

Ecological site F108XD757IA

Sandstone Upland Woodland

Accessed: 05/19/2024

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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 108X—Illinois and Iowa Deep Loess and Drift

The full document of this Provisional Ecological Site Description can be found on the Iowa and Missouri Natural Resources Conservation Service electronic Field Office Technical Guide in Section 2.

Classification relationships

The full document of this Provisional Ecological Site Description can be found on the Iowa and Missouri Natural Resources Conservation Service electronic Field Office Technical Guide in Section 2.

Ecological site concept

Sandstone Upland Woodlands are within the red areas on the map (Figure 1). These sites formed in sandstone residuum and can be found on hillslopes on uplands. Typically these sites are located down slope from till ecological sites. Soils are typically Alfisols and are moderately deep (24 to 40 inches) to paralithic contact. Plant communities consist of mostly trees and few grasses forbs and shrubs.

Table 1. Dominant plant species

Tree	(1) <i>Quercus alba</i> (2) <i>Carya ovata</i>
Shrub	Not specified
Herbaceous	(1) <i>Carex pensylvanica</i>

Physiographic features

Sandstone Upland Woodlands are of small extent, and can be found on hillslopes (Table 1) in uplands in the northwestern part of MLRA 108D. These sites are within a dissected till plain landscape. Slopes range from 9 to 14 percent. These sites typically occur the lower parts of slopes along stream valleys.

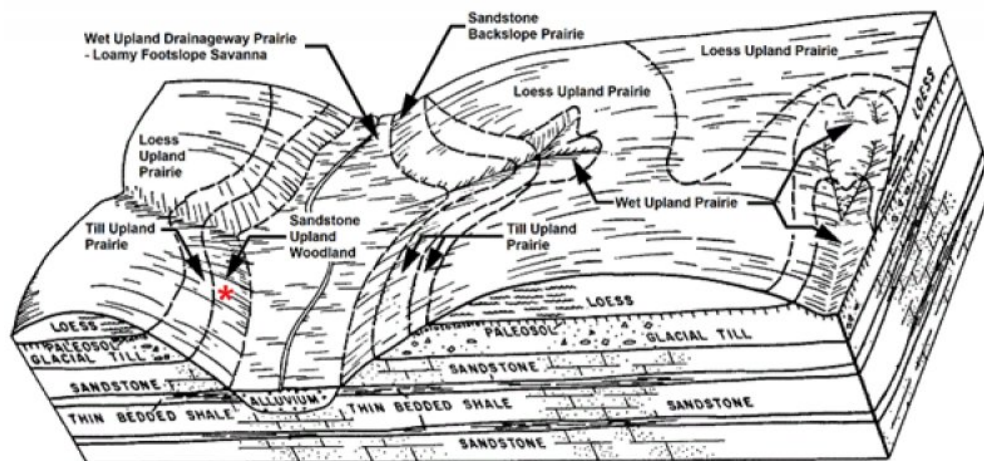


Figure 2. Block diagram representing typical soil-landform s

Table 2. Representative physiographic features

Landforms	(1) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	244–335 m
Slope	9–14%
Water table depth	152 cm
Aspect	Aspect is not a significant factor

Climatic features

The soil temperature regime of MLRA 108D is classified as “mesic” where the mean annual soil temperature is between 46 and 59°F (Soil Survey Staff, 2014). The average freeze-free period of this ecological site is about 165 days, while the frost-free period is about 140 days (Table 2). Average annual precipitation is 32 inches, which includes rainfall plus the water equivalent from snowfall (Table 3). The average annual low and high temperatures are 37 and 60°F, respectively. Climate data and analyses are derived from 30-year averages gathered from two National Oceanic and Atmospheric Administration (NOAA) weather stations contained within the range of this ecological site (Table 4).

Table 3. Representative climatic features

Frost-free period (average)	140 days
Freeze-free period (average)	165 days
Precipitation total (average)	940 mm

Climate stations used

- (1) WINTERSET 1N [USC00139132], Winterset, IA
- (2) GUTHRIE CTR [USC00133509], Guthrie Center, IA

Influencing water features

This ecological site is not influenced by wetland or riparian water features. Drainage is excessively well. Permeability is moderate to slow. The soil at this site is in hydrologic group A. Land capability class is 6e. The water source is direct precipitation and overland flow from upslope contributing sites. Depth of endosaturation is greater than 5 feet.

Soil features

These soils have a major rooting restriction at a depth of 32 inches. The soils were formed under woodland vegetation, and have thin surface horizons. These sites formed in material weathered from a sandstone layer ranging from 10 to greater than 40 feet thick. Beneath this sandstone is typically clayey shale or limestone bedrock. The soils have a loamy sand surface horizon (Table 5). Subsoils are also loamy sand. Montieth is the only soil series associated with this site.

