflower (Maianthemum canadense), other herbaceous
- starflower (Trientalis borealis), other herbaceous
- wild sarsaparilla (Aralia nudicaulis), other herbaceous

Dominant resource concerns

- Plant productivity and health
- Plant structure and composition

- Wildfire hazard from biomass accumulation
- Terrestrial habitat for wildlife and invertebrates

Community 1.4 Hemlock Forest

Hemlock forests are usually on slopes (typically 5-50%) and ravines, with well drained loamy soil. On lower slopes and flats, soils may grade to imperfectly drained. Soils tend to be shallow (<50 cm) and acidic (pH 4.8-5.6). Sites are from sea level to 1200' and often in cool microsites, although aspect varies. This closed canopy forest type is dominated by hemlock (>50% cover). The conifer canopy allows little light to reach below, and the shrub, herb, and bryoid layers are sparse (each usually <25%, and sometimes absent altogether). Small conifers are present in the herb layer, as well as scattered individuals of typical upland conifer forest plants. Graminoids are rarely very apparent. The ground layer is mostly conifer litter, with spotty bryophyte cover. (Gawler and Cutko, 2010)

Resilience management. Maine Natural Areas Program State Rank: S4 Apparently Secure – At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors. Demand in the 1700s -1800s for hemlock considerably reduced mature, undisturbed examples of this type, yet poor market conditions more recently have caused hemlock to be left in partial harvests; many of these legacy trees are quite old. Some evidence suggests that hemlock is less successful at maintaining itself in the face of human-caused disturbance than are northern hardwoods. Most sites known to be of high ecological quality are in southern and central Maine and lack formal protection. Maintaining the surrounding lands as forest is important in conserving particular stands of this type, particularly given that many known examples are small (<50 acres). (Gawler and Cutko, 2010)

Dominant plant species

- eastern hemlock (Tsuga canadensis), tree
- northern red oak (Quercus rubra), tree
- red spruce (Picea rubens), tree
- sugar maple (Acer saccharum), tree
- eastern white pine (Pinus strobus), tree
- yellow birch (Betula alleghaniensis), tree
- paper birch (Betula papyrifera), tree
- red maple (Acer rubrum), tree
- Canada mayflower (Maianthemum canadense), other herbaceous

Pathway 1.2a Community 1.2 to 1.3

Presence of red oak, red oak dominated forest

Pathway 1.3a Community 1.3 to 1.2

Absence of red oak and spruce dominated forest

State 2 Semi-natural State

Shifts in ecological site composition, functionality, and dynamics driven by natural disturbances, processes, and pressures (may have some anthropogenic influences). More research is needed to determine the extent of the Semi-natural state associated with this ecological site.

Community 2.1 Invasiveness and Biological Introductions

Introduction of invasive species, pathogens, and/or pests resulting in shifts in ecological site composition, functionality, and dynamics. More research is needed to determine the extent of these effects on the semi-natural

state associated with this ecological site.

State 3 Cultural State

Shifts in ecological site composition, functionality, and dynamics that are primary driven by anthropogenic disturbances and pressures (may have some associated natural influences). More research is needed to determine the extent of the cultural state associated with this ecological site.

Community 3.1 Plantation

Crop or hayland cultivation, timber management and harvesting

Transition T1A State 1 to 2

Introduction of invasive species, pests, and/or pathogens that alter ecological site functions, dynamics, and properties

Transition T1B State 1 to 3

Timber management and harvesting, landscape clearing, mechanical landscape alteration, mechanical soil disturbance, planting, seeding, cultivation

Conservation practices

Cover Crop
Land Clearing
Precision Land Forming
Land Smoothing
Spoil Spreading
Stripcropping
Nutrient Management
Managed Haying/Grazing
Harvest hay in a manner that allows wildlife to flush and escape
Creating forest openings to improve hardwood stands
Continuous No Till
Conversion of cropped land to grass-based agriculture
Crop management system on crop land acres recently converted

Restoration pathway R2A State 2 to 1

Removal, remediation, or control of invasive species, pests, and/or pathogens through mechanical, biological, or chemical management; establishment of native plants through seeding and/or planting

Conservation practices

Prescribed Burning	
Critical Area Planting	

Integrated Pest Management (IPM)
Vegetated Treatment Area
Forest Stand Improvement
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Pathogen Management
Invasive Plant Species Control
Pathogen Management
Invasive Species Pest Management
Precision Pest Control Application
Multi-species Native Perennials for Biomass/Wildlife Habitat
Habitat Development for Beneficial Insects for Pest Management
Drainage water management for nutrient, pathogen, or pesticide reduction
Biological suppression and other non-chemical techniques to manage brush, weeds and invasive species
Biological suppression and other non-chemical techniques to manage herbaceous weeds invasive species
Monitoring and Evaluation
Herbaceous Weed Control

Transition T2A State 2 to 3

Timber management and harvesting, landscape clearing, mechanical landscape alteration, mechanical soil disturbance, planting, seeding, cultivation

Conservation practices

Cover Crop
Land Clearing
Precision Land Forming
Irrigation Land Leveling
Land Smoothing
Tree/Shrub Site Preparation
Spoil Spreading
Land Grading
Forest Land Management
Prescribed Forestry
Intensive Management of Rotational Grazing
Conversion of cropped land to grass-based agriculture
Patch Harvesting

Restoration pathway R3B State 3 to 1

Restoration of native plant communities, planting, seeding, removal of obstructions or barriers

Conservation practices

Obstruction Removal
Vegetated Treatment Area
Early Successional Habitat Development/Management
Restoration and Management of Natural Ecosystems
Native Plant Community Restoration and Management
Restoration of Compacted Soils
Forest stand improvement for habitat and soil quality
Monitoring and Evaluation

Restoration pathway R3A State 3 to 2

Restoration of native plant communities, planting, seeding, removal of obstructions or barriers

Additional community tables

Inventory data references

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

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Contributors

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Approval

Nels Barrett, 9/27/2024

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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	05/11/2025
Approved by	Nels Barrett
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 annualproduction):
- 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: