USDA Natural Resources Conservation Service

Ecological site F114XA101IN
Wet Lacustrine Forest

Last updated: 9/26/2024
Accessed: 05/12/2025

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): 114X–Southern Illinois and Indiana Thin Loess and Till Plain

MLRA 114 makes up about 4,550 square miles (11,795 square kilometers. The three parts of this MRLA are mostly in the Till Plains Section of the Central Lowland Province of the Interior Plains. The western third of the western part is in the Highland Rim Section of the Interior Low Plateaus Province of the Interior Plains. The eastern half of the eastern part is in the Kanawha Section of the Appalachian Plateaus Province of the Appalachian Highlands. Both large and small tributaries of the Ohio River dissect the nearly level to very steep glaciated uplands in this area. The major streams and rivers have well defined valleys with broad flood plains and numerous stream terraces. The flood plains along the smaller streams are narrow. Broad summits are nearly level to gently sloping. Elevation ranges from 320 feet (100 meters) on the southernmost flood plain along the Ohio River to 1,250 feet (380 meters) on the highest ridges. Local relief is mainly 10 to 50 feet (3 to 15 meters), but it can be 50 to 100 feet (15 to 30 meters) along drainage ways and streams. Also, the Ohio River bluffs are as much as 300 feet (90 meters) above the river valley floor.

Classification relationships

222 Eastern Broadleaf Forest (Continental) Province.

The following NatureServe Explorer Ecological System has a high level of probability to match the ecological site found on these soils. Field verification and ESD development is needed prior to using this information for conservation planning and/or restoration initiatives: Scientific Name: North-Central Interior Wet Flatwoods/ Unique Identifier: CES202.700.

Ecological site concept

The Wet Lacustrine Forest ecological site is on lake plains, terraces, outwash plains or local areas on till plains and formed in lacustrine parent materials. The soils in this group somewhat poorly drained to poorly drained. Sites generally occur on nearly level to depressional areas of stream terraces, till plains, and glacial lake plains. Sites may incur frequent flooding and/or ponding.

The characteristic vegetation of the site is that of a flatwoods type dominated by pin oak and swamp white oak. Silver maple, red maple, sweetgum and green ash are common on these sites. Topography and seasonal fluctuation of water (ponding) on these sites may create a diverse vegetative community that gradients from wet-mesic upland tree species to zones of flood-tolerant lowland tree species. Inundation of the site generally occurs in the spring and depending on the length of inundation, may leads to a sparse understory.

Associated sites

F114XA102IN	**Lacustrine Terrace Forest** Lacustrine Terrace Forest. These sites are located on terraces in MLRA 114A and include soils that are somewhat poorly drained to moderately well drained. Sites will exhibit more upland tree, shrub and understory species than F114AY101IN.

Similar sites

F114XA501IN	**Wet Till Flatwoods** The Wet Till Flatwoods will exhibit similar species, such as pin oak, sweetgum, swamp white oak, etc.

Table 1. Dominant plant species

Tree	(1) *Quercus palustris* (2) *Quercus bicolor*
Shrub	(1) *Cornus* (2) *Salix*
Herbaceous	(1) *Carex*

Physiographic features

These soils are found on lake plains, terrace, and flood-plain steps. Sites may be influenced by flooding and/or ponding.

Table 2. Representative physiographic features

Landforms	(1) Lake plain > Lake plain (2) Valley > Terrace (3) Flood-plain step
Runoff class	Negligible to high
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	104–335 m
Slope	0–5%
Ponding depth	0–38 cm
Water table depth	0–168 cm
Aspect	Aspect is not a significant factor

Climatic features

Most of the rainfall occurs as high-intensity, convective thunderstorms during summer. Snowfall is common in winter. The freeze-free period averages about 179 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	154-156 days
Freeze-free period (characteristic range)	177-180 days
Precipitation total (characteristic range)	1,168-1,194 mm
Frost-free period (actual range)	153-159 days
Freeze-free period (actual range)	176-181 days

Precipitation total (actual range)	1,168-1,194 mm
Frost-free period (average)	155 days
Freeze-free period (average)	179 days
Precipitation total (average)	1,194 mm

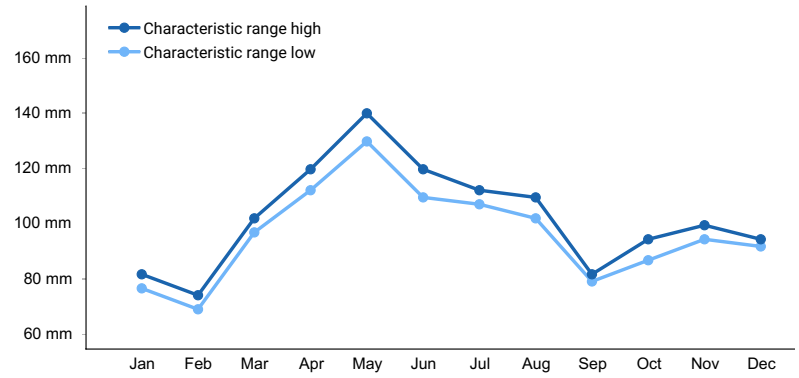


Figure 1. Monthly precipitation range

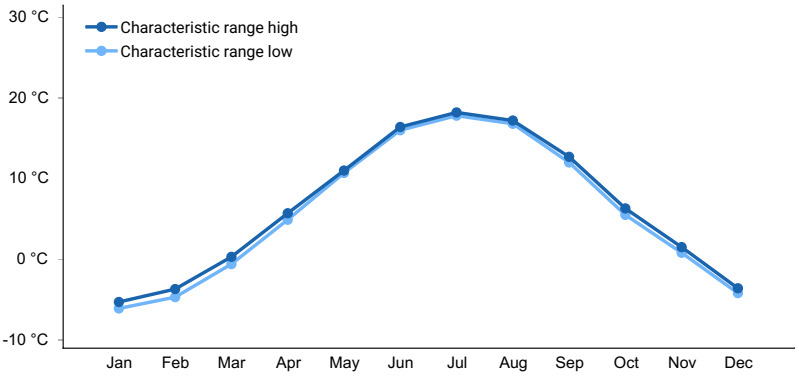


Figure 2. Monthly minimum temperature range

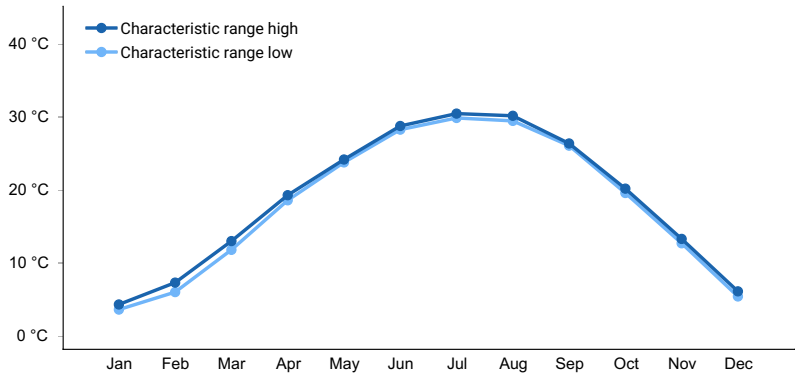


Figure 3. Monthly maximum temperature range

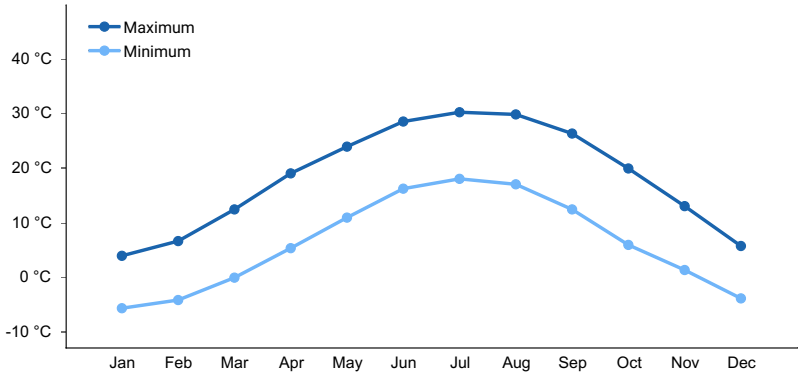


Figure 4. Monthly average minimum and maximum temperature

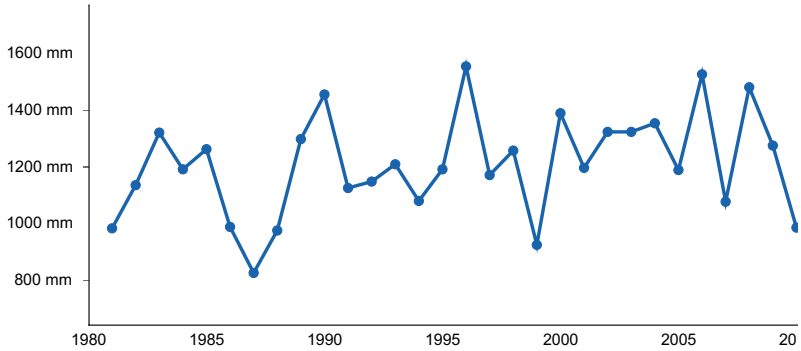


Figure 5. Annual precipitation pattern

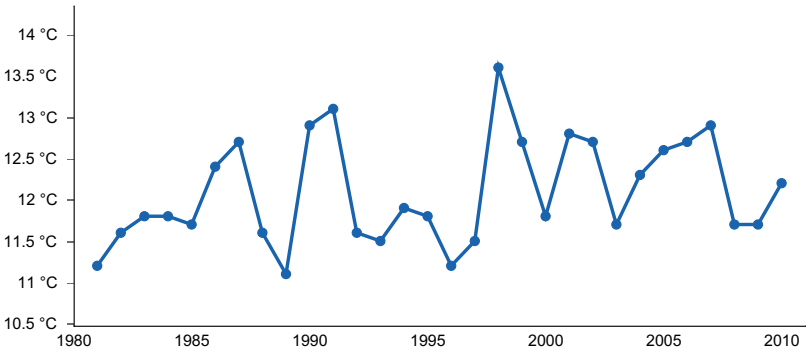


Figure 6. Annual average temperature pattern

Climate stations used

- (1) NORTH VERNON 2 ESE [USC00126435], North Vernon, IN
- (2) SEYMOUR 2 N [USC00127935], Seymour, IN
- (3) MILFORD [USC00335268], Milford, OH
- (4) SCOTTSBURG [USC00127875], Scottsburg, IN

Influencing water features

This site receives water mostly from precipitation, though some water is contributed to the site from adjacent, higher elevation sites or on terraces, stream flooding. Flooding and ponding frequencies and length on inundation varies depending on soil series and topography.

The hydro-geographic model classification for this site is Riverine: alluvial plain, backswamp, floodplain, forested. This site has a Cowardin classification of PFO6An: it is a forested system that is temporarily flooded/ponded on mineral soil.

Soil features

Soil in this group are very deep, somewhat poorly drained to poorly drained, and very slow to moderate permeable soils, with acidic to neutral soil reaction and formed in lacustrine materials. Series currently include Luray, McGary, Montgomery, Peoga, Sebring, and Zipp.