Table 4. Representative soil features

Parent material	(1) Residuum—sandstone
Surface texture	(1) Loamy sand
Family particle size	(1) Sandy
Drainage class	Excessively drained
Permeability class	Moderate to rapid
Soil depth	81 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	6.86 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Soil reaction (1:1 water) (0-101.6cm)	5–6.2
Subsurface fragment volume <=3" (Depth not specified)	2–3%
Subsurface fragment volume >3" (Depth not specified)	2–3%

Ecological dynamics

State and transition model

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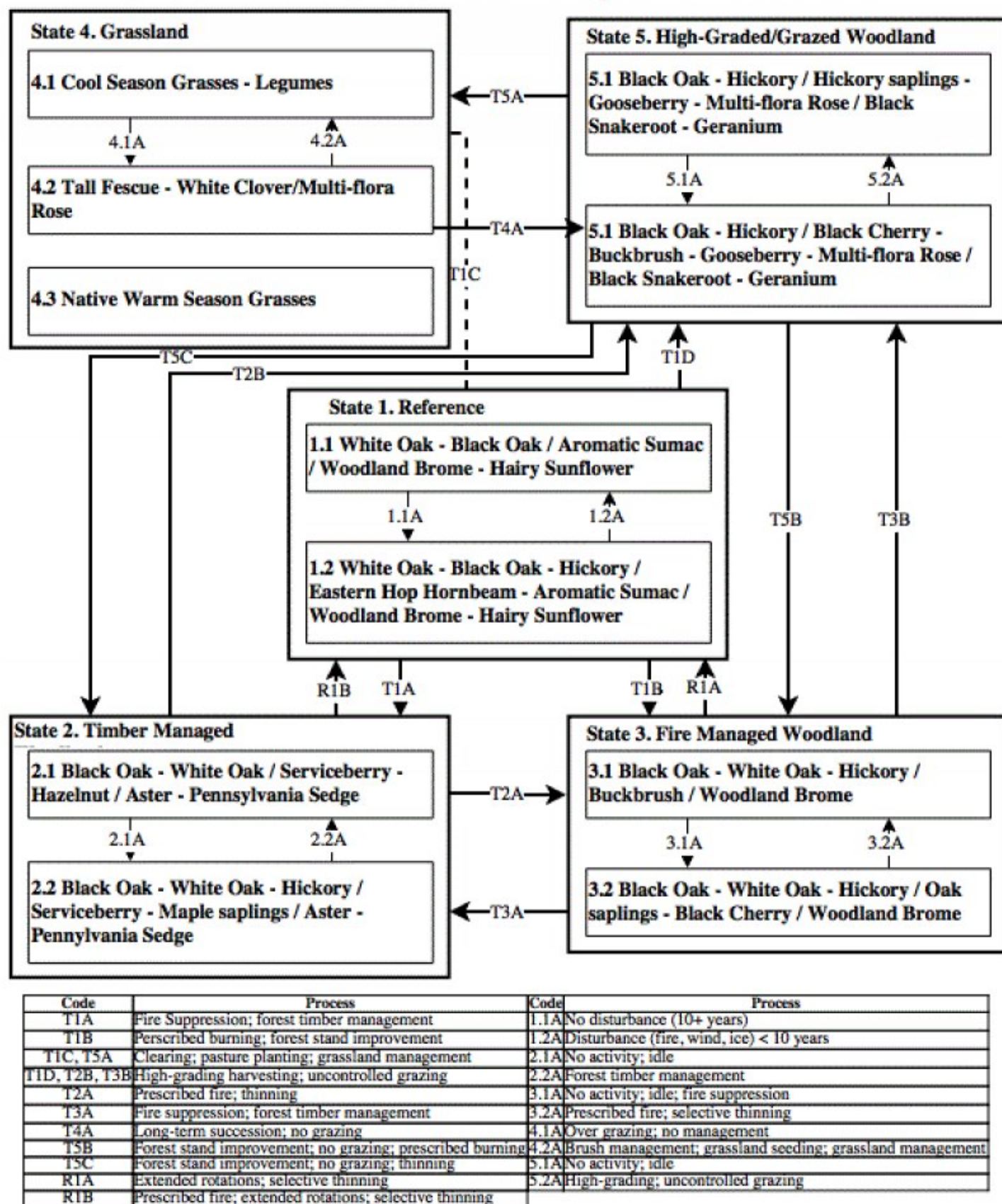


Figure 7. State-and-transition diagram for Sandstone Upland

State 1 Reference

This phase is a dry/mesic oak woodland. As such, this has a reference plant community which includes trees, grasses and forbs.

Community 1.1

White Oak – Black Oak / Aromatic Sumac / Woodland Brome

Species composition of this phase includes *Quercus alba*, *Carya ovata*, *Carya tomentosa*, *Carya ovalis*, *Quercus rubra*, *Quercus velutina*, *Andropogon gerardii*, *Elymus virginicus*, *Elymus hystrix*, *Festuca subverticillata*, *Carex pensylvanica*, *Amphicarpaea bracteata*, *Asclepias purpurascens*, *Helianthus strumosus*, *Penstemon digitalis*, *Sanicula Canadensis*, *Sanicula odorata*, *Solidago ulmifolia*, and *Veronicastrum virginicum*. Canopy cover is between 21 and 60 percent. Periods of no disturbance greater than 10 years will cause a shift to phase 1.2 (Figure 3). If disturbance frequency becomes more often than every 10 years, the phase will shift back to this phase.

Community 1.2

White Oak – Black Oak / Aromatic Sumac / Woodland Brome

Species composition of this phase includes *Quercus alba*, *Carya ovata*, *Carya tomentosa*, *Carya ovalis*, *Quercus rubra*, *Quercus velutina*, *Andropogon gerardii*, *Elymus virginicus*, *Elymus hystrix*, *Festuca subverticillata*, *Carex pensylvanica*, *Amphicarpaea bracteata*, *Asclepias purpurascens*, *Helianthus strumosus*, *Penstemon digitalis*, *Sanicula Canadensis*, *Sanicula odorata*, *Solidago ulmifolia*, and *Veronicastrum virginicum*. Canopy cover is between 21 and 60 percent. Periods of no disturbance greater than 10 years will cause a shift to phase 1.2 (Figure 3). If disturbance frequency becomes more often than every 10 years, the phase will shift back to this phase.

Additional community tables

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	
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:**