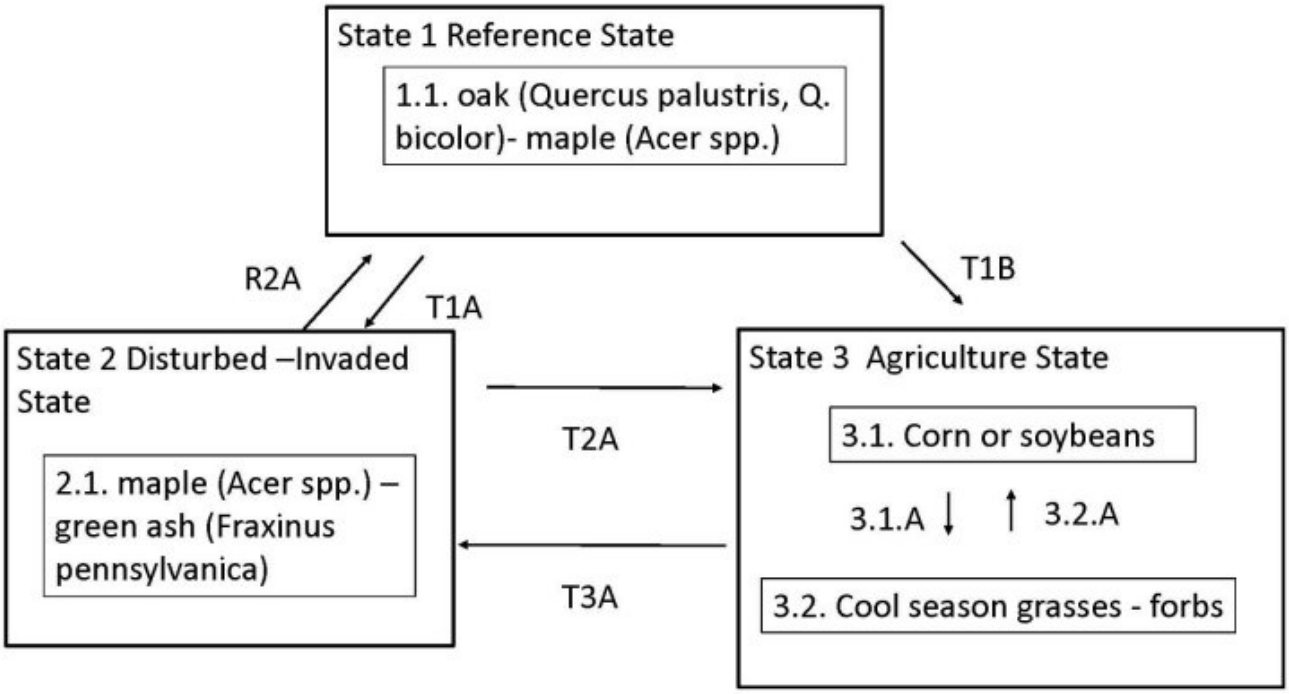
Table 4. Representative soil features

Parent material	(1) Lacustrine deposits (2) Glaciolacustrine deposits (3) Loess
Surface texture	(1) Silt loam (2) Silty clay loam (3) Silty clay
Drainage class	Very poorly drained to somewhat poorly drained
Permeability class	Very slow to moderate
Depth to restrictive layer	203 cm
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	13.72–20.57 cm
Calcium carbonate equivalent (Depth not specified)	0–23%
Soil reaction (1:1 water) (Depth not specified)	4.7–7.9
Subsurface fragment volume <=3" (Depth not specified)	0–2%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The historic plant community of this ecological site is a wet mixed hardwood forest with a substantial oak component. The dominant species in the canopy for undisturbed sites are pin oak and swamp white oak. Silver maple and green ash are common as well. The soils of this site are very poorly or poorly drained and characterized by seasonal ponding in the spring and much drier in the summer. This seasonal change in water presence may limited seed germination in some areas thereby reducing the diversity of shrubs and herbaceous species.
Most sites today have been disturbed via oak removal, clearing, grazing, and/or hydrological modifications. Few wooded sites remain that are dominated by oaks. Successional sites will be dominated by maples, ashes, willows, and various shrubs. Non-native, invasive species may be problematic on sites and require management control to insure oak regeneration and native understory development.

State and transition model



State 1
Reference State

Historic reference communities on these sites exhibited a complex and diverse mosaic of wetland and wet-mesic species based on microtopography, soils, flooding regime, and natural disturbances. Canopy species often included pin oak (*Quercus palustris*) and/ or swamp white oak (*Quercus bicolor*) in the wetter portions of these sites. Other hardwood trees include silver maple (*Acer saccharinum*), green ash (Fagus pennsylvanica), and sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*). Areas of slightly high topography would exhibit more mesic forest species such as white oak (*Quercus alba*), northern red oak (*Q. rubra*), white ash (*Fraxinus americana*), sugar maple (*Acer saccharum*) and blackgum (*Nyssa sylvatica*). Depending on microtopography and flooding/ponding regimes, the understory composition of these communities would vary. . Common species for the wetter sites include dogwoods, willows (Salix spp.), Osmunda, buttonbush (*Cephalanthus occidentalis*), alders (Alnus spp.) and hollies (Ilex spp.). A more wet-mesic understory community would be found on the higher portions of these sites. Natural influences to these communities include flooding, windthrow, drought, and fire which would cause temporary changes to the community structure. Today, most sites have been disturbed (farmed, grazed, cleared, drained) and show a variety of ruderal/successional forest communities which often include maples, boxelder, hackberry, poplar,s willows and ashes. Mature, high-quality trees have usually been removed over the years and shade-tolerant, fast-growing species such as maple, and ash have become common on these sites. Diverse understory communities of native plants are rare due to the repeated disturbances which has spread invasive species.

Dominant plant species

- swamp white oak (*Quercus bicolor*), tree
- pin oak (*Quercus palustris*), tree

- maple (*Acer*), tree
- willow (*Salix*), shrub
- dogwood (*Cornus*), shrub
- sedge (*Carex*), grass
- osmunda (*Osmunda*), other herbaceous

Community 1.1
Forestland

The distinguishing reference community is a water-tolerant oak forest. Dominant species on mature forested reference sites include pin oak (*Quercus palustris*)-swamp white oak (*Quercus bicolor*). Other species on site may include green ash, silver maple, red maple, and green ash. The seasonal change in water presence may limited density and diversity of shrubs and ground layer species in low areas. Vegetation communities are highly variable based on the microtopography.

Dominant plant species

- swamp white oak (*Quercus bicolor*), tree
- pin oak (*Quercus palustris*), tree
- red maple (*Acer rubrum*), tree
- silver maple (*Acer saccharinum*), tree
- dogwood (*Cornus*), shrub
- willow (*Salix*), shrub
- sedge (*Carex*), grass
- osmunda (*Osmunda*), other herbaceous

State 2
Disturbed/Invaded Woodland State

This state reflects areas that have had anthropogenic disturbances such as clearing, selective harvest, unmanaged grazing, with no timber stand improvement management implemented. Quick growing trees such as maples and ashes quickly dominant these sites. Invasive non-native plant species are often found on these sites. Management activities such as weed control, brush control, and planting of desired tree species will improve the quality of these sites;; however, restoration to the reference condition would require long-term management inputs.

Dominant plant species

- maple (*Acer*), tree
- ash (*Fraxinus*), tree
- honeysuckle (*Lonicera*), shrub
- Nepalese browntop (*Microstegium vimineum*), grass
- knotweed (*Polygonum*), other herbaceous
- garlic mustard (*Alliaria petiolata*), other herbaceous

Community 2.1
Disturbed-invaded woodland

Oak removal without timber stand improvement activities often allows these sites to be dominated by fast growing, shade tolerant species such as maples and ashes. Multiple hardwood species may be present depending on nearby seed sources. Invasive, non-native vegetation is often found on disturbed areas.

State 3
Agricultural State

These sites are subject to clearing, draining, and utilization for agricultural uses. Sites can be managed as cropland or pastureland. Numerous species may be planted depending on the landowners objectives. The most common agricultural uses are cool season grass production (managed or unmanaged grazing regimes), hay production, or row crop production (corn - soybean rotation). The natural hydrology of these sites are often modified through

ditching and tiling.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- brome (*Bromus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- corn (*Zea*), other herbaceous
- soybean (*Glycine*), other herbaceous

Community 3.1
Cropland

Many of these sites are no longer forested and are utilized as cropland. Hydrological modifications such as ditching and tiling are common.

Dominant plant species

- corn (*Zea*), other herbaceous
- soybean (*Glycine*), other herbaceous

Community 3.2
Pastureland

Some sites are in pasture - generally cool season pasture with forbs. Pasture species and composition will vary depending on management goals and seeding.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- brome (*Bromus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- red clover (*Trifolium pratense*), other herbaceous

Pathway 3.1.A
Community 3.1 to 3.2

Establishment of pastureland. Cool season grasses such as tall fescue are usually grown.

Pathway 3.2.A
Community 3.2 to 3.1

Establishment of row crops would include management activities such as tillage, seeding, and weed control. Hydrology modifications may be utilized including ditching and tiling.

Transition T1A
State 1 to 2

The mechanism of this transition is a large scale disturbance of the reference community. Often the transitional disturbance is forest clearing or selective timber harvest that removed the mature, high-value trees with no post-harvest management inputs.

Transition T1B
State 1 to 3

The site is converted to agriculture via clearing, tillage, weed control, seeding, and continual intensive management. Natural hydrology is often modified through ditching and tiling.

Restoration pathway R2A
State 2 to 1

Timber stand improvement activities include long-term management activities including planting of desired tree species , brush control, selective thinning, weed control, etc.

Transition T2A
State 2 to 3

Clearing of trees and shrubs and planting of desired agricultural cropland or pastureland species. Natural hydrology may be modified through installation of ditches and/or tiling.

Restoration pathway T3A
State 3 to 2

A site that is abandoned will transition through various successional communities with numerous tree, shrub and herbaceous species possible depending on seed sources and the severity of disturbance.

Additional community tables

Inventory data references

No field monitoring was conducted as part of this PES development. Future ESD development may result in plant community edits, soil mapunits being added or removed from this grouping, and/or additions or modifications to the narratives, tables, vegetation descriptions and state and transition model.

Other references

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Approval

Greg Schmidt, 9/26/2024

Acknowledgments

PES documents developed for adjacent MLRAs in Indiana and Ohio served as a source of information as these regions often shared similar soil series with MLRA 114A. NRCS county soil surveys where a valuable reference including tree species observed on site by NRCS staff. Soil Survey and NRCS Indiana resource soil scientists contributed field observation, field notes, and extensive soil mapping expertise.

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)	A. Arends, ESI Specialist.
Contact for lead author	
Date	05/12/2025
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:**

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:**